**STATE OF NEW YORK**
**PUBLIC SERVICE COMMISSION**

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| In the Matter of Proceeding<br>on Motion of the Commission in<br>Regard to Gas Planning Procedures | )<br>)<br>) | Case 20-G-0131 |

# NATIONAL GRID SUPPLY AND DEMAND ANALYSIS RELATED TO SERVICE AREAS WITH KNOWN SUPPLY CONSTRAINT VULNERABILITIES

## 1. Introduction

On March 19, 2020, New York State Public Service Commission ("Commission") initiated a proceeding to examine the gas planning processes and procedures of New York's local gas distribution companies ("LDCs").[1] Ordering Clause No. 3 of the March 2020 Order directed the LDCs, including The Brooklyn Union Gas Company d/b/a National Grid NY ("KEDNY"), KeySpan Gas East Corporation d/b/a National Grid ("KEDLI"), and Niagara Mohawk Power Corporation d/b/a National Grid ("Niagara Mohawk") (KEDNY, KEDLI, and Niagara Mohawk are referred to hereinafter collectively as "National Grid" or the "Company"), to file this report presenting a supply and demand analysis focusing on locations in our service territory "known to be vulnerable to supply constraints" within 90 days of the March 2020 Order. The New York LDCs that are required to file this analysis pursuant to the March 2020 Order, including National Grid, 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]

National Grid understands 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

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

[2] Gas Planning Proceeding, Letter from Michelle L. Phillips, Secretary to the Commission (dated June 17, 2020) granting an extension to July 17, 2020 for the report evaluating supply and demand at vulnerable locations. The Secretary also granted a 14-day extension of the filing deadline for a report each LDC will file pursuant to Ordering Clause No. 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 the LDCs to file a report within 120 days that will address standards for reliance on peaking services and moratorium management. Finally, each LDCs 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.

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 National Grid has 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 "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, but our analysis to identify the "vulnerable locations" is performed for ten 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. National Grid Background

National Grid operates three gas LDCs in New York serving areas of New York City, Long Island, and upstate New York. KEDNY's gas distribution system serves customers in Brooklyn, Staten Island, and portions of Queens, all located within New York City. KEDLI's gas distribution system serves Nassau and Suffolk counties on Long Island, as well as the Rockaway Peninsula in Queens. For purposes of this filing, we will refer to KEDNY and KEDLI's service territories as "Downstate NY." Niagara Mohawk's gas distribution system comprises large areas of central (*e.g.*,Syracuse, Utica), northern (*e.g.*. Watertown), and eastern (*e.g.*, Albany) New York. For purposes of this filing, we will refer to the Niagara Mohawk service territory as "Upstate NY."

[4] The collaborating LDCs are Consolidated Edison Company of New York, Inc. ("Con Edison"); KEDNY, KEDLI, Orange and Rockland Utilities, Inc.; Central Hudson Gas & Electric Corporation; Niagara Mohawk; New York State Electric & Gas Corporation; Rochester Gas and Electric Corporation; and National Fuel Gas Distribution Corporation.

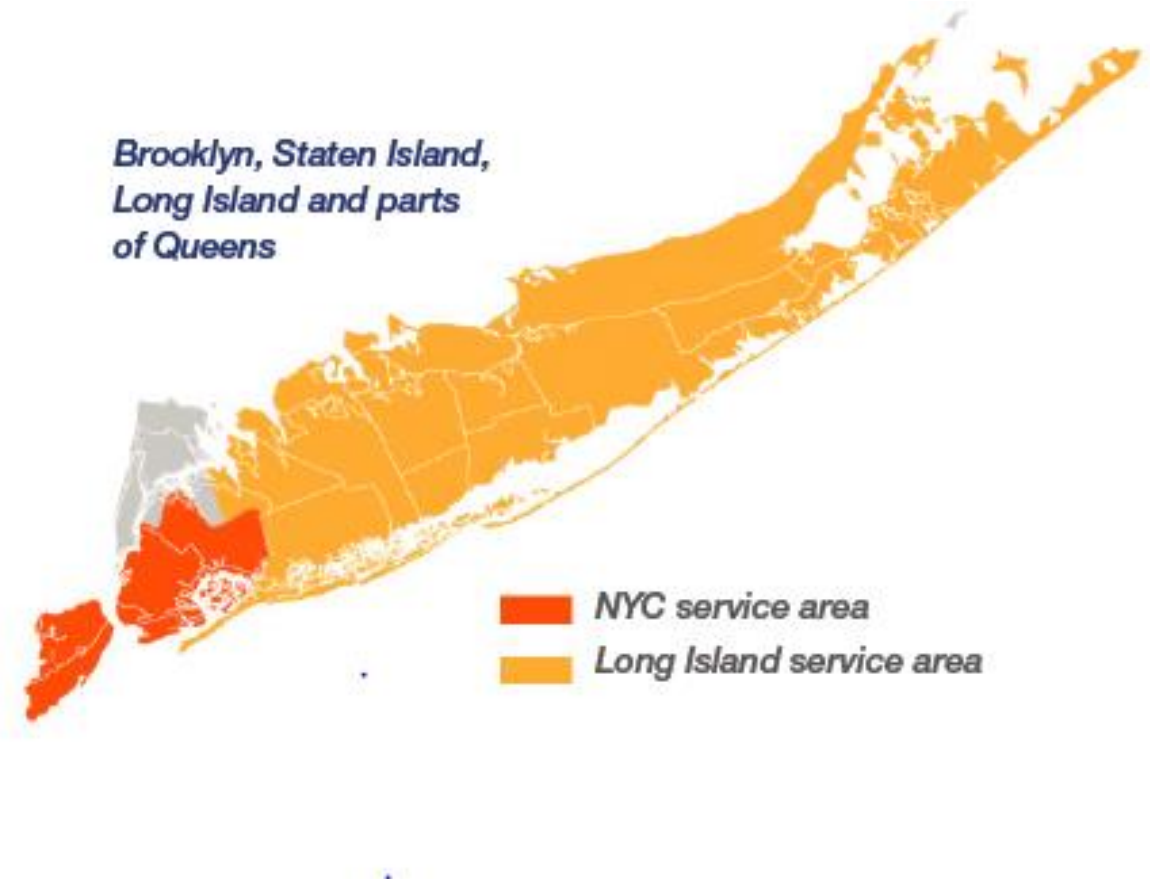
[5] In this context, supply/demand imbalance includes imbalances due to supply limitations, upstream pipeline delivery limitations, distribution infrastructure limitations, and/or any other limitations that result in an inability to serve expected demand.

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

### A. Downstate New York

For more than 100 years, National Grid and its predecessors have provided natural gas service to customers in Downstate NY. Today, we provide natural gas service to more than 1.9 million customers – 1.3 million throughout Brooklyn, parts of Queens, and Staten Island, and 0.6 million across Long Island. Figure 1 is a map of our KEDNY and KEDLI service territories.

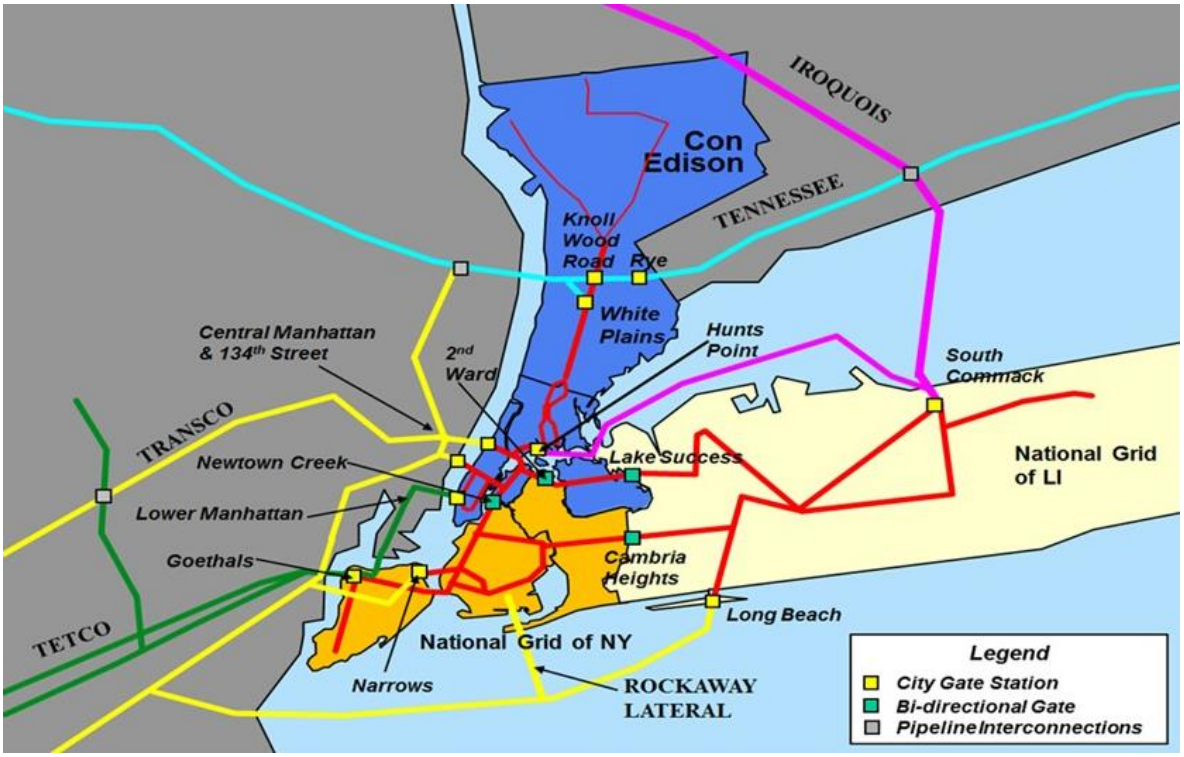
**Figure 1: KEDNY and KEDLI Service Territory**




KEDNY and KEDLI have a unique arrangement with Con Edison concerning the ownership and operation of the high-pressure gas transmission system serving the three downstate New York distribution companies, known as the New York Facilities System ("NYFS"). Under the terms of the NYFS agreement, the downstate LDCs contract for the transportation and receipt of gas from various interstate pipelines that interconnect with the NYFS, including Transcontinental Gas Pipeline Company LLC ("Transco"), Texas Eastern Transmission LP ("Texas Eastern"), Iroquois Gas Transmission System LP ("Iroquois"), and Tennessee Gas Pipeline Company, LLC ("Tennessee"). KEDNY and KEDLI contract for service from each of these pipelines as well as various other upstream pipelines and storage service providers. The NYFS companies exchange gas across their systems and take delivery of gas on each other's behalf to maximize the benefits of the supply diversity available to us and minimize the capital asset base that is needed to move gas to their combined customer bases. Up to ten gate stations from four pipelines contribute some

portion of the gas delivered on any given day. Figure 2 below is a map of National Grid's Downstate NY third-party gas transmission network.

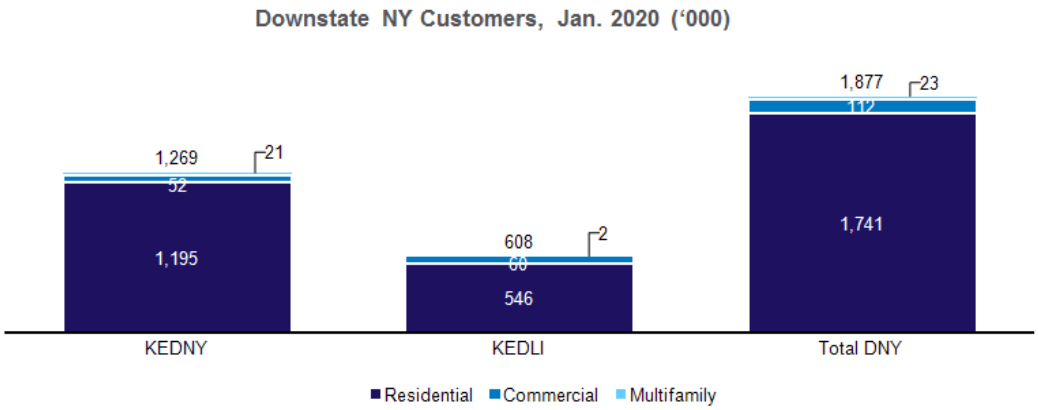
**Figure 2: National Grid Downstate NY Transmission Network**




KEDNY and KEDLI serve customers across the residential, multi-family, and commercial and industrial ("C&I") sectors. Figure 3 below shows the breakdown of KEDNY and KEDLI's customer base by sector. These sectors are defined as follows:

- *Residential Customers* – customers in individually metered dwellings that use gas primarily for cooking, clothes drying, space and water heating.
- *Multi-Family Customers* – companies or individuals managing multi-unit residential buildings that are centrally metered.
- *C&I Customers* – gas service used for business purposes (*e.g.*, office buildings, restaurants, manufacturing facilities).

**Figure 3: Downstate NY Customer Base as of January 2020**

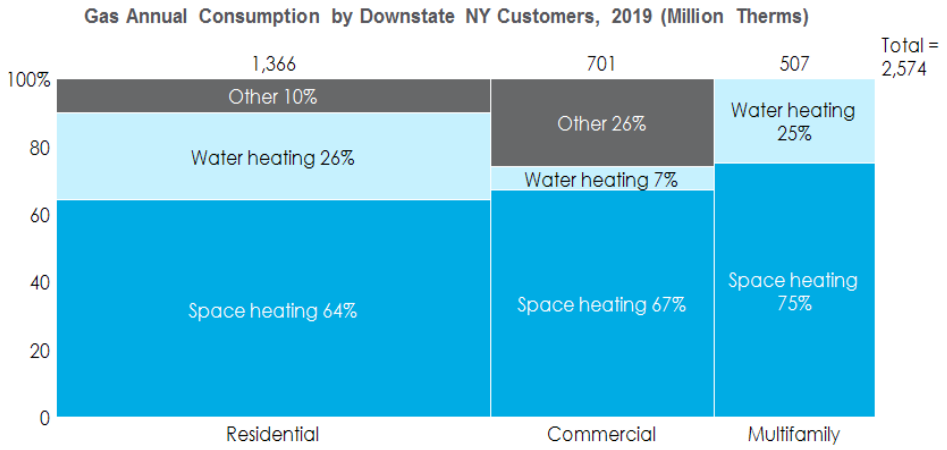



Our customers use gas for a wide range of purposes, including:

- *Space heating* – using natural gas to heat air or water that is subsequently circulated throughout the building to maintain desired indoor temperature. Space heating accounts for the majority of gas consumption, particularly during cold peak days.
- *Water heating* – using natural gas to heat water for household needs (*e.g.*, washing dishes, taking a shower).
- *Cooking* – using natural gas for cooking utilizing gas stoves and ovens in homes or in business facilities (*e.g.*, restaurants).
- *Industrial processes* – using natural gas for production of goods and services (*e.g.*, fuel for industrial furnaces).
- *Other/miscellaneous* – using gas in appliances (*e.g.*, gas fireplaces, gas cloth dryers).

Figures 4 shows consumption by customer and usage type on an annual basis.

**Figure 4: Downstate NY Natural Gas Annual Consumption by Customer and Usage Type**



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To serve customers, KEDNY and KEDLI rely on a resource portfolio comprised of pipeline transportation contracts, underground storage contracts, local natural gas production, renewable natural gas ("RNG"), and peaking supplies, including city-gate delivered peaking supplies, liquefied natural gas ("LNG"), and truck-delivered compressed natural gas ("CNG").

