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Management Response to the ICF Resources, LLC Report, *2025 Study of Winter Fuel Constraints in New York State*

March 2, 2026

Background

The NYISO management team would like to thank ICF Resources, LLC (ICF) for its efforts in producing the report titled, *2025 Study of Winter Fuel Constraints in New York State*. We would also like to thank stakeholders for their engagement in the development of this report.

To further evolve the modeling of winter fuel constraints and associated impacts of fuel availability on available power generation capacity, the NYISO commissioned ICF to conduct an assessment of winter fuel supply availability for power generation between 2025 and 2035. ICF's assessment aims to quantify the availability of natural gas and fuel oil deliveries to New York's power sector, identify potential supply constraints or shortfalls, and quantify the power generation that may be unserved due to insufficient fuel supply under a range of demand conditions. It considers different scenarios such as fuel switching between natural gas and fuel oil, interstate pipeline expansion, and potential retirement of power generators in New York.

In its report, ICF notes that its assessment focuses on the available gas only from the total supply perspective. It notes that the assessment did not consider operational constraints that can exist under low temperature conditions (such as operation flow orders issued by Local Distribution Companies), which further limit available fuel for power generators across all ranges of potential conditions, and event-based factors (such as pipeline interruptions, fuel oil re-supply interruptions, and other supply-related limitations that may arise from low temperatures). It also did not account for operational aspects that may impact facilities' ability to dispatch beyond fuel availability (such as environment permit limitations, position in the dispatch order, or potential contributions to reserve markets). Given these limitations, ICF recommends viewing its report as a starting point for the NYISO's fuel availability assumptions in a winter reliability assessment.

The NYISO management team notes the following additional information for potential consideration for winter reliability: Analysis Group, Inc. (AG)'s Fuel and Energy Security Assessments, New York State Reliability Council's (NYSRC) Winter Fuel Constraints Modeling, and Installed Capacity (ICAP) Suppliers' firm fuel characteristic elections to participate in the NYISO's ICAP market.

AG Fuel and Energy Security Assessments

Since 2019, the NYISO has engaged AG to conduct a forward-looking assessment of fuel and energy security of the New York electric grid during winter operations. This assessment focuses on winter operational risks, evaluating system projected supply and demand balance under extended and extreme cold weather conditions. AG's most recent analysis issued in 2023 evaluates three future winters (i.e., 2023/2024, 2026/2027 and 2030/2031).[1]

NYSRC's Winter Fuel Constraints Modeling

[1] Analysis Group, Inc., Fuel and Energy Security In New York State: An Assessment of Winter Operational Risks for a Power System in Transition (Nov. 2023), https://www.nyiso.com/documents/20142/41258685/Analysis-Group-2023-Fuel-Security-Study-Final.pdf

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As winter reliability risk has become more prominent in the New York Control Area system, the availability of gas and oil during winter conditions has become a critical input in the annual NYSRC Installed Reserve Margin (IRM) setting process.

In 2024 and 2025, respectively, the NYISO supported the NYSRC's effort to develop the Gas Constraints Modeling Whitepaper[2] and the Winter Fuel Availability Constraints Modeling Whitepaper.[3] Based on these analyses, the NYSRC adopted a six-tiered winter fuel availability constraint model as part of the IRM study process, starting with the 2026-2027 Capability Year. The model represents varying levels of available generation at different load levels, which reflect higher gas demand to serve heating loads and potential challenges acquiring fuel (gas and/or oil) for electricity generation. The available fuel (gas and oil) assumptions within the model are based on available historical data, which captures operational constraints, oil re-supply, and fuel switching. Of note, the winter fuel availability constraints model only applies to Load Zones F-K consistent with the gas pipeline constraints identified by NYISO's Market Monitoring Unit in 2022.[4]

ICAP Suppliers' Firm Fuel Characteristic Elections to Participate in the ICAP Market

Starting with the 2026-2027 Capability Year, the NYISO implemented rules to more accurately value certain ICAP Supplier's contributions to resource adequacy by accounting for natural gas and fuel oil constraints during periods of high winter demand. To do so, these rules created Capacity Accreditation Resource Classes (CARC) for fossil fuel Generators with and without firm access to natural gas and/or fuel oil. The rules permit an ICAP Supplier that operates by utilizing natural gas and/or fuel oil to elect to fully or partially participate in a firm fuel CARC based on its ability to obtain firm access to fuel.[5] On November 1, 2025, the NYISO received the firm fuel characteristic elections for the 2026-2027 Capability Year.[6]

Conclusion

The NYISO management team appreciates the efforts of ICF in conducting this assessment of winter fuel supply availability for power generation between 2025 and 2035. Because the ICF report focuses on the available gas only from the total supply perspective without accounting for constraints that impact fuel available to power generators, the NYISO management team agrees that the report serves as a starting point for the NYISO's fuel availability assumptions in consideration for winter reliability.

[2] New York State Reliability Council, Gas Constraints Modeling Whitepaper (June 14, 2024), https://www.nysrc.org/wp-content/uploads/2024/06/Gas-Constraints-Modeling-Whitepaper-Final.pdf

[3] New York State Reliability Council, Winter Fuel Availability Constraints Modeling Whitepaper – Phase 2 (Oct. 9, 2025), https://www.nysrc.org/wp-content/uploads/2025/10/4.1.4-Winter-Fuel-Constraints-Whitepaper-Attachment-4.1.4.pdf

[4] MMU Analysis of Gas Availability in Eastern New York (Oct. 20, 2022), https://www.nyiso.com/documents/20142/33916814/MMU%20Gas%20Availability%20Presentation__20221020.pdf

[5] For more information on firm fuel characteristic elections and their accompanying obligations, *see* Market Administration and Control Area Services Tariff Sections 5.12.6.2.2, 5.12.12.3, 5.12.15; Installed Capacity Manual Sections 5.8.1, 5.8.2, 5.8.3, 7.2.1.

[6] *See* NYISO, 2026-2027 Firm Fuel Characteristic Elections Summary (presented at the December 1, 2025 NYISO Installed Capacity Working Group meeting, as revised), https://www.nyiso.com/documents/20142/55419869/Firm%20Fuel%20Characteristic%20Elections_12.1.2025_ICAPWG_reposting.pdf

2025 Study of Winter Fuel Constraints in New York State

An ICF report commissioned by the NYISO

12/30/25

Table of Contents

Figures and Tables

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List of Abbreviations and Acronyms

Acronym	Description
AEO	Annual Energy Outlook
AGT	Algonquin Gas Transmission
BCF/D	Billion Cubic Feet per Day
BBL/CD	Barrels per Calendar Day
BBL/D	Barrels per Day
BTU	British Thermal Unit
CAMPD	EPA Clean Air Markets Program Data
CECONY	Consolidated Edison Company of New York, also known as ConEd
CGT	Columbia Gas Transmission
CHG	Central Hudson Gas
CNG	Compressed Natural Gas
CRIS	Capacity Resource Interconnection Service
Corning	Corning Gas Company
DFO	Distillate Fuel Oil
DMNC	Dependable Maximum Net Capability
EGT&S	Eastern Gas Transmission and Storage, also known as EGTS
ExC	Enhancement By Compression
EIA	US Energy Information Administration
EPA	US Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GAL	Gallon
H	Hour
HDD	Heating Degree Days
ICAP	Firm Installed Capacity
ICE	Firm Installed Capacity Equivalent
IGT	Iroquois Gas Transmission
IRM	Installed Reserve Margin
KEDLI	KeySpan Gas East Company (National Grid)
KEDNY	Brooklyn Union Gas Company (National Grid), also known as BUG
KWH	Kilowatt-hour
LCOE	Levelized Cost of Energy
LDC	Local Distribution Company
LNG	Liquified Natural Gas
Millenium	Millenium Pipeline
MGD	Million Gallons per Day
MMCF	Million Cubic Feet
MMBtu	Million British Thermal Units
MMT	Million Metric Ton
MT	Metric Ton
MW	Megawatt
NEEDS	National Electric Energy Data System
NERC	North American Electric Reliability Corporation
NESE	Northeast Supply Enhancement
NFG	National Fuel Gas Distribution Corporation
NG	(Geologic) Natural Gas
NiMo	Niagara Mohawk Power Corporation
NJ	New Jersey

NPCC	Northeast Power Coordinating Council
NY	New York
NYC	New York City
NYCA	New York Control Area
NYFG	New York Facilities Group
NYISO	New York Independent System Operator
NYPA	New York Power Authority
NYSEG	New York State Electric & Gas
NYSRC	New York State Reliability Council
O&R	Orange and Rockland
OFO	Operational Flow Order
PADD	Petroleum Administration for Defense District
RFO	Residual Fuel Oil
RG&E	Rochester Gas and Electric
RNG	Renewable Natural Gas
SCFM	Standard Cubic Feet per Minute
TBtu	Trillion British Thermal Units
TCF	Trillion Cubic Feet
TETCO	Texas Eastern Transmission
TGP	Tennessee Gas Pipeline
Transco	Transcontinental Gas Pipeline
T&D	Transmission & Distribution

Executive Summary

Assessment of Natural Gas and Oil Fuel Availability for Power Generation in New York: Winter Reliability Outlook (2025–2035)

New York's electric system reliability during winter months is dependent on the availability of natural gas and secondary fuels such as fuel oil for power generation. To further evolve the modeling of winter fuel constraints and associated impacts of fuel availability on available power generation capacity, the New York Independent System Operator (NYISO) commissioned ICF to conduct an assessment of winter fuel supply availability for power generation between 2025 and 2035. This study aims to quantify the availability of natural gas and fuel oil deliveries to New York's power sector, identify potential supply constraints or shortfalls, and quantify the power generation that may be unserved due to insufficient fuel supply under a range of demand conditions, ultimately informing strategic planning and system reliability assessments. This study adds to the work conducted for the Installed Reserve Margin (IRM) study with a forward-looking, fundamentals-based assessment of supply and demand for the fuels relied upon for power generation in New York winters.

While this report assesses fuel availability under a range of potential temperature probabilities, the assessment focuses on the available gas only from the total supply perspective. It should be noted that even though supply is present, the available portion for power generators can still be impacted by operational constraints that can exist under low temperature conditions. These operational constraints, such as operation flow orders (OFOs) issued by Local Distribution Companies, are not considered in this report and can further limit available fuel for power generators across all ranges of potential conditions.

In addition, event-based factors such as pipeline interruptions, fuel oil re-supply interruptions, and other supply-related limitations that may arise from low temperatures are not considered in the supply assessment of this report. These factors represent additional potential reduction in fuel availability to power generators, especially under extreme weather, i.e. lower temperature, conditions.

Lastly, for power generators that can use alternative fuel other than gas, i.e. dual fuel units, the amount of alternative fuel (i.e. oil) storage is assumed to be sufficient in this assessment based on fuel inventory reported by power generators via survey and interviews. The power sector demand assessment also does not account for operational aspects that may impact facilities' ability to dispatch beyond fuel availability, such as environment permit limitations, position in the dispatch order, or potential contributions to reserve markets.

Given these limitations, the fuel availability assessed in this report should be viewed as a starting point for NYISO's fuel availability assumptions in winter reliability assessment.

Winter Gas Availability

Availability of natural gas during peak winter days was the first primary input into the assessment of supply constraints to serve power generation. The highest deliveries of pipeline natural gas into New York over the last six years occurred on February 3, 2023, when 7,105 MMcf/d were delivered to pipeline receipt points in New York.[7] While individual receipt points have recorded higher deliveries on other days, this historical peak coincident supply of natural gas to New York serves as the primary supply scenario for this analysis.

Table ES1. 2025 NYISO Zonal Coincident Peak Supply

7 In addition to the 7,105 MMcf. capacity in Table ES1 includes "Other Supplies" which includes Greenpoint LNG, Astoria LNG, Holtsville LNG, National Grid CNG, National Grid Cogen Supplies, and National Grid RNG supplying the New York Facilities Group and split evenly between Zone J and Zone K, firm capacity available to generators in Zone G that was not used on February 3, 2023, and peaking supplies available to National Fuel Gas in Zone A.

Peak Supply Capacity (MMcf/d)	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone H	Zone I	Zone J	Zone K	Total
	1,197	228	556	81	950	116	779	160	160	3,085	940	8,253

Gas Availability for Power Generation – Firm Gas Utility Demand

In addition to natural gas supply, demand from non-power sector utility customers, which are considered firm utility demand, determines the available natural gas supply for power generation. Five scenarios driven by a range of temperature assumptions characterize the potential range of firm utility demand, including utility design-day planning conditions, temperature assumptions consistent with peak day temperatures consistent with NYISO Load Bins 1, 4, and 7, as well as the highest natural gas demand day in 2025, which occurred on January 22nd, 2025.[8]

Utility firm customer demand on the peak demand day for each scenario is shown in Table ES2 below. The design day shows by far the highest natural gas demand at over 8,000 MMcf in 2025, growing to close to 8,300 MMcf/d by 2035, driven by growth in downstate demand. Temperatures consistent with peak day temperatures in NYISO's Load Bin 1 results in a utility demand projection closest to the design day at 83%. The coldest and highest demand day in 2025 featured temperature conditions between NYISO Load Bin 1 and Bin 4.

Table ES2. Peak Day Firm Gas Demand Forecast Scenarios (MMcf)

Forecasted Peak Day Firm Gas Demand	Design Day		22-Jan-25		NYISO Load Bin 1		NYISO Load Bin 4		NYISO Load Bin 7	
	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035
	8,021	8,285	4,981	4,752	6,696	6,337	4,238	4,063	2,629	2,573

To assess gas supply for power generation, firm gas demand in table ES2 was subtracted from total available gas deliveries in table ES1. Table ES3 below summarizes the resulting gas supply available for power sector generation from the Coincident Peak Supply scenario for the five different winter peak day scenarios in 2025. Zonal gas availability for power generation varies significantly by Zone – with design day conditions exhibiting shortfalls in the downstate areas served by the New York Facilities Group, upstate Zones A and B, as well as Zones E and F being in short supply.

Table ES3. 2025 Winter Peak Day Gas Supply for Power Sector Generation – Coincident Peak Supply Scenario (MMcf/d)

Coincident Peak Supply Scenario Supply for Power Generation	Design Day	Jan '25 Winter	Bin 1	Bin 4	Bin 7
NYISO	232	3,272	1,558	4,014	4,942

Fuel Constraint Power Generation Results

The winter peak gas supply is combined with power sector scenarios to analyze potential limits in natural gas supply for the power sector. The power sector scenarios differ in their natural gas demand based on how dual fuel units operate. In the Fuel Switch Scenario, all dual fuel units switch to back up fuel and all single-fuel units (gas units without backup alternative fuel capability) rely on natural gas, whereas in the Partial Fuel Switch Scenario only units considered without firm fuel supply shift to backup fuels. Table ES 4

8 January 22nd, 2025, was the day with the highest natural gas demand in the seven-day period from January 19th – January 25th, 2025, which was selected as the one-week demand period. examined in this study as it included among the highest observed demand for both natural gas and electricity over the last 6 years, and also showed the best correlation between HDD and gas/electric demand.

presents the unserved capacity resulting from fuel availability shown in Figure ES3 above in the Fuel Switch and Partial Fuel Switch power sector scenarios. Unserved capacity is most prominent in Zone F as well as in the downstate Zones J and K, as these Zones feature a combination of limited supply and single-fuel capacity that cannot rely on backup fuel during natural gas supply shortages.

In Zone F, unserved capacity is projected across demand scenarios, indicating insufficient fuel supply to serve the existing capacity even in the absence of significant cold events driving utility non-power sector demand. In higher demand scenarios, such as the Design Day or Bin 1, little to no gas is projected to be available for power generation, leading to unserved capacity up to the entire single-fuel fleet.

Zone E also experiences unserved capacity of its entire single-fuel fleet in the coldest days, Design Day and Bin 1 scenarios given firm customer gas demand. At higher temperatures, Zone E gas supply meets power generation demand for the single-fuel units, eliminating any unserved capacity.

In Zone J and K, unserved capacity varies by scenario based on the available gas for power generation. In higher demand scenarios such as the Design Day, no supply is available for power generation and the power generation serving demand would rely on backup fuel, leaving single-fuel generators unserved. While fuel switching leads to sufficient total fuel supply in Zones J and K in the Bin 1 scenario, when units with firm supply maintain natural gas operations even though they are dual fuel capable, less supply is available for single-fuel generators, which leads to unserved capacity of 401 MW in Zone J and 388 MW in Zone K.

Table ES4. 2025 & 2035 Unserved Capacity– Coincident Peak Supply Scenario (MW)[9]

Scenario	2025 Fuel Switch Scenario	2025 Partial Fuel Switch Scenario	2035 Fuel Switch Scenario	2035 Partial Fuel Switch Scenario
Design Day	4,997	5,056	4,598	4,598
Jan '25 Winter	1,628	1,953	1,548	1,871
Bin 1	2,625	3,551	2,365	2,703
Bin 4	1,496	1,668	1,222	1,594
Bin 7	444	704	681	676

Pipeline and Retirement Sensitivities

Several interstate pipeline expansions are in the proposal or planning stages. One expansion project, the Northeast Supply Enhancement (NESE), was granted full permitting as of November 2025. Neither NESE nor the other proposed pipelines are included in the scenarios summarized above. The impact of pipeline expansion was explored through a pipeline expansion scenario that assumes NESE, Constitution, and Iroquois's Enhancement by Compression all to be in-service by 2028. The additional supply brought by these pipeline expansion projects would increase total available fuel and reduce the 2035 unserved capacity by over 400 MW across scenarios. The expansions would eliminate downstate unserved capacity across Bin 1 conditions; only during Design Day conditions would unserved capacity remain in Zones I-K. There would also still be unserved capacity in Zone F during Design Day conditions, which does not benefit as much from potential expansion projects as directly as the downstate areas.

ICF's model of fuel demand and generating capacity in these scenarios is based on existing facilities. The assumed retirement of generators as outlined in the 2025 Gold Book reduces the scale of what would otherwise be unserved capacity by 2035, as many of the retiring units are part of the unserved single-fuel capacity on a Design Day, due to insufficient fuel supply and lack of backup fuel options. It should be

9 Unserved capacity projections throughout this report reflect only unserved capacity related to fuel quantities available in the state. Generators that face supply limitations due to factors not driven by the fuel quantities available are not captured in the results shown. In the event additional limitations unrelated to available fuel quantities arise, unserved capacity would increase relative to the values shown throughout this report.

noted that, even though generator retirement may reduce the fuel demand on the surface, these assumed retirements do not reduce electricity demand that needs to be served. Therefore, while this report considered the generator retirement as a scenario that mitigates the expected unserved capacity, the outcome of the NYISO's short-term reliability process on potential generator deactivations can potentially offset the mitigation effect assess by this report.

Oil Availability for Power Generation

New York State is a major petroleum consumer, but relies on out-of-state and international petroleum sources, as it lacks local refining capacity. Generators build up oil reserves ahead of each expected peak winter season, and usually run those supplies down during peak events, such that the limitations to power generation's reliance on oil are subject to generators' abilities to resupply. A review of a range of historical oil deliveries and plant stock data established that New York's/ the New York Harbor's oil stocks are likely to suffice as backup supply for dual fuel generators across the state under the temperature ranges examined that would lead to gas supply deficits.

Historical data shows generators can sustain peak events and replenish stocks, though sustained resupply rates are lower than short-term demand peaks. Zonal limitations to restocking oil supplies under extreme oil demand scenarios were identified for conditions where extreme cold conditions and associated power sector demand extends beyond the seven-day period with one design day as the Maximum demand scenario examined in this study. Extended cold streaks have the potential to disrupt supply re-stocking through impacts on trucking and shipping routes (road conditions, trucking availability, river freezes), and event-based limitations to supply availability or delivery have the potential to extend unserved capacity into the dual-fuel fleet in the state. While such conditions are not quantitatively examined in this report the reliance on backup fuel for power generation is an important consideration for the overall fuel supply during the winter peak. With demand closer to historical maximum values, it is expected that the system would have sufficient fuel oil inventories and delivery capacity to avoid supply constraints. Consequently, fuel oil supply is not anticipated to be a major limiting factor to New York peak winter one-week power generation.

Conclusions

In summary, New York's current fuel supply infrastructure is projected to face limitations in several Zones under conditions consistent with NYISO's Load Bin 1 or a natural gas design day planning standard, driven by supply shortages downstate and in Zone F. The substantial fuel switching capabilities of New York's generators mitigate unserved capacities in winter scenarios reflecting warmer conditions, such that supply shortfalls and unserved capacity were found to be limited primarily to Zone F in ICF's 2025-2035 outlook. Constraints in the downstate area are more sensitive to temperature and resulting demand conditions as well as retirement and pipeline expansion scenarios, whereas constraints in Zone F arise from a combination of limited supply and large single-fuel capacity. New York's projected unserved capacity reaches up to 5,056 MW under design day conditions and 3,551 MW under Bin 1 conditions. If units that are assumed to retire stay online, unserved capacity would increase by close to 500 MW of single-fuel capacity. Additional pipeline capacity from projects under permitting review have the potential to mitigate unserved capacity of up to ~1,600 MW, specifically in Zones J and F, with a larger potential impact on cases of higher demand.

1 Introduction

The New York Independent System Operator (NYISO) engaged ICF to explore winter fuel (natural gas and secondary fuels) constraints to supplement the available information used for the NYISO's and the New York State Reliability Council's (NYSRC)'s Resource Adequacy and Installed Reserve Margin studies. Specifically, NYISO's natural gas and secondary fuel constraint modeling assumptions for the Resource Adequacy studies have been based in part on available data that covers recent historical weather conditions, with limited inputs on forecasted natural gas supply and demand fundamentals. ICF collaborated with the NYISO to create a forward projection of winter fuel supply and demand across New York Control Area (NYCA) Load Zones with refined assumptions on the availability of fuel resources given winter weather risks.

This study identifies existing and future natural gas supply constraints in New York (NY) during winter peak periods. Moreover, the objective of this report is to address the following questions (via NYISO's description of 2025 Market Projects):[10]

1. **What is the amount of natural gas available to electricity generators during winter** under various weather conditions, considering non-power generation demand, gas pipeline limitations, local distribution company limitations, economic limitations due to natural gas price, as well as impact from liquefied natural gas?[11]
2. **What is the dependable storage level of secondary fuel** of electricity generators during winter under various weather conditions, considering on-site storage size, replenishment of on-site storage, and lead time for on-site fuel switching if needed?
3. **How are the identified fuel constraints expected to change in the next ten years?**

To answer these questions, ICF analyzed New York's fuel supply infrastructure, transport and storage capabilities, as well as utility demand for non-power generation customers for a peak winter week over the next ten years. The quantity of natural gas supply for power generation depends on the balance of the supply from the pipeline infrastructure and the gas demand from firm utility customers. ICF's analysis examines the pipeline infrastructure and the associated fuel delivery capabilities by NYISO Load Zone,[12] including the impact of proposed pipeline expansion projects on fuel availability.