*Pipelines Transportation*: KEDNY and KEDLI have capacity entitlements on multiple upstream pipelines that allow for the delivery of gas to their distributions systems in New York. These contracts provide access to production fields as well as liquid trading points that afford KEDNY and KEDLI a level of operational flexibility to ensure the reliable and least-cost delivery of gas supplies. KEDNY and KEDLI source gas supply from various receipt points associated with the upstream pipelines in the supply portfolio. These points include:

- Dawn, Ontario
- Transco (zone 1, zone 2, zone 3, zone 4, zone 6 NY, zone 6 non-NY, zone 6 non-NY North and Leidy Line)
- Dominion (North Point and South Point)
- Texas Eastern (Market Area 2 and 3)
- Iroquois (zone 2 and Waddington)
- Tennessee (zone 4-300 Leg and zone 5-White Plains)
- Millennium (East receipts)
- Leidy Hub

KEDNY and KEDLI have spent the last decade planning and implementing major improvements to their supply infrastructure to meet increasing demand. Because interstate natural gas projects have long lead times, KEDNY and KEDLI typically plan their access to new or upgraded pipelines five to ten years in advance of the anticipated need date for incremental supplies. These expansion efforts have led to the development, construction, and operation of the following upstream transportation projects since 2007:

**Table 1: Downstate NY Pipeline Projects**

| Pipeline | Project | Quantity (Dth/day) | In-Service Date |
|---|---|---|---|
| Transco | Leidy-to-Long Beach | 100,000 | 2007 |
| IGTS | Empire/Millennium | 200,000 | 2008 |
| Transco | Rockaway Lateral | 647,000* | 2015 |
| Transco | Northeast Connector | 100,000 | 2015 |
| Transco | New York Bay Expansion | 115,000 | 2017 |

* The Rockaway Lateral capacity initially allowed for the contingent redirect of all existing flow normally delivered to Long Beach. Actual incremental supply of 165,000 Dt/day was provided by the Northeast Connector and a portion of the New York Bay Expansion.

*Underground Storage:* KEDNY and KEDLI have contracts with several underground storage facilities that allow them to serve peak-period requirements and meet short-term fluctuations in demand with off-peak-priced gas supply. KEDNY and KEDLI maintain a total of 62 billion cubic feet ("BCF") of underground storage capacity with a total maximum daily withdrawal

quantity of 854,084 dekatherms ("dth") per day and a total maximum daily injection quantity of 357,155 dth/day. [7]

*Indigenous and Renewable Natural Gas:* Currently, KEDNY and KEDLI have one source of local natural gas production with Fresh Kills Landfill, located in Staten Island, and owned by the City of New York. The supply agreement with the landfill provides for up to 6,500 dth/day but there is no contractual minimum daily quantity. Landfill supply is directly fed into the KEDNY distribution system. On June 30, 2020, KEDNY received notification from the City of New York that it intends to cease operation of the natural gas reclamation and processing facility on Staten Island as of December 31, 2020 and that it will no longer sell or deliver gas to National Grid after that date. KEDNY and KEDLI expect a new bio-gas facility at Newtown Creek to be placed into service by the third quarter of 2020. The new facility is expected to produce approximately 275,000 dth/year (750 dth/day) of RNG.

*Peaking Supplies:* KEDNY and KEDLI contract for peaking supplies that are delivered on the upstream pipelines from third-parties. KEDNY and KEDLI also maintain two on-system LNG facilities (Greenpoint and Holtsville) that collectively provide 2.27 BCF of storage capacity with a total maximum daily withdrawal quantity of 394,500 dth/day. Lastly, and more recently, KEDNY and KEDLI have incorporated CNG injection facilities supplied by trucks into the peaking supply portfolio. For the winter of 2019/20, KEDNY and KEDLI operated two CNG facilities, one in Glenwood, NY and one in Riverhead, NY on Long Island. By winter 2020-2021, KEDNY and KEDLI plan to complete construction of three additional/upgraded CNG facilities (expansion of the existing site at Glenwood and two new sites on Long Island).

National Grid has seen significant growth in peak demand in the Downstate NY service areas due to economic development, as well as a concerted effort to move large commercial and industrial customers from heating oil to cleaner natural gas. On average, KEDNY and KEDLI's combined peak day demand has grown by approximately 30,000-60,000 dth per year, even after accounting for the cumulative effect of past and future energy efficiency, demand response, and interruptible service programs to reduce load on peak days. This growth had occurred with support from the regulators and municipalities of the various programs and incentives designed to promote the use of natural gas to displace more expensive, dirtier fuels. In response to growing demand, National Grid has advanced several innovative initiatives to further increase energy efficiency and achieve peak demand reductions. These projects have enabled increased supply diversity, provided pressure support throughout the system, improved outage contingency, and enhanced operational flexibility. National Grid has also invested heavily in energy efficiency to mitigate increased demand. In addition to their mature programs for interruptible gas service (allowing service to be curtailed to certain commercial and industrial customers under conditions of heightened demand) and for "temperature controlled" customers who can be switched from gas back to alternate heating sources on cold days, National Grid was an industry pioneer in expanding demand response programs to small and medium business customers.

[7] KEDNY and KEDLI also have approximately 20 BCF of Gulf Coast storage capacity.

As discussed in the March 2020 Order, in May 2019, following the denial for the second time of necessary water permits for a pipeline project that would have served National Grid's downstate New York service territory, KEDNY and KEDLI announced that they would no longer process applications for new or expanded firm natural gas service for residential, multi-family, commercial, and industrial customers in their service territory. In November 2019, KEDNY, KEDLI, and the Department of Public Service Staff entered into a Settlement Agreement[8] that resolved the restrictions on service connections implemented in 2019 by deploying interim supply mechanisms and increasing demand response and energy efficiency. The Settlement Agreement also provides a framework for evaluating the long-term energy supply issues, including a process whereby National Grid agreed to develop options to meet New York's long-term supply needs and facilitate a series of public meetings on those options with customers, residents, advocates, business leaders, local elected officials, and other stakeholders through a series of public meetings.[9]

*Downstate New York Long Term Capacity Reports*

Pursuant to the Settlement Agreement, KEDNY and KEDLI prepared the *Natural Gas Long-Term Capacity Report for Brooklyn, Queens, Staten Island and Long Island* (the "Long-Term Report") that provided an analysis of the gas capacity constraints affecting National Grid's Downstate New York service territory and discussed the reasonably available options for meeting long-term customer demand. Following a series of six public meetings, National Grid published on May 8, 2020 its *Natural Gas Long-Term Capacity Supplemental Report for Brooklyn, Queens, Staten Island and Long Island* (the "Supplemental Report").[10] The Supplemental Report summarized the feedback received during the public comment period and provided additional information and analysis on the various long-term natural gas supply options. The Long-Term Report and Supplemental Report address many of the same issues raised in the Gas Planning Proceeding and, therefore, will be referenced throughout this filing.

### B. Upstate New York

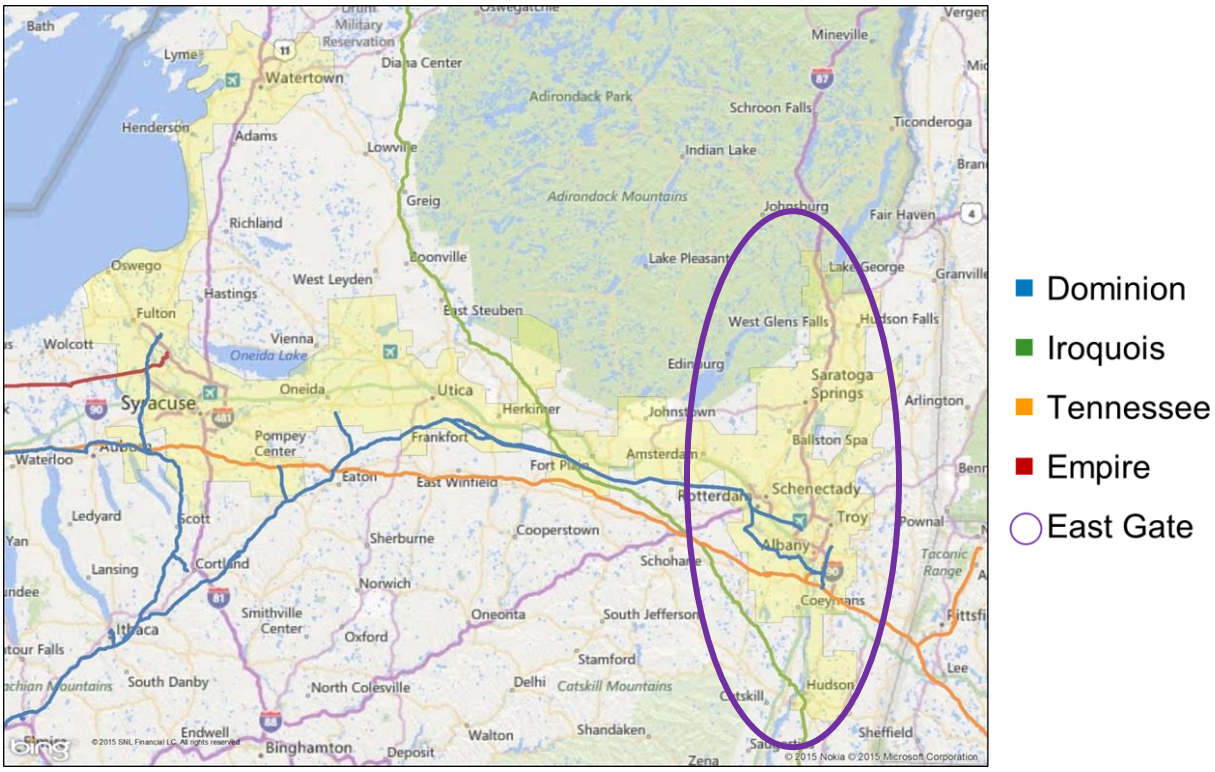
Niagara Mohawk's gas distribution business serves nearly 628,000 customers in the areas of central, northern, and eastern upstate New York utilizing more than 9,000 miles of gas transmission and distribution main. Figure 5 is a map of Niagara Mohawk's service territory and the interstate pipelines that serve the distribution system.

[8] Settlement Agreement, dated November 24, 2019, between National Grid and Staff and approved by the Commission in Case 19-G-0678 - Proceeding on Motion of the Commission to Investigate Denials of Service Requests by National Grid USA, The Brooklyn Union Gas Company d/b/a National Grid NY and KeySpan Gas East Corporation d/b/a National Grid, "Order Adopting and Approving Settlement," (Issued November 26, 2019).

[9] National Grid conducted six meetings that were attended by hundreds of members of the public and enabled extensive comments from individuals and organizations representing a wide array of stakeholder interests. The first meeting was held in-person on March 9th in Nassau County, and the other five meetings were transitioned to a virtual format due to the necessity for public distancing.

[10] Both reports are available at https://ngridlongtermsolutions.com/

**Figure 5: Map of Niagara Mohawk Natural Gas Service Territory and Pipelines**



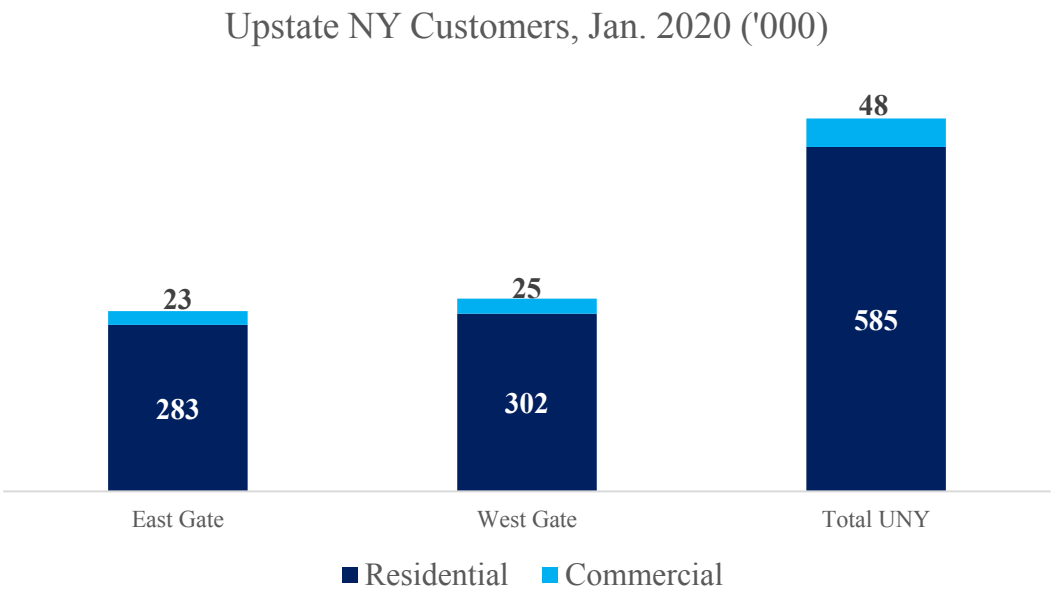

Niagara Mohawk's service area is depicted in the region shaded yellow.

Niagara Mohawk's gas system generally extends from the City of Syracuse north along the Interstate 81 corridor toward Watertown and east along the New York State Thruway toward the City of Albany. Niagara Mohawk has 24 interconnections ("city gates") with the facilities of upstream delivery pipelines. Nineteen of these are with Dominion Energy Transmission, Inc. ("DETI"), two are with Iroquois, and one is with Tennessee. Niagara Mohawk also interconnects with Empire State Pipeline ("Empire") at two locations.

With respect to the DETI city gates, those located in the Town of Amsterdam and west are referred to collectively as the "West Gate," whereas those located east of the Town of Amsterdam are referred to as the "East Gate." Niagara Mohawk has broadened these terms to include its Empire, Iroquois, and TGP city gates. Niagara Mohawk's Empire and Iroquois city gates are in the West Gate region; Niagara Mohawk's TGP city gate is in the East Gate region.

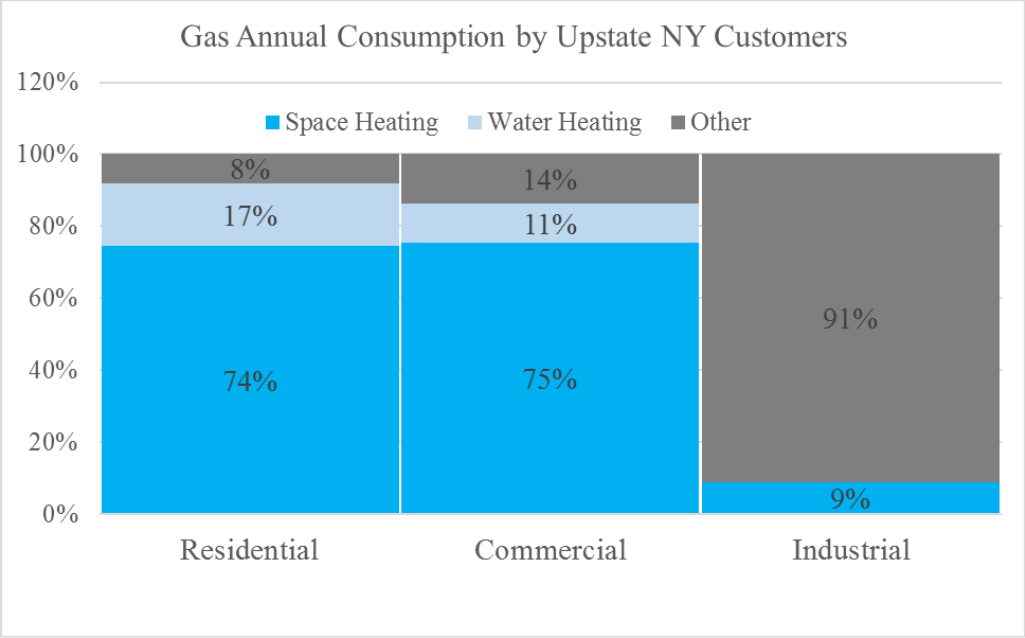
Niagara Mohawk serves its customers almost entirely across the Residential and C&I sectors - as defined above. Figure 6 below shows the breakdown of Niagara Mohawk's customer base by sector.

**Figure 6: Upstate NY Customer Base as of January 2020**




Our Upstate New York customers also use gas for a wide range of purposes, including: space heating, water heating, cooking, industrial processes as well as other miscellaneous appliances (*e.g.*, gas fireplaces, gas cloth dryers). Figures 7 below shows consumption by customer and usage type on an annual basis.

**Figure 7: Upstate NY Natural Gas Annual Consumption by Customer and Usage Type**




Niagara Mohawk relies on a resource portfolio comprised of transportation contracts, underground storage contracts, and peaking supplies, including truck-delivered CNG.

*Pipeline*: Niagara Mohawk has capacity entitlements on multiple upstream pipelines that allow for the delivery of gas to its distributions system in Upstate New York. These contracts provide access to production fields as well as liquid trading points that afford the Company a level of operational flexibility to ensure reliable, least-cost delivery of gas supplies. Niagara Mohawk sources gas supply from various receipt points associated with the upstream pipelines in the supply portfolio. These points include;

- Dawn, Ontario
- Dominion (North Point and South Point)
- Iroquois (Waddington)
- Tennessee (zone 4-313 Pool and zone 6 North)
- Leidy Hub

*Underground Storage:* Niagara Mohawk maintains a storage contract with DETI that allows it to serve peak-period requirements with off-peak-priced gas supply, as well as to meet short-term fluctuations in demand. Niagara Mohawk maintains a total of 23 BCF of underground storage capacity with a total maximum daily withdrawal quantity of 438,078 dth per day and a total maximum daily injection quantity of 127,318 dth/day. Approximately 30 percent of Niagara Mohawk's winter normal supply obligation and 45 percent of design day demand requirements are met by deliveries of gas withdrawn from storage.

*Peaking*: Niagara Mohawk has peak shaving agreements with two of its on-system customers. In January 2020, Niagara Mohawk constructed a CNG injection facility in Moreau, New York to enable the Company to better serve forecast growth in the East Gate area and manage peak hour requirements for all firm customers.

## 3. General Approach for Identifying Vulnerable Locations

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

> 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.[11]

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 (i) customer interest in switching from their current fuel to natural gas; (ii) the prospect of large economic development projects during the forecast period in a particular location; and (iii) 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.

[11] March 2020 Order, p. 5

The Commission noted that, when maintaining adequate pressures during periods of high demand, an LDC's 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 (sustained, multi-day cold snaps), days (coldest days) and hours (peak hour demand on the coldest days). System performance 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 and the system's ability to transport gas from the injection point to the associated demand safely and reliably.

As noted in Section 1, National Grid defines 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. 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.

After collaborating with other LDCs, National Grid applies three high-level assumptions in its vulnerable location analysis:

- A ten-year analysis and reporting 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 (*e.g.*, New York City's Local Law 97) are relevant factors when addressing the future gas system planning process. The Supplemental Report discusses how various available supply and non-infrastructure options could support a pathway to carbon reduction and overall CLCPA achievement, as well as the impacts of Local Law 97 and the Commission's energy efficiency goals. However, given we and other stakeholders are in the early stages of addressing these requirements, the potential for considerable differences between forecast and actual impacts must be recognized; and
- The Company's distribution systems are designed to serve loads without regard to municipality or borough boundaries – therefore, our analysis is organized by city gates and then identify any boroughs, municipalities or neighborhoods that may be affected.

Below, we address each element of the analysis and identify additional assumptions that National Grid has made in performing the analyses.

### A. Demand Forecast

The 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. The consequences of a supply/demand imbalance that leads to an unplanned outage on an extremely cold day can be severe, and restoration efforts require multiple visits to each home and business affected to initially shutoff, and then subsequently relight when gas to the distribution system is restored. 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/deign hour" (*i.e.*, during the peak hours of an extremely cold day for which utilities ensure they can serve demand). 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 resources are planned for and contracted to meet demand behind a particular city gate. However, there are supplies that are "local" including any on-system natural production or storage, LNG facilities, and CNG facilities. Trucked CNG is an option that may be injected close to a locational need, but this resource comes with siting hurdles and delivery risk that must be assessed, particularly if there is no on-site storage.

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 changes in contract volumes that are reasonably anticipated in the future (*e.g.*, contract expirations) are incorporated into the analysis, as are anticipated infrastructure projects that have a strong likelihood of delivery. Because it is difficult to predict whether/when uncontracted volumes or planned projects will be available when needed in future years, it is not prudent to rely on these resources until there is reasonable assurance they will be available to deliver the expected volumes. For example, delivered services (firm contracts that LDCs hold with third parties) are subject to availability risk year-to-year based on market conditions. This risk is amplified with short-term (*e.g.*, single season) contracts where there is less certainty with the LDC's ability to renew/replace the contract volumes, and in the downstate region where pipeline constraints restrict the availability of delivered services. For these reasons, the Commission has expressed concern that "[r]eliance on delivered services for a high percentage of a utility's peak load presents significant risks."[12]

For infrastructure projects, the need to secure various state and local permits required for construction creates a risk that these projects will not be available on schedule. There are also numerous dependencies required to enable non-infrastructure programs like energy efficiency and demand response to support customers' future energy needs, including permitting, market and technology development, and customer adoption. Section 5 (below) identifies potential projects/resources that are being pursued but are not yet at the stage where they can be relied on to meet customer demand.

### C. Transmission and Distribution System Configurations

We use flow modeling to evaluate the delivery of supplies to meet customer demand throughout our transmission and distribution system. Our flow modeling assumes existing operational capabilities and configurations of our system assets, consistent with the approach taken for supply

[12] Gas Planning Order at p. 8.

assets. Again, we only consider new infrastructure or upgrades to existing assets that have a strong likelihood of development. Potential new projects are identified in Section 5.

The Company also considered its experience with interstate pipeline constraints, as well as the impacts of future operational flow orders ("OFOs") issued by the pipelines. The pipelines employ OFOs to maintain the integrity of the interstate pipeline network and generally require that end users, including LDCs, closely align their supplies with demand across several possible geographies and time intervals. The most restrictive OFO would require that an end user match supply and demand at each take station on an hourly basis. As the northeast regional supply/demand balance tightens, the risk for OFOs increases. Therefore, the Company has incorporated these OFO criteria and the associated operational risks in its evaluation of vulnerable areas.

### 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, targeted energy efficiency programs and customer demand response programs, and electrification of building heating systems and other natural gas end-uses. Proposed infrastructure solutions may be compared to a non-pipeline alternative ("NPA") if they meet suitability criteria. Some LDCs may also consider a combination of the potential solutions noted. For Downstate NY, National Grid's Long-Term Report and Supplemental Report discuss various options to address the supply gap, including a package of infrastructure enhancements, distributed solutions (*e.g.*, CNG and LNG) and non-infrastructure (*e.g.*, energy efficiency, demand response, and electrification) solutions to address long-term demand.

## 4. Utility-Specific Methodology

### A. Coordination

National Grid's gas demand forecasting process, which is led by the Advanced Data Analytics ("ADA") team, is a coordinated effort that solicits input from and provides outputs to various internal stakeholders, including: Energy Procurement, Gas Engineering, Gas Control, Customer Ops (*e.g.*, energy efficiency and demand response product strategy teams and Customer Sales & Solutions), and Regulatory (including the gas "utility of the future" team). National Grid is continuously making enhancements to its forecasting and planning process, building on the experience with its Long-Term Report and consistent with recommendations made by the Downstate New York external monitor appointed pursuant to the Settlement Agreement. These enhancements include governance of the gas demand forecasting and planning process, including review and approval of the gas demand forecast by senior company leadership. Once developed, the gas demand forecasts are used internally by National Grid's Energy Procurement, Gas Engineering, and Customer Ops groups to ensure that National Grid's portfolio of gas supply, its distribution network infrastructure, and increasingly its demand-side programs (such as gas demand response) can meet customer requirements each winter, including design day and design hour conditions.

## B. Demand Forecast

### i. Demand Forecast Methodology

Each spring, National Grid conducts its annual process to model and forecast the natural gas requirements for KEDNY, KEDLI, and Niagara Mohawk, which includes a historic lookback to incorporate actual data from the preceding winter as compared against previous forecasts.

National Grid uses the forecasts to anticipate the needs of its distribution systems each winter so that National Grid can take necessary steps to ensure that it can meet projected gas supply and system engineering needs for design day conditions.

National Grid prepares the following for each distribution company as part of its annual gas load forecast:

- Retail forecast: forecast customer usage at the burner tip.
- Wholesale forecasts: the amount of incoming gas needed to satisfy the retail forecast, as measured at the companies' city gate stations—this forecast is adjusted upwards from the retail forecast to account for loss within the system, such as unmetered usage, line losses, and metering errors.
- Design Day forecast: The wholesale requirements for the design day. This is used to ensure that the Company has the resources to meet customer demand on the coldest days.

The following describes the high-level process of building the gas demand forecast:

1. Unadjusted Baseline forecast: This is a macro-economic forecast that uses regression analysis to determine the statistical relationship between historical customer usage patterns and economic variables such as GDP, population, housing, income, employment, and oil and gas prices. This assumes current energy efficiency programs and electrification-of-heat continue at similar rates. The projected economic variables include the forecasted impact of the pandemic on the economy.
2. Factor in increases in energy efficiency: In this step the forecast is modified to account for projected acceleration (or deceleration) in the rate of energy efficiency relative to historic energy efficiency achievement rates. The forecasts for KEDNY, KEDLI, and Niagara Mohawk all assume that the Commission's New Efficiency: New York ("NENY") targets are fully achieved through 2025 and then continues through 2030. This energy efficiency contributes to Local Law 97 and CLCPA compliance.
3. Factor in increases in electrification-of-heat: Increasing penetration of heat pumps as a substitute for natural gas fired heat is accounted for by reducing the projected number of customers in the Unadjusted Baseline forecast. The increases in electrification-of-heat are primarily driven by NENY heat-pump targets. In addition, the Company assumes the rate of organic adoption will start to increase over the forecast horizon. The forecast incorporates increased heat pump penetration in New York City in furtherance of Local Law 97 compliance.

4. Factor in customer demand response: The design day forecast is adjusted to reflect demand response by firm customers in KEDNY and KEDLI. No adjustment is made for Niagara Mohawk since there are currently no established demand response programs for firm customers. Demand response from interruptible and temperature-controlled customers is accounted for in the unadjusted baseline forecast.
5. Adjusted Baseline: The final Adjusted Baseline forecast is the Unadjusted Baseline with energy efficiency, electrification-of-heat and demand response factored in. The Adjusted Baseline is the forecast that is used for planning purposes.

**ii. Analysis Level**

Annually, National Grid prepares its econometric forecasts for KEDNY and KEDLI separately in Downstate NY. It also prepares separate forecasts for Niagara Mohawk in Upstate NY for its West and East Gates. National Grid uses its historical retail billing system data as well as historical and forecasted economic and price data from Moody's Analytics and the U.S. Department of Energy ("DOE"), Energy Information Administration ("EIA") and historical weather data to develop models of meter counts and of use-per-customer for various groupings of its customers: residential non-heating, residential heating, commercial, industrial, multi-family, temperature-controlled customers, and others. Historical daily sendout data is also used for the wholesale forecast.

**iii. Historical data period**

For its June 2020 forecasts, National Grid based its forecasts on historical data from April 2007 through February 2020.

**iv. Economic Outlook Assumptions**

For the Unadjusted Baseline econometric regression analysis, National Grid uses monthly historic and forecasted division-specific economic and gas and oil price data from Moody's (publication date April 2020) and the DOE/EIA.

To quantify the impact of COVID-19 on the gas load forecast, National Grid calculated the unadjusted baseline econometric forecast using Moody's baseline economic forecast immediately before Moody's included the COVID-19 impact in the baseline forecast (publication date: March 2020). By comparing the forecast outcome using the pre-pandemic and pandemic economic forecasts, National Grid can estimate the impact of COVID-19 on gas demand.

There is still much uncertainty around the economic outlook because of the unknown course of the virus, how long the lockdowns will continue and when there will be a vaccine or effective treatment. Moody's forecast assumes a significant reduction in COVID-19 infections by July; some ICU bed and ventilator shortages but not widespread; a widely available test to determine if individuals have developed anti-bodies by mid-summer 2020; and a vaccine by mid-summer 2021. It assumes 40 percent of businesses are locked down in May 2020 and 20 percent from June 2020 until a vaccine is found in mid-2021. Many businesses are reopened by 2020 Q3, but travel, trade and business expansion will continue to be hindered by fears that the virus will flare up again, through 2021. The economy does not return to full employment or normalcy until 2023.

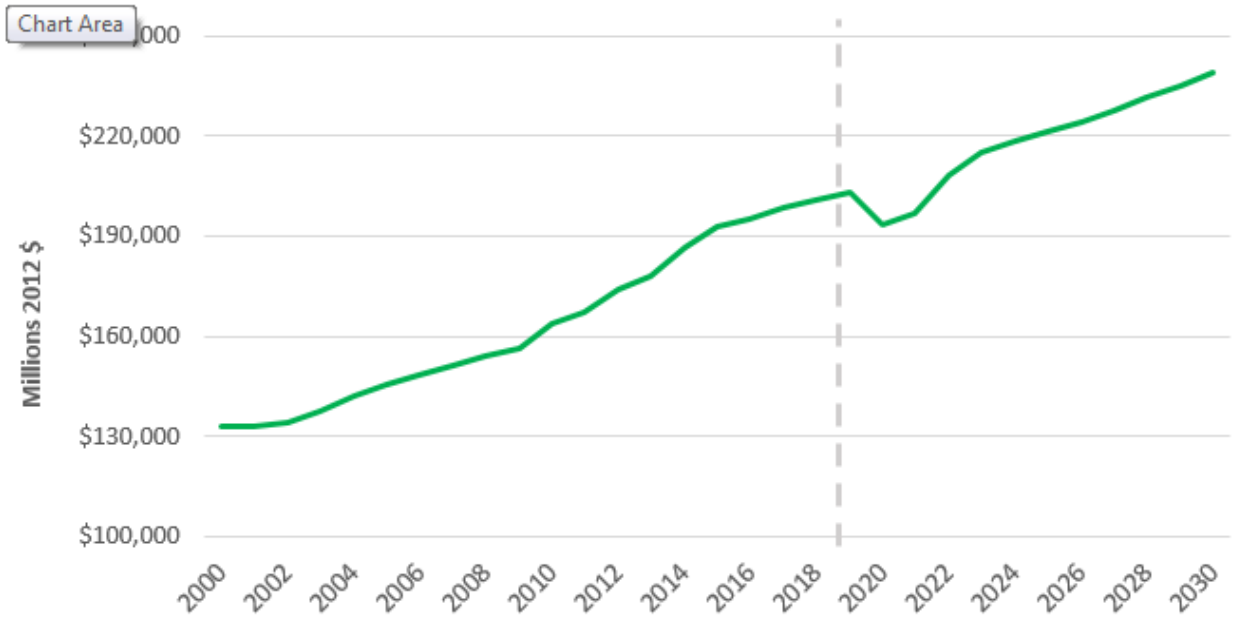
Below are summaries of Moody's economic outlook used in the econometric analysis for KEDNY, KEDLI, and Niagara Mohawk.

*a. KEDNY Economic Outlook*

The base case economic outlook calls for a severe, COVID-19-driven recession in KEDNY's downstate New York service territory in 2020. Lockdowns that began in March have caused an estimated 5.5 percent drop in first quarter gross domestic product (GDP) and the forecast anticipates another 20 percent drop in the second quarter as the lockdowns are expected to continue through May. The forecast assumes some businesses will be allowed to re-open beginning June 1. This causes third and fourth quarter GDP to rise sharply from its second quarter lows, but only about half the loss is recovered by the end of the year. Without a vaccine or effective medical treatment, travel, tourism, hospitality and other important industries will remain severely curtailed, preventing a full economic rebound. The forecast assumes a vaccine by summer 2021. This allows the economy in KEDNY's service territory to fully reopen and recover. However, the economy does not return to full employment until 2023.

Overall, GDP falls 4.8 percent in 2020 (Figure 8). GDP has averaged growth of 2.3 percent per year since 2000 and did not fall during the Great Recession of 2008/09, in which the US experienced a 2.5 percent drop in GDP. Following the COVID-19 drop in 2020, GDP is projected to grow 2.0 percent in 2021, 5.6 percent in 2022 and 3.3 percent in 2023 before settling in at an average annual growth rate of 1.5 percent from 2023-2030.