A range of temperature assumptions influence the non-power generation demand from firm gas utility customers as well as the power sector demand and associated demand for fuel from power generators. The forecasts for utility demand assume temperature trends consistent with NYISO projections over the next ten years and incorporate a range of starting points for peak day[13] temperatures - ranging from relatively warm temperatures consistent with NYISO's Load Bin[14] 7 forecasts, to the coldest temperatures and highest electric loads from NYISO's Load Bin 1, as well as utility design days[15] and weather consistent with a historical peak winter demand week in January 2025.

With an established forecast of fuel supply under a range of scenarios, ICF contrasted the available fuel for power generation with the potential demand for fuel based on the existing fleet of thermal generators and assumed future retirements. Fuel consumption forecasts for fuel switching scenarios as well as gas-only dispatch, combined with insights from generator interviews and NYISO data refined the assumed fuel

10 2025 Market Project Candidates - Draft, 2024 The New York Independent System Operator, Inc.
11 Not all potential LDC delivery limitations are captured in this analysis. Potential LDC limitations incorporated are based on utility and generators interviews, NYISO winter fuel survey data and publicly available information. Additional limitations unrelated to fuel supply quantities may exist that could further impact unserved generation capacity during high winter demand periods.
12 Load Zones are geographically defined areas within the New York Control Area electricity grid/market.
13 Peak day is associated with highest observed energy demand – for natural gas and electricity.
14 Load Bins group hourly electricity demand data by magnitude (quantity of electricity usage) and are commonly used for reliability studies. ICF incorporated temperature assumptions that drive Load Bin results into the assessment of non-power sector demand.
15 Utilities plan their resources around design day conditions as a forecasted benchmark of worst-case gas demand, based on statistical analysis of historical cold weather over a given timeframe.

consumption from generators. Shortfalls of fuel supply then translated into a projection of megawatt (MW) of NYISO's generation fleet by Zone that would be unavailable under the demand and weather conditions considered.

1.1 Comparison of this Study to Current Winter Gas Constraints Modeling for the NYISO Installed Reserve Margin Study

This study intends to inform NYISO about its modeling of winter fuel availability for the Installed Reserve Margin (IRM) Study. The IRM study was updated in 2024 to reflect updates derived from the Gas Constraints Modeling Whitepaper and its underlying modeling of previous winter fuel consumption for power generation. Prior to the development of the Gas Constraints Modeling Whitepaper and the associated IRM updates, thermal generators were modeled without limitations due to fuel availability in the winter months. The Gas constraints Modeling Whitepaper then modeled fuel availability based on daily winter peak loads and hourly production from fuel for winter days between 2017 and 2022. Regressions characterizing the relationship between power production by fuel and daily peak loads supported estimates of fuel-specific production by fuel type at load levels beyond the historically observed hourly peak loads. Based on the regressions, the White Paper categorizes the estimated natural gas availability into six load bins between <22,000 MW (no assumed constraints) and >26,000 MW, with no estimated available gas. The results of the Whitepaper assessment are summarized in Table 1 of the Whitepaper, excerpted below.

Table 1. Total Fuel Available in Load Zones F-K based on NYCA Load Conditions, via NYSRC Gas Constraints Modeling Whitepaper[16]**

<table>
<tr><th>Tier</th><th>NYCA Load Conditions (MW)</th><th>Available Gas (MW)</th><th>Available Oil (MW)</th><th>Total Available Fuel (MW) (Gas + Oil)</th><th>Illustrative Modeled Derate (Rounded MW)***</th></tr>
<tr><td>1</td><td>>26,000</td><td>375</td><td rowspan="6">11,000</td><td>11,375</td><td>8,600</td></tr>
<tr><td>2</td><td>25,000 - 26,000</td><td>750</td><td>11,750</td><td>8,225</td></tr>
<tr><td>3*</td><td>24,000 - 25,000</td><td>2,750</td><td>13,750</td><td>6,225</td></tr>
<tr><td>4*</td><td>23,000 - 24,000</td><td>4,500</td><td>15,500</td><td>4,475</td></tr>
<tr><td>5</td><td>22,000 - 23,000</td><td>5,500</td><td>16,500</td><td>3,475</td></tr>
<tr><td>6</td><td><22,000</td><td>No Constraint</td><td>No Constraint</td><td>0</td></tr>
</table>

* Tier 3 and 4 load levels comprise the actual peak loads observed in recent winter operating conditions. The illustrative MW derates are generally consistent with the typical reduction in generator capability experienced during such operating conditions.
**Includes gas-only and dual fuel units located in Load Zones F-K.
*** "Illustrative Modeled Derate" values are calculated using the gas-only and dual fuel fleet modeled in Load Zones F-K in the 2024-2025 IRM Final Base Case (FBC) (ICAP: ~21,770 MW; UCAP: ~19,975 MW)

The analysis presented in this study differs in its approach from the analysis previously carried out by NYISO to determine the levels of fuel availability in several key areas. Historical data on fuel-specific production represents which fuel was used under the respective electric load levels. Observed dispatch and associated fuel consumption may not, however, be an accurate and exhaustive indicator of physical fuel availability, as an absence of gas consumption in particular can result from a range of conditions that include, but are not limited to, natural gas availability. Generators that do not consume natural gas for power generation during peak hours may do so for several reasons unrelated to fuel supply, such as:

- for **economic** reasons – with oil potentially the cheaper resource during cold days when demand spikes and gas prices rise to levels above oil prices
- for **market scheduling** reasons, with less efficient units potentially not scheduled to dispatch due to the projected supply and demand balance

16 [Gas Constraints Modeling Whitepaper - 2024-2025 IRM Study]

- for **operational** reasons, such as pipeline operational flow orders or minimum fuel offtake quantities that limit operational flexibility. These reasons are, amongst other things, driven by different planning and operational approaches across the natural gas and electric sector that can result in suboptimal resource allocation and utilization for electric generators.

Given these factors, historical fuel consumption for power generation is one of a number of indicators that can help characterize the fuel availability for power generation during peak winter days. The assessment of fuel availability in this report supplements conducted by NYISO to date with an additional approach to determining winter fuel availability and potential winter fuel constraints for power generation. This study characterizes and forecasts the fuel supply available for power generation in New York state over the next ten years and compares the resulting supply of natural gas to potential demand from power generators. The study projects pipeline supply under upper and lower-bound scenarios and subtracts from this supply utility demand for non-power sector use. To capture a range of anticipated utility natural gas demand conditions, this analysis includes five different demand scenarios to align natural gas utility demand forecasts with the temperature assumptions driving NYISO load forecasts for its Load Bins, reflect historical weather conditions during the winter of 2025, as well as a gas utility design-day, a forecast used for natural gas reliability planning that represents the most stringent of gas demand scenarios.

As a forecasting assessment based on supply and demand fundamentals to determine fuel availability in the winter, this analysis has its own set of limitations and caveats that apply. Key caveats and limitations are explored below:

1. **Mapping of Supply to Demand Zones** – Natural gas supply is delivered from pipelines and storage facilities to utilities, which in turn serve end-use customers in their service territories. NYISO's IRM study and planning is conducted by Load Zone. The pipeline delivery points, utility service territories and NYISO Load Zones do not follow the same geographical boundaries, and the resulting allocation of gas supply to utilities and Load Zones does not directly reflect how utilities meet demand and supply generators. The analysis applies simplifying assumptions and balancing approaches to more accurately reflect utility services to power generators to mitigate the potential impact of this approach.
2. **Limited Data Availability/Consistency** – The study approach accounts for several data points not being available.
    a. <u>Fuel Supply</u> – Pipeline deliveries to utility delivery points inform the overall supply for utilities. Data to allocate the supply at a higher resolution – aligned with regional consumption – is not available data behind the citygate[17] as it is not gathered/reported.
    b. <u>Fuel Consumption in High Demand Scenarios</u> – Several of the natural gas demand scenarios considered for this analysis assume lower temperatures and therefore higher demand than observed over the last 5 years. Design Day conditions are planning conditions for the natural gas sector and not present in the data that informed the quantitative analysis. As a result, the data inputs for the demand/temperature regressions at the high demand/low temperature end is limited. ICF worked with NYISO to increase the accuracy of the regressions by including all forecasted design-day projection for the Load Zones into the analysis.
    c. <u>Inconsistent Utility Design-Day Forecasting Approaches</u> – Utility practices to project design day demand varies from utility to utility. Downstate utilities temperature inputs into design day forecasts start at HDD65 (on an HDD65 basis), which increases to HDD75 and even HDD85 for upstate Zones. This analysis assumes that utility design days occur

[17] The citygate (or "city gate") is generally the point where natural gas is transferred from an interstate or intrastate pipeline to a local natural gas utility.

coincidentally – an assumption that presents an upper bound of potential demand for utility natural gas demand.

In addition to data availability and consistency, certain factors for pipeline, utility, and power plant operations are beyond the scope of this assessment.

Intra-day operational supply flexibility - As an assessment of daily fuel supply and demand for power generation, this analysis does not incorporate the ability of utilities and pipeline operators to provide additional supply during intra-day peak demand periods to avoid unserved capacity, such as additional storage, line packing and peak demand shaving approaches.

Pipeline and utility operational limitations – As a fuel supply and demand assessment based on pipeline deliveries to the utility delivery points, operational constraints from pipeline operators and utilities such as operational flow orders (OFOs) and other limitations that would impact utility and/or pipeline supply to generators are not considered beyond the fundamental supply and demand assessments described throughout this report. Such limitations, which have been qualitatively explored through interviews with pipeline operators, generators, and utilities, are not fully captured in the quantitative forecasting approach.

Fuel Supply – The fuel supply assessment for this analysis is limited to a week-long duration event. Fuel supply constraints, however, may occur under compounding conditions outside the scope of the study, which would increase the risk of unserved capacity extending into the dual-fuel fleet across the state. Risks and impacts of such conditions occurring vary from zone to zone depending on the generation fleet and backup fuel supply characteristics.

Some examples of compounding events that may alter the analysis would include:

- Extended extreme cold weather events can lead to power generation oil demand maintaining above resupply capacity, causing a depletion of stocks. Under such multi-week extreme cold conditions, generators may not have sufficient oil on-site to maintain system reliability. Extended and back-to-back cold weather events also increase the risks of supply routes (rivers, roads) deteriorating and operating at less than peak capacity, limiting re-supply.
- Back-to-back cold weather events can lead to stocks not having sufficient time to resupply between usage periods. This can lead to similar analysis outcomes as this study, but beginning at depleted stock levels and fewer days of supply, with the potential for unserved capacity extending into the dual-fuel fleet for the second event.
- Event based risks – Events impacting key pipelines (e.g. cyber-attack or a break on a pipeline) or events impacting tanker supply to the New York Harbor (e.g. severe weather, icing, something in the waterway) can all reduce the regions available supply. These events, if prolonged, will reduce the regional stocks and may make power plants have to find alternative suppliers after a prolonged outage. All these factors can delay deliveries. Additionally, some events may impede roadways to terminal facilities and power plants, or cause power outages at terminals delaying resupply. Lastly, other scenarios such as the war in Ukraine, can cause shifts in economics and cause reduction of regional stocks as price spikes drive product oversees and reduce the days of supply in the region ahead of a compounding event such as cold weather.

2 Fuel Supply

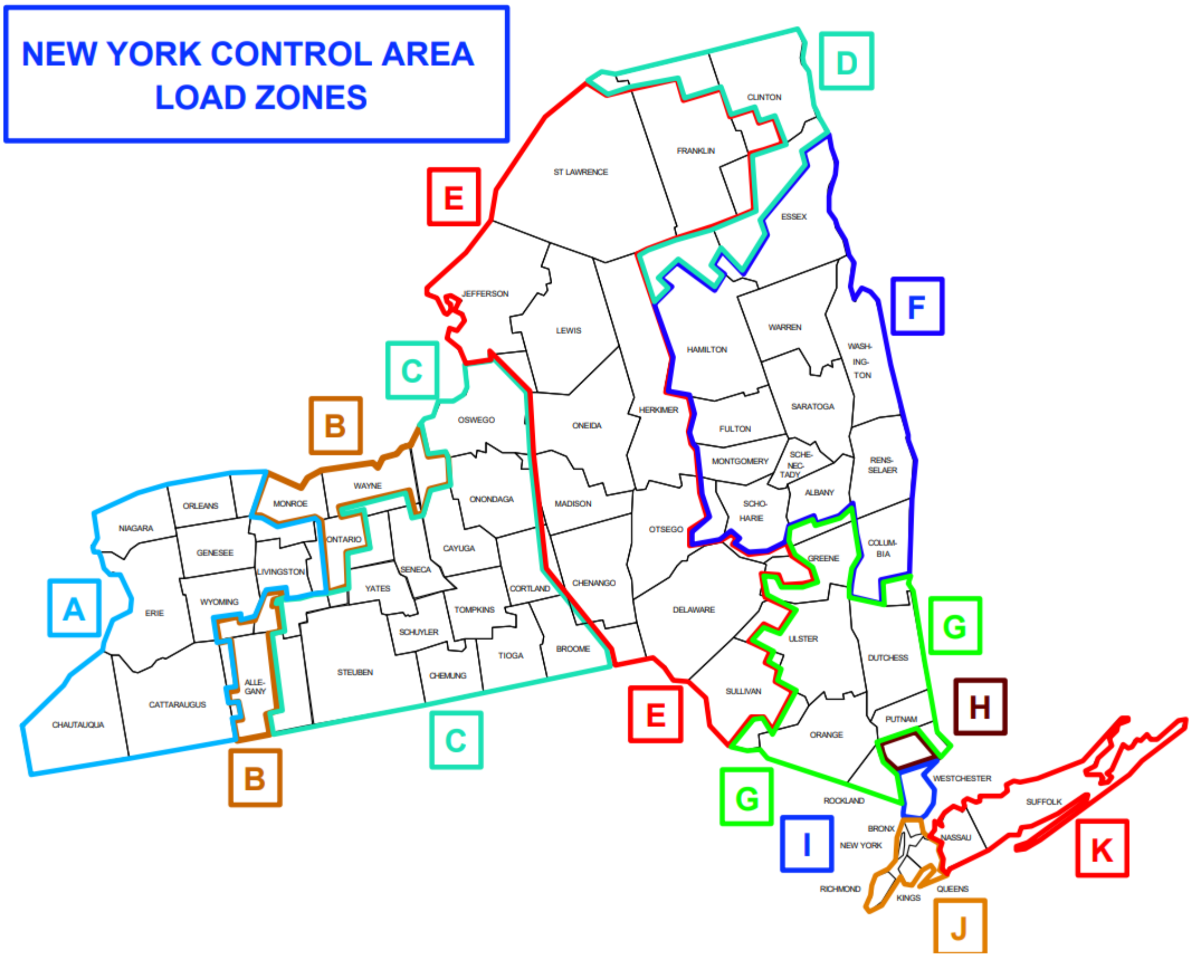
This report begins with an overview of New York's (NY) fuel transportation infrastructure, with a focus on natural gas and oil supply and delivery. Section 2.1 describes the natural gas transportation infrastructure and Section 2.2 describes the oil transportation infrastructure.

2.1 Natural Gas Infrastructure

New York relies almost entirely on natural gas that is imported to the state on 11 interstate natural gas pipelines. In 2023, the state averaged 3,510 MMcf/d of total natural gas consumption while only producing 23 MMcf/d of natural gas, and the difference was supplied by pipeline imports to the state. Some large natural gas customers, including some power generation plants and large industrial plants, are connected directly to the interstate pipelines that serve the state, but most of the natural gas consumed in New York is delivered from interstate pipelines to natural gas utilities, also known as local distribution companies (LDCs), which then deliver natural gas to consumers. There are 11 large, investor-owned LDCs, six much smaller LDCs, and three small municipal utilities in New York. The 11 large, investor-owned LDCs that serve the vast majority of the state's residential, commercial, industrial, and power generation demand are: Brooklyn Union Gas Company (KEDNY, also known as BUG – of National Grid), Central Hudson Gas and Electric (CHG), Consolidated Edison Company of New York (ConEd/CECONY), Corning Gas Corporation (Corning), KeySpan Gas East Corporation (KEDLI – also of National Grid), Liberty Utilities (St. Lawrence Gas) Corp., National Fuel Gas Distribution Corporation (NFG), New York State Electric & Gas (NYSEG), Niagara Mohawk Power Corporation (NiMo), Orange and Rockland (O&R), and Rochester Gas and Electric (RG&E). While the NYISO divides the power generation sector in New York into 11 NYCA Load Zones from A to K, the natural gas LDCs' service territories do not perfectly map to the areas of demand defined by these Load Zones. The downstate utilities KEDNY, ConEd/CECONY, and KEDLI serve Zones I, J, H, and K, while Zones A to G are served by the upstate utilities.

Together, the 11 utilities operate a distribution system comprised of approximately 48,900 miles of transportation and distribution pipeline. To meet their demand, New York's LDCs rely on a diverse portfolio of supply sources. While much of the design day (peak day) demand is served through the interstate pipelines and underground storage, the three downstate utilities, which share a distribution system known as the New York Facilities Group (NYFG), also rely on gas supply from liquified natural gas (LNG) peak shaving storage, compressed natural gas (CNG), and renewable natural gas (RNG).

Figure 1. New York Control Area Load Zones



Source: NYISO[18]

2.1.1 Interstate Pipeline Capacity Assessment

New York is served by 11 interstate natural gas pipelines as shown in Figure 2. To assess the current capacity of each of those pipelines to deliver natural gas to New York, ICF used the daily interstate pipeline nominations data aggregated by Hitachi Energy for the 11 interstate pipelines.[19] ICF analyzed the customer nominations data between 1/1/2019 and 2/28/2025 to construct two scenarios that characterize a lower and upper bound of potential pipeline deliveries into New York.

1. The Coincident Peak Supply scenario is characterized by the maximum physical interstate pipeline deliveries observed on any given day over the last five winters. This day occurred on February 3, 2023, when 7,105 MMcf were delivered to receipt points within New York.[20]

2. The Non-Coincident Peak Supply scenario is characterized by the sum of the maximum physical interstate pipeline deliveries to each delivery point within New York. This scenario has not occurred on any specific day, and delivery point peak deliveries happened from 2019 to 2025.[21] Non-coincident pipeline supply to New York is 9,667 MMcf/d.[22]

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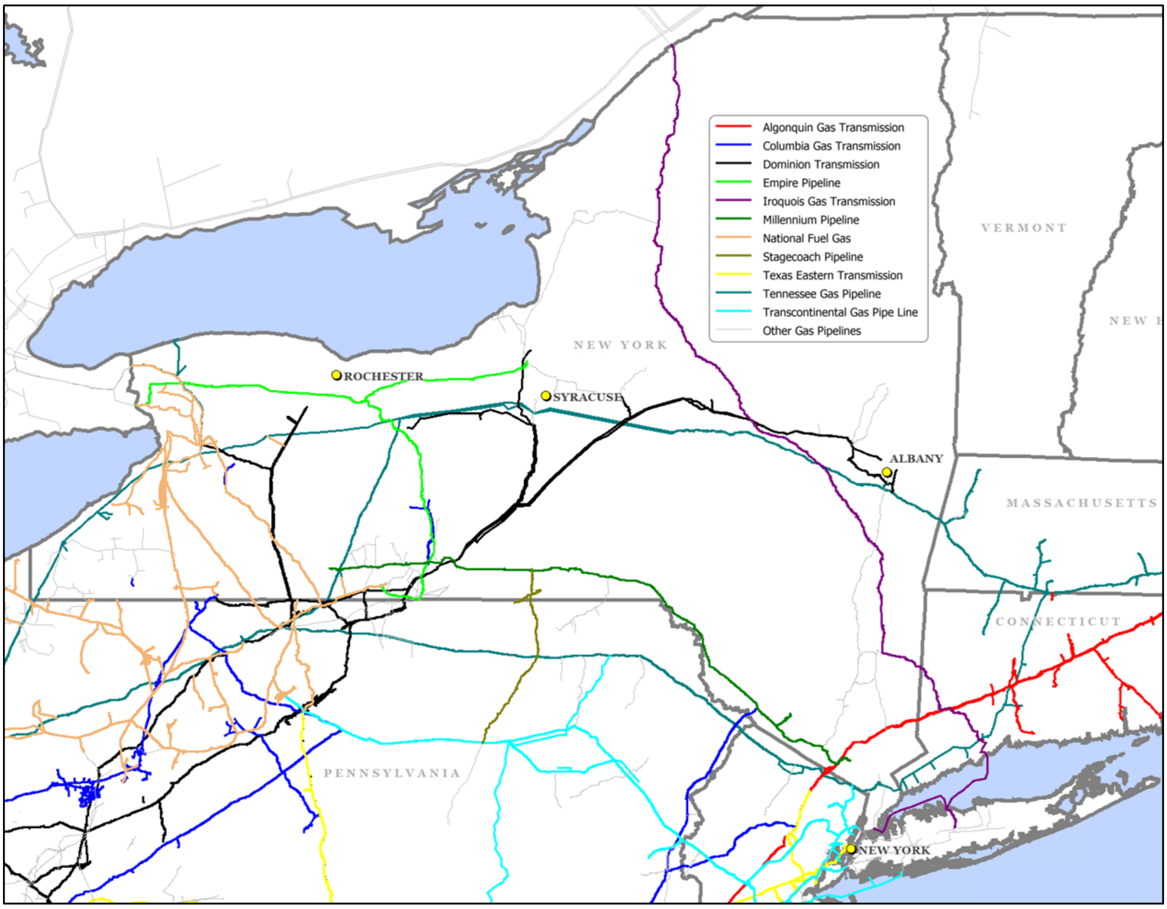
18 [New York Control Area Load Zones Map]
19 Interstate natural gas pipeline daily volumetric nominations via Hitachi Energy.
20 185 MMcf of delivery capacity was added to Zone G in the coincident peak scenario to account for known firm transportation capacity dedicated to power generation that was not used on February 3, 2023. 257 MMcf of additional supply from National Fuel's peaking supplies and 706 MMcf of "Other Supplies" for the NYFG utilities was added to the Coincident Peak Supply scenario.
21 See Appendix A – Section 5.2.3 for the individual receipt point peak deliveries.
22 Does not include the 314 MMcf of additional supply from National Fuel's 2024-25 Winter Supply Plan and 706 MMcf of "Other Supplies" for the NYFG utilities.

The Coincident and Non-Coincident Peak Supply scenarios serve as two supply scenarios for the availability of natural gas for gas demand in the state, with different approaches to characterize the potential upper bound of supply into the State. The Non-Coincident Peak Supply scenario likely overstates available supply as receipt point deliveries at levels observed have not been achieved on the same day over the last six years. The Coincident Peak Supply scenario may understate available capacity as individual delivery points may record higher deliveries on high demand days. Following the comparison of the supply overview across scenarios, this analysis and the assessment of unserved capacity primarily focuses on the Coincident Peak Supply scenario. As the scenario with the highest deliveries over the last six years, it is seen as the more realistic scenario of potential supply to the state and is assumed to carry less risk to potential overstate supply and therefore understate unserved capacity.