**Figure 8: KEDNY GDP Forecast**




Moody's Analytics, April 2020 forecast scenarios for Kings, Queens and Richmond counties, New York.

After finishing 2019 with an unemployment rate of just 4.0 percent, the unemployment rate rises sharply in the second quarter of 2020 as workers are furloughed and laid off because of the

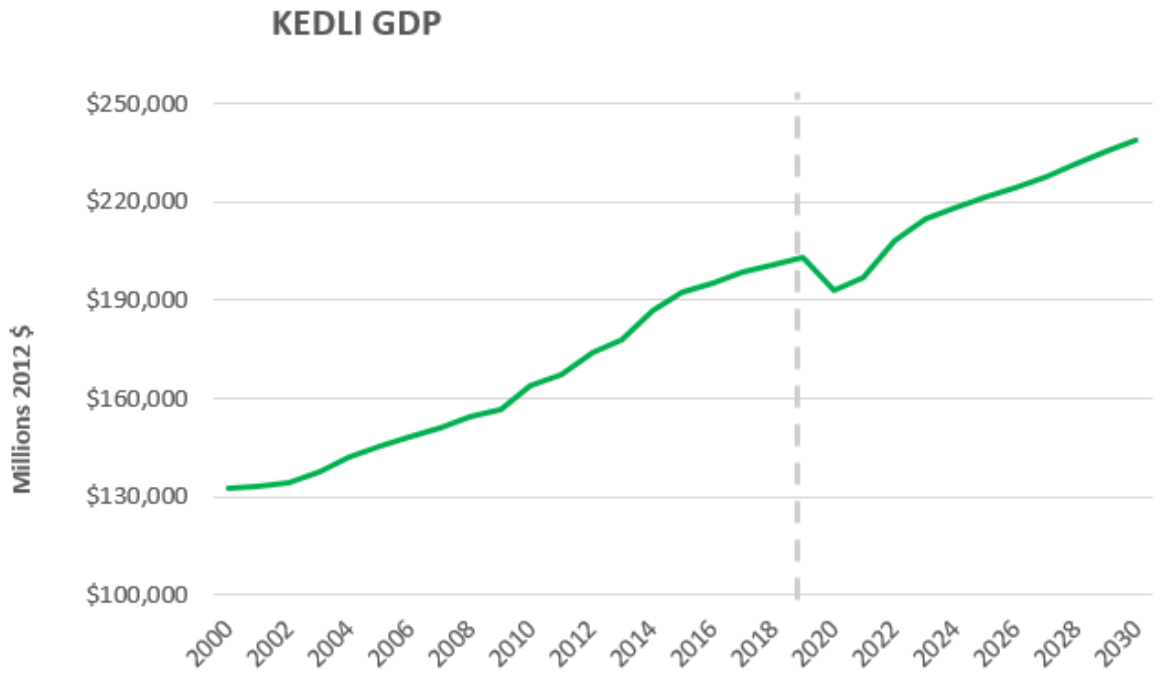
lockdowns. The unemployment rate comes down in the second half of the year as some workers are called back but it averages 8.5 percent in 2020 and rises to 9.1 percent in 2021. This is more than double the rate enjoyed before COVID-19. Employment does not begin rising again until 2022 and the economy does not get back to full employment until 2023.

*b. KEDLI Economic Outlook*

The base case economic outlook similarly calls for a severe, COVID-19-driven recession in 2020. Lockdowns that began in March have caused an estimated 4.2 percent drop in first quarter GDP in the service territory. The forecast anticipates another 20 percent drop in the second quarter as the lockdowns are expected to continue through May. The forecast assumes some businesses will be allowed to re-open beginning June 1. This causes third and fourth quarter GDP to rise sharply from its second quarter lows, but only about half the loss is recovered by the end of the year. Without a vaccine or effective medical treatment, travel, tourism, hospitality and other important industries will remain severely curtailed, preventing a full economic rebound. The forecast assumes a vaccine by summer 2021. This allows the economy in KEDLI's service territory to fully reopen and recover; however, the economy does not return to full employment until 2023.

Overall, GDP in KEDLI's service territory falls 3.7 percent in 2020 (Figure 9). GDP growth has averaged 1.2 percent per year since 2000 and fell only 0.9 percent during the Great Recession of 2008/09, in which the US experienced a 2.5 percent drop in GDP. Following the COVID-19 drop in 2020, GDP is projected to grow 2.0 percent in 2021, 5.2 percent in 2022 and 3.2 percent in 2023 before settling in at an average annual growth rate of 1.3 percent from 2023-2030.

**Figure 9: KEDLI GDP Forecast**




Moody's Analytics, April 2020 forecast scenarios for Nassau and Suffolk Counties, New York

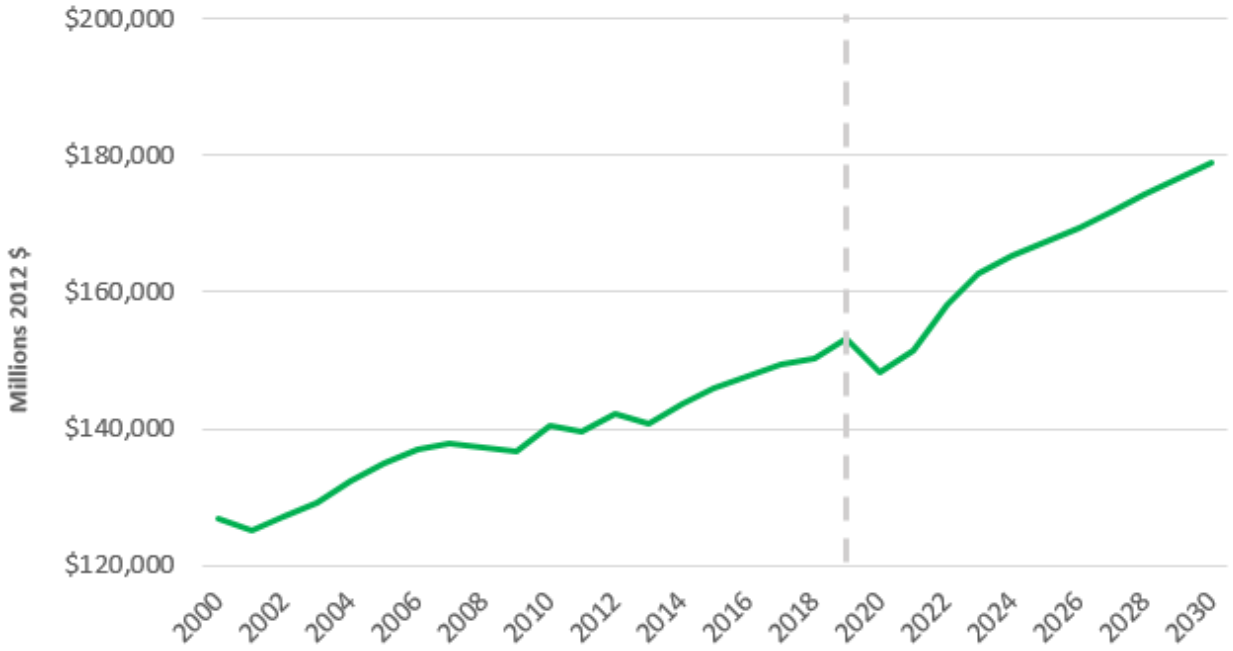
After finishing 2019 with an unemployment rate of just 3.5 percent, the KEDLI service territory unemployment rate rises sharply in the second quarter of 2020 as workers are furloughed and laid off because of the lockdowns. The unemployment rate comes down in the second half of the year as some workers are called back but it averages 6.6 percent for the year and rises to 7.0 percent in 2021. This is double the rate that KEDLI's service area enjoyed before COVID-19. Employment does not begin rising again until 2022 and the economy does not get back to full employment until 2023.

*c. Niagara Mohawk Economic Outlook*

The base case economic outlook is for a severe COVID-19 recession in 2020. Lockdowns that began in March have caused an estimated five percent drop in first quarter Niagara Mohawk GDP and the forecast anticipates another 20 percent drop in the second quarter as lockdowns are expected to continue through May. The forecast assumes some businesses will be allowed to re-open beginning June 1. This causes third and fourth quarter GDP to rise sharply from its second quarter lows, but only about half the loss is recovered by the end of the year. Without a vaccine or effective medical treatment, travel, tourism, hospitality and other important industries will remain severely curtailed, preventing a full economic rebound. The forecast assumes a vaccine by summer 2021. This would allow the economy in Niagara Mohawk's territory to fully reopen and recover; however, the service area does not return to full employment until 2023.

Overall, Niagara Mohawk's service area GDP falls 3.2 percent in 2020 (Figure 10). The GDP has consistently grown about 1.0 percent per year since 2000 and fell only 0.8 percent during the Great Recession of 2008/09, during which the US experienced a 2.5 percent drop in GDP. Following the COVID-19 drop in 2020, GDP in the service area is projected to grow 2.2 percent in 2021, 4.4 percent in 2022 and 2.9 percent in 2023 before settling in at an average annual growth rate of 1.4 percent from 2023-2030.

**Figure 10: Niagara Mohawk GDP Forecast.**




The base economic forecast predicts that the Niagara Mohawk unemployment rate will rise sharply in the second quarter of 2020 as workers are furloughed and laid off during the lockdowns. The unemployment rate comes down in the second half of the year as some workers are called back but it remains at 8.5 percent for the year. As total Niagara Mohawk employment continues to fall through 2021, the unemployment rate rises to 9.3 percent, more than double the rate of 4.3 percent that Niagara Mohawk enjoyed immediately before COVID-19. Employment does not begin rising again until 2022 and the Niagara Mohawk unemployment rate does not fall below six percent until 2023.

### v. Design Criteria

National Grid models the gas needs for its regional and local distribution systems to ensure that it is capable of meeting the needs of all of its customers for firm gas service (*i.e.*, those to whom National Grid has committed to provide gas upon demand and without interruption) on the Design Day: a day on which gas demands are projected to be elevated due to unusually cold, but foreseeable, winter temperatures. The Design Day conditions for which each gas distribution system is modeled vary with the expected climate in the area. National Grid models the Downstate New York gas supply and distribution requirements based upon a Design Day average temperature of 0° Fahrenheit in Central Park (65 Heating Degree Days); National Grid models the Upstate New York gas supply and distribution requirements based upon a Design Day average temperature of minus 10° Fahrenheit (75 Heating Degree Days). Both Design Day criteria are based on weather actually observed in the Downstate and the Upstate NY service territories.

National Grid also models the "Design Hour," the peak hour on the Design Day The Design Hour requirement is estimated to be five percent of the Design Day requirement, which accounts for the behavior of most customers who do not consume gas evenly throughout the day.

Design Day and Design Hour modeling ensures National Grid's distribution system is capable of maintaining sufficient pressure to deliver gas without interruption when demand is highest—usually, a few hours during the early morning (when residential customers generally turn up the thermostat and use gas for hot water/cooking), and again in the evening, on days that meet the Design Day criteria. By modeling the Design Hour, the Company is ensuring that there is sufficient deliverability capacity to and from its city gate stations during the hour of the day when maximum gas is consumed as customers turn up their thermostats, cook, and use gas for hot water heating. If customers used the same volume of gas each hour, it would be sufficient to look at the daily demand and divide by 24 to ensure the system could provide that amount of gas each hour. The reality is that customers tend to use more gas in the early morning hours, typically 6 am to 10 am, and again in the evening from 4 pm to 8 pm.

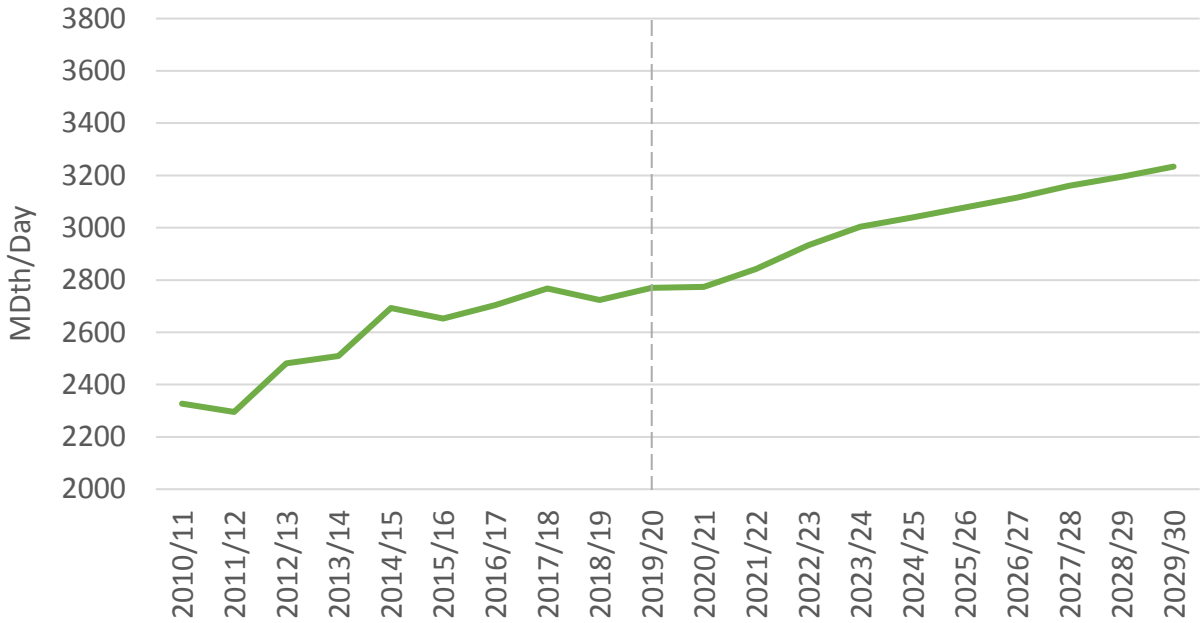
Annually, the Company prepares comprehensive forecasts for the next ten years. Its retail (burnertip) forecasts provide its projections of monthly volumes under normal weather conditions. Its wholesale (citygate) forecasts provide its projections of daily volumes under both normal and design weather conditions. Each annual forecast includes in its historical data the most recent heating season's usage and, hence, the most recent observations of the usage patterns of natural gas by its customers.

### vi. Demand Forecast Summary

#### a. *Downstate NY*

Over the next 10 years, Downstate NY gas demand is expected to grow at approximately 1.6 percent per annum, from 2,769 MDth/day in 2020 to 3,233 MDth/day in the winter of 2029/30. This is substantially slower than the 2.1 percent per annum growth observed over the last 10 years (see Figure 11),

**Figure 11: KEDNY and KEDLI Design Day forecast and historical data.**




The slower growth rate over the next ten years is driven by the impact of the pandemic on the economy, the newly created DR program, and the acceleration of EE and electrification-of-heat. The pandemic impact was estimated by calculating the unadjusted baseline (*i.e.*, without accounting for additional EE, electrification, and DR) using Moody's March economic forecast (before the pandemic was part of Moody's baseline forecast) and comparing it to the Unadjusted Baseline with the Moody's April economic forecast (when the pandemic was a part of Moody's baseline economic forecast). This resulted in an estimated 2.7 percent decline in the forecast for the winter of 2020/21 due to the pandemic (compared to what it would have been had the pandemic not occurred) and a one percent decline in 2030, as shown in Figure 12.

**Figure 12: KEDNY and KEDLI unadjusted Design Day forecast and historical data pre- and post- pandemic.**

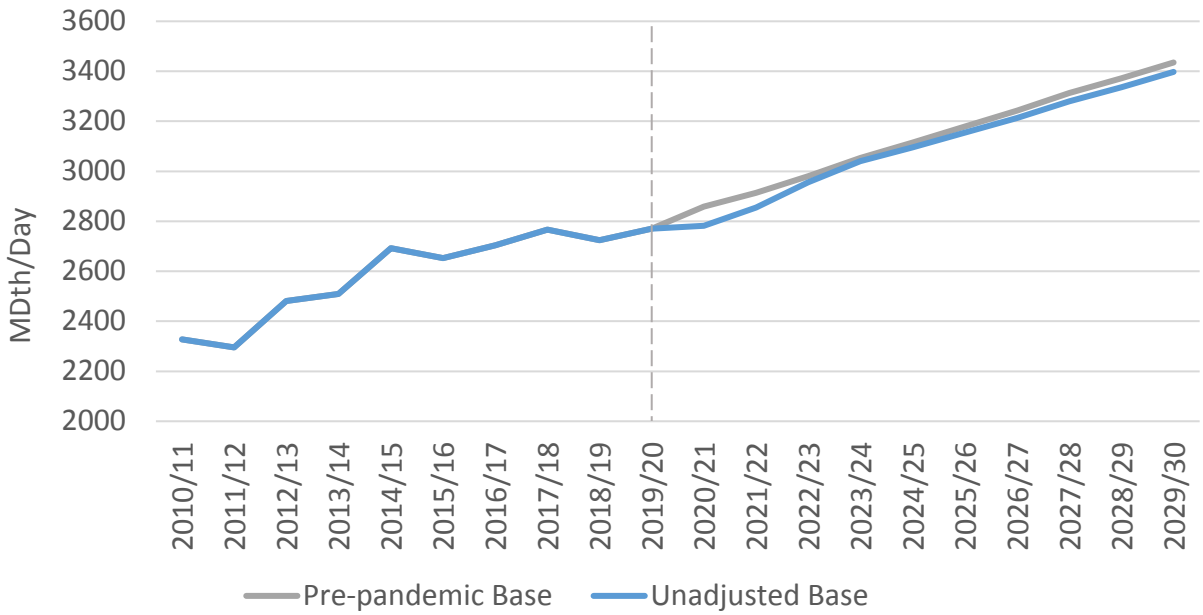
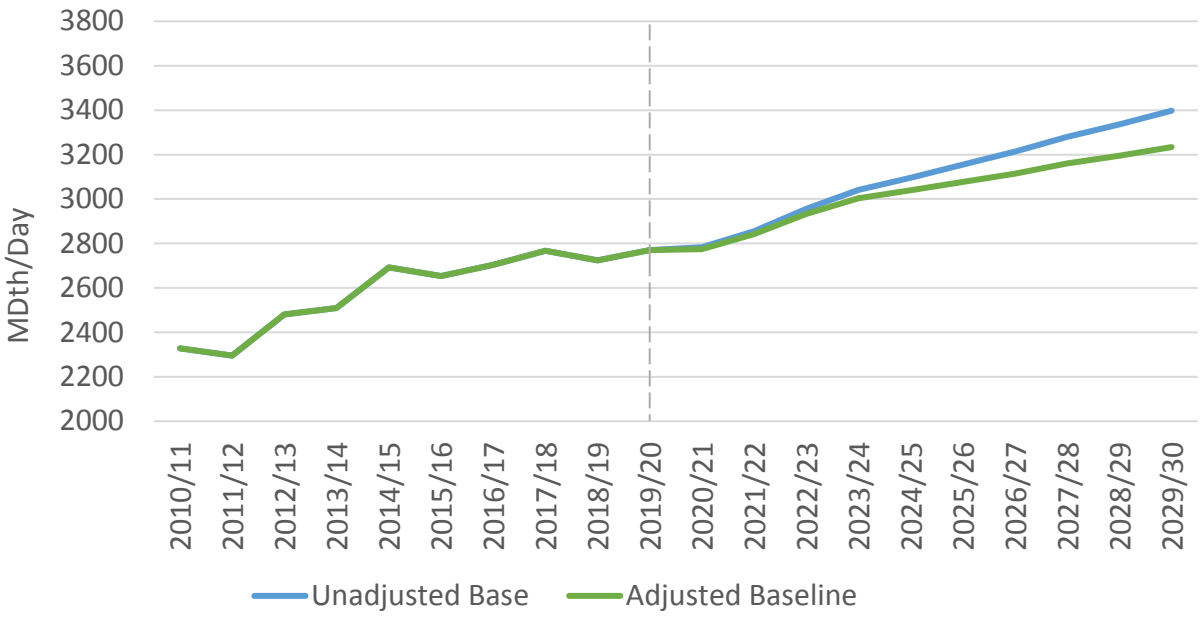



Figure 13 shows the impact of the DR program, and the acceleration of EE and electrification-of-heat by comparing the Unadjusted and Adjusted Baselines. Note there is EE and electrification embedded in the Unadjusted Baseline at the same rate it has been recently occurring, and the Adjusted Baseline only shows the acceleration of those resources due to NENY, Local Law 97 and the accelerated organic adoption in furtherance of climate goals. In 2030 these resources reduce the design day forecast by 4.8 percent or 164 MDth/day for Downstate NY.

**Figure 13: KEDNY and KEDLI unadjusted and adjusted Design Day forecast and historical data.**




*b. Upstate NY*

Over the next 10 years, Niagara Mohawk's gas demand is expected to remain relatively flat with a 0.1 percent annual growth rate, growing from 928 MDth/day in 2020 to 939 MDth/day in the winter of 2029/30. This is substantially slower than the 1.3 percent per annum growth observed over the last 10 years.

Figure 14 shows that West Gate is forecast to have a net decline in the design day forecast from 481 MDth/day in 2020 to 468 MDth/Day in 2030. Absent the impacts of the pandemic and the acceleration of EE and electrification, this would have been increasing at a compound annual growth rate of 0.4 percent, still slower than the 0.9 percent average annual growth over the last 10 years (see below).

**Figure 14: West Gate Design Day forecast and historical data.**

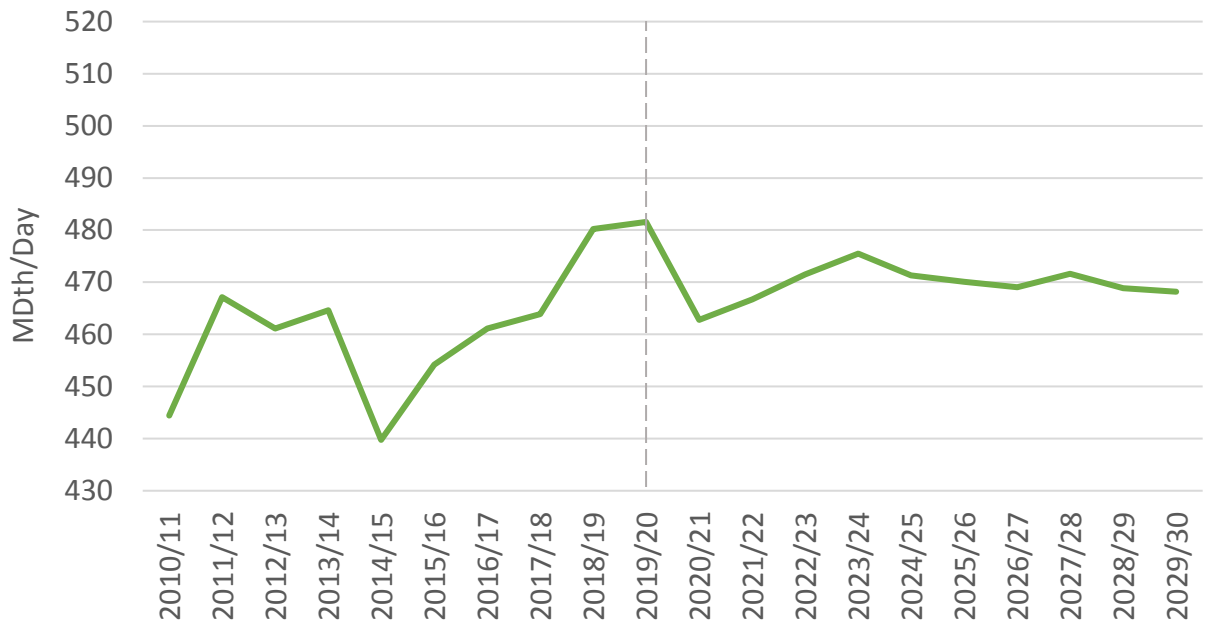
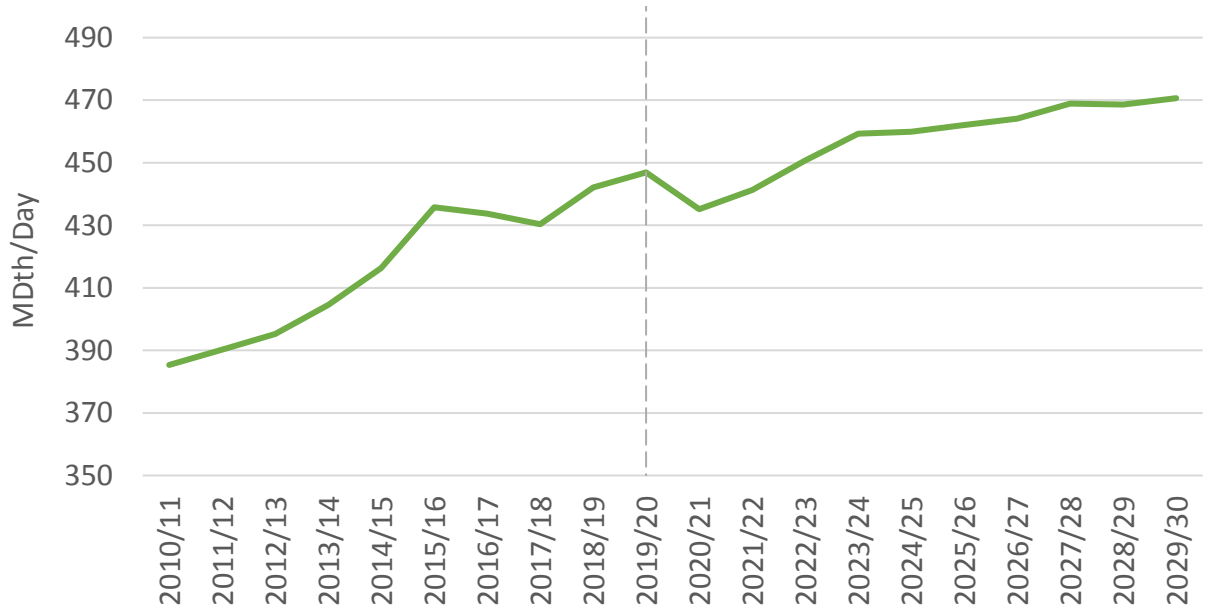



Figure 15 shows that East Gate is forecasted to grow annually at 0.5 percent over the next 10 years from 447 MDth/day in 2020 to 471 MDth/day in 2030. Absent the pandemic and acceleration of EE and electrification this would have been increasing at a compound annual growth rate of 1.1 percent, still slower than the 1.7 percent average annual growth over the last 10 years (see below).

**Figure 15: East Gate Design Day forecast and historical data.**



The slower growth rate over the next ten years is driven by the impact of the pandemic on the economy, and the acceleration of EE and electrification-of-heat. The pandemic impact was estimated by calculating the unadjusted baseline (*i.e.*, without accounting for additional EE and electrification) using Moody's March economic forecast (before the pandemic was part of Moody's baseline forecast) and comparing it to the Unadjusted Baseline with the Moody's April economic forecast (when the pandemic was a part of Moody's baseline economic forecast). This resulted in an estimated 1.7 percent decline in the forecast for the winter of 2020/21 due to the pandemic (compared to what it would have been had the pandemic not occurred) and a 1.3 percent decline in 2030, as shown in Figure 16.

**Figure 16: Niagara Mohawk unadjusted Design Day forecast and historical data pre- and post- pandemic.**

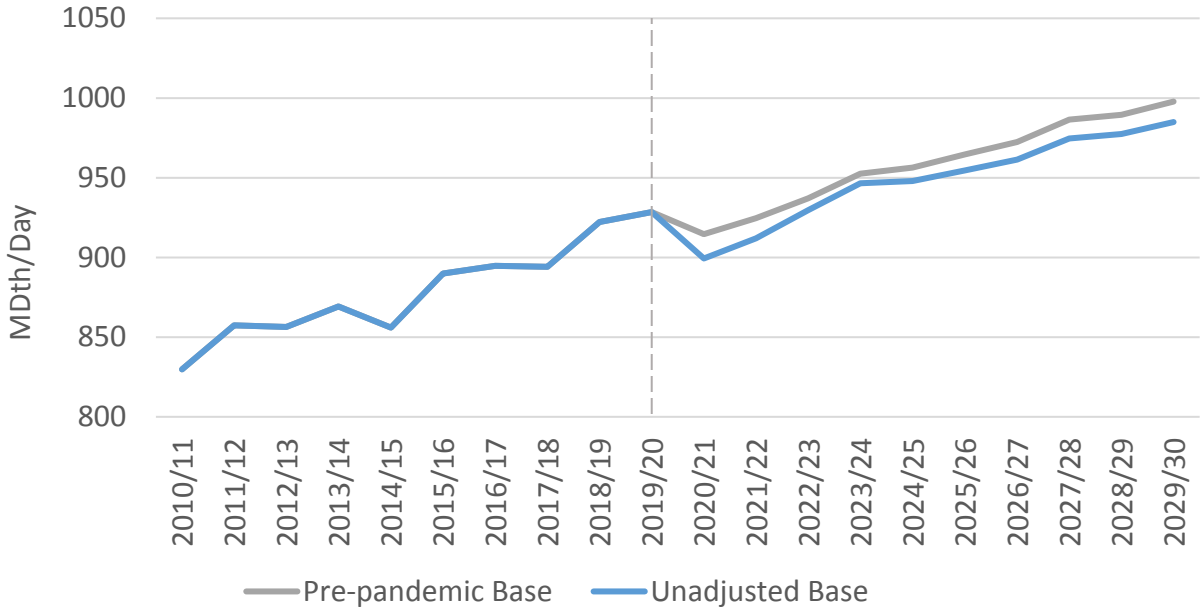
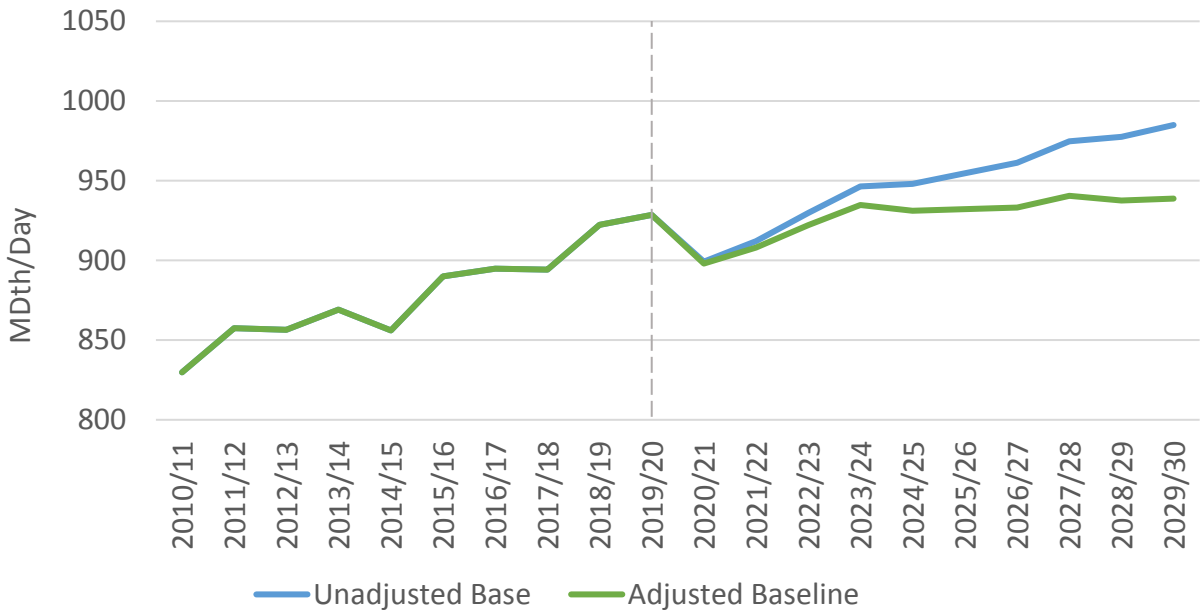



Figure 17 shows the impact of the acceleration of EE and electrification-of-heat by comparing the Unadjusted and Adjusted Baselines. Note there is EE and electrification embedded in the Unadjusted Baseline at the same rate it has been recently occurring, the Adjusted Baseline only shows the acceleration of those resources due to NENY and accelerated organic adoption in furtherance of climate goals. In 2030, these resources reduce the design day forecast by 4.7 percent or 46 MDth/day for Niagara Mohawk.