Figure 2. New York Interstate Pipeline Infrastructure



Source: Hitachi Energy, ICF

2.1.2 Interstate Pipeline Capacity by NYISO Load Zone

To assess the interstate pipeline capacity available for power generation in New York, ICF allocated the non-coincidental delivery capacity to NYISO Load Zones A through K. ICF utilized a county-to-Load Zone[23] mapping approach to assign each pipeline delivery point to its respective Zone and estimated the non-coincidental peak demand at the Zone level. For edge cases (Zones D and H), special handling was applied: Zone D uses a small Canadian pipeline (North Country) with known capacity and demand; Zone H, lacking direct interstate capacity, was allocated a share of capacity from adjacent Zone I.

The capacity figures presented in Table 2 represent the current physical pipeline capacities that ICF incorporated into its Zone-level modeling and analysis. The discussion below reviews ICF's assessment of

23 GitHub repository maps New York State counties to their NYISO load Zones: [NYISOToolkit/nyisotoolkit/nyisodata/county_to_load_Zone_map.csv at master · m4rz910/NYISOToolkit · GitHub]

these capacity values at the Zonal level. This Zone-level pipeline capacity represents the estimated availability of natural gas supply during a peak demand day.

Interstate pipeline capacity is assigned to NYISO Load Zone based on the physical location of the delivery point. Natural gas demand for each of the utilities is, however, not met according to NYISO Load Zone boundaries and instead based on the geography of each of the utilities' service territories. In certain areas with high demand and limited pipeline connectivity, utilities share distribution networks to ensure demand is met from supply that enter the area at the respective receipt points. This is, for example, the case in the downstate areas served by the NYFG. The allocation of supply to NYISO Load Zone and the impact on potential mismatches between natural gas supply and demand will be an important factor of assessing the adequacy of fuel supply for power generation in Section 3.2. The following subsection describes the interstate supply for each Load Zone. Capacity in this table includes "Other Supplies" which includes Greenpoint LNG, Astoria LNG, Holtsville LNG, National Grid CNG, National Grid Cogen Supplies, and National Grid RNG supplying the New York Facilities Group and split evenly between Zone J and Zone K and the NFG peaking supplies. Other supply quantities, sourced from utility supply plans, are assumed to be available to meet utility firm customer demands during high demand periods. While other supplies are not assumed to serve power sector demand directly, the supply sources would meet firm customer demands, freeing up more of the pipeline supply to meet power sector demand after firm customer demand is met. Limitations on the other supply sources would reduce the overall pipeline supply and, depending on scenario and zone, increase unserved capacity projections.

The determination of interstate pipeline is based on pipeline deliveries to delivery points within New York and is described in more detail in Section 5.2.3 of Appendix A.

Table 2. Zonal Total Interstate Pipeline Capacity

Zone Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Zone A	1,197	1,392
Zone B	228	265
Zone C	556	631
Zone D	81	81
Zone E	950	1,175
Zone F	116	390
Zone G	779	1,412
Zone H	160	181
Zone I	160	181
Zone J	3,085	3,915
Zone K	940	1,065
Total	**8,253**	**10,687**

Source: Hitachi Energy, Pipeline Bulletin Boards, and ICF

Zone A

Major interstate pipelines like Columbia Gas Transmission (CGT), Eastern Gas Transmission and Storage (EGT&S), Empire Pipeline Inc, National Fuel Gas Supply Corporation (pipeline and storage operating segment of National Fuel Gas Company, per the utility NFG), and Tennessee Gas Pipeline (TGP) deliver gas into Zone A. National Fuel Gas Supply Corporation and EGT&S supply 72% and 21% of the interstate pipeline deliveries, respectively, to Zone A, while the rest is delivered through CGT and Empire Pipeline Inc. Most of the gas delivered in Zone A happens through NFG distribution system, while NYSEG and RG&E distribution systems also overlap with Zone A and make some deliveries into the Zone.

Table 3. Zone A Interstate Pipeline Capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Columbia Gas Transmission Corp	6	15
Dominion Transmission Inc	265	299
Empire Pipeline Inc	19	30
National Fuel Gas Supply Corp	882	1,009
Tennessee Gas Pipeline Co	26	39

Zone B

Empire Pipeline Inc. supplies the bulk of capacity to Zone B, comprising 95% of the interstate pipeline deliveries. EGT&S provides the remaining 5% of the supply to Zone B. Most of the gas delivered in Zone B happens through NYSEG and RG&E distribution systems.

Table 4. Zone B Interstate Pipeline Capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Dominion Transmission Inc	7	15
Empire Pipeline Inc	220	250

Zone C

Major interstate pipelines like CGT, EGT&S, Empire Pipeline Inc., Millennium and TGP all supply to Zone C, however, the majority of supplies into the Zone C are delivered through EGT&S and Empire Pipeline Inc. – contributing 42% and 45% respectively – while the rest, 13%, is delivered through CGT, Millennium and TGP. Most of the gas delivered in Zone C comes through Corning and NYSEG distribution systems.

Table 5. Zone C interstate pipeline capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Columbia Gas Transmission Corp	11	12
Dominion Transmission Inc	251	268
Empire Pipeline Inc	261	284
Millennium Pipeline	21	35
Tennessee Gas Pipeline Co	12	31

Zone D

North County Pipeline moves the gas from Canada through TC Energy's system and delivers into Zone D through NYSEG's distribution system.

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
North Country Pipeline	81	81

Zone E

Major interstate pipelines like EGT&S, Iroquois Gas Transmission (IGT), and TGP supply Zone E, with EGT&S providing 88% of the total. Meanwhile, IGT and TGP provide 12% and 0.5% of the total, respectively. Most of the gas deliveries in Zone E happen through NiMo's distribution systems.

Table 6. Zone E Interstate Pipeline Capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)

Dominion Transmission Inc	890	1,039
Iroquois Gas Transmission System	60	136
Tennessee Gas Pipeline Co	0	1

Zone F

EGT&S and IGT supply to Zone F, with IGT accounting for 77% of the total supply to Zone F. The rest, 23%, is supplied by EGT&S. Most of the gas deliveries in Zone F happen through CHG.

Table 7. Zone F Interstate Pipeline Capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Dominion Transmission Inc	0	90
Iroquois Gas Transmission System	116	300

Zone G

Algonquin Gas Transmission (AGT), CGT, IGT, Millennium, and TGP deliver gas to Zone G. IGT, Millennium and CGT deliver 35%, 39%, and 13%, respectively, while the remaining 12% is supplied by AGT and TGP. The majority of the gas deliveries in Zone F happen through CHG, O&R and NYSEG.

Table 8. Zone G Interstate Pipeline Capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Algonquin Gas Transmission Co	66	158
Columbia Gas Transmission Corp	154	178
Iroquois Gas Transmission System	257	465
Millennium Pipeline	237	518
Tennessee Gas Pipeline Co	66	92

Zone H

Zone H receives natural gas supply primarily from two pipelines: AGT and TGP. Of the total supply to the Zone, AGT accounts for 24%, while TGP serves as the major supplier, contributing 76% of the total volume. Gas deliveries into Zone H are facilitated through the distribution infrastructure operated by ConEd/ CECONY, as Zone H lies in Westchester County.

Table 9. Zone H Interstate Pipeline Capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Algonquin Gas Transmission Co	15	20
Tennessee Gas Pipeline Co	145	161

Zone I

Interstate pipelines AGT and TGP supply gas to Zone I, with TGP supplying 89% and the rest (11%) is contributed by AGT. Again, gas deliveries into Zone I are facilitated through the distribution infrastructure operated by CECONY.

Table 10. Zone I Interstate Pipeline Capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Algonquin Gas Transmission Co	15	20
Tennessee Gas Pipeline Co	145	161

Zone J

Interstate pipelines Transcontinental Gas Pipeline (Transco), Texas Eastern Transmission (TETCO), and IGT form 49%, 33%, and 8%, respectively, of the total supply to Zone J, while the final 10% is met with other supplies. Gas deliveries into Zone J are facilitated through the distribution infrastructure operated by KEDLI, KEDNY, and CECONY.

Table 11. Zone J Interstate Pipeline Capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Iroquois Gas Transmission System	117	279
Texas Eastern Transmission LP	1,057	1,562
Transcontinental Gas Pipe Line Corp	1,559	1,721
Other Supplies[24]	353	353

Zone K

Interstate pipelines Transco and IGT provide 4% and 63%, respectively, of the total supply to Zone K. The remaining 33% is met by other supplies. Gas deliveries into Zone K are facilitated through the distribution infrastructure operated by KEDLI.

Table 12. Zone K Interstate Pipeline Capacity

Pipeline Name	Coincident Peak Supply Existing Capacity (MMcf/d)	Non-Coincident Peak Supply Existing Capacity (MMcf/d)
Iroquois Gas Transmission System	549	673
Transcontinental Gas Pipe Line Corp	38	39
Other Supplies	353	353

2.1.3 Proposed Interstate Pipeline Projects in New York

There are numerous proposed interstate pipeline projects that could increase interstate pipeline delivery capacity in New York. As of November 2025, only the Northeast Supply Enhancement (NESE) project has received the necessary permits to commence construction, with final water permits issued by New Jersey and New York on November 7th. Legal challenges to the NESE state permits are expected and could delay the project or overturn approval of the project. While none of the other proposed expansion projects have all the necessary permits to begin construction, they are being considered by state regulators in New York and its neighboring states. ICF's reference case scenario did not include these proposed expansions of the interstate pipeline system.

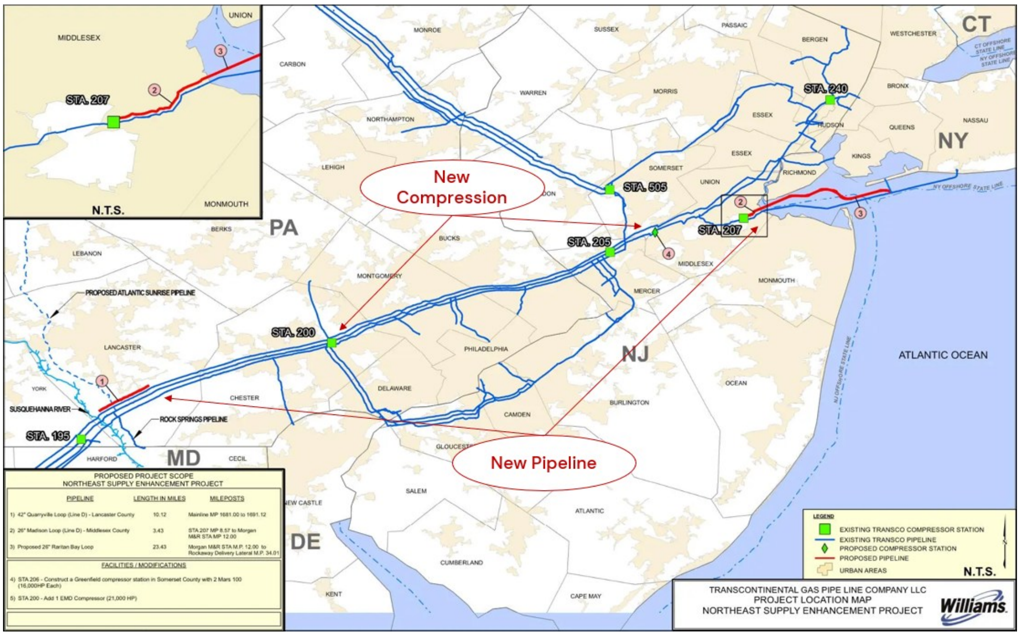
Williams' Transco NESE

On May 29, 2025, Williams asked FERC to expedite and reissue the certificate of public convenience and necessity for the NESE Project. The 400 MMcf/d project expands Transco's natural gas transmission system in PA, NJ, and offshore NJ/NY waters. It was previously halted in 2019 due to Clean Water Act Section 401 permit denials by NY and NJ. In 2025, Transco revived the project and Binding precedent agreements with the Brooklyn Union Gas Company and KeySpan Gas East Corporation for the full NESE capacity. The agreements cover 211,300 Dth/d and 188,700 Dth/d respectively, each with a 15-year term, supporting National Grid's forecasted demand growth. Additionally, the project would provide needed ancillary reliability benefits by creating a second service feed into Brooklyn. If constructed, the NESE project would increase Transco's Zone J capacity by 400 MMcf/d.

24 Greenpoint LNG, Astoria LNG, Holtsville LNG, National Grid CNG, National Grid Cogen Supplies, and National Grid RNG supply the New York Facilities Group and split evenly between Zone J and Zone K.

In November 2025, New York and New Jersey issued the required water permits. Given the timing of the permit issuance, NESE is not assumed in the Reference Case and impacts of the increased pipeline capacity is explored through the pipeline expansion scenario described further in Section 5.2.3.

Figure 3. Northeast Supply Enhancement Project Map



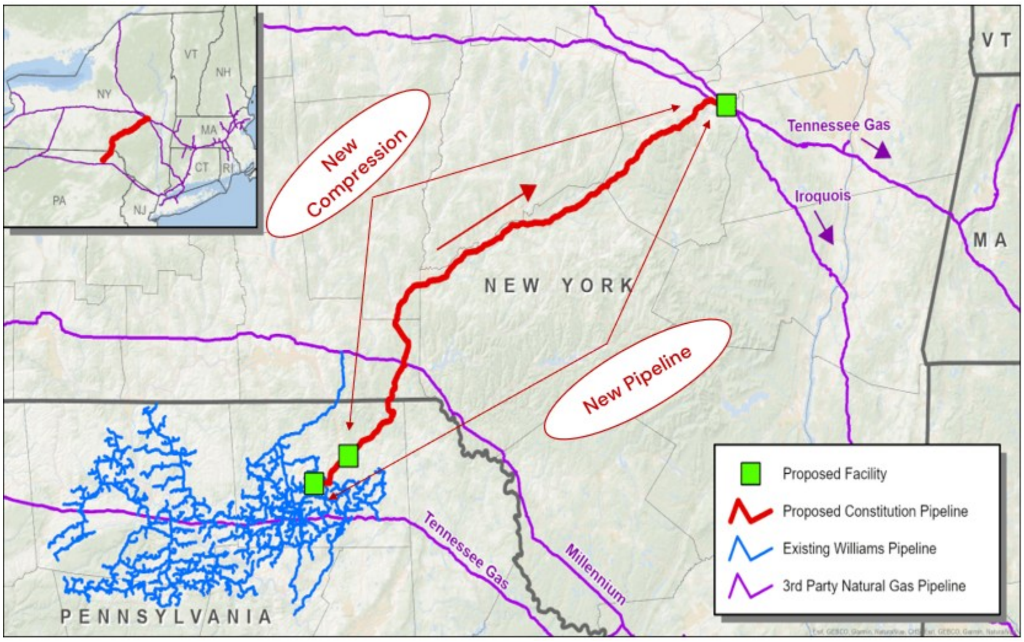
Source: Williams[25]

Williams' Constitution Pipeline

In May 2025, Williams revived the proposed Constitution Pipeline project, which was cancelled in 2020. The Constitution Pipeline would provide a new route for 650 MMcf/d of Marcellus natural gas supply from Pennsylvania to New York and New England. Stretching approximately 125 miles from Susquehanna County, Pennsylvania, to Schoharie County, New York, the pipeline would interconnect with the IGT and TGP pipelines. If the pipeline receives the necessary FERC, U.S. Army Corps of Engineers, and state permits in 2025, it could be in-service by Q3 2027. If constructed, the Constitution Pipeline could facilitate increased deliveries into NYISO Zones E, F, J, and K via the TGP and IGT pipelines.

25 Northeast Supply Enhancement Project Fact Sheet - Williams

Figure 4. Constitution Pipeline Project Map



Source: Williams[26]

Iroquois' Enhancement by Compression (ExC) Project

To meet the increasing need for natural gas in the northeast region, Iroquois' ExC Project is proposed as a 'compression only' alternative to provide additional firm natural gas transportation to New York utilities. IGT's 125 MMcf/d ExC project would enhance delivery capacity to CECONY and KEDLI, with each utility contracting for 62.5 MMcf/d of the capacity, thus increasing capacity in Zones J and K. The project has its FERC approval and New York state permits but is awaiting approval for its air permit from the Connecticut Department of Energy and Environmental Protection.

26 [Constitution Fact Sheet - Williams]

Figure 5. Iroquois' ExC Map

Source: Iroquois[27]

2.2 Oil Infrastructure

2.2.1 Oil Products Supply

New York State is a major petroleum consumer, but its petroleum supply infrastructure is almost entirely dependent on out-of-state and international sources with no in-state refining capacity. New York largely depends on a combination of nearby East Coast refineries in New Jersey and Pennsylvania, refined product pipelines from the Gulf Coast and Midwest, and imports. New York Harbor, which includes terminals on both the New York and New Jersey shorelines, offers over 75 million barrels of bulk storage capacity, making it the primary product distribution point in the Northeast. Products delivered to the harbor via pipeline, tanker, or barge are redistributed to smaller ports and inland terminals, by truck or barge, to Long Island and upstate along the Hudson River. Western New York is supplied primarily through pipelines from Pennsylvania and the Midwest, as well as marine shipments from Canada through the Port of Buffalo.[28]

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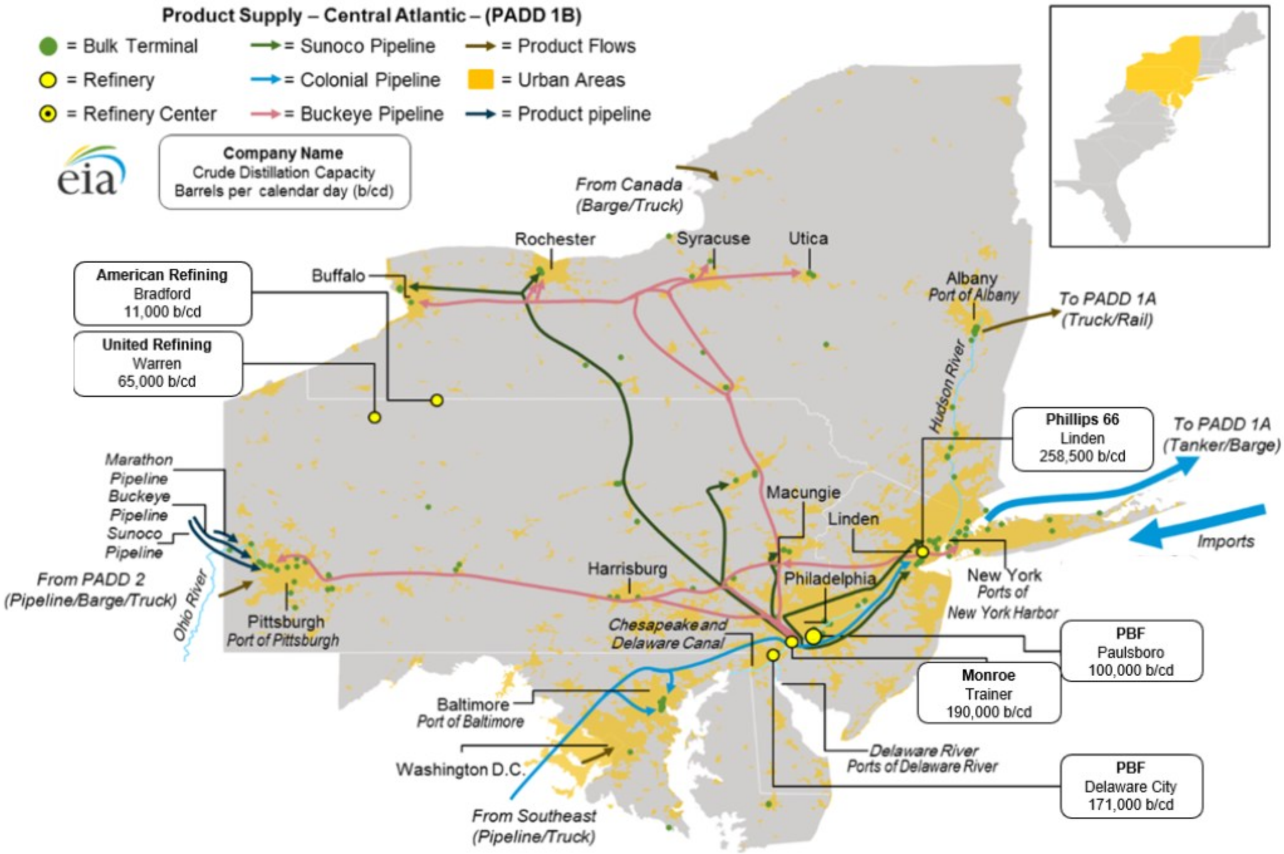
27 ExC Project | Iroquois Gas

28 [New York State Energy Profile - US EIA]

Figure 6. Central Atlantic Refined Petroleum Infrastructure



Source: Energy Information Administration (EIA)[29]

Pipelines

New York receives petroleum products through a network of interstate pipelines that primarily transport refined products from the Gulf Coast, Midwest, and nearby states. Pipelines entering New York are part of broader systems serving the East Coast, including connections that originate in Petroleum Administration for Defense District (PADD) 3 (Gulf Coast) and PADD 2 (Midwest) and terminate in PADD 1 (East Coast), which includes New York. Western New York is connected by pipeline infrastructure to supply points in Pennsylvania and the Midwest, serving as a delivery route for refined products into cities like Buffalo and Rochester. These pipelines support both continuous delivery and bulk transfers into terminal storage and are used in combination with other modes of transport depending on regional demand and supply availability.

Table 13. Key Refined Products Pipelines in New York and New York Harbor

Owner	Line Name	Origin	Destination	Pipeline Type	Capacity (bbl/d)
Colonial Pipeline Company	Line 3	Greensboro, NC	Linden, NJ	Product	885,000
Buckeye Partners	Long Island System	Linden, NJ	JFK and LaGuardia Airports, NY	Product	120,000
		Linden, NJ	Brooklyn and Inwood NY	Product	138,500

29 EIA - Company Level Petroleum Imports

	Eastern System	Macungie, PA	Rochester, Brewerton, and Utica, NY	Product	N/A
		Malvern, PA	Buffalo and Syracuse, NY	Product	30,000
Sunoco LP	Inland System	Philadelphia, PA	Rochester and Buffalo, NY	Product	64,800
		Philadelphia, PA	Syracuse, NY	Product	29,400

Source: EIA Energy Atlas, EIA PADDs 1 and 3 Transportation Fuels Markets[30]

Ports and Marine Access

New York Harbor is the largest hub for petroleum product imports in the Northeast and includes marine terminals located along both the New York and New Jersey shorelines. Petroleum products are delivered into the harbor by tanker and barge, and the area supports redistribution by water, truck, and pipeline. Bulk storage capacity in the harbor area exceeds 75 million barrels. Products received through the harbor are transported by barge to smaller ports along the Hudson River and to terminal facilities on Long Island. Western New York also receives petroleum shipments by water through the Port of Buffalo, which handles marine deliveries from Canada. These marine connections supplement pipeline supply and enable fuel movements into parts of the state that are not directly connected to interstate pipeline systems. Unlike pipelines, shipments into the port are not constrained by pipeline capacity and have the ability to increase shipments during peak periods if necessary.

Table 14. Waterborne Movements of Petroleum Products into New York Ports, 2023

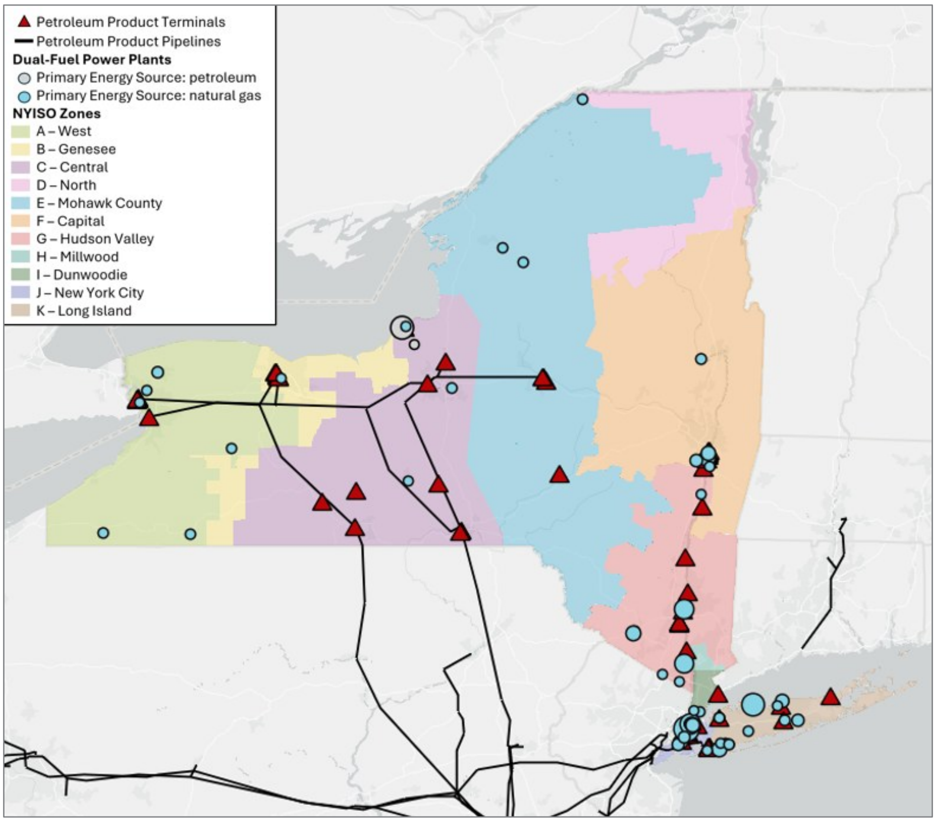
Port	Inbound (thousand bbl/d)					Outbound (thousand bbl/d)				
	Domestic DFO	Foreign DFO	Domestic RFO	Foreign RFO	Total	Domestic DFO	Foreign DFO	Domestic RFO	Foreign RFO	Total
Buffalo – Niagara Falls, NY	–	1	–	–	1	–	–	–	–	–
Albany, NY	14	–	4	–	18	–	–	–	–	–
New York Harbor	22	221	44	–	287	171	14	152	–	337
Champlain-Rouses Point, NY	–	1	–	–	1	–	–	–	–	–
Port Jefferson, NY	9	–	–	–	9	–	–	–	–	–
Hempstead, NY	–	–	–	–	–	–	–	–	–	–
Hudson River Waterway	45	–	29	–	74	–	14	1	–	15

Terminals, Storage, and Distribution

Bulk terminals across New York store and distribute petroleum products received from pipelines and marine shipments. As illustrated in Figure 7, the highest concentration of terminal infrastructure is in the New York Harbor area, which accounts for the majority of the region's total storage capacity. Terminals in this area are capable of handling product receipts from both domestic and international sources and provide facilities for transfer to truck and barge. Additional terminals are located along the Hudson River and in Western New York. Terminal storage capacity is used to manage seasonal demand fluctuations, enable distribution to retail markets, and provide contingency supply during disruptions. Many terminals in coastal and riverfront areas are able to support barge loading and unloading, and several are equipped with emergency backup systems.

30 EIA PADDs 1 and 3 Transportation Fuels Markets

Figure 7. New York State Terminals, Petroleum Pipelines, and Dual-Fuel Power Plants



Sources: GIS, EIA

The distribution of terminal infrastructure leads to variations in supply accessibility across NYISO Zones. Zones J and K, and to a lesser extent Zone G, benefit from proximity to the Linden New Jersey, New York Harbor and Hudson River terminal clusters, enabling more efficient and flexible resupply during periods of high winter demand. These regions may also compete with heavy traffic at times. In contrast, the northern portions of Zones D, E, and F, as well as the southern part of Zone A, are located farther from bulk terminal infrastructure and have limited access to large-scale fuel storage. While some secondary terminals may exist in these areas, deliveries often depend on longer overland routes which are more susceptible to weather-related disruptions and logistical delays. These constraints increase operational risk for dual-fuel generating units in those regions, particularly during extended cold weather events when demand for oil-based fuels increases and transportation networks may be strained.

2.2.2 Oil Use for Power Generation

Oil available for power generation in New York is primarily in the form of No. 2 distillate fuel oil (commonly used in dual-fuel units) typically trucked to facilities, and to a lesser extent, No. 6 residual fuel oil used in older steam plants with access to barge delivery. The availability of oil for power generation depends on on-site storage capacity and the extent to which that capacity is filled, as well as terminal storage levels, delivery logistics, and the operational readiness of dual-fuel capable generating units, which typically operate on natural gas but can switch to oil during high demand periods, natural gas curtailments or price spikes, or system emergencies.

Refined product terminals across the state, particularly in the New York Harbor area and along the Hudson River, supply oil to generation sites via barge and truck deliveries. Generators typically maintain on-site storage tanks to support several days of oil-fired operation, though storage capacity varies by plant type, location, and environmental permitting. During winter, generators often secure oil inventories in advance to support grid reliability, consistent with guidance from the North American Electric Reliability Corporation

(NERC),[31] New York State Reliability Council (NYSRC),[32] and recommendations in Northeast Power Coordinating Council (NPCC)[33] studies on fuel assurance. LDCs that manage the New York Fuel Gas (NYFG) system also place alternate fuel inventory requirements on generation customers through their tariffs.[34] Both terminal and on-site inventory levels are monitored closely by grid operators, especially during cold weather events when fuel availability can become a limiting factor for dispatchable capacity.

The state's overall reliance on oil-fired generation is relatively modest in terms of annual output; in 2024 oil accounted for approximately 0.24% (312 GWh) of total electricity generation in New York, with peak hourly supply exceeding 5,000 MW.[35] However, its role during extreme weather events is significant. For example, during polar vortex events or extended cold snaps, oil-fired units may account for a larger share of the generation mix due to constraints on the natural gas system. In the near-to-mid-term horizon, adequate oil remains a key component of winter reliability planning.

3 Demand

What follows is a summary of ICF's natural gas and fuel oil demand forecasting methodology and results for New York, focusing on the key drivers used to estimate future gas needs. Determination of design day demand, which represents the maximum expected gas usage on the coldest day, and peak winter week demand based on a range of temperature inputs underpins ICF's analysis. Forecasts were developed using utility-specific data, regulatory requirements, operational insight from ICF's interviews with key stakeholders, historical weather patterns, and historical deliveries from interstate pipelines to gas utilities. The analysis employs a combination of statistical modeling, scenario analysis, and expert judgment to forecast demand possibilities, accounting for factors such as customer growth, energy efficiency initiatives, fuel switching, and broader economic trends.

Additionally, this section discusses how utilities, pipeline operators, and generators plan for both short-term and long-term demand, ensuring that delivery infrastructure can accommodate peak needs even during extreme weather events. ICF also discusses the demand for backup resources like fuel oil – which play a limited but critical role in the broader NYISO system. While annual gas demand growth is expected to be modest, key uncertainties—like the pace of electrification, policy changes, and market dynamics—are not directly reflected in ICF's forecasts, so their trajectory must be continuously monitored in practice to ensure New York's electric supply infrastructure is prepared for future winter peak events.

3.1 Firm Gas Demand

Demand for natural gas from a utility's firm natural gas customers is the demand that must be served (primarily for heating purposes) before utilities serve non-heating customers, such as power plants, that rely on utility service for fuel supply. Whereas utilities guarantee (barring unforeseen circumstances) supply for their firm customers, gas supply for non-firm customers is interruptible. In line with that hierarchy of delivery, the assessment of demand for natural gas and secondary fuels summarized in the following section (3.1) examines the utility gas demand prior to natural gas consumption from power generators (explored in Section 3.2).

The demand assessment focuses on a seven-day period over the next 10 years. The seven-day forecast for future years is based on pipeline deliveries, temperature [expressed in heating degree days (HDD) on an HDD 50 basis[36]], and utility demand for non-power sector use over the course of the seven days from January 19, 2025 to January 25, 2025, the week during which the peak energy demand day of the

31 North American Electric Reliability Corporation (NERC)
32 New York State Reliability Council (NYSRC)
33 Northeast Power Coordinating Council (NPCC)
34 See, for example, Consolidated Edison Company of New York Tariff PSC No: 9 GAS, Interruption of Service for Power Generation Customers.
35 EIA Electricity Form EIA-923 detailed data with previous form data (EIA-906/920)
36 HDD is indicative of heating energy demand; using HDD 50 means how cold it is (in terms of HDDs) is measured by a recorded mean outdoor temperature relative to a base temperature of 50°F.

2024/2025 winter occurred on January 22, 2025.[37] ICF developed regressions that project the firm gas demand for each of the seven days of a peak demand week for the next ten years, based on Zonal temperature assumptions from NYISO's Climate Change Impact Study[38] and relative annual utility demand growth projections from design day forecasts. The regression results, paired with the temperature forecasts, resulted in utility- and Zone-specific demand forecasts for each year over a seven-day period.

Within the seven-day forecasts, a peak-day demand forecast examines the highest potential demand on any given day. To examine the range of potential demand levels, this peak day forecast was constructed based on three different weather input assumption categories and five scenarios that varied the input into utility demand regressions:

1. Historical January 22, 2025, weather, consistent with the other six days of the forecast
2. Design Day from utility design day forecasts
3. Peak Day Weather consistent with NYISO load forecasting Bins 1, 4, and 7

The following sections discuss the demand methodology for the design day, the demand results for all the seven-day forecasts over the next 10 years, as well as the comparison of the peak day forecasts.

3.1.1 Utility Design Day Demand

ICF analyzed the reported design day demand requirements for each of the 11 gas utilities considered in this analysis. Utility reporting of demand requirements under each utility's preferred scenario for regulatory proceedings is considered a reliable source of data; utility design day demand forecasts represent the maximum possible gas demand from utilities on the coldest day. ICF built a statewide design day, and peak week forecast for natural gas demand using utility design day demand forecasts from winter and long-term supply plans. ICF then allocated that demand to each Load Zone using the proportion of historical peak day deliveries to each Load Zone. Finally, ICF calculated the remaining interstate pipeline capacity available for power generation in each Load Zone by subtracting forecasted utility demand from pipeline capacity by Load Zone. As shown in Figure 8, ICF incorporates utility design day forecasts directly into the projection of the peak design day, and also integrates annual demand growth forecasts from design days into the regressions used to determine the seven-day demand forecast for each year, including non-peak Days 1-3 and 5-7 of the peak week. For more information on the methodologies used to derive demand forecasts, please see Appendix A: Detailed Methodology.

ICF's characterization of design day gas demand by Load Zone was constrained by limited information. The Zonal gas demand methodology may result in mismatches or artificial surpluses/deficits at the Zonal level, which do not necessarily reflect operational realities, especially since utilities do not plan by Load Zone. Further, while we know that gas can be shared there is uncertainty about how much gas can be shifted or shared between Zones, particularly in complex areas, due to a lack of hydraulic modeling and historical data.

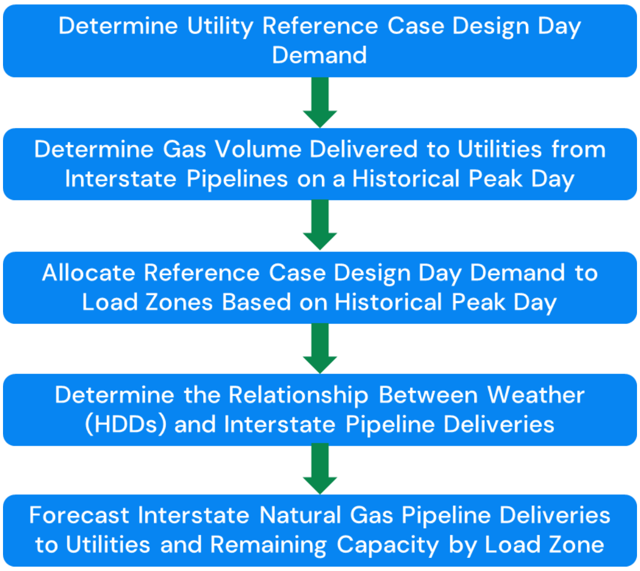
For the winter of 2025/26, the total projected natural gas design day demand for the 11 gas utilities is 8,045 MMcf/d. This number represents a coincident total, in which every utility in the state experiences design day demand on the same day, which ICF considers unlikely. From the winter of 2025/26 to the winter of 2034/35, the coincident design day demand requirement is projected to increase by 3% to 8,285

37 January 22nd, 2025, and the surrounding week was selected as the historical peak day/week given its recent occurrence, the coincidence of temperature, natural gas, and electric peak demands and overall highest energy demand occurrence over the past 8 years. Of the historical peak days reviewed January 22nd and the week surrounding it was therefore deemed the most suitable basis for demand forecasting of peak energy demand.

38 New York ISO Climate Change Impact Study Phase 1: Long-Term Load Impact

MMcf/d and utilities must plan to meet this growth in design day demand primarily through contracting for interstate pipeline capacity, leaving less of that capacity for the power generation sector.

Figure 8. Natural Gas Design Day and Peak Week Utility Demand Forecast Methodology



Design day forecasts from utilities are incorporated directly into ICF's projection. Each utility follows their own process and relies on their own set of assumptions to determine design day forecasts, and therefore forecasts can vary between utilities, both in methodology and in outcome. As an example, CECONY's design-day forecast is projected to decline over 5% from 2025 to 2035, whereas KEDNY and KEDLI project material design day demand growth of 10% over the ten-year forecast period. Regional differences in design day growth trajectories directly impact the available fuel for power generation and given that the design day assumptions reflect the highest demand forecast and most extreme weather scenario in this analysis, regional differences in design day forecasts are important to recognize when identifying potential fuel supply limitations for power plants.

Table 15. Design Day Demand Forecasts by Utility (MMcf)

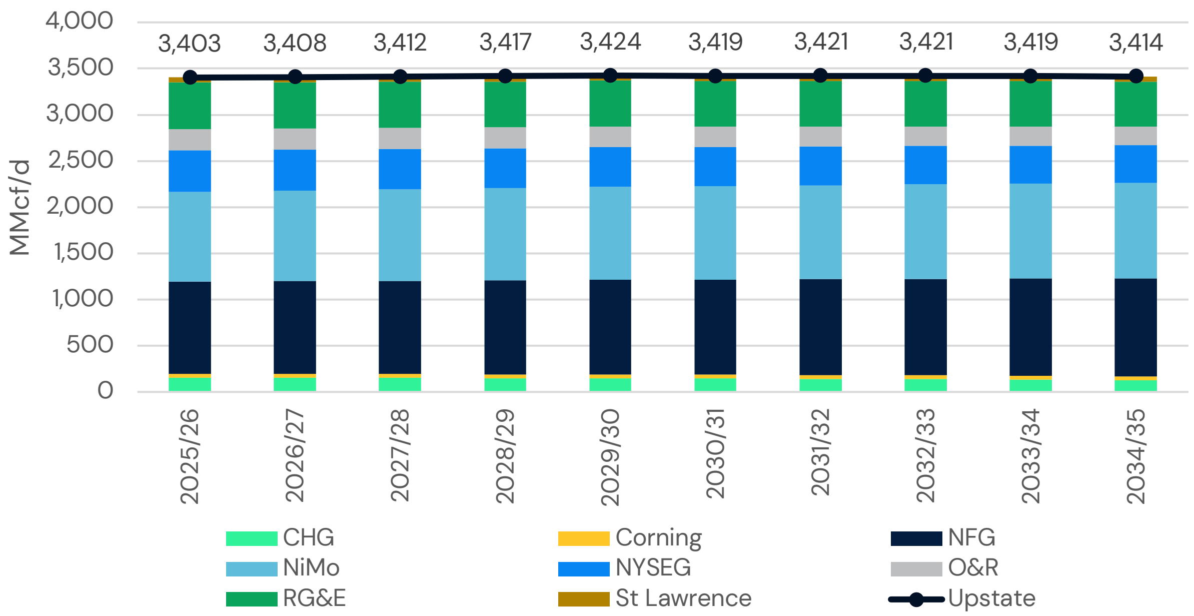
LDC Name	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35
CHG	153	152	151	150	147	144	141	138	135	129
Corning	42	42	42	42	42	42	42	42	42	42
NFG	997	1,004	1,010	1,018	1,025	1,032	1,038	1,044	1,050	1,056
NiMo	970	979	987	994	1,007	1,007	1,015	1,023	1,030	1,036
NYSEG	451	445	440	435	430	425	420	415	410	406
O&R	233	230	228	225	223	220	218	213	208	203
RG&E	502	500	499	497	495	493	491	490	488	486
St Lawrence	55	56	56	56	56	56	56	56	56	57
Upstate	**3,403**	**3,408**	**3,412**	**3,417**	**3,424**	**3,419**	**3,421**	**3,421**	**3,419**	**3,414**
KEDNY	1,720	1,730	1,736	1,756	1,778	1,800	1,820	1,856	1,891	1,921
KEDLI	1,220	1,230	1,240	1,255	1,280	1,299	1,320	1,325	1,330	1,340
CECONY	1,703	1,705	1,703	1,700	1,690	1,680	1,665	1,650	1,630	1,610
Downstate	**4,643**	**4,665**	**4,679**	**4,711**	**4,748**	**4,779**	**4,805**	**4,831**	**4,851**	**4,871**
Total	**8,045**	**8,073**	**8,091**	**8,128**	**8,172**	**8,198**	**8,226**	**8,252**	**8,270**	**8,285**

Source: Utility Long Term Supply Plans and Winter Supply Plans

Upstate New York Design Day Demand

While most upstate gas utilities are projected to experience a decline in demand, NFG and NiMo stand out as exceptions. Between 2025 and 2035, NFG's design day natural gas demand is expected to increase by 59 MMcf, a 6% increase. Similarly, NiMo forecasts a 66 MMcf increase, a 7% increase.

Figure 9. Design Day Demand Forecast: Upstate

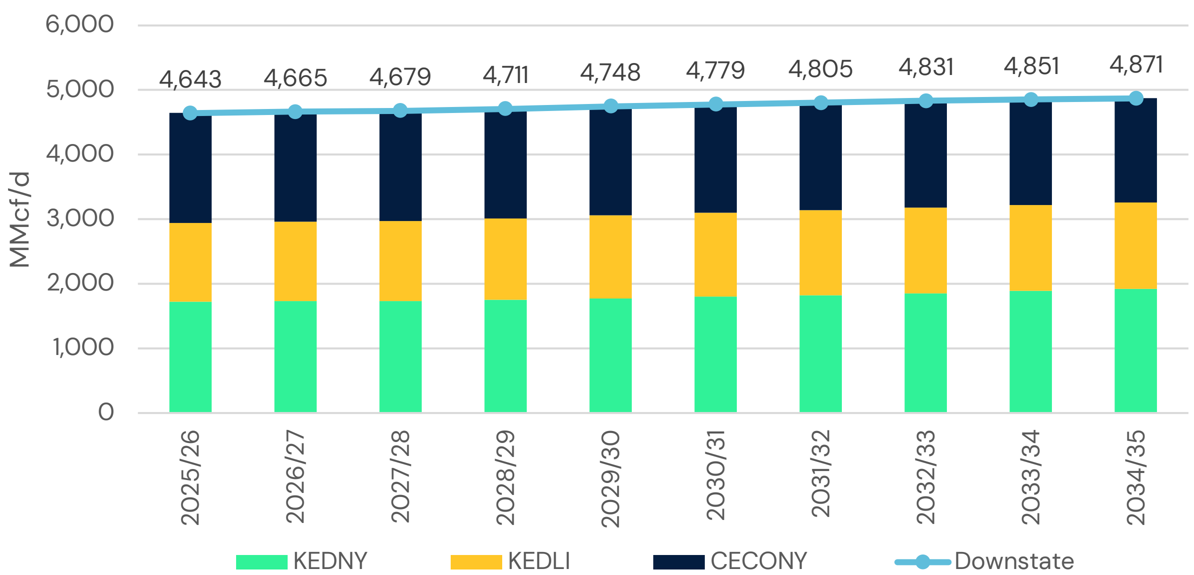


Source: Utility Long Term Supply Plans

Downstate New York Design Day Demand

Two of the three Downstate utilities, KEDNY and KEDLI – both of National Grid – forecast design day demand growth. Between 2025 and 2035, KEDNY's demand is expected to increase by 201 MMcf, a 12% rise, while KEDLI forecasts a 120 MMcf increase, representing 10% growth over the same period driven by forecasted demand growth in residential and commercial sector, and the phase-out of #4 fuel oil in New York City through Local Laws 32 and 38.

Figure 10. Design Day Demand Forecast: Downstate



Source: Utility Long Term Supply Plans

3.1.2 Zonal Design Day Demand

Since utilities report gas demand by service territory rather than by NYISO Load Zones, ICF developed a methodology to reallocate demand accordingly. This approach involved analyzing gas deliveries from interstate pipelines into each utility's service area and the counties they serve on a historical coincidental peak day—January 21, 2025. These counties were then mapped to their respective NYISO Load Zones to estimate Zonal demand. For edge cases (Zones D and H), special handling was applied: Zone D sources its gas from Canada via the North Country Pipeline with known capacity and demand; Zone H, lacking direct interstate capacity, was allocated half of the demand from adjacent Zone I.

Table 16 below highlights the Zonal firm gas demand that is used for modeling and analysis to assess the gas availability for the power generators.