**Figure 17: Niagara Mohawk unadjusted and adjusted Design Day forecast and historical data.**




### C. Supply Portfolio

#### i. Downstate New York

Figure 18 (below) is a schematic depicting the components of KEDNY and KEDLI's gas portfolio and provides the maximum delivery entitlements from various sources of supply, including underground storage contracts. Appendix 1 summarizes the firm pipeline transportation capacity and bundled peaking assets in KEDNY/KEDLI's gas supply portfolio for the 2020/21 winter season (November 1, 2020 to March 31, 2021).

Appendix 2 summarizes KEDNY and KEDLI's firm storage contracts and the transportation contracts used to deliver storage withdrawal volumes to the city gate for the 2020-21 winter season.

#### ii. Upstate New York

Figure 19 is a schematic of Niagara Mohawk's current gas portfolio and provides the maximum delivery entitlements from various sources of supply and the available firm storage capacity.

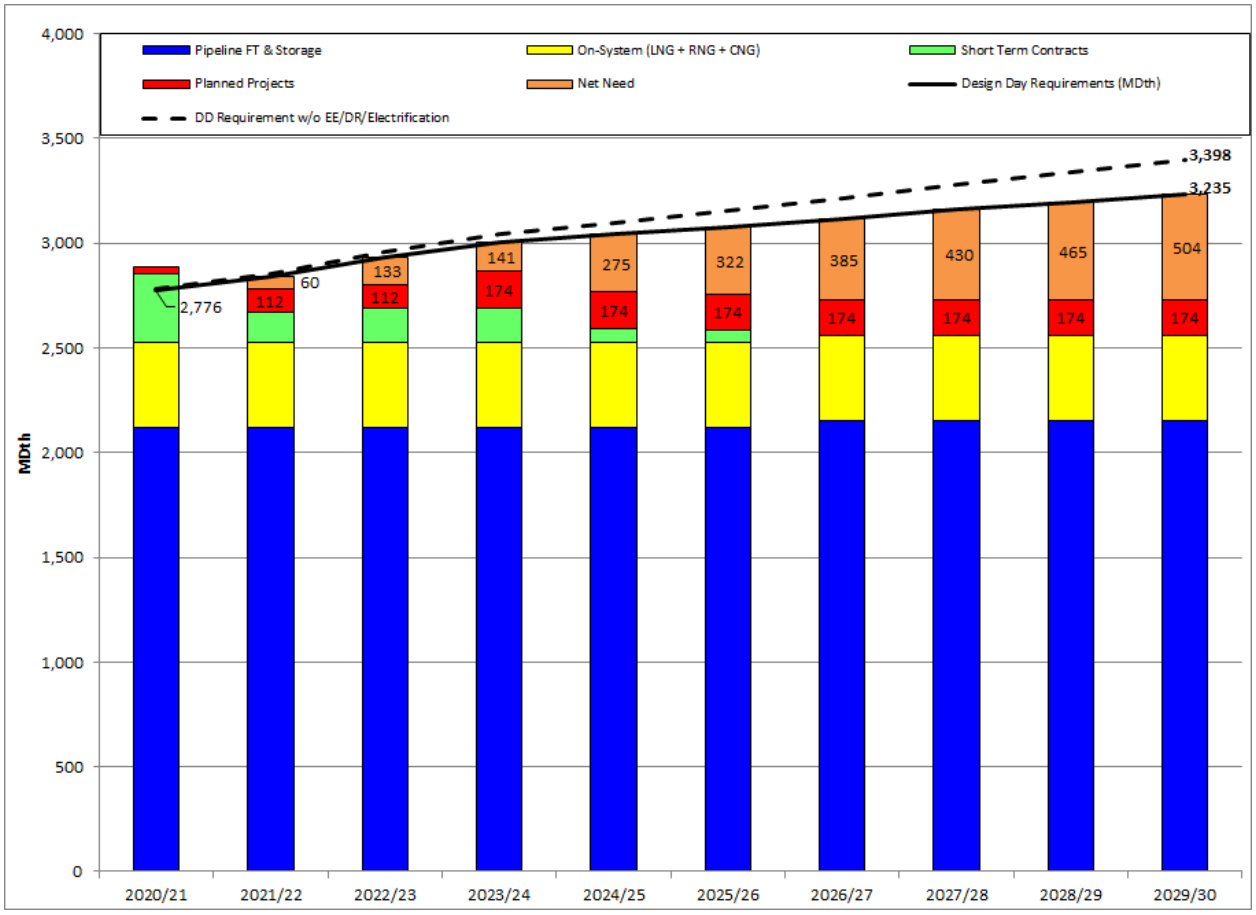
Appendix 3 summarizes Niagara Mohawk's contracts for firm pipeline transportation capacity and bundled peaking assets in the portfolio for the 2020/21 winter season, including the service provider (pipeline or supplier), contract number, tariff rate schedule, contract volume, and contract expiration date. Appendix 4 summarizes Niagara Mohawk's firm storage contract for the 2020/21 winter season, including the name of the storage service provider or pipeline, contract number, tariff rate schedule, contract volume, and contract expiration date.

## D. Supply/Demand Imbalance

### i. Downstate New York

Figure 18 depicts the Company's Downstate NY gas supply portfolio and shows how the supply stack compares to forecast Design Day requirements (with and without the assumed impacts of increasing energy efficiency, demand response, and electrification). Based on the updated demand forecast, the Downstate New York supply portfolio is sufficient to meet forecast Design Day requirements in 2020/21. Beginning in 2021/22, there is a forecasted supply imbalance that requires the Company to complete certain Planned Projects and secure/renew sufficient quantities of Short Term Contracts (city gate delivered services), which we believe is achievable but not without risk (discussed below). In subsequent years, the supply shortfall widens beyond what can be covered with any Short Term Contracts due to forecast demand growth, thus requiring incremental supply capacity and/or demand reduction solutions.

**Figure 18: Downstate New York Supply Portfolio/Demand Imbalance**




The supply portfolio assumes 100 percent availability of the interstate pipeline system, supply contracts, on-system assets (*e.g.*, LNG), and third-party ESCO deliveries. "Planned Projects" include increased LNG vaporization capabilities, CNG injections from new/expanded on-system sites, and anticipated volumes from the Iroquois Enhancement by Compression ("ExC") Project. The supply portfolio assumes that these Planned Projects will be constructed and in-service on

schedule. If one or more of these assumptions are not met, any potential supply imbalance could be exacerbated.

In addition to the Planned Projects, National Grid is actively soliciting city gate delivered services to address the supply shortfalls over the next several winters; however, given the market uncertainties and risks associated with this option, we do not account for these resources in the supply portfolio until we are reasonably confident they will be available to deliver the expected gas volumes (see Section 3(B)).

Going forward, National Grid's Long-Term Report and Supplemental Report describe our coordinated efforts to identify and implement solutions to meet customer demand, including enhancements to existing infrastructure (*e.g.*, the Planned Projects) combined with incremental energy efficiency and demand response.

### ii. Downstate NY - Gate Station Deliveries

The design day requirements depicted in Figure 18 represents the minimum, system-wide design day supply needs (total secured supply, less total requirements). The Company may also experience localized supply shortfalls at its city gates. To drill down to specific supplies needed at each city gate, system modeling is performed to determine the peak hour supplies requirements at each gate station. The sum of these individual gate station supply requirements will, in some cases, exceed the simple, high-level calculations done to produce the chart above.

Table 2 presents the gate station parameters that inform supply decisions for peak hour requirements. These are physical and contractual limitations that provide guidelines for system modeling.

**Table 2: Downstate NY Gate Station Deliveries (Confidential)**

| Pipeline | Physical Gate Station | Gate Operator | Gate Station Design Limit [1] (Dth/day) | Group Limit [2] (MDT/day) | Operational Hourly Limit [3] (Dth/day) | Operational Daily Limit [4] (Dth/day) |
|---|---|---|---|---|---|---|
| **Transco** | 134th Street | CE | 550,000 | 2,055 | 27,500 | 550,000 |
| | Central Manhattan | CE | 853,000 | | 22,660 | 453,200 |
| | Narrows | BUG | 446,000 | | 13,287 | 265,740 |
| | Long Beach | KeySpan | 545,000 | | 27,244 | 544,880 |
| | Rockaway | BUG | 645,000 | | 8,250 | 165,000 |
| **Tennessee** | White Plains | CE | 295,000 | | 12,292 | 245,833 |
| **Tetco** | Goethals | BUG | 793,250 | | 35,000 | 700,000 |
| **Iroquois** | South Commack | KeySpan | 753,000 | | 29,000 | 580,000 |
| | Hunts Point | CE | 360,000 | | 11,000 | 220,000 |

1. Design limit designated by pipelines. Does not represent takeaway capacity of LDC.
2. Group limit applies to Transco gate stations only. Transco limits the total NYFS contracts for all the delivery points noted above to 2,055 MDT/day. The individual station limits listed above can be utilized but the total of all the daily flows must not exceed 2,055 MDT/day.

3. Operational Hourly Limit is the takeaway capacity at each individual physical gate station determined by system modeling.
4. Operational Daily Limit is the estimated daily quantity needed to support the Operational Hourly Limits.

System modeling for the 10-year forecast was performed to determine system needs at each gate station listed noted above. The results of that analysis are summarized below. When reviewing 2020-21, the simplified net need shown in Figure 18 is 60,000 Dth/day. Appendix 7 presents the net needs by pipeline. The sum of the individual net needs is 226,000 Dth/day. As on-system projects are completed, the difference between these two numbers decreases.

### iii. Upstate New York

Figure 19 depicts the supply portfolio and forecast demand for Niagara Mohawk's gas service territory. Over the next ten years, the supply portfolio is sufficient to meet forecast Design Day requirements for Niagara Mohawk when considering the requirements of core customers. However, this analysis is based on the same assumptions discussed above regarding the 100 percent availability of supply, transportation, and on-system assets

**Figure 19: Upstate New York Supply Portfolio/Demand Imbalance**

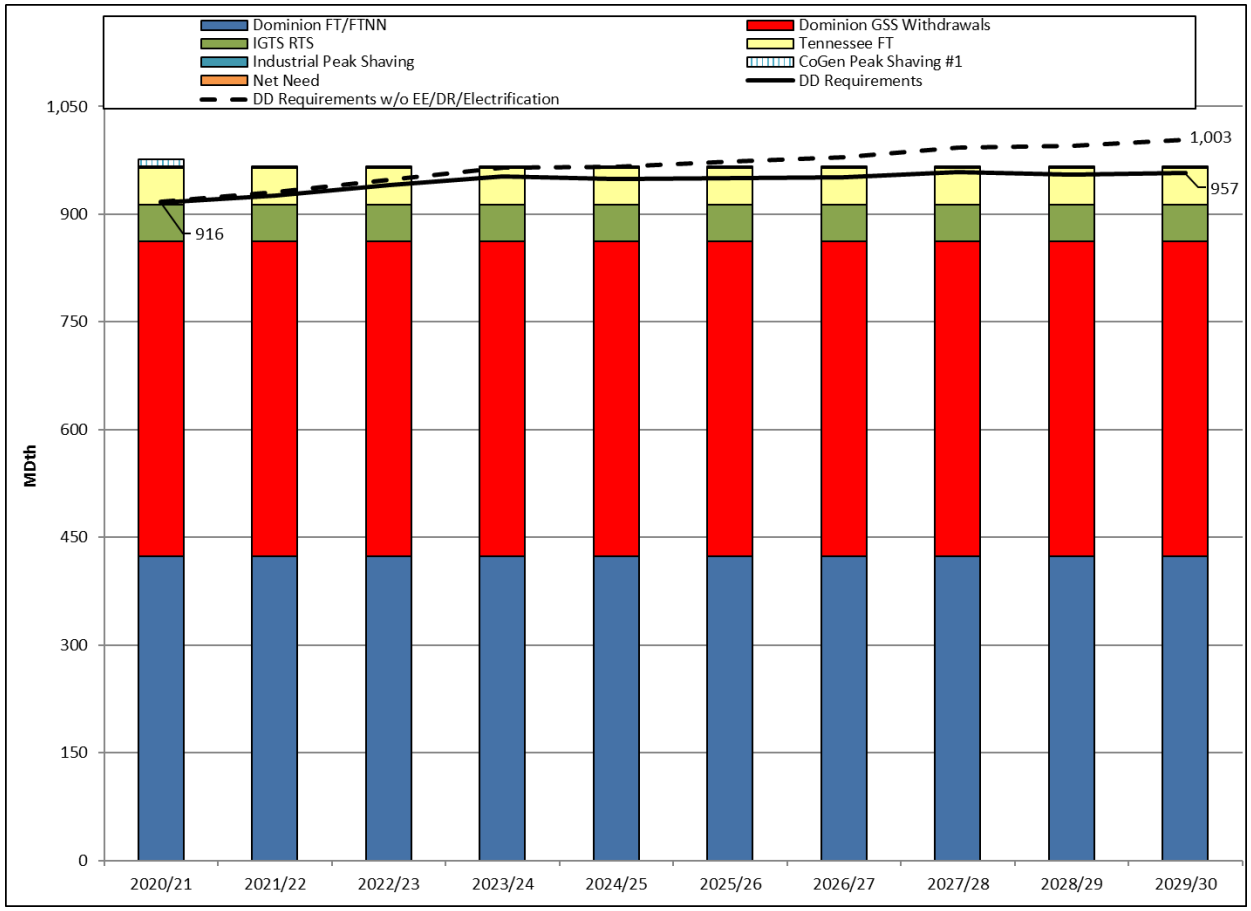





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Figure 20 depicts the supply/demand balance specifically for the Company's East Gate (DETI city gates located east of the Town of Amsterdam). When considering the forecast design hour requirements of all firm customers in the East Gate region, including non-core customers, there is a projected shortfall in 2027/28 and 2029/30.