Table 16. Zonal Design Day Firm Gas Demand Forecast (MMcf)

Zone Name	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35
Zone A	1,303	1,308	1,313	1,319	1,325	1,330	1,335	1,339	1,344	1,348
Zone B	273	272	271	270	269	268	266	266	264	263
Zone C	322	319	315	312	309	306	302	299	296	293
Zone D	13	13	13	13	13	13	13	13	13	13
Zone E	1,002	1,011	1,019	1,026	1,039	1,039	1,046	1,054	1,061	1,067
Zone F	62	62	62	62	62	62	61	61	60	59
Zone G	427	423	418	414	409	403	397	389	381	371
Zone H	314	315	314	314	312	310	308	305	301	297
Zone I	314	315	314	314	312	310	308	305	301	297
Zone J	2,870	2,883	2,888	2,907	2,924	2,941	2,953	2,980	3,003	3,021
Zone K	1,143	1,152	1,162	1,176	1,199	1,217	1,237	1,241	1,246	1,256
Total	**8,045**	**8,073**	**8,091**	**8,128**	**8,172**	**8,198**	**8,226**	**8,252**	**8,270**	**8,285**

Between 2025 and 2035, Zones A, E, J, and K are projected to experience growth in design day natural gas demand, while all other Zones are expected to see declines ranging from 3 to 56 MMcf. Zone J is forecasted to record the highest absolute increase at 150 MMcf, followed by Zone K with an increase of 112 MMcf. Increases in Zones J and K are attributable to growth in the KEDNY and KEDLI design day forecasts, outpacing reductions in design day forecasts from CECONY.

Zones E and A are also expected to see moderate growth, with increases of 65 MMcf and 46 MMcf, respectively. In aggregate, design day demand across all Zones is anticipated to rise by 240 MMcf, representing a 3% increase over the ten-year period.

3.1.3 Zonal Modeled LDC Demand

ICF's forecast of the Zonal utility natural gas demand focuses on a seven-day period in each year between 2025 and 2035. Within the seven-day forecast, Day 4 represents a peak day that incorporates temperature assumptions to assess a range of potential weather scenarios and their impact on utility demand. In modeling Zone-level LDC demand for its ten-year forecast, ICF applied the design day growth rates to capture underlying winter peak week demand trends across each Zone. A more detailed explanation of the Zone-level LDC demand modeling methodology, including underlying assumptions and potential caveats, is provided in the Appendix A: Detailed Methodology of this report.

Seven-Day Demand Forecast

Table 17 below summarizes the modeled LDC natural gas demand across all NYISO Zones during Capability Year 2025-2026 for the winter peak week. Days 1-7 use the HDDs from January 19, 2025, to January 25, 2025, as the historical peak natural gas demand week over the reviewed period of historical demand was January 19, 2025, to January 25, 2025. Natural gas utility demand on Days 1-7 are forecasted volumes based on the regression of HDDs and interstate pipeline deliveries to the utilities allocated to each Load Zone.

Table 17. Zonal Seven-Day Peak Week Peak Demand (MMcf)[39]

Zone Name	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035
Zone A	314	309	461	440	593	560	733	690	427	410	424	407	418	402
Zone B	85	82	125	119	165	157	181	172	115	110	111	106	118	112
Zone C	45	43	72	67	108	99	131	119	77	71	60	56	64	59
Zone D	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Zone E	649	644	710	703	791	782	842	832	781	772	710	703	689	683
Zone F	-	-	9	7	19	16	27	24	8	7	8	6	7	6
Zone G	168	162	225	213	287	269	324	302	278	260	241	228	234	221
Zone H	139	136	167	163	209	201	233	223	211	203	186	180	182	177
Zone I	138	136	163	159	203	196	225	216	204	196	184	178	182	176
Zone J	627	615	918	883	1,425	1,348	1,633	1,539	1,417	1,341	1,131	1,079	1,046	1,001
Zone K	224	225	316	312	520	507	639	622	505	493	474	464	432	423
Total	**2,401**	**2,363**	**3,179**	**3,079**	**4,333**	**4,148**	**4,981**	**4,752**	**4,036**	**3,876**	**3,542**	**3,420**	**3,385**	**3,273**

Over the next ten years, Zonal peak demand over the coldest winter week is projected to decline between 67 and 324 MMcf, depending on the day of the week. Increasing temperatures identified in NYISO's Climate Change Impact Study decrease Zonal demand, with the largest impact on the highest demand day.[40]

Peak Day Demand Forecasts

Table 17 above features a peak demand day consistent with the historical weather observed on January 22, 2025. Four additional peak demand forecasts examine potential alternative peak day demands. Table 18 below compares the demand for the five different peak day demand forecasting approaches, starting with the historical January 22, 2025, data shown in Table 17 above.

For the design day forecast, gas demand for the LDC sector is highest due to high residential and commercial heating demand driven by the extremely cold temperature assumed by utilities when forecasting their demand. For this day, ICF's model applies Zonal design day demand values to reflect these conditions accurately. The remaining three forecasts for the peak demand day incorporate the temperature forecasts that NYISO relies on for the definition of different electric load scenarios, capturing seven different peak day weather assumptions that result in a range of natural gas demand forecasts. ICF incorporated estimated HDDs for the highest load Bin 1, the medium Bin 4 and the lowest load Bin 7.

Table 18. Peak Day Demand Forecast Scenarios (MMcf)

Zone Name	22-Jan-25		Design Day		NYISO Load Bin 1		NYISO Load Bin 4		NYISO Load Bin 7	
	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035
Zone A	733	690	1,298	1,348	994	929	573	544	340	333

39 The combination of allocating supply to Load Zones based on physical deliveries and HDD-based regressions can lead to individual Load Zone demand projections approaching 0 during high winter temperatures with low HDDs, such as in Zone F on Day 1. This does not indicate an actual demand of 0 MMcf in Zone F, and is an artifact of the Zonal allocation approach required absent locational and granular customer demand/gas delivery data.

40 The trends in temperatures observed in NYISO's Climate Change Impact Study utilized for this report do not speak to the potential changes in the likelihood of extreme weather events, including cold weather events that would lead to lower temperatures and result in higher demand. Potential weather outcomes are covered in this analysis through the five different demand scenarios, each assuming a different peak day temperature, including a colder-than-recently-observed gas planning design day.

Zone B	181	172	275	263	236	223	157	149	95	91
Zone C	131	119	327	293	233	211	108	98	46	44
Zone D	13	13	13	13	13	13	13	13	13	13
Zone E	842	832	994	1,067	971	957	801	792	632	627
Zone F	27	24	62	59	55	49	18	16	0	(1)
Zone G	324	302	432	371	391	361	266	250	180	172
Zone H	233	223	314	297	271	259	196	190	146	144
Zone I	225	216	314	297	268	255	198	191	149	146
Zone J	1,633	1,539	2,858	3,021	2,354	2,198	1,411	1,335	770	747
Zone K	639	622	1,134	1,256	910	882	497	485	258	257
Total	**4,981**	**4,752**	**8,021**	**8,285**	**6,696**	**6,337**	**4,238**	**4,063**	**2,629**	**2,573**

The design day represents by far the highest demand scenario, and the only scenario with projected growth in demand between 2025 and 2035. In 2025, the design day across NYISO is projected at a 30% higher demand compared to the second highest demand projection, which is NYISO's load Bin 1 forecast for colder temperatures. Compared to the peak energy demand day of the 2024/2025 winter, the design day peak demand is projected 67% higher. Results do however vary significantly by region – NYISO's load Bin 1 forecast approaches design day conditions for Zone C in 2025 and exceeds it in 2035 given the reduction in design day demand projected over the next ten years in Zone C. Table 20 below shows the relationship of each of the Zonal peak day projections relative to the design day. Upstate Zones B, C, D, and E are closest to the design day both historically and in forecasted demand using NYISO's Load Bins. Table 19 shows the 2025 HDDs by the various demand scenarios, using an HDD50 reference.

Table 19. 2025 Peak Day HDDs by Scenario (HDD50)

Zonal HDD50 (2025)	Design Day	January 22, 2025	NYISO Bin 1	NYISO Bin 4	NYISO Bin 7
Zone A	60	46	54	39	24
Zone B	60	44	53	39	25
Zone C	60	44	56	40	24
Zone D	70	46	64	46	28
Zone E	60	47	60	43	26
Zone F	58	45	57	40	23
Zone G	50	44	51	36	21
Zone H	50	42	49	34	19
Zone I	50	39	47	33	19
Zone J	50	34	44	30	16
Zone K	50	36	44	30	16

Table 20. Peak Day Demand Forecast Scenarios Relative to Design Day Conditions (%)

Zone Name	Jan 22nd 2025		Design Day		NYISO Load Bin 1		NYISO Load Bin 4		NYISO Load Bin 7	
	2025	2035	2025	2035	2025	2035	2025	2035	2025	2035
Zone A	49%	45%	100%	100%	63%	58%	41%	38%	27%	26%
Zone B	68%	67%	100%	100%	91%	89%	59%	58%	35%	35%
Zone C	83%	90%	100%	100%	98%	106%	79%	85%	60%	65%
Zone D	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Zone E	81%	75%	100%	100%	89%	82%	78%	72%	64%	59%
Zone F	52%	53%	100%	100%	66%	66%	47%	47%	31%	31%
Zone G	69%	76%	100%	100%	81%	88%	59%	65%	42%	47%
Zone H	67%	69%	100%	100%	75%	77%	60%	61%	47%	49%
Zone I	67%	68%	100%	100%	77%	78%	61%	62%	48%	49%
Zone J	54%	49%	100%	100%	76%	68%	48%	43%	27%	25%
Zone K	51%	45%	100%	100%	71%	62%	41%	36%	23%	21%
Total	**60%**	**56%**	**100%**	**100%**	**77%**	**71%**	**53%**	**49%**	**35%**	**33%**

3.2 Power Demand

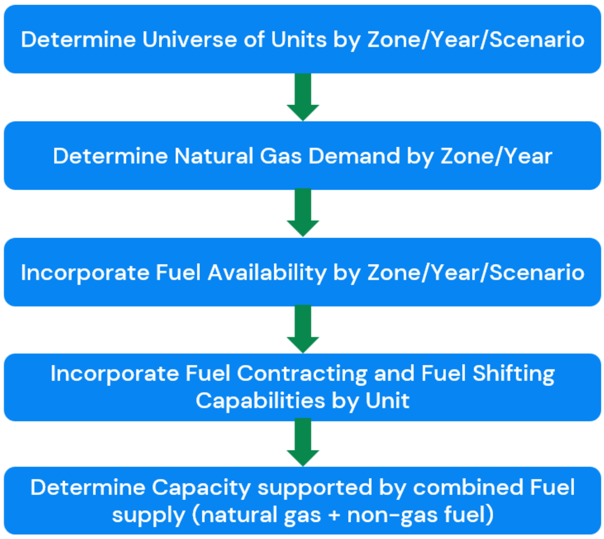
The purpose of this analysis is to evaluate winter fuel availability to understand how supply constraints may impact the ability of the thermal system to support power sector demand during peak winter conditions. This assessment is intended to highlight potential vulnerabilities and stress points in the natural gas and oil fuel supply system that could limit thermal power generation.

It is important to note that this analysis is not a dispatch analysis and does not attempt to forecast how future electricity load will be met. Unit level operational parameters such as dispatch decisions and real time grid balancing are outside the scope of this analysis. This analysis isolates fuel supply as a key variable and examines its impacts on power sector fuel availability and generation.

3.2.1 Power Sector – Methodology

The following section summarizes ICF's methodology to determine fuel demand from power plants during a peak winter week between 2025 and 2035. A detailed description of the data sources used in this methodology is included in Appendix A: Detailed Methodology.

Figure 11. Overview of Power Sector Fuel Demand Methodology



As shown in Figure 11, the first step to determine the winter fuel demand for a ten-year forecast is the definition of the universe of generators assumed to be in the system and the capacity of facilities in winter conditions. ICF relied on NYISO's 2025 Gold Book for existing capacity, winter capability and anticipated retirement dates.

The second step quantifies the theoretical maximum demand for natural gas and oil that could result from the dispatch of the universe of generators identified in the first step. This step uses the lesser of the Capacity Resource Interconnection Service (CRIS) and winter rated capacities from step 1 and fuel-specific full-load heat rates for each generator to determine the maximum potential fuel consumption under scenarios of gas-only dispatch or fuel-switching. Gas-only dispatch assumes that all power generators capable of running on gas do so, whereas the fuel switching scenarios assumes that all generators capable of running on oil do so. Neither scenario is intended to project assumed dispatch and instead represent a theoretical maximum fuel demand to assess fuel supply against.

The third step incorporates the availability of natural gas and fuel from the natural gas and oil supply analysis included in Sections 2.1 and 2.2 of this report. Again, available supply for power generation is characterized over a seven-day period, with scenario analysis leading to variation of the supply available for natural gas generation on the coldest day of the week. The scenarios incorporate weather-driven changes to utility demand for non-power sector end-uses, with resulting variation in the available supply for power generation. Scenarios include temperature variation for the 2025 temperature on the coldest day of the year, based on January 2025 weather, weather consistent with NYISO Load Bin load forecasts, as well as a gas utility design day. Gas utility design day forecasts inform the design day availability of fuel for power generation. All results shown for fuel availability are presented in MMcf/d, whereas all demand numbers represent the demand for fuel under the assumption of 24h dispatch at the CRIS or winter capability rating in NYISO's Gold Book.

All following steps of the analysis compare the demand for natural gas and fuel oil during the coldest winter week and the coldest winter day under the different weather conditions outlined above. In addition to comparing fuel demand with supply under different weather conditions, insights from interviews, NYISO Generator Fuel and Emissions Reporting (GFER) surveys, pipeline data and EIA generator data were incorporated to capture generator-specific fuel procurement strategies. As a result, the available fuel for power generation was compared not only to fuel demand under gas-only generation or fuel-switching at all capable generators, but also under the assumption that generators consume fuel based on their preferred fuel procurement. For example, combined cycle or cogeneration facilities may be dual-fuel capable, and therefore assumed to dispatch on oil under a fuel-switching scenarios, but instead consume natural gas even under extreme cold conditions as their natural gas supply is firmly contracted directly on the pipeline for at least a part of their output, with pricing of natural gas hedged against day-ahead pricing through fuel procurement strategies. In this example, natural gas would still be consumed by these generators, limiting the gas remaining as available for other generators, resulting in a lower supply for gas-only generators.

3.2.2 Power Sector – Universe of Generators

Table 21 below summarizes the capacity of thermal generators in the New York ISO footprint by fuel type in 2025. No thermal generators are shown in the Gold Book for Zones H and I.

Table 21. 2025 NYISO Zonal Thermal Capacity (MW) by Fuel Type[41]

Zone Name	Gas Only (MW)	Oil Only (MW)	Dual Fuel (MW)	Total (MW)
Zone A	-	-	503	5,03
Zone B	122	-	7	129
Zone C	1,298	819	1,050	3,167
Zone D	365	-	-	365
Zone E	61	-	155	216
Zone F	2,334	-	1,183	3,517
Zone G	1,644	-	3,216	4,860
Zone J	1,948	-	7,389	9,337
Zone K	224	1,362	3,672	5,258
Total	**7,996**	**2,181**	**17,175**	**27,352**

Table 22 below summarizes the assumed retirements of the units in the Reference Scenario, their assumed retirement date, and their CRIS or winter capacity. These retirement dates are derived from the NYISO Gold Book and are subject to change based on NYISO's Short-Term Reliability Process. These retirements lead to a reduction in 25 MW, 1,147 MW, and 46 MW in Zones G, J, and K, respectively. Retirements are primarily driven by compliance with the New York State Peaker Rule and plans from the New York Power

41 NYISO 2025 Gold Book, Winter Capability, NYISO Winter Fuel Survey. Limitations of generators to consume backup fuel due to generator-specific conditions such as lack of LDC connection or other non-supply driven limitations beyond what is referenced in the Gold Book are not fully captured in this report.

Authority (NYPA) to phase out small peaker plants in line with the Small Natural Gas Power Plant Transition Plan and as directed in the 2023-24 state budget. Table 22 lists the retirement assumptions for thermal generators in New York and Table 23 summarizes the impact these retirements have on their respective Zones and total NYISO thermal capacity.

Table 22. Assumed Retirements by Load Zone and Date[41]

Unit	Load Zone	Date	Winter Capacity (MW)
Coxsackie GT	G	5/31/2026	25
Gowanus CT02	J	5/1/2027	182
Gowanus CT03	J	5/1/2027	180
Narrows CT01	J	5/1/2027	187
Narrows CT02	J	5/1/2027	187
Gowanus 5	J	12/31/2030	40
Gowanus 6	J	12/31/2030	40
Kent	J	12/31/2030	46
Pouch	J	12/31/2030	46
Hellgate 1	J	12/31/2030	40
Hellgate 2	J	12/31/2030	40
Harlem River 1	J	12/31/2030	40
Harlem River 2	J	12/31/2030	40
Vernon Blvd 2	J	12/31/2030	40
Vernon Blvd 3	J	12/31/2030	40
Brentwood	K	12/31/2030	46

Table 23. NYISO 2025 Capacity, Assumed Retirements & 2035 Capacity (MW)

Load Zone	Gas Only (MW)	Oil Only (MW)	Dual (MW)	Total (MW)
Zone G 2025 Capacity	1,644	-	3,216	4,860
Zone G Retirements	-	-	25	25
Zone G 2035 Capacity	**1,644**	**-**	**3,191**	**4,835**
Zone J 2025 Capacity	1,948	-	7,389	9,337
Zone J Retirements	412	-	735	1,147
Zone J 2035 Capacity	**1,536**	**-**	**6,654**	**8,190**
Zone K 2025 Capacity	224	1,362	3,672	5,258
Zone K Retirements	46	-	-	46
Zone K 2035 Capacity	**178**	**1,362**	**3,672**	**5,212**
NYISO 2035 Total Capacity	**7,538**	**2,181**	**16,415**	**26,133**

To calculate fuel consumption from generators, fuel-specific heat rates were derived from the EPA's Clean Air Markets Program Data (CAMPD), which provides hourly generation and emissions data at the unit level, which can be used to categorize hourly generation by fuel type and derive unit and fuel-specific heat rates. These rates were calculated based on historical operating periods when units were running at typical base load while consuming either natural gas or oil. The fuel consumption for each unit is based on the lower of its two capacities: the full CRIS or winter rated capacity reported in the 2025 Gold Book[41].

These assumptions are intended to capture the theoretical maximum potential fuel demand, rather than reflect specific dispatch behavior or economic operating limits. The NYISO's reliability tools, which this analysis may inform, separately account for non-fuel related derates.

Fuel switching capability assumptions were derived from the 2025 NYISO Gold Book[41]. Two approaches are taken to incorporate fuel switching into the scenarios. The first approach, referred to as Fuel Switch, calculates fuel consumption with all dual fuel units switching to oil consumption. Table 21 above shows that 17 GW of NYISO capacity is dual fuel and therefore all of this capacity would consume oil, not gas, when fuel switching is incorporated. The second method, the Partial Fuel Switch approach, utilizes historical operating data and information gained from the generator interviews to identify units that would not fuel switch under this condition and instead continue to have gas demand.

Table 24. Zonal Dual Fuel Capacity with Gas Demand in the Partial Fuel Switch Power Sector Scenario

Load Zone	Winter Capacity (MW)
C	128
F	639
J	1,544

3.2.3 Power Sector Results – Natural Gas Supply (MMcf/d) for Power Sector Demand

Natural gas fuel availability during peak winter conditions directly affects the ability for thermal generation to produce electricity. This section first presents results from the gas supply scenarios. All gas supply scenarios presented below do not include gas pipeline capacity expansion. For the peak winter week, Days 1-3 and 5-7 are classified as Non-Design Days and utilize January 2025 weather data to forecast firm gas customer demand. Supply side results for Day 4 vary depending on the weather assumptions. Day 4 demand varies depending on the demand scenario selected below.

Five different assumptions for Peak Week, Day 4 are examined in this study:

1. First, this study examines the supply conditions during a peak winter day that reflects a **design day** – a natural gas utility planning standard that gas utilities specifically plan supply for.
2. Second, this analysis incorporates the peak day weather assumptions that align with **NYISO's assumptions for load forecast Bins 1, 4, and 7**. NYISO temperature assumptions for the peak day for these Load Bins served as inputs for regressions that forecast utility demand for non-power sectors to determine the available supply for power generation.
3. Third, weather assumptions consistent with the **coldest day of the 2024/25** winter served as inputs into the demand regressions to determine the fuel supply for electric power generation.

Table 25 summarizes the modeled natural gas supply for the power sector across all NYISO Load Zones during the winter 2024-25 Capability Period for the Coincident Peak Supply Design Day scenario. These values are derived from the modeled supply-side analysis conducted for this study. On the Design Day, gas supply for the power sector is at its lowest due to high residential and commercial heating demand driven by the extremely cold temperature assumed by utilities when forecasting their design-day demand. Notably, Zones A, B, E, H, I, and K experience negative gas supply for power sector generation on the Design Day with coincident supply. On the Non-Design Day, only Zones H and I show negative gas supply (the Non-Design Days are all based on January 2025 winter peak weak data).

Table 25. 2025 Design Day Natural Gas Supply for Power Sector Demand (MMcf/d) – Coincident Peak Supply Scenario

Zone Name	1	2	3	Design Day	5	6	7

Zone A	883	736	604	(101)	770	773	778
Zone B	143	103	62	(47)	112	117	110
Zone C	511	484	448	229	479	496	492
Zone D	68	68	68	68	68	68	68
Zone E	302	241	159	(43)	170	241	261
Zone F	117	107	97	53	107	108	108
Zone G	611	554	492	347	502	538	546
Zone H	22	(7)	(48)	(154)	(50)	(25)	(22)
Zone I	22	(2)	(43)	(154)	(43)	(24)	(21)
Zone J	2,458	2,167	1,660	227	1,668	1,954	2,039
Zone K	716	624	420	(194)	435	466	508
Total	**5,852**	**5,074**	**3,919**	**233**	**4,218**	**4,712**	**4,867**

In the Non-Coincident Peak Supply Design Day scenario, Zones B, H, I, and K experience a negative gas supply for power sector generation, while all other Zones show a positive gas supply. On the Non-Design Days Zones H and I continue to face negative gas supply for the power sector, but the shortfall no longer occurs on Day 2 like in the Coincident scenario.

Table 26. 2025 Design Day Natural Gas Supply for Power Sector Demand (MMcf/d) - Non-Coincident Peak Supply Scenario

Zone Name	1	2	3	Design Day	5	6	7
Zone A	1,078	931	799	94	965	968	974
Zone B	180	140	99	(10)	149	154	147
Zone C	586	559	522	304	554	571	567
Zone D	68	68	68	68	68	68	68
Zone E	526	465	384	181	394	465	485
Zone F	392	381	372	328	382	383	383
Zone G	1,244	1,187	1,125	980	1,134	1,170	1,178
Zone H	42	14	(28)	(133)	(30)	(5)	(1)
Zone I	43	18	(22)	(133)	(23)	(3)	(1)
Zone J	3,288	2,997	2,490	1,057	2,497	2,784	2,869
Zone K	840	749	545	(69)	560	591	633
Total	**8,286**	**7,508**	**6,353**	**2,667**	**6,652**	**7,146**	**7,301**

Negative supply in the tables above indicates that gas supply is projected to be insufficient to meet firm, non-power sector demand and that therefore no supply would remain for power generation. It is important to note, however, that the summary of supply by Zone does not fully align with the service territories that utilities serve in the state. For example, the Design Day deficit in Zone E, while a deficit on paper, is not necessarily representative of an actual utility deficit. Utilities that serve power generators (Niagara Mohawk) also serve power generators in Zone F. A deficit, such as in Zone E, is therefore – during real-time utility operations – likely balanced between the utility supply and demand across Zones.

The Non-Coincident Peak supply scenario, while informative to assess the potential natural gas supply to the state under maximum supply conditions for each delivery point, exceeds what has historically been delivered to the state at any one day over the last six years. A reliance on the Non-Coincident Supply Scenario for natural gas availability would therefore overstate the natural gas supply can rely on for power generation. All further considerations of natural gas available for non-power generation and power generation demand is therefore based on the Coincident Peak scenario.

Table 27 below shows how the reallocation of gas could occur for Zones E, H, I, and K in the Design Day scenario. Zone F allocates 43 MMcf/d of gas to Zone E because these Zones share LDCs, which coordinate planning and resource allocation across the Zones. The downstate Zones of H, I, J, and K share significant portions of their gas infrastructure and supply networks. Because Zone J does not have enough supply to meet the total firm gas customer demand of all the downstate Zones, its surplus is evenly spread across Zones H, I, and K, reducing but not eliminating the firm gas customer demand. Zones F and J reallocate just enough gas to support the firm gas demand, withholding any additional supply to meet their own demand. When Zone A or B has surplus gas, the excess supply is reallocated between them. However, under the Coincident Peak Supply Design Day scenario neither has sufficient gas supply to meet its own power sector demand, leaving no capacity to share with the other.

Table 27. 2025 Design Day Gas Supply Prior to and Post to Reallocation to Meet Firm Gas Customer Demand (MMcf/d) – Coincident Peak Supply Scenario

Zone Name	Prior to Reallocation (MMcf/d)	Post Reallocation (MMcf/d)
Zone A	(101)	(101)
Zone B	(47)	(47)
Zone E	(43)	-
Zone F	53	10
Zone H	(154)	(78)
Zone I	(154)	(154)
Zone J	227	-
Zone K	(194)	(194)

Table 28 presents the winter day gas supply for power generation in the Coincident Peak Supply scenarios prior to balancing gas supply across Zones. The Design Day scenario has the lowest gas supply of all the scenarios as the extremely cold temperatures lead to the highest firm gas customer demand, leaving less gas available for power sector generation. In contrast, the Bin 7 scenario has the largest gas supply because it experiences the warmest modeled temperatures. Zones A, B, E, H, I, and K see a gas supply deficit on the Design Day. Bin 1 has the second coldest temperature and therefore a gas supply deficit is still experienced in Zones B, E, H, and I in the Coincident scenario. The warmer temperatures in the other scenarios lead all Zones to have a positive gas supply for power generation except for Zones H and I, which experience a gas supply deficit in all scenarios except in the Bin 7 scenario. As a reminder, Zone H and I are balanced with supply from Zone J across scenarios.

Table 28. 2025 Winter Day Scenarios Gas Supply for Power Sector Demand (MMcf/d) – Coincident Peak Supply Scenario

Zone	Coincident Supply Scenario				
	Design Day	Jan'25 Winter	Bin 1	Bin 4	Bin 7
A	(101)	464	203	624	857
B	(47)	47	(9)	71	133
C	229	425	323	448	510
D	68	68	68	68	68
E	(43)	109	(20)	149	318
F	53	88	60	97	116
G	347	455	389	513	600

H	(154)	(72)	(111)	(36)	14
I	(154)	(64)	(107)	(38)	11
J	227	1,452	731	1,674	2,315
K	(194)	301	30	443	682

Table 29 summarizes the 2025 winter day gas supply available for power sector generation in the Coincident Supply scenario after reallocating fuel supply to meet firm customer demand. In the Coincident Peak Supply Design Day scenario, Zones A, B, H, I, and K see a negative gas supply as there is not enough gas in Zones with shared LDCs to meet firm customer gas demand. Zone H and I only have a positive gas supply in Bin 7 scenario, which features the highest temperature and therefore the lowest demand for non-power sector gas loads. While no thermal power generators are located in Zones H and I, a shortfall in non-power sector demand for heating customers would require reallocation of supply from other Zones that do have power generators that would rely on natural gas – such as Zone J. The results in Table 29 form the basis for the assessment of natural gas supply against demand from power generators.

Table 29. 2025 Winter Day Gas Supply with Reallocation for Firm Gas Customer Demand (MMcf/d) - Coincident

Zone	Coincident Supply Post Re-Allocation				
	Design Day	Jan' 25 Winter	Bin 1	Bin 4	Bin 7
A	(101)	464	195	624	857
B	(47)	47	–	71	133
C	229	425	323	448	510
D	68	68	68	68	68
E	–	109	–	149	318
F	10	88	40	97	116
G	347	455	389	513	600
H	(78)	–	–	–	14
I	(78)	–	–	–	11
J	–	1,315	513	1,601	2,315
K	(118)	301	30	443	682

While the five peak day scenarios examined focus on the supply of natural gas from a perspective of pipeline deliveries to utilities and the utility demand for non-firm customers, it is worth highlighting that utilities may face limitations to supply that are unrelated to pipeline fuel supply. Mechanical issues associated with cold weather, such as supply freeze-offs and other infrastructure limitations related to mechanical and other limitations to fuel supply are not captured in this analysis. Utilities may also have independent and individual procedures on supplying non-firm customers such as power plants with fuel that impact fuel availability prior to reaching design day conditions. Ensuring reliability for firm customers may result in gas being diverted from non-firm customers at specific temperature cutoffs prior to reaching design day conditions. On the other hand, utilities can and often do engage in operational actions to help them prepare for peak demand days and to supply additional gas to manage demand spikes. These utility-specific operational procedures are not fully reflected in the determination of available supply for power generation in this Report.

3.2.4 Power Sector Results – Power Sector Demand

The power sector demand results evaluate the balance between reallocated gas supply and Zonal power demand, subtracting power sector demand from the available gas supply across supply scenarios to identify any shortfalls in daily gas supply for thermal generation. Zones H and I are not shown in this section as there are no power generators located in these Zones

No Fuel Switching

Table 30 presents the comparison of 2025 gas supply for the power sector generation seen in Table 25 and power sector demand over a full winter week, including the Design Day scenario as the designated winter day on Day 4 for the Coincident Peak Supply scenario. This comparison measures the difference between available gas supply for power sector generation and the power sector's gas demand. There are three approaches to modeling power sector demand in relation to fuel switching. The first approach, shown in Table 30 below, assumes that no dual fuel units switch to oil - which illustrates the highest potential gas demand from the power sector. Under this assumption, all Zones have a negative gas supply-demand balance on the Design Day and Zones C, D, F, G, J, and K all have a negative gas supply-demand balance on Non-Design days. This result does not indicate that fuel switching would not occur – it sets a physical limitation baseline that reflects a theoretical scenario without fuel switching and Design-Day demand – a combination **not** expected to occur in the NYISO market, as tariff rules require dual fuel generators to have a five-day reserve of alternate fuel in the case of distillate fuel oil as a backup fuel.

Table 30. 2025 Gas Supply Minus No Fuel Switch Power Sector Demand with Design Day (MMcf/d) – Coincident Peak Supply Scenario

Zone Name	Day 1	Day 2	Day 3	Design Day	Day 5	Day 6	Day 7
Zone A	747	601	468	(236)	635	638	643
Zone B	109	69	29	(80)	79	83	77
Zone C	18	(9)	(45)	(264)	(13)	3	(1)
Zone D	(14)	(14)	(14)	(14)	(14)	(14)	(14)
Zone E	254	193	111	(48)	122	193	213
Zone F	(542)	(552)	(562)	(649)	(551)	(551)	(551)
Zone G	(476)	(533)	(595)	(740)	(585)	(549)	(541)
Zone J	(215)	(515)	(1,104)	(2,673)	(1,099)	(768)	(677)
Zone K	(324)	(416)	(620)	(1,158)	(605)	(574)	(532)

Fuel Switching

The second approach to modeling power sector demand assumes that all dual fuel units switch to backup fuel consumption. Table 31 shows the gas supply minus the power sector demand when all dual fuel units switch to backup fuel consumption. With fuel switching, Zones A, B, D, E, F, J, and K have a negative gas supply-demand balance while Zones C and G have a gas surplus after power sector demand has been met. On Non-Design Days, only Zones D and F have a negative supply-demand balance. This scenario highlights the importance of fuel switching as a mitigation strategy during peak winter conditions.

Table 31. 2025 Gas Supply Minus Fuel Switch Power Sector Demand with Design Day (MMcf/d) - Coincident Peak Supply Scenario

Zone Name	Day 1	Day 2	Day 3	Design Day	Day 5	Day 6	Day 7
Zone A	883	736	604	(101)	770	773	778
Zone B	111	70	30	(79)	80	85	78
Zone C	294	267	231	12	263	280	276
Zone D	(14)	(14)	(14)	(14)	(14)	(14)	(14)
Zone E	286	225	144	(15)	154	225	246
Zone F	(322)	(332)	(342)	(429)	(331)	(331)	(331)
Zone G	281	225	162	18	172	208	216
Zone J	1,936	1,636	1,047	(552)	1,052	1,383	1,474
Zone K	667	576	372	(166)	387	418	460

Fuel switching enables generators in the power sector to meet demand on the Design Day. It also significantly contributes to balancing gas supply and power sector demand in the other winter gas scenarios. Table 32 presents the winter gas scenarios availability with fuel switching relative to the available fuel supply. Zones D, F, G, J, and K have a negative gas supply-demand balance in the No Fuel Switch approach in all the gas supply winter scenarios. With fuel switching, Zones B, E, and K have a negative gas supply-demand deficit in the Bin 1 scenario, which is the second coldest day examined, but this deficit no longer exists in the warmer, winter days. While this "all or nothing" fuel switching approach is unlikely to occur as black and white as outlined here, these approaches serve as bookends to illustrate the range of potential fuel constraints affecting thermal power sector demand.

Table 32. 2025 Gas Supply Minus Power Sector Demand Fuel Switching Peak Winter Day (MMcf/d) – Coincident Peak Supply Scenario

Gas Supply Scenario & Fuel Switch Approach	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone J	Zone K
Design Day	(101)	(79)	12	(14)	(15)	(429)	18	(552)	(166)
Jan '25 Winter	464	14	209	(14)	93	(350)	125	793	252
Bin 1	195	(32)	106	(14)	(15)	(399)	59	(9)	(18)
Bin 4	624	38	232	(14)	134	(341)	184	1,079	395
Bin 7	857	100	294	(14)	303	(323)	270	1,793	634

Non-Firm Gas Fuel Switching

Table 33 presents a more nuanced approach to fuel switching- referred to as the Partial Fuel Switch scenario - where the majority of power plants (those with non-firm gas supply) switch to backup fuel while a small subset continues using gas. This approach incorporates input from GFER surveys, interviews with generators, utilities, and pipelines, and adjusts the fuel demand for natural gas based on plant-specific fuel procurement approaches. Generators that are assumed to have firm gas supply either through pipelines directly or through marketers may still rely on natural gas in high-demand and high gas price events, depending on fuel procurement and hedging strategies. Factors that inform the adjustments of natural gas demand include:

- **Fuel contracting and purchasing**- Generators that have hedged their supply through purchases of gas months ahead (months prior to any specific event) rather than day-ahead (the day before any specific event) may not be subject to natural gas price drivers that would otherwise cause oil to be the more economic fuel for dispatch. In those examples, even though the facilities can theoretically switch to oil, they would continue to bid into the NYISO market with their lowest cost fuel, which would be natural gas.
- **Steam Supply from Cogeneration Units** – Some generators are relied upon to provide the steam system in New York City with steam supply for heating purposes. Even though facilities that do provide steam are on the utility system and therefore subject to utility-specific supply limitation, their essential role in supplying steam results in fuel supply with natural gas that is prioritized over non-firm natural gas generators.

This additional scenario is not intended as a projection of future behavior of generators and is based on historical information. The purpose of this scenario is to serve as an example of how individual generators fuel procurement approaches may impact the available fuel for generators across Zones, and the impact on unserved capacity. Actual generator fuel procurement will vary depending on factors considered in this analysis – such as gas supply and utility demand – as well as those beyond the scope of this analysis and therefore not comprehensively covered – generator procurement and hedging strategies on the daily and monthly level, fuel pricing, dispatch and reserve scheduling, as well as pipeline and utility operations.

Table 33 presents the Fuel Switch and Partial Fuel Switch power demand scenarios against the various gas supply scenarios. On the Design Day, the Partial Fuel Switch scenario shows a negative gas supply-demand balance in all the same Zones as the Fuel Switch scenario. However, Zones C, F, J, and K experience a more severe deficit due to continued gas consumption by select dual fuel units that may still consume gas even as non-firm generators shift to backup fuels. This increased gas demand also leads to Bin 1 having a negative gas supply-demand balance in Zone J, which is not seen in the Fuel Switch Approach. Meanwhile, the negative gas supply-demand balance in Zones B, E, F, and K in Bin 1 are seen in both fuel switching scenarios. The temperatures seen in Jan '25 Winter, Bin 4 and Bin 7 are warm enough that there is no longer a gas deficit except for in Zones D and F.

Table 33. 2025 Gas Supply Minus Power Sector Demand Fuel Switching vs Partial Fuel Switching Winter Day (MMcf/d)

Gas Supply Scenario & Fuel Switch Approach		Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone J	Zone K
Design Day	Fuel Switch	(101)	(79)	12	(14)	(15)	(429)	18	(552)	(166)
	Partial Fuel Switch	(101)	(79)	(23)	(14)	(15)	(551)	18	(662)	(221)
Jan '25 Winter	Fuel Switch	464	14	209	(14)	93	(350)	125	793	252
	Partial Fuel Switch	464	14	174	(14)	93	(472)	125	653	197
Bin 1	Fuel Switch	195	(32)	106	(14)	(15)	(399)	59	(9)	(18)
	Partial Fuel Switch	195	(32)	71	(14)	(15)	(521)	59	(149)	(73)
Bin 4	Fuel Switch	624	38	232	(14)	134	(341)	184	1,078	395
	Partial Fuel Switch	624	38	196	(14)	134	(463)	184	939	340
Bin 7	Fuel Switch	857	100	294	(14)	303	(323)	270	1,793	634
	Partial Fuel Switch	857	100	258	(14)	303	(445)	270	1,653	579

Under Design Day conditions, deficits in Zone J and K indicate that even prior to allocating gas supply to dual-fuel capable units, there is a shortfall of gas supply in both Zones. This indicates that even if all generators capable of shifting to oil do so, gas supply will not be sufficient to supply gas-only generators and that a share of capacity would be unable to operate. As the Partial Fuel Switch scenario updates are incorporated, the deficit grows, resulting in the majority of single-fuel units not having sufficient fuel to operate. Impacts of fuel availability on available capacity are explored further in the following section.

While changes in power sector demand over the evaluated 10-year time horizon stem solely from unit retirements, shifts in gas supply are driven by assumed changes in temperature and design day demand. Across the gas supply scenarios, except for the Design Day, gas supply increases between 2025 and 2035. This leads to a less constrained supply and demand balance across the NYISO Zones and fuel switching approaches. The 2035 Design Day gas supply is dependent on the gas utility assumptions regarding gas customer demand. Zones with increasing gas customer demand see decreasing power sector gas supply in 2035, whereas Zones with decreasing gas customer demand see increasing gas supply for the power sector over time. In the Design Day scenario Zones A, E, J, and K experience a decline in gas supply for the power sector, while other Zones see an increase. This leads Zones A and E to experience a tighter gas supply-demand balance on the Design Day in 2035. While there is less supply in Zones J and K, the deficit does not increase due to retirements that occur. The Zones with increasing gas supply over the time horizon on the Design Day experience a loosening of the gas supply and demand balance.

Table 34 presents the 2035 winter day gas supply scenarios compared to the Fuel Switch and Partial Fuel Switch approaches for the Coincident Peak Supply scenarios. On the Design Day only Zone C and G see a positive gas supply-demand balance with both fuel switching approaches. Under Bin 1 more Zones experience a positive supply-demand balance; however, Zones B, D, E, and F still have a negative balance with both fuel approaches and Zone K shows a negative balance with the Partial Fuel Switch approach. In all other winter day and power sector demand scenarios, every Zone maintains a positive supply-demand balance, except Zone D and F, which remains negative under the Partial Fuel Switch scenario.

Table 34. 2035 Gas Supply Minus Power Sector Demand Fuel Switching, & Partial Fuel Switching Winter Day (MMcf/d) – Coincident Peak Supply Scenario

Gas Supply Scenario & Fuel Switch Approach		Zone A	Zone B	Zone C	Zone D	Zone E	Zone F	Zone G	Zone J	Zone K
Design Day	Fuel Switch	(152)	(68)	46	(14)	(76)	(439)	79	(427)	(332)
	Partial Fuel Switch	(152)	(68)	11	(14)	(76)	(561)	79	(567)	(387)
Jan '25 Winter	Fuel Switch	507	24	221	(14)	103	(347)	148	1,001	281
	Partial Fuel Switch	507	24	185	(14)	103	(469)	148	861	226
Bin 1	Fuel Switch	268	(27)	128	(14)	(15)	(379)	88	267	21
	Partial Fuel Switch	268	(27)	93	(14)	(15)	(501)	88	127	(34)
Bin 4	Fuel Switch	653	46	241	(14)	143	(339)	200	1,263	418
	Partial Fuel Switch	653	46	206	(14)	143	(461)	200	1,122	362
Bin 7	Fuel Switch	864	104	296	(14)	308	(323)	277	1,911	646
	Partial Fuel Switch	864	104	260	(14)	308	(445)	277	1,771	591

Retirement Scenario

The Reference Case results shown above assume retirement of power plants consistent with NYISO's 2025 Gold Book. To evaluate the impact of these retirements, this analysis also examined a scenario in which those generators do not retire. A lack of retirements increases gas demand in Zone J by 95 MMcf/d and Zone K by 10 MMcf/d across all scenarios. Table 35 compares unserved capacity in Zone J and Zone K under the Retirement and No Retirement scenario on the Design Day. Removing unit retirement assumptions increases unserved capacity in Zone J and Zone K by 412 MW and 45 MW respectively since several retiring units are single-fuel and therefore cannot be served when due to the gas supply deficits seen on the Design Day.

Table 35. 2035 Unserved Capacity in Zone J and Zone K Design Day Retirement vs. No Retirement Scenario

Design Day Unserved Capacity	Zone J		Zone K	
	Retirement	No Retirement	Retirement	No Retirement
	1,536	1,948	178	223

Oil Supply to Support Dual Fuel Operations

Results shown above for the fuel switching scenarios assume that dual-fuel generators will have sufficient fuel supply to support operations on at least the peak day, if not the peak week. Gas supply is not as limited during Days 1-3 and 5-7 of the modeled week due to lower demand compared to the highest demand assumed on Day 4, and therefore the oil switching is not as impactful, since gas supply is sufficient to fuel most generators even without a shift to backup fuels. Given those dynamics, the limitations on fuel supply for oil focus on the 24h of the coldest day of the week.

Based on stock information from EIA, generator interview and GFER survey data, dual fuel generators are assumed to have sufficient supply available to support operations for a period of at least 3-5 days, with many generators indicating fuel stock and refueling capabilities beyond a one-week window. Fuel supply includes on-site storage, storage contracted at nearby storage facilities, and trucking and barge supply contracts. Oil supply to support power generation fuel demand is further examined in Section 3.3.4

Impact of Fuel Supply on Available Capacity

Gas supply constraints across the scenarios and fuel switching approaches shown above lead to thermal capacity that is unserved due to insufficient fuel availability.

Table 36 summarizes the 2025 and 2035 unserved capacity (in MW) in New York across the various temperature and associated natural gas demand scenarios under the Fuel Switch and Partial Fuel Switch scenarios. The Design Day, which represents the coldest conditions and most limited gas supply, shows the highest level of unserved capacity, while Bin 7, the warmest winter day, shows the lowest. Unserved capacity is however present across all demand scenarios, driven by the supply demand balance in Zone F.

The Partial Fuel Switch scenario results in greater unserved capacity than the Fuel Switch scenario as select dual-fuel units are assumed to receive supply before single-fuel units, even as they technically have dual fuel capability, pulling resources from single-fuel capacity that as a result goes unserved. Over the next 10 years, unserved capacity is projected to decline as some Zones average temperatures are projected to increase, which reduces the demand from non-power sector uses and leaves more natural gas supply for power generation. Additionally, assumed retirements of single-fuel units reduces gas demand from units that cannot rely on backup fuels and would go unserved in natural gas supply shortages.

Unserved capacity projections throughout this report reflect only unserved capacity related to fuel quantities available in the state. Generators that face supply limitations due to factors not considered in this analysis or not driven by the fuel quantities available are not captured in the results shown. In the event additional limitations unrelated to available fuel quantities arise, unserved capacity would increase relative to the values shown throughout this section.

Table 36. Unserved Capacity (MW) by Winter Day in New York for 2025 and 2035 under Fuel Switch and Partial Fuel Switch Scenario

Scenario	2025 Fuel Switch Scenario	2025 Partial Fuel Switch Scenario	2035 Fuel Switch Scenario	2035 Partial Fuel Switch Scenario
Design Day	4,997	5,056	4,598	4,598
Jan '25 Winter	1,628	1,953	1,548	1,871
Bin 1	2,625	3,551	2,365	2,703
Bin 4	1,496	1,668	1,222	1,594
Bin 7	444	704	681	676

The following section provides more detailed results on projected unserved capacity by Zone, natural gas supply and power sector demand scenarios between 2025 and 2035.

Table 37 presents the gas supply demand balance under Design Day conditions and the resulting unserved capacity for both the Fuel Switch and Partial Fuel Switch scenarios in 2025. Not all negative gas supply and demand balances result in unserved capacity as not all Zones are home to single-fuel generating capacity that would not be able to rely on backup fuel sources.