**Figure 20: East Gate Firm Design Hour Supply/Demand Balance**

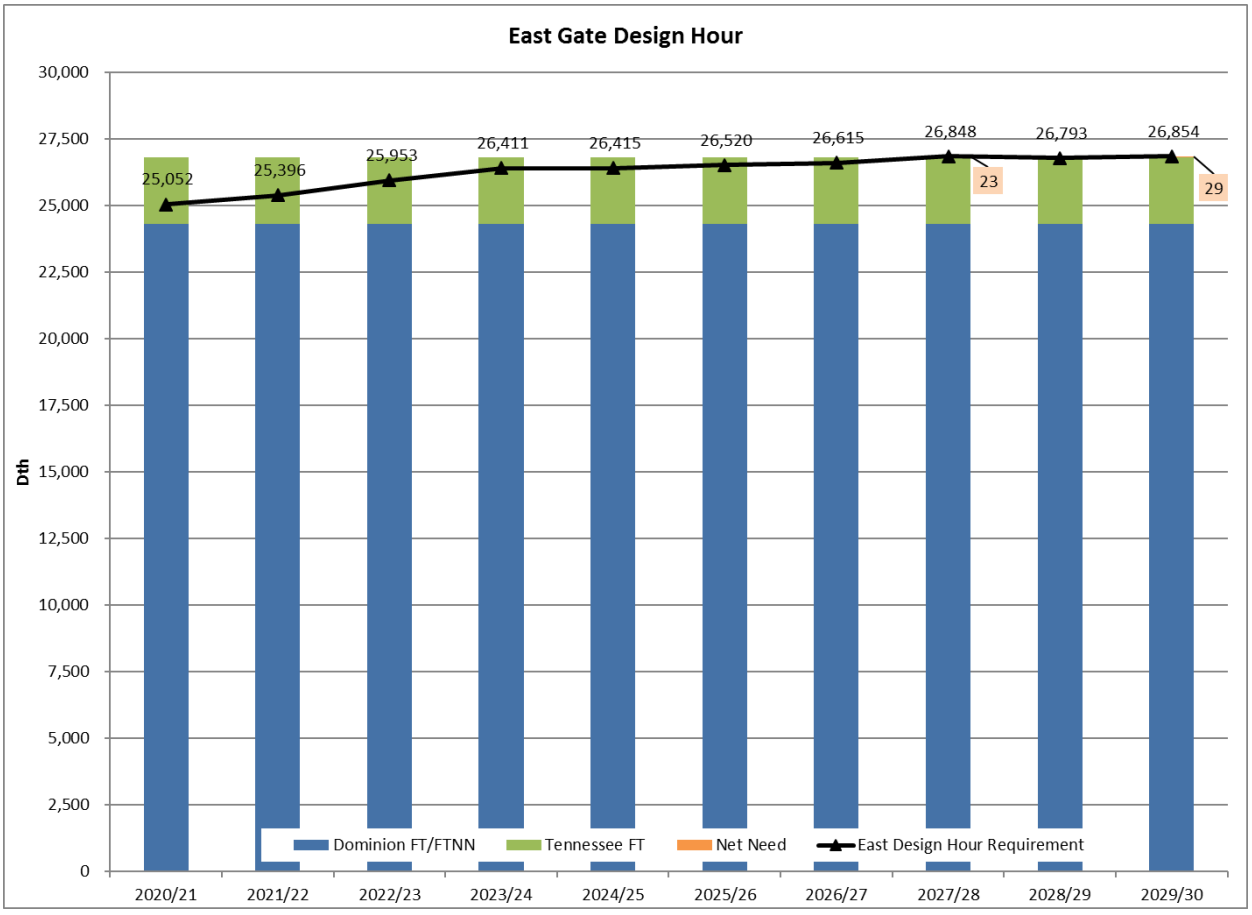




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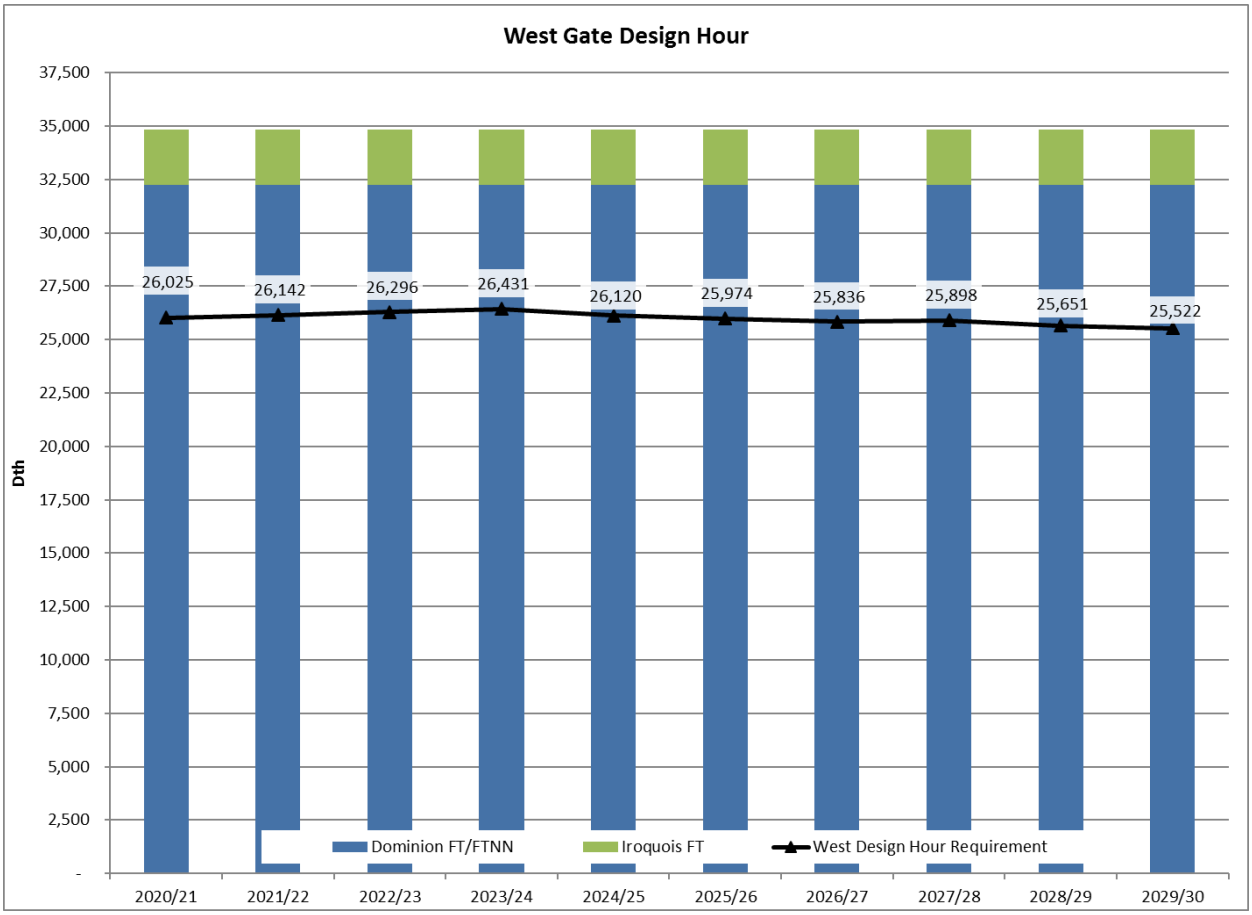
Figure 21 depicts the supply/demand balance specifically for the Company's West Gate (DETI city gates located in the Town of Amsterdam and west). There is no projected supply shortfall on the design hour for West Gate firm customer requirements over the ten-year planning horizon.

**Figure 21: West Gate Firm Design Hour Supply/Demand Balance**




## E. Vulnerable Location Analysis

### i. Tools, Analysis, and Metrics

Each year, National Grid performs an analysis on its gas system to determine the reinforcement projects that need to be constructed over the following five years to support forecast customer growth. Program costs are estimated for subsequent years six through ten, and any known large-scale projects are identified. Reinforcement projects are designed to maintain minimum design pressures throughout the gas system under design hour conditions and traditionally have been constructed as they become necessary for the most efficient use of capital dollars. The 5-Year Plan is revised and issued annually so that it can be adjusted for changes to the sendout forecast, differences between actual load growth and estimated load growth, reinforcement project deferrals, public works activity, main replacement program activity, Customer Gas Connections supported

growth reinforcements, and updates/improvements to the Synergi computer network analysis models.

If there is inadequate supply to meet the forecast demand in a region, National Grid will review the available pipeline and NPA options and determine if there is on-system and/or off-system solutions to rebalance supply and demand. An options analysis follows, with the most cost-effective constructible solution(s) for the identified need being pursued. While National Grid has utilized demand side management for decades under its Temperature Controlled customer program, many customers have left the program due to challenges with oil deliveries and the phase-out of the No. 4 and 6 oil used for backup fuel in New York City. Under a new planning approach, there may be opportunities to leverage newly available demand-side solutions to balance supply and demand.

### ii. Methodology Used to Identify Vulnerable Locations

National Grid annually reviews and evaluates the operating condition of the gas network along with the accuracy of the Synergi network models used to simulate field operating conditions. Network models are used for critical short and long-term recommendations including decisions related to capital investments (*e.g.*, reinforcement and reliability projects, new customers' requirements) on the gas system, and decisions associated with system operations. Accuracy of the network models is critical to ensuring the safe, reliable, and cost-effective operation of the gas distribution system, as well as continued service to customers.

The primary basis for the annual review is a comparison and assessment of the gas system and network model under the high load conditions experienced during a cold day from the previous winter period. High send-out/demand conditions provide the best view into system constraints and/or model accuracy evidenced through available field pressure and flow data. System reliability and risk is assessed at an aggregate and site-specific level by comparing data discrepancies to established tolerance targets. In general, close correlation between field data and model data is achieved. All points which exceeded tolerance and would have experienced below minimum pressures are reviewed to determine the possible causes of the discrepancies and develop follow up actions for each location. The winter model calibration and performance report document the results of this analysis and provides conclusions and recommendations aimed at improving performance of the network models and gas distribution network.

### iii. Methodology Used to Calculate Supply/Demand Balance

Projected annual growth is applied to the Synergi models based on forecast information provided by ADA for each zip code. From this data, a growth factor (percentage) is calculated for each zip code for the five-year period of the Plan. These growth factors or percentages are used to allocate the forecasted customer growth to the five-year models. The result of this methodology is that some zip codes show positive growth while others may show negative growth, even when the overall sendout forecast is flat. By better simulating where the customer growth is expected to occur, the overall accuracy of the Plan is improved.

Once the Synergi models are loaded with the forecasted customer growth, specific distribution system reinforcement projects and regulator capacity projects that must be constructed in order to

support each company's average annual system growth are identified. These projects are designed to maintain the minimum system design pressures. When the demand in an area exceeds the available supply despite demand reduction efforts, a below minimum pressure condition will result and a reinforcement project to increase supply to the area will be identified. If the supply deficit is determined to exist upstream of the system, National Grid will go to the market to secure some combination of additional supply and NPAs to align demand with supply. If that process fails to identify a resolution, a project with an upstream entity will be sought to bring supply and demand back in balance. As noted earlier, under a new planning approach, there may be opportunities to leverage newly available demand-side solutions to balance supply and demand.

## 5. Vulnerable Locations

### A. Vulnerable Location: Downstate NY - Entire Downstate New York Service Territory Except Staten Island[13]

Nearly all of National Grid's Downstate NY service territory is considered vulnerable because of forecast supply gaps over the next few years. Specifically, the borough of Brooklyn and the portions of Queens served by KEDNY and KEDLI, as well as Nassau and Suffolk County, are all considered vulnerable as defined in this filing. Of the 1.3 million customers served by KEDNY, approximately 160,000 are in Staten Island, which is not considered vulnerable because the existing supply infrastructure to/on the island can support additional growth. KEDLI serves approximately 600,000 customers in this vulnerable area.

A detailed analysis of natural gas capacity constraints in the region, and available options for meeting long-term demand for this vulnerable area, are discussed extensively in National Grid's Long-Term and Supplemental Reports.

#### i. Future Potential Imbalances

In Downstate NY, several factors could exacerbate future supply demand imbalances, including: increased customer demand; the unavailability of the interstate pipeline system or the portfolio of supply contracts, construction/permitting delays or failure to secure funding for planned on-system supply assets (*e.g.,* LNG or CNG projects); or the failure of demand reduction measures to predictably meet target volumes. Consider, for example, that any significant issue on one of the existing upstream pipelines serving the area could lead to curtailments that would further strain an already precarious supply situation that is relying on temporary/peaking solutions. As demonstrated by the pipeline curtailments experienced this past winter, such disruptions occur regularly and can significantly impact available gas supplies.

[13] The hydraulic limitations of National Grid's distribution system impact which gas supplies from the various city gate stations can move within the system from one area to another. Particularly relevant to the present situation, National Grid does not have unlimited capacity to move gas from its Staten Island distribution system—where its Goethals City Gate facility is located—eastward to its systems covering Brooklyn, Queens, and Long Island because of a significant pressure drop across Staten Island. For that reason, National Grid's Design Day planning cannot (and does not) depend exclusively upon solutions that deliver additional gas to its Goethals facility through its connection to the Enbridge TETCO pipeline. Instead, the Company also depends upon mechanisms for transporting gas to City Gates interconnected to its distribution systems in Brooklyn, Queens, and on Long Island.

There are also potential future limitations on the transportation of gas across the NYFS. The geography of the region has gas delivered through some gate stations passing through Con Edison's service territory on its way to National Grid (and other gate stations pass through National Grid service territory on its way to Con Edison). These exchanges are accomplished through displacement and/or physical exchange at designated custody transfer points. The physical and/or contractual limitations at all of these custody transfer points from Con Edison to National Grid will be reached and/or exceeded within a ten year period and will require mitigation by National Grid to maintain flows within those limitations.

#### ii. Projects/plans to address future potential imbalance

Available options for meeting long-term demand are discussed extensively in the Long-Term and Supplemental Reports. The distributed supply infrastructure projects currently under development include: additional CNG sites,[14] upgraded vaporizers at existing LNG facilities, and on-system reinforcement and reliability projects. Proposed non-infrastructure solutions include demand-side management, energy efficiency, and electrification programs.

In addition to the projects identified in the Long-Term and Supplemental Reports, several additional projects will be needed to address the constraints on the NYFS. These projects include a new regulator station in Queens and flow control valves as part of the Northwest Nassau transmission integrity replacement project. Lastly, a new regulator station in Southeast Suffolk will address an existing constraint on that portion of the KEDLI system.

### B. Vulnerable Location: Niagara Mohawk - East Gate Region

Until the most recent Gas Load Forecast was produced for the East Gate region in June 2020, which now accounts for the impacts of the COVID-19 pandemic and the energy efficiency benefits of NENY, Niagara Mohawk had forecast that it would exceed daily and/or hourly limits in the East Gate region at some point in the next several years. A failure to identify and implement prudent solutions to this problem would impact Niagara Mohawk's ability to serve firm customers during periods of peak demand in the future. However, the most recent forecast does not indicate a design day shortfall at any point in the next ten years and only suggests a very slight shortfall on the design hour beginning in the 2027/28 winter. Given the historical supply and reliability concerns for the East Gate region, National Grid still considers this area to be vulnerable and has very limited tools to manage any unexpected increase in customer requirements. Furthermore, Niagara Mohawk relies on DETI for approximately 90 percent of its design day supplies, putting it at tremendous risk for interruption due to a single point of failure

#### i. Future Potential Imbalance

In Upstate NY, as with Downstate NY, any increase in forecast demand or the failure to construct planned on-system projects (*e.g.*, reinforcements and CNG) could contribute to potential imbalances). There is also limited pipeline capacity to the Niagara Mohawk East Gate region. The region is supplied by DETI and TGP. However, there is very little capacity to the city gates

[14] In addition to supply considerations, additional on-system CNG injection capabilities are required in the near-term to maintain pressures above design minimums in certain constrained areas. This is a function of system hydraulics that directly impacts the pressures at various points.

held by parties other than Niagara Mohawk, and where it does exist, it is already incorporated into the Company's Maximum Daily Delivery Obligation ("MDDO") with DETI.

DETI's tariff permits its delivery point operators, which includes Niagara Mohawk, to consume gas at a rate of 1/20th or 5 percent of the MDDO for a single peak hour. There are subsequent rules for any consecutive 3-, 5-, and 12-hour period.

- 120.0 percent of 1/24th of the MDDO in any one hour
- 115.7 percent of 3/24ths of the MDDO in any three consecutive hours
- 112.6 percent of 5/24ths of the MDDO in any five consecutive hours
- 104.2 percent of 12/24ths of the MDDO in any 12 consecutive hours

The resulting limits at each gate station or gate station group is summarized in the below table.