- Despite Zone A's negative gas supply on the Design Day, there is no unserved capacity since all units are dual fuel capable and switch to oil consumption in this scenario. This carries through all demand scenarios.
- Zones B and K have a negative gas supply and therefore have 122 MW and 224 MW of unserved gas capacity respectively.
- Zones E and J have no gas supply available for power generation, leading to 61 MW and 1,948 MW of unserved capacity respectively.
- Zone E had negative supply prior to Zone F reallocating gas to meet power sector demand, and Zone J does not have any gas supply because it reallocates gas to Zones H, I, and K to meet firm gas customer demand prior to being able to meet power sector natural gas demand.
- While Zone F had a surplus of gas supply, power sector demand from single-fuel units exceeds available supply and therefore results in 2,583 MW of unserved capacity in the Fuel switch scenario and 2,642 MW in the Partial Fuel Switch scenario.

Table 37. 2025 Coincident Peak Supply Design Day Gas Supply, Power Sector Demand, Supply/ Demand Balance, and Unserved Capacity

Zone Name	Gas Supply vs. Power Sector Demand Fuel Switch (MMcf/d)	Unserved Capacity Fuel switch (MW)	Gas Supply vs. Power Sector Demand Partial Fuel Switch (MMcf/d)	Unserved Capacity Partial Fuel Switch (MW)
Zone A	(101)	-	(101)	-
Zone B	(79)	122	(79)	122
Zone C	12	-	(23)	-
Zone D	(14)	59	(14)	59
Zone E	(15)	61	(15)	61
Zone F	(429)	2,583	(551)	2,642
Zone G	17	-	17	-
Zone H	(79)	-	(79)	-
Zone I	(79)	-	(79)	-
Zone J	(552)	1,948	(662)	1,948
Zone K	(167)	224	(222)	224
Total	(1,376)	4,997	(1,808)	5,056

Zone F experiences higher unserved capacity in the Partial Fuel Switch scenario as generators with assumed firm supply are prioritized for natural gas supply. This allocation reduces the available gas for single-fuel units. In contrast, under the Fuel Switch scenario, firm gas units do not compete for gas supply since they are dual-fuel and switch to burning oil. As a result, gas demand is lower and single-fuel units have more access to gas supply.

Table 38 presents the gas supply and power sector demand balance, along with unserved capacity for the Bin 1 scenario, which represents the second coldest day considered in this analysis and the coldest peak day temperatures considered in NYISO's load forecasting process. After meeting power sector demand, unserved capacity remains in Zones B, D, E, F, J, and K. However, Zones with surplus gas after serving their own needs that share an LDC are likely to reallocate extra supply to facilities in Zones that face shortages and are served by the same LDC. This assumed sharing of natural gas supply across Zone is consistent in principle with the sharing of supply to ensure firm, non-power sector demand is met and eliminates supply shortages in the upstate Zone B with supply shared from Zone A.

Table 38. 2025 Coincident Peak Bin 1 Gas Supply, Power Sector Demand, Supply/ Demand Balance, and Unserved Capacity

Zone Name	Gas Supply vs. Power Sector Demand Fuel Switch (MMcf/d)	Unserved Capacity Fuel switch (MW)	Gas Supply vs. Power Sector Demand Partial Fuel Switch (MMcf/d)	Unserved Capacity Partial Fuel Switch (MW)
Zone A	194	-	194	-
Zone B	(32)	-	(32)	-
Zone C	106	-	71	-
Zone D	(14)	59	(14)	59
Zone E	(15)	61	(15)	61
Zone F	(399)	2,404	(521)	2,642
Zone G	59	-	59	-
Zone H	-	-	-	-
Zone I	-	-	-	-
Zone J	(9)	25	(149)	401
Zone K	(18)	76	(73)	388
Total	(48)	2,625	(480)	3,551

Table 39 presents fuel availability and unserved capacity when surplus gas from Zone A, after meeting its own power sector demand, is reallocated to Zone B. The third column presents the power sector gas demand that had not been met due to Zonal gas deficits, and the final column shows the unserved capacity. Due to the redistribution of gas supply, Zone B no longer experiences unserved capacity unserved capacity.

Table 39. 2025 Coincident Peak Bin 1 Gas Supply, Power Sector Demand, Supply/ Demand Balance, and Unserved Capacity

Zone	Gas Supply vs. Power Sector Demand (MMcf/d)	Gas Surplus Reallocation (MMcf/d)	Power Sector Demand (MMcf/d)	Unserved Capacity (MW)
Zone A	194	164	-	-
Zone B	(32)	32	32	-

Table 40 presents the Bin 4 scenario gas supply-demand balance, and the resulting unserved capacity. The only unserved capacity in Bin 4 is seen in Zones D and F, which show unserved capacity across all scenarios. All other Zones that showed unserved capacity in Bin 1 and the Design Day show sufficient supply to meet power sector demand as higher peak day temperatures reduce the natural gas demand for non-power sector uses. Even with a state-wide surplus of natural gas does not eliminate the unserved capacity as regional supply limitations cannot be fully compensated with a surplus in other regions. The same is true for Bin 7, shown in table 41 below, albeit to a lower extent. In Bin 7, the additional supply for power generation mitigates around 1 GW of unserved capacity in Zone F.

Table 40. 2025 Coincident Peak Bin 4 Gas Supply, Power Sector Demand, Supply/ Demand Balance, and Unserved Capacity

Zone	Gas Supply vs. Power Sector Demand Fuel Switch (MMcf/d)	Unserved Capacity Fuel Switch (MW)	Gas Supply vs. Power Sector Demand Partial Fuel Switch (MMcf/d)	Unserved Capacity Partial Fuel Switch (MW)
Zone A	624	-	624	-
Zone B	39	-	39	-
Zone C	231	-	196	-
Zone D	(14)	59	(140)	59
Zone E	134	-	134	-
Zone F	(342)	1,437	(464)	1,609
Zone G	183	-	183	-
Zone H	-	-	-	-
Zone I	-	-	-	-
Zone J	1,078	-	938	-
Zone K	395	-	340	-
Total	2,408	1,496	1,990	1,668

Table 41. 2025 Coincident Peak Bin 7 Gas Supply, Power Sector Demand, Supply/ Demand Balance, and Unserved Capacity

Zone	Gas Supply vs. Power Sector Demand Fuel Switch (MMcf/d)	Unserved Capacity Fuel switch (MW)	Gas Supply vs. Power Sector Demand Partial Fuel Switch (MMcf/d)	Unserved Capacity Partial Fuel Switch (MW)
Zone A	857	-	857	-
Zone B	101	-	101	-
Zone C	293	-	258	-
Zone D	(14)	59	(14)	59
Zone E	303	-	303	-
Zone F	(323)	385	(445)	645
Zone G	270	-	270	-
Zone H	14	-	14	-
Zone I	11	-	11	-
Zone J	1,793	-	1,653	-
Zone K	634	-	579	-
Total	4,019	444	3,587	704

Table 42. Potential Gas Pipeline Expansion Projects

Project Name	Pipeline Expansion Capacity (MMcf)	Zone Name	Load Zone Capacity Impact (MMcf)
ExC	125	J	62.5
		K	62.5
NESE	400	J	400

Constitution	200	E	75
		F	75
		J	25
		K	25

The pipeline expansion reduces the total unserved capacity by 534 MW in the Fuel Switch scenario and by 332 MW in the Partial Fuel Switch scenario on the Design Day. These reductions primarily occur in Zones F and Zone J, while Zone K remains unchanged because even with the expansion, gas supply is still insufficient to meet any demand there. Across other winter days, the pipeline expansion continues to lower unserved capacity in Zone F. Most notably, on the warmest examined winter peak day, Bin 7, Zone F experiences no unserved capacity due to the increased Zone E/F supply. The only unserved capacity seen in the Bin 7 scenario stems from Zone D, which is unaffected by the pipeline expansion.

Table 43. 2035 Unserved Capacity With and Without Pipeline Expansion

	Fuel Switch Scenario		Partial Fuel Switch Scenario	
	No Pipeline Expansion	Pipeline Expansion	No Pipeline Expansion	Pipeline Expansion
Design Day	4,598	4,064	3,837	4,169
Bin 1	2,365	1,225	2,800	1,548
Bin 7	422	59	676	59

Table 43 shows the unserved capacity for the Design Day with and without the pipeline expansion. The additional gas supply in Zones F and J enables some units to receive fuel where none was previously available. While the pipeline expansion increases supply in Zone K on the Design Day, it is not enough for generation in that region. In the Non-Fuel Switch scenario, unserved capacity is higher because firm gas units in Zone F are prioritized, leaving certain single-fuel units without gas and ultimately increasing unserved capacity.

Additional Factors Impacting Generator Fuel Decision and Capabilities

As highlighted throughout this section, the projected demand for natural gas and oil in this study represents a hypothetical scenario that is intended to calculate fuel demand to compare against fuel supply. The forecast does not represent projected usage of fuel for power generation, or a projection which thermal generators will be called upon in any given hour to meet demand across the NYISO footprint. The daily total demand projected here assumes 24-hour dispatch at the Winter fuel capability. This assumed duration of dispatch goes beyond the 8 hours of daily dispatch that generators are required to guarantee as part of the NYISO's firm fuel requirement for generators that elect to provide firm fuel (eight hours per day over any seven-day period during the months of December, January and February). While the demand on the daily level is higher than what is likely to be observed in the actual market, the trends translate to the hourly level and the potential implications for generators to supply electricity. The 24-hour demand values shown above reflect the sum of 24 hours of dispatch. Similarly, the available supply of fuel can be represented by dividing the available supply by 24. Given the equal approach of allocating hourly supply and demand from daily totals, a shortfall of fuel to supply all power generators translates to an hourly shortfall of fuel for generation. While the capacity of fuel may be sufficient for several hours over the course of the peak day, an understanding of potential hourly supply limitations can inform the reliability planning for NYISO.

Beyond fuel availability, additional factors may impact generator dispatch during winter peak hours and days, both in terms of natural gas and non-gas fuel dispatch. Fuel costs, procurement approaches, various operational and permitting limitations on the various fuels, participation in NYISO markets that require reserve products and could divert supply from energy markets to reserve markets are all factors that impact whether a plant dispatches, and if so, on which fuel. While some of these factors – such as fuel procurement approaches – are captured to the extent possible, not all factors impacting dispatch and fuel choice are incorporated into the quantitative analysis given the lack of publicly available information and given the intent of this analysis to focus on the fuel availability.

- **Operational Limitations**
  - Interviews with generators have shown that as generators shift to oil, either in oil-only configuration or firing gas and oil in separate generators, can lead to operational limitations that result in reduced MW dispatch capabilities. Combined Cycle facilities that operate gas turbines and duct burners on natural gas would likely see their output reduced to just the natural gas turbines, as duct burners typically do not run on oil. When operating on natural gas and oil on different generators at a plant, plant output may be limited to ensure voltage stability and prevent tripping issues. These factors may limit output on single-fuel oil operations or dual-fuel co-firing operations to less than the assumed winter capability.
  - In addition to limitations for generators, cycling and fuel shifting and the associated change in demand for natural gas also poses challenges to utilities that need to plan for and manage supply of natural gas to generators. As these cycling conditions would overlap with high gas demand periods for non-power sector customers, the ability of utilities to balance changing gas demand from generators cycling and fuel switching may be limited, preventing full flexibility in operational decisions based on utility fuel supply.
- **DAM Scheduling**
  - While the scenario analysis conducted for this project assumed full load dispatch of power generation facilities to estimate fuel demand, electric load conditions in the weeks projected did not require all generators to dispatch. Actual dispatch of thermal generators will depend on the day-ahead and real-time market bids, real-time demand conditions and the resulting energy and spinning reserve demand. Actual dispatch is therefore not always an accurate predictor of the availability of fuel, and lack of dispatch does not reflect an inability to dispatch. Generators may be scheduled to provide reserves due to their cost of commitment, minimum run times or start-up times, and therefore not dispatched even as they have available fuel and are more efficient than other resources in the market. Real-Time market operations are not accounted for in this analysis.
- **Environmental Permitting Limits**
  - The ability to dispatch on oil can be constrained due to permit limitations. Oil-fired dispatch is typically limited to a certain number of hours, as specified in their Air Pollution Control Title V permits. Restrictions are typically 720 to 960 hours per year, which does not limit dispatch in any given week unless limits are close to being exceeded. Dispatch decisions may however be impacted by the timing of periods of high demand and natural gas pricing that would be indicative of oil burn. Relying on a growing number of oil dispatch hours early in the winter season may limit operational flexibility for the rest of the year and therefore limit oil dispatch at times that would otherwise be economic.

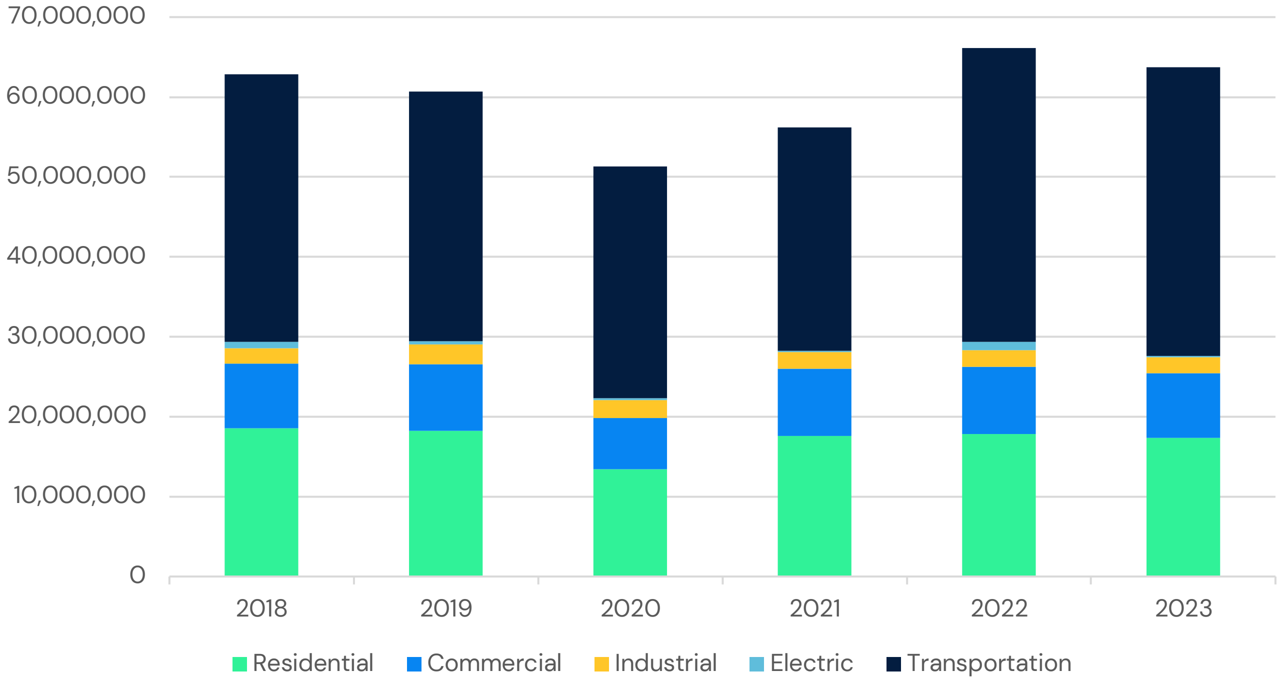
3.3 Oil Demand

3.3.1 Historical Distillate and Residual Fuel Oil Consumption Across New York

New York consumption of refined petroleum products is largely focused on the transportation and heating sectors, with power plants consuming both distillate and residual fuel oil. In 2023, distillate fuel oil accounted for 26% of total petroleum product consumption within the state, while residual fuel oil accounted for roughly 2%. Of the total distillate fuel oil consumed within the state, approximately 0.2% was used for electricity generation in 2023. By contrast, approximately 13% of residual fuel oil consumption was attributed to the electric power sector.

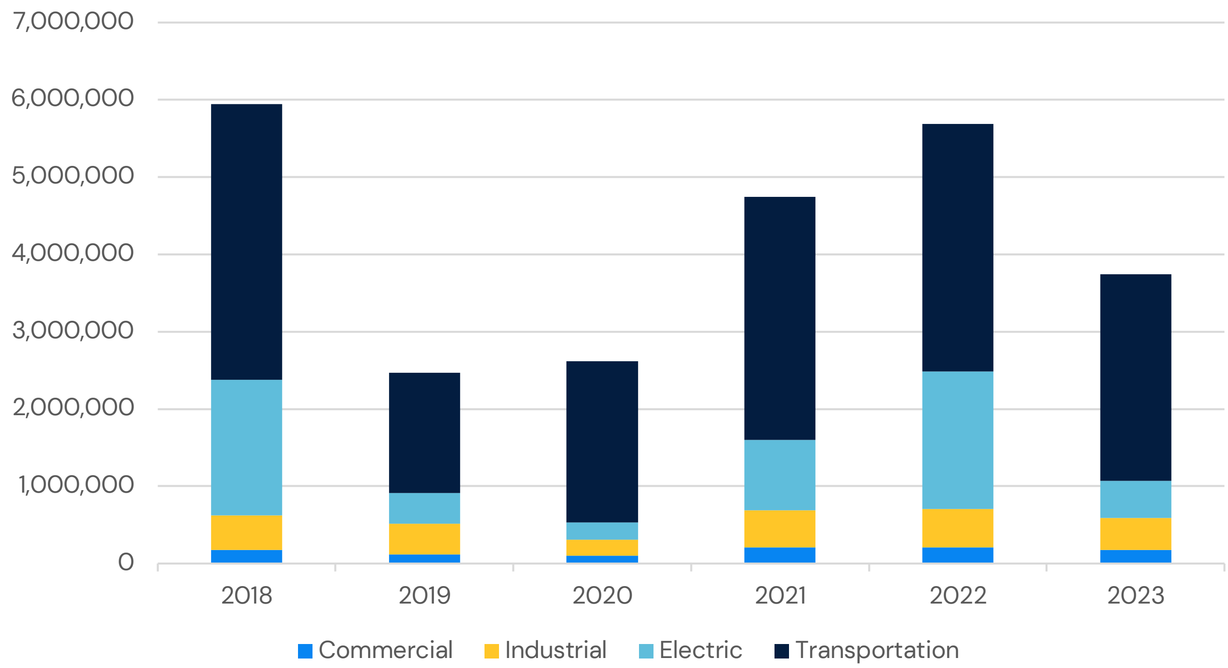
Figure 12 and Figure 13 showcase the breakdown by consumer of distillate and residual fuel oil over time.

Figure 12. New York State Yearly Total Distillate Fuel Oil Consumption by Sector (Barrels), 2018-2023



Source: EIA State Energy Data System 2023: Consumption

Figure 13. New York State Yearly Total Residual Fuel Oil Consumption by Sector (Barrels), 2018-2023

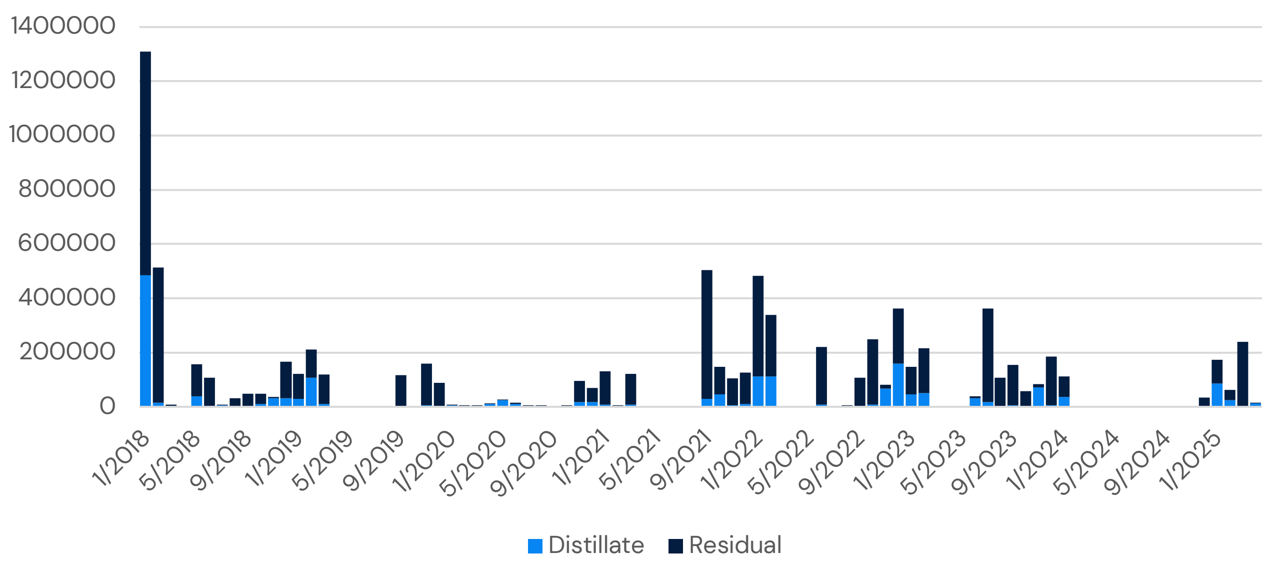


Source: EIA State Energy Data System 2023: Consumption

3.3.2 Historical Distillate and Residual Fuel Oil Consumption in New York Power Plants

While New York State's reliance on petroleum for electricity generation has declined steadily over recent decades, fuel oil remains an essential resource for maintaining grid reliability during winter cold weather events. In such periods, oil-fired generation, particularly from dual fuel plants, plays a large role in meeting system needs when natural gas supply becomes constrained or expensive. These events are typically short in duration, but they lead to a surge in demand. Stocks on-site and in bulk terminals in the region help power plants meet this influx of demand. Figure 14 showcases the receipts of distillate and residual fuel purchases over time.