**Table 3: Upstate NY DETI Winter Season Hourly Limits**

| (Dth; w/ Full Ellisburg/Canajoharie Volumes) | | | | | | |
|---|---|---|---|---|---|---|
| **DETI E/W** | **Delivery Point (POD)** | **Daily** | **One Hour** | **Three Hours** | **Five Hours** | **Twelve Hours** |
| W | Therm City Connection | 278,100 | 13,905 | 40,220 | 65,238 | 144,890 |
| W | Skaneateles Connection | 4,500 | 225 | 651 | 1,056 | 2,345 |
| W | Tully Connection | 2,030 | 102 | 294 | 476 | 1,058 |
| W | Scribners Corner / Oneida Connection | 5,000 | 250 | 723 | 1,173 | 2,605 |
| W | Higby Road / Utica Connection | 103,000 | 5,150 | 14,896 | 24,162 | 53,663 |
| W | Vickerman Hill / Herkimer Connection | 22,000 | 1,100 | 3,182 | 5,161 | 11,462 |
| W | Cazenovia Connection | 10,030 | 502 | 1,451 | 2,353 | 5,226 |
| W | Biddlecum Road Connection | 176,000 | 8,800 | 25,454 | 41,287 | 91,696 |
| W | Marshville / Canajoharie Connection | 6,100 | 305 | 882 | 1,431 | 3,178 |
| W | Shellstone / Amsterdam Connection | 38,100 | 1,905 | 5,510 | 8,938 | 19,850 |
| E | Burdeck Street / Schenectady* | 250,000 | 12,500 | 36,156 | 58,646 | 130,250 |
| E | Putnam Road / West Schenectady** | | | | | |
| E | Wolf Road / Albany | 100,600 | 5,030 | 14,549 | 23,599 | 52,413 |
| E | Brookview | 53,700 | 2,685 | 7,766 | 12,597 | 27,978 |
| E | Fort Orange (Castleton) | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| E | East Greenbush | | | | | |
| E | Troy | | | | | |
| E | Normanskill / South Albany | 82,125 | 4,106 | 11,877 | 19,265 | 42,787 |
| E | Riverside | 75 | 4 | 11 | 18 | 39 |

*Burdeck Street/Schenectady's individual MDDO is 125,000 Dth.
**Putnam Road/West Schenectady's individual MDDO is 175,000 Dth.

The Company has historically forecast that it would approach or exceed the collective East Gate design hour MDDO. Therefore, reliance on city gate delivered pipeline supplies is not a practical option to curing any supply/demand imbalance. For this reason, the Company has installed a CNG injection facility in Moreau, NY.

**ii. Projects/plans to address future potential imbalance**

The Company has identified Albany Loop project as a potential option to enhance reliability for approximately 50,000 customers in the event of a loss of gas supply at the DETI Troy Gate and to address vulnerability concerns in the East Gate region. This project involves approximately 7.3 miles of 16-inch natural gas transmission main in the Towns of North Greenbush and East Greenbush in Rensselaer County, New York, and the Town of Bethlehem in Albany County. This project would provide the flexibility to allow the Company to diversify its gas supply portfolio by reducing the current dependence on DETI pipelines and increase the take away capacity from the existing Tennessee gate to address a supply shortfall in the East Gate region. In the near term, we have determined that there are adequate gas supplies to meet customer demand in upstate New York, such that we are able to temporarily defer the Albany Loop project from a supply perspective - but the project would still provide significant reliability benefits. The supply/demand forecast provides a window of opportunity to expand and enhance our existing energy efficiency and demand response programs and offer new solutions (*e.g.*, renewable natural gas, geothermal) that, taken together, have the potential to reduce natural gas demand in the region. Niagara Mohawk will continue its preliminary engineering and development work for this project given the potential reliability benefits. As always, we will closely monitor gas supply and demand to ensure safe, reliable service to our customers.

An additional project to increase the operating pressure of Pipeline E36 will address a pressure constraint in the Capital Region without requiring additional gas supply to the East Gate. This project will also help balance flows between the Putnam Road and Burdeck Stations.

**C. Vulnerable Location: Niagara Mohawk – Various DETI Gates**

While the Company does not anticipate an overall supply/demand imbalance over the next several years in Upstate New, one area of concern is the risk of imbalance at individual gate stations, particularly the stations with DETI. Historically, the Company regularly exceeded the daily and hourly limits at the Scribners Corner and Wolf Road city gates. The Company's flow model analysis shows that the Company could require quantities in excess of its MDDOs at the Tully gate station, the Shellstone gate station, the Wolf Road gate station, the Troy gate station, and a

collection of gate stations east of the Hudson River, which also includes the Troy gate station. Appendix 8 include a summary of the vulnerable gate stations on Niagara Mohawk's system.

The Wolf Road Gate Station upgrade is a potential project to address future imbalances. The growth in demand in the East Gate has created the possibility to exceed the MDDO at Wolf Road because of its location on both DETI's and National Grid's systems. To address this condition, a flow control valve project has been undertaken to rebalance flow by shifting demand to the DETI Normanskill Gate to the south. Once constructed, it will enable National Grid to have some direct on-system control over this circumstance for the first time and provide operating flexibility year-round.

The project to increase the operating pressure of PL E36 (discussed above) will also help balance flows between the Putnam Road and Burdeck Stations. Higher pressures on PL E36 will also allow gas delivered at Putnam to back off some of the gas delivered at Shellstone without adversely impacting the pressure constrained area.

The MDDO at the Tully Gate Station (which is a single feed system) may have a contractual remedy if the MDDO for Therm City can be used to offset the need at Tully. Available energy efficiency and demand response measures may also slow growth or reduce demand on this system to reestablish demand within the MDDO of the station.

The MDDO for Scribners Corner has historically not been an issue, but recent work on the system has generated atypical use of the station in cold weather. As this system work in finite and not recurring, operation of the gate station is expected to return to normal parameters and the MDDO issue will be moot.

## 6. Conclusion

National Grid appreciates the opportunity to submit this filing in support of the Commission's consideration of the important issues presented in the Gas Supply Proceeding. As an industry, we must continuously improve our resource and supply planning capabilities to keep pace with the dynamic energy landscape in New York – and this proceeding presents an opportunity for collaboration among LDCs, regulators, customers, and other stakeholders to evolve our approach and identify best practices in these areas.

National Grid is committed to serving our customer and communities, as we have for more than 100 years. Today, we are facing significant supply challenges in areas of New York that will require new and innovative solutions to responsibly meet our customers' energy needs. Nowhere is the challenge more acute than in Downstate NY where, with the exception of KEDNY's Staten Island service area, National Grid's entire service territory is considered a vulnerable location due to forecast supply gaps in the near term, even as the updated demand forecast shows some near-term reductions in demand growth due to the Commission's aggressive energy efficiency targets and the economic impacts of COVD-19. National Grid is currently implementing a package of on-system projects (*e.g.*, CNG injection stations) and non-infrastructure (*e.g.*, EE/DR) solutions to meet near-term demand. Going forward, National Grid's Long-Term and Supplemental Reports discuss specific long-term options for addressing the demand/supply gap in the coming years.

For Upstate NY, the current demand forecast, which was similarly updated to reflect the anticipated impacts of NENY and COVID-19, suggests that Niagara Mohawk will have adequate gas supplies to serve customers' peak demand for the foreseeable future. However, the East Gate area of Niagara Mohawk's system continues to present potential reliability concerns and, therefore, is considered a vulnerable location, as are individual gate stations in Upstate NY where the Company frequently exceeds its daily and hourly limits. As with Downstate NY, National Grid is considering infrastructure and non-infrastructure solutions to address these issues.

To this point, National Grid has supported increasing customer requirements with a combination of capital investments and demand-side reduction programs, which has enabled economic development and emissions reductions in New York. However, the State, the Company, regulators, and other stakeholders recognize that more action is needed to address the current supply gaps while advancing the State's energy and climate goals, as outlined in the groundbreaking CLCPA. National Grid's gas networks will play an integral role in meeting these ambitious climate goals and delivering the low-carbon economy of the future. To the end, for the more constrained areas of the gas system, long-term solutions must be chosen and implemented to close the demand-supply gap and avoid future moratoria. National Grid is committed to working with regulators and other stakeholders to developing these solutions.

## APPENDICES

### Appendix 1: Downstate NY Contracts for Firm Pipeline Capacity

| Pipeline Company Name | Daily Quantity (Dth) | Expiration Date | Daily Quantity (Dth) | Expiration Date |
|---|---|---|---|---|
| **Flowing Gas To Citygate** | KEDNY | | KEDLI | |
| Transco | 245,955 | 6/1/2024 | 123,984 | 6/1/2024 |
| | 115,000 | 10/31/2032 | 25,000 | 11/1/2022 |
| | 100,000 | 5/14/2030 | 25,000 | 11/1/2022 |
| | 13,945 | 4/1/2022 | 17,433 | 4/1/2022 |
| | 4,244 | 7/31/2024 | 2,100 | 2/1/2022 |
| | 4,035 | 12/14/2021 | 1,863 | 7/31/2024 |
| | 3,250 | 1/1/2022 | 1,811 | 2/25/2024 |
| | 1,969 | 3/20/2024 | | |
| | 353,700 | 5/14/2030 | | |
| Texas Eastern | 51,315 | 10/31/2021 | 25,001 | 10/31/2021 |
| | 27,500 | 3/31/2023 | 22,500 | 3/31/2023 |
| | 12,161 | 10/31/2021 | 8,106 | 10/31/2021 |
| | 5,403 | 10/31/2021 | 1,110 | 10/31/2021 |
| | 5,000 | 12/1/2021 | | |
| | 2,560 | 10/31/2021 | | |
| Iroquois | 80,936 | 11/1/2022 | 87,760 | 11/1/2021 |
| | | | 25,000 | 11/1/2021 |
| | | | 7,000 | 11/1/2021 |
| Tennessee | 57,822 | 10/31/2024 | 7,720 | 10/31/2024 |
| **Upstream Pipeline Support** | | | | |
| Transco | 10,688 | 10/31/2021 | | |
| Texas Eastern | 20,604 | 10/31/2025 | 12,578 | 10/31/2021 |
| Dominion | 82,000 | 10/31/2032 | 26,021 | 3/31/2023 |
| | 40,301 | 3/31/2023 | | |
| Equitrans | 16,193 | 4/1/2022 | | |
| Algonquin | | | 196,000 | 11/1/2023 |
| Millennium | | | 150,000 | 12/31/2023 |
| | | | 50,000 | 12/31/2023 |
| | | | 50,000 | 12/31/2023 |
| TransCanada | 28,326 | 10/31/2026 | 21,347 | 10/31/2026 |
| | 12,142 | 10/31/2026 | 16,086 | 10/31/2026 |

| | | | | |
|---|---|---|---|---|
| Union | 28,640 | 10/31/2022 | 21,584 | 10/31/2022 |
| | 12,277 | 10/31/2022 | 16,266 | 10/31/2022 |
| **Deliveries from Storage** | | | | |
| Transco | 180,137 | 3/31/2023 | 112,484 | 3/31/2023 |
| | 31,940 | 3/31/2023 | 50,000 | 12/12/2027 |
| | 22,838 | 4/16/2022 | 50,000 | 12/12/2027 |
| | 46,040 | 12/14/2021 | 36,225 | 10/31/2021 |
| | | | 23,184 | 3/31/2028 |
| | | | 19,807 | 3/31/2023 |
| Texas Eastern | 114,190 | 4/30/2026 | 20,000 | 3/31/2023 |
| | 16,193 | 3/31/2022 | 15,572 | 4/30/2026 |
| | 10,340 | 3/31/2023 | 15,000 | 3/31/2023 |
| | 21,332 | 4/15/2023 | 15,000 | 3/31/2023 |
| | | | 14,771 | 3/31/2023 |
| | | | 2,076 | 4/30/2022 |
| Dominion | | | 100,000 | 3/31/2023 |
| | | | 15,000 | 3/31/2023 |
| **Winter Peaking Service** | | | | |
| [redacted] | [redacted] | [redacted] | | |
| | [redacted] | [redacted] | | |
| | [redacted] | [redacted] | | |
| [redacted] | [redacted] | [redacted] | | |
| | [redacted] | [redacted] | | |
| [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| | | | [redacted] | [redacted] |
| | | | [redacted] | [redacted] |

**Appendix 2: Downstate NY Firm Storage Contracts**

| Pipeline Company Name | Daily Quantity (Dth) | Expiration Date | Daily Quantity (Dth) | Expiration Date |
|---|---|---|---|---|
| **Deliveries from Storage** | KEDNY | | KEDLI | |
| | Market Area Storage | | | |
| Transco | 180,137 | 3/31/2023 | 112,484 | 3/31/2023 |
| Transco | 31,940 | 3/31/2023 | 19,807 | 3/31/2023 |
| Transco | 22,838 | 4/16/2022 | 23,184 | 3/31/2028 |
| Texas Eastern | 114,190 | 4/30/2026 | 15,572 | 4/30/2026 |
| | | | 2,076 | 4/30/2022 |
| Equitrans-Keystone | 16,193 | 4/1/2022 | | |
| Tennessee | 20,808 | 10/31/2025 | 5,202 | 10/31/2025 |
| Honeoye | 10,220 | 4/1/2022 | | |
| Dominion | 46,351 | 3/31/2023 | 100,000 | 3/31/2023 |
| | 32,267 | 3/31/2023 | 35,814 | 3/31/2024 |
| | | | 35,000 | 3/31/2023 |
| | | | 15,000 | 3/31/2023 |
| | | | 15,000 | 3/31/2023 |
| | Gulf Coast Storage | | | |
| Transco | 162,680 | 8/31/2021 | 46,939 | 8/31/2021 |

**Appendix 3: Downstate Supply Contracts (Confidential)**

[redacted]

**Appendix 4: Upstate NY Contracts for Firm Pipeline Capacity**

| Pipeline Company Name | Daily Quantity (Dth) | Expiration Date |
|---|---|---|
| **Flowing Gas to Citygate** | | |
| Dominion Energy Transmission Inc. | 340,122 | 3/31/2021 |
| Iroquois Gas Transmission | 51,596 | 11/1/2021 |
| Dominion Energy Transmission Inc. | 10,000 | 3/31/2021 |
| Dominion Energy Transmission Inc. | 17,700 | 10/31/2025 |
| Dominion - New Market Project | 30,000 | 10/31/2032 |
| Dominion Energy Transmission Inc. | 26,200 | 6/30/2035 |
| Tennessee | 20,000 | 10/31/2038 |
| Tennessee | 30,000 | 10/31/2037 |
| **Upstream Pipeline Support** | | |
| Union (Dawn to Parkway) | 52,247 | 10/31/2021 |
| TransCanada (Parkway to Waddington) | 51,596 | 10/31/2024 |
| **Deliveries from Storage** | | |
| Dominion Energy Transmission Inc. | 434,078 | 3/31/2021 |
| Dominion Energy Transmission Inc. | 4,000 | 3/31/2021 |

**Appendix 5: Upstate NY Firm Storage Contracts**

| Storage Company Name | Daily Quantity (Dth) | Winter Quantity (MDth) | Expiration Date |
|---|---|---|---|
| **Market Area Storage** | | | |
| Dominion Energy Transmission Inc. | 438,078 | 22,917 | 3/31/2021 |

**Appendix 6: Niagara Mohawk Supply Contracts (Confidential)**

[redacted]

## Appendix 7: Transco, Texas Eastern (Tetco) and Iroquois (IGTS)

**(Confidential)**

The Company plans to procure the Transco net need (as highlighted in red) to continue to serve firm requirements. This will include soliciting bids for additional FT, year-round supply and/or city gate peaking deals. Without additional pipeline capacity, the Company can no longer pursue plans to bring in more Transco supply via Rockaway. No other Transco projects are planned at this time.

The Company plans to procure the Tetco net need as highlighted to continue to serve firm requirements. This will include soliciting bids for additional FT, year-round supply and/or city gate peaking deals. System modeling has determined a need for on-system work to address takeaway issues that are likely to occur beginning in 2025-26. No Tetco pipeline projects are planned to address takeaway concerns.

The Company plans to procure the Iroquois Net Need (as highlighted in red) to continue to serve firm requirements. This will include soliciting bids for additional firm transportation, year-round supply and/or city gate peaking deals. Without the [redacted] Dth/day from the anticipated Iroquois ExC project, the Company anticipates a supply shortfall beginning in 2024-25.

Appendix 7 Notes:

1. "Secured" represents what the Company has under contract, not including volumes associated with future pipeline projects.
2. "Modeled Need" is the daily supply required for the combined Transco physical gates.
3. "Net Need" is the supply required to support the Modeled Need.

**Appendix 8: Niagara Mohawk Vulnerable DETI Gas Stations**

**(Confidential)**