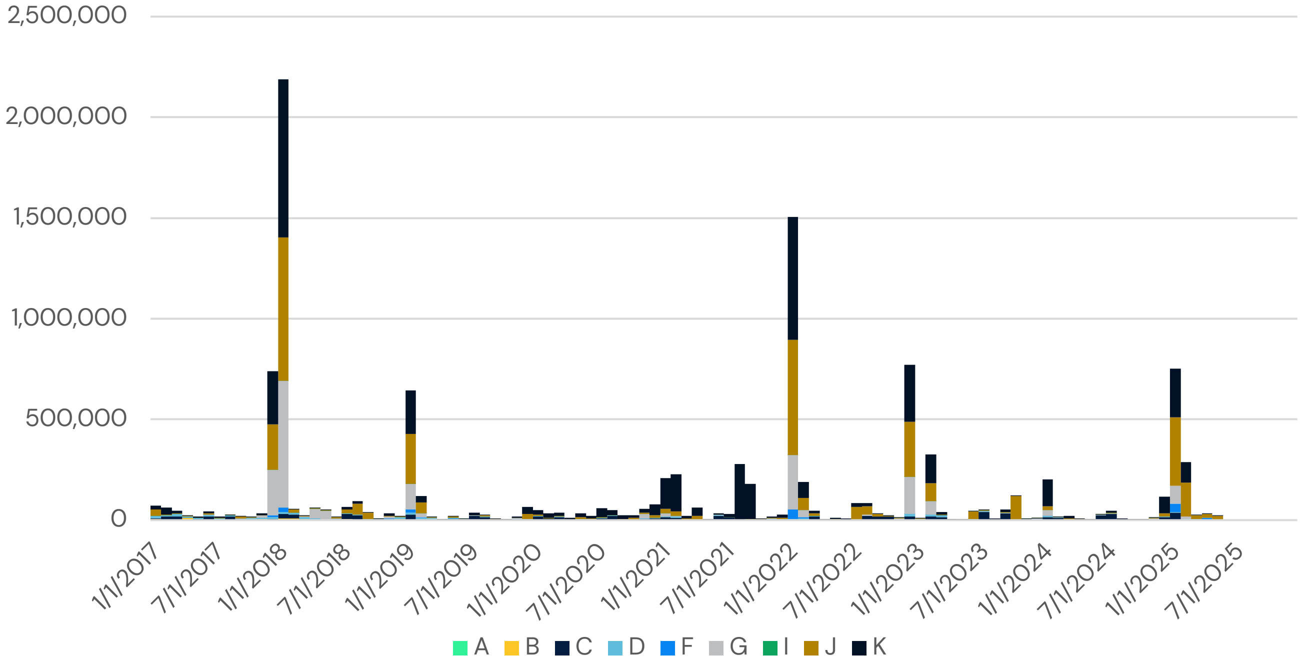
Figure 14. New York State Power Plant Monthly Petroleum Product Receipts (barrels/month), 2018-2025



Source: EIA 923

Consumption patterns follow a similar seasonal trend. According to the EIA, ten power plants account for 69% of distillate and residual fuel oil consumption over the years highlighted in Figure 15, with activity concentrated in the winter months when natural gas supply is tight and system conditions require the capability to respond more quickly.

Figure 15. New York State Monthly Distillate and Residual Fuel Oil Consumption (barrels) by NYISO Zone, 2017 – 2025



Source: EIA 923

3.3.3 Historical Distillate and Residual Fuel Oil Stocks

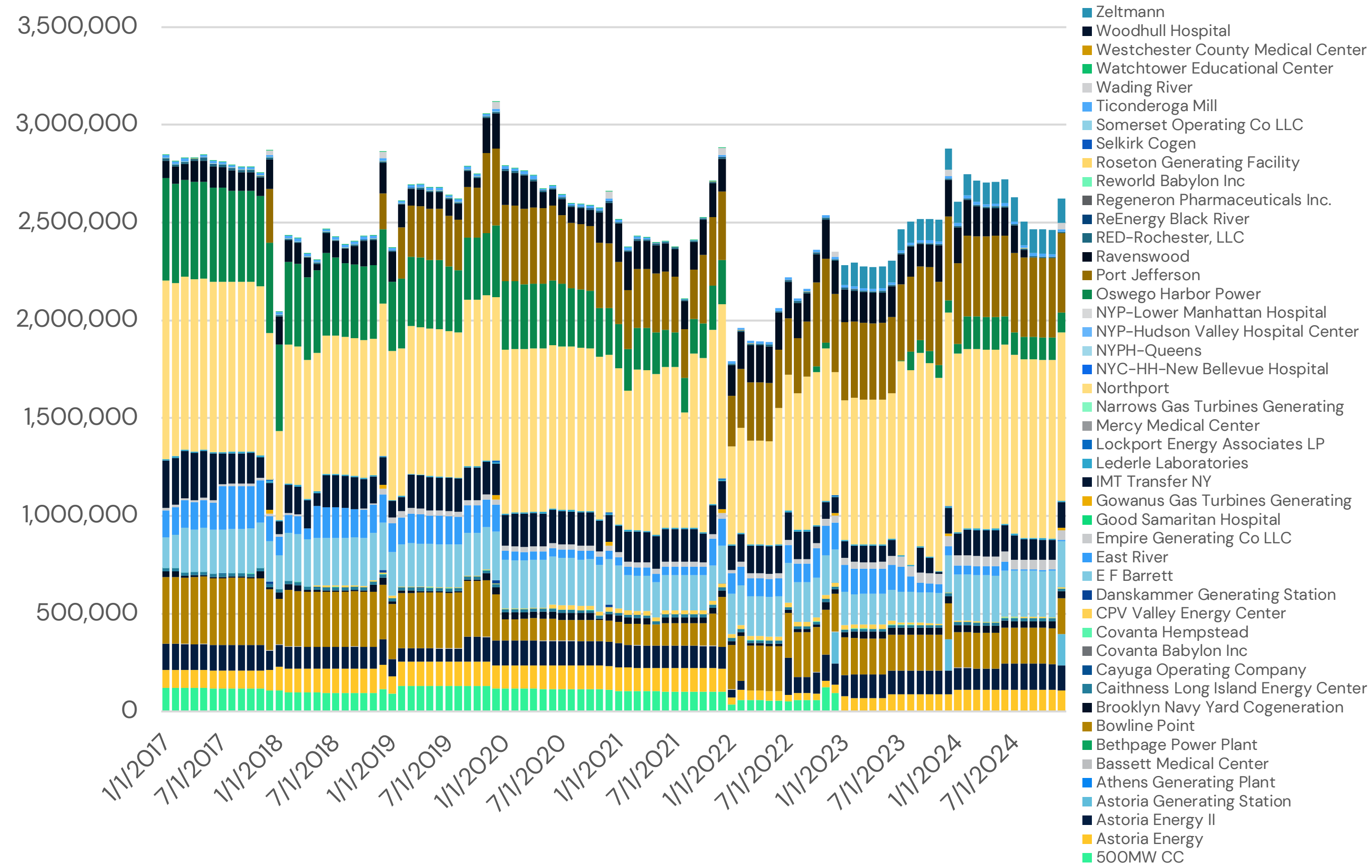
New York and the New York Harbor have historically had sufficient bulk storage stocks on-site to supply the region even during winter peaks. However, sudden spikes in demand during extreme cold weather or multi-day peaking events can cause constraints on trucking as thousands of truckloads of distillate may be needed to meet demand during a surge period. Trucking companies staff operations based on base load demand expectations and have a few levers to expand capacity via seasonal/part-time employees, HOS waiver, and delivering heating oil ahead of cold weather events, but these surges can still strain trucking operations despite these measures.

Because demand is event-driven, the ability of terminals and distributors to deliver fuel on specific days becomes just as important as the amount of fuel in storage. In most cases, generators and fuel suppliers are able to plan ahead and secure sufficient inventory in anticipation of winter weather. As a result, the primary constraint during cold-weather events is not regional supply availability but the timing and execution of deliveries in comparison to consumption. Particularly multi-day or back-to-back cold weather events, when multiple generators may require resupply within a short timeframe, and distribution networks are under pressure from concurrent heating demand and weather-related disruptions. In such conditions, transport delays, especially for plants dependent on truck or barge deliveries, can limit the operational availability of oil-fired capacity.

Analysis of historical monthly stocks and consumption from 2017-2025 indicates that distillate fuel oil stocks in New York average around 18 days of supply across the year, while residual fuel oil averages about three days. During the winter months (December, January, and February), when demand is highest, average days of supply drop to approximately 8.4 days for distillate and 0.6 days for residual fuel. This illustrates how peak seasonal consumption can reduce the operational buffer even when overall stocks remain relatively high.

Inventories of distillate fuel oil typically build during the fall and early winter months, reflecting planned procurement ahead of peak demand. Stock levels often remain elevated through the core of the winter season before declining in late winter or early spring. Residual Fuel oil stocks tend to follow a less pronounced seasonal pattern, given their more limited use.

Figure 16. New York State Monthly Distillate and Residual Fuel Oil Stocks (barrels) by Plant, 2017 - 2025



Source: EIA 923

3.3.4 Modeled Distillate and Residual Fuel Oil Stocks During Peak Day Demand

NYISO has established requirements for generators that classify as Firm Installed Capacity (ICAP) suppliers, defining the need to demonstrate the ability to operate at their Firm Installed Capacity Equivalent (ICE) for a specified duration.

> *During the Winter Performance Period of the subject Capability Year, an Installed Capacity Supplier that submits a Firm Fuel Characteristic Election must have fuel available to operate at its Firm ICE [Installed Capacity Equivalent of UCAP Sold] for a minimum of eight consecutive hours on any given day, except the Installed Capacity Supplier will not be required to have fuel available to operate for a given day for more MWh than its Firm ICE multiplied by fifty-six (56) hours measured over a consecutive seven-day period ending with that given day ("Firm Fuel Performance Availability Requirement").*[42]

42 NYISO Installed Capacity Manual, Section 5.8.1, p.182

This threshold of being able to operate for eight hours a day and 56 hours over a seven-day period is what generators must demonstrate to qualify as Firm ICAP suppliers. For the purposes of this report the team has evaluated oil supply cases under various conditions and then under these conditions evaluated whether any fuel shortage/challenges would occur. These modeled scenarios exceed the stringency of NYISO's firm fuel requirements and are therefore not focused on the capacity to meet NYISO's Firm Fuel Characteristics Election criteria, but instead fuel availability assessments.

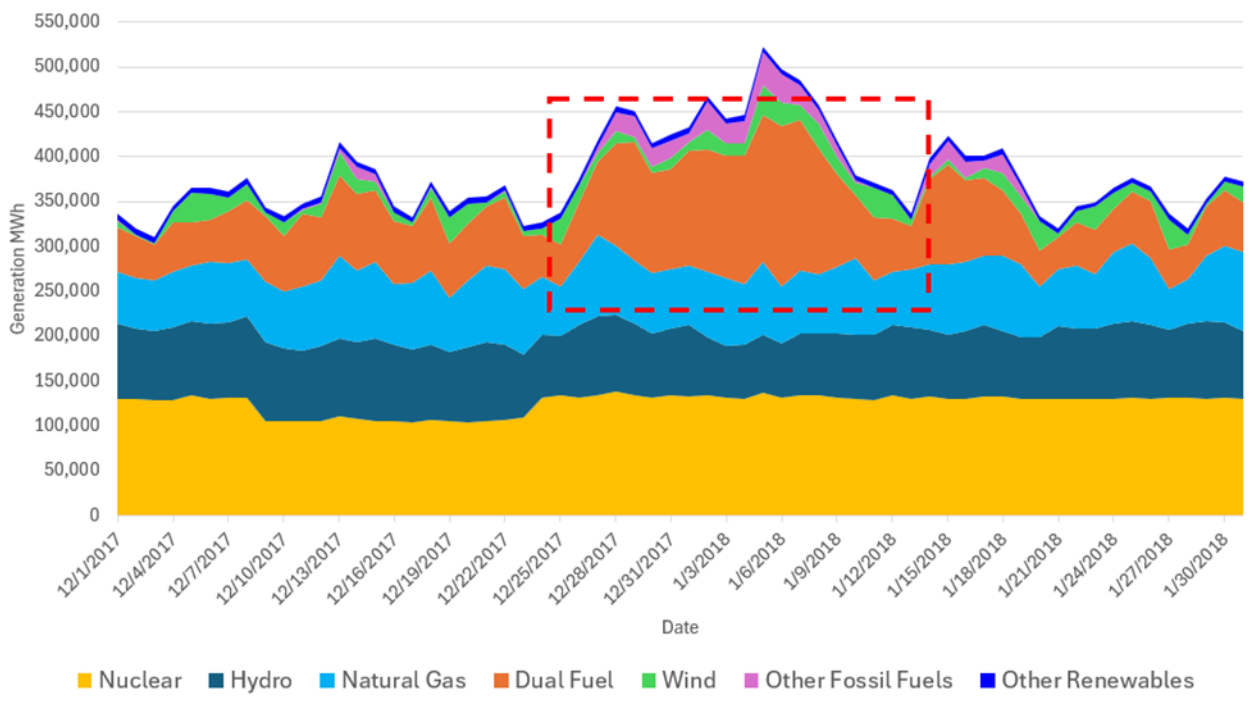
1. **Scenario 1: 2018 Peak Analysis** – In 2018, New York state had its highest winter demand over the past eight years evaluated for any one event. The team evaluated this two-week period event, which exceeds the 7-day focus of this analysis.
2. **Scenario 2: Peak-Hour Analysis** – The peak hour oil consumption by Zone was taken over the last eight years. ICF evaluated if fuel demand were to continue at this rate for a full day, how quickly the system could sustain deliveries.
3. **Scenario 3**: **Max Design Day Analysis** – assumed all dual fuel generation ran on oil for a 24h period at winter rated capacity.

To examine power plant non-gas fuel stocks, ICF relied on monthly reported stock data from EIA Form 923, as well as data from NYISO's GFER survey data, which includes weekly stock information for non-gas fuels. To supplement EIA Stock data, the average of weekly GFER data for every month was compared for generators that are included in the EIA data and supplemented for those without data in EIA 923 data. Average stock information by Zone is therefore aggregated from the unit level to the Zonal level. The representation of Zonal stock information may mask individual facilities that do not feature sufficient stock for extended oil operations through excess stock at other facilities.

Scenario 1: Historical Max – 2018 Peak

In January 2018, NYISO experienced the highest demand observed during the 2017-2025 analysis period, as shown in Figure 15 above. Demand in January reached 2.16 million barrels of petroleum products consumed by power generators in the state with the majority of the event taking place over a two-week period as shown in Figure 17 below.

Figure 17. Daily New York Electricity Net Generation (MWh) during 2017-2018 Polar Vortex



Source: NYISO Real-Time Fuel Mix historical data

This event saw demand of oil products surge approximately 150,000 barrels per day over an extended period of time. Power generators' stocks dropped from 3,311,304 barrels in December 2017 to 2,363,080 barrels in January 2018, but were able to sustain the necessary supply. Power generators continued replenishing stocks into February, a few weeks after the event as shown in Figure 14, with deliveries averaging roughly 18,000-20,000 barrels per day despite negligible demand. Analysis of the stock changes indicates that generators briefly achieved resupply rates of up to approximately 105,000 barrels per day during onset of the event in December, likely reflecting short-term, unsustainably high resupply efforts. As the event progressed and conditions moderated, effective resupply rates fell to roughly 39,000 barrels per day across January and approximately 19,000 barrels per day in February, indicating that sustained replenishment capability is substantially lower than the short-term duration peak. Additionally, companies likely start to weigh pricing against weather forecasts as stock levels approach steady state.

Scenario 2: Peak-Hour Analysis

Table 44 presents historical maximum values for each Zone, showing both peak-hour consumption during the January 2018 event and the theoretical amount of fuel that would be required if that peak hour rate persisted for a full 24 hours. Including these historical maximums provides a baseline for comparison, demonstrating how the modeled peak demand scenario presented in Table 44 compares to anything observed historically. It also identifies which plants and Zones have historically placed the largest demands on oil supplies, which contextualizes potential logistical challenges for extreme, high-demand events. Not all plants listed in the table below are still on the NYISO system as the peak hour for this analysis occurred in early 2018.

In the event that all Zones were able to sustain their peak hour demand for a day, power plants in the state would consume over 278,000 barrels per day. This compares to average winter stock levels of over three million barrels. On a Zonal level, stock data indicates that the highest historical hour could not only be maintained for a day, but at least a five, if not seven-day period. Other Zones exhibit between four-times or more supply of the calculated peak day if the historical peak hour were to be maintained for the full day.

Table 44. Scenario 2: Peak-Hour Analysis

Zone Name	Stocks (Average Winter 2024, barrels)	Peak Hour (barrels)	Peak Day if Peak Hour Ran for 24 hours (barrels)	Power Plants with Largest Demand Historically
Zone A	9,653	124	2,978	Somerset Generating Station
Zone B	7,190	-	-	RED-Rochester
Zone C	150,412	1,502	36,043	Oswego Harbor Power
Zone D	13,728	-	-	Ticonderoga Mill
Zone E	-	-	-	-
Zone F	61,719	467	11,219	Empire Generating Co.
Zone G	428,131	2,840	68,164	Roseton Generating Facility
Zone H	-	-	-	-
Zone I	-	-	-	Regeneron Pharmaceuticals Inc.
Zone J	642,825	3,885	93,231	Astoria Generating Station, Ravenswood, East River, Brooklyn Navy Yard Cogeneration
Zone K	1,729,952	2,775	66,593	Northport, Port Jefferson, E F Barrett, East Hampton, Richard M Flynn
Total	**3,043,612**	**11,593**	**278,228**	

Scenario 3: Max Design Day Analysis

Under a theoretical max scenario, ICF modeled what could happen if all dual fuel units were operated on oil simultaneously, simulating a scenario where lack of natural gas supply required backup fuel operations across regions in the state. The purpose of this analysis was to confirm that oil stocks suffice to serve as backup to supply dual fuel generators across the state in a scenario of gas deficits.

Under the Maximum Design Day scenario, inventories vary significantly across Zones. The largest demand for oil occurs in Zones J, G, K, and C, given the concentration of oil-only and dual-fuel generators in those Zones. Some Zones, such as A and F, have less stocks, larger Zones including J and K, have 1,141,629 and 1,571,626 barrels of stock versus peak-day demands of 319,472 and 172,630 barrels. As highlighted in Sections 3.1 and 3.2, scenarios of gas shortfall, even on a design day, are limited to certain regions – specifically downstate. Therefore, while upstate Zone A does not indicate sufficient oil stocks to have all dual fuel generators dispatch for 24h on the peak winter day, gas supply modeling shows that on a design day, some fuel switching is required to not cause a gas deficit, but that there would be gas remaining if the entire dual-fuel fleet shifted to oil. As a result, the average stocks' potential to be insufficient for a full day's dispatch on oil is unlikely to actually cause generators in Zone A to be without fuel supply. Zones J and K, areas with the most pronounced need for oil backup, show sufficient stock for the peak day dispatch, and sufficient stock to dispatch multiple days on oil if required.

Table 45. Max Design Day Analysis

Zone Name	Stocks (Average Winter 2024, barrels)	Design Day (Max Scenario, barrels)
Zone A	9,653	17,962
Zone B	7,190	–
Zone C	150,412	131,956
Zone D	13,728	–
Zone E	–	2,484
Zone F	61,719	76,300
Zone G	428,131	136,851
Zone H	–	–
Zone I	–	–
Zone J	642,825	319,472
Zone K	1,729,952	172,630
Total/ Overall	**3,043,612**	**857,655**

Fuel Delivery Under Modeled Scenarios

Meeting these extreme demand levels would require continuous, highly coordinated deliveries, involving thousands of truckloads. Trucking operators scale their staffing based on baseload operations across products which across New York averages roughly 170,000 barrels/day across transportation, residential, commercial, industrial and electric power generation. During these surges in demand due to power generation jobbers/trucking companies would face limitations including vehicle availability, driver hours, and terminal loading capacity, which have the potential to become bottlenecks under sustained high-demand periods. Road congestion, weather-related delays, and restricted delivery operations for barge-dependent facilities could further constrain timely deliveries.

Several measures could partially alleviate some of these constraints:

- Hours-of-Service (HOS) waivers, for example, temporarily relax federal restrictions on drivers' work hours, allowing trucks to make more deliveries per day and potentially increasing overall delivery capacity by roughly 25 percent.
- Ahead of a cold snap, trucking companies may try to deliver fuel to heating oil customers ahead of time and therefore reduce number of deliveries during a cold snap. This may be able to reduce heating oil deliveries up to 30 percent at a maximum, however, as an event goes on longer, the ability to shift product away from heating oil will diminish.
- On-call employees – Some companies may be able to call a few staff who are primarily utilized during a peak day period.

- Pre-positioned inventories at key terminals provide local stockpiles that can be rapidly dispatched to nearby plants, which can shorten delivery times and mitigate congestion risks.
- If the event is localized to New York, truck drivers from other states may be able to come into New York to facilitate larger deliveries.

Overall, the three modeled scenarios produce varying demand scenarios from 150,000 barrels per day, to 278,000 barrels/day, to 858,000 barrels per day. Based on the potential surges in trucking identified in the bullets above, trucking may be able to surge and devote additional resources to meet power demand, but would be limited to deliver more than 100,000 barrels per day for short-term spikes; historical data from the 2017-2018 Polar Vortex suggests that while short bursts may reach close to 100,000 barrels per day, sustainable resupply may decline to roughly 40,000 barrels per day as heating customer needs can no longer be delayed. As such, power plants in these three scenarios would be able to maintain operations initially by drawing down existing on-site stocks, but their ability to sustain operations would depend on the pace and reliability of resupply. Zones with fewer initial stocks or more constrained delivery logistics would experience limitations sooner, potentially leading to localized fuel shortages. This being said, Scenarios 1 and 2 would sustain fuel for the seven-day window in question, and under the extreme case of Scenario 3, we would expect power plants to be able to run fully on oil for approximately four days. While this represents less than a seven-day period, it is important to qualify that the reliance on oil for all dual-fuel generators assumed for the peak demand Scenario 3 would only occur in certain Zones and only on the design day, which is not assumed to occur for multiple days in a row within the seven-day forecast prepared by ICF.

Therefore, while this scenario represents an extremely aggressive peak demand and demonstrates that even substantial inventories could be insufficient during consecutive cold-weather design days, for the purpose of a seven-day forecast with one design day, oil stocks are not likely to cause fuel-driven generators unavailability. In more realistic scenarios, with demand closer to historical maximum values, the system would have sufficient inventories and delivery capacity to avoid such supply constraints.

4 Conclusion

Assumed natural gas supply is derived from Coincident and Non-Coincident maximum pipeline deliveries to utilities across the 11 major pipelines and utilities serving New York State and allocated to NYISO Load Zones based on delivery points. Natural gas pipeline infrastructure delivers gas to NYISO Load Zones through LDCs that often span across multiple NYISO Zones. Pipeline flows into the NYISO territory are currently modeled in this study based on both coincident maximum delivery state-wide and non-coincident maximum flow values to each delivery point, creating upper and lower bound scenarios that create a supply quantity ranging from 8,253 to 10,687 MMcf/d, a difference of 23%.[43] Given limitations on data availability beyond the utility level, tracking historical deliveries from interstate pipelines to the utilities and power plants is deemed most appropriate approach to forecasting regional gas supply capacity in the State.

Utility Design Day peak demand is projected to reach 8,285 MMcf/d by 2035, with growth in the most constrained areas of the state. Of the five peak scenarios modeled, the utility design day reaches the highest projected demand for natural gas for non-power sector use of 8,045 MMcf/d in 2025 and 8,285 MMcf/d in 2035, with regional variation based on design day forecasts from utilities, with growth in Zones such as Zones E, J and K, and declining demand in Zones such as C and G.

All scenarios result in unserved capacities due to limited supply into Zones F and D. Supply shortfalls and associated projections for unserved. Zone F features both a significant single-fuel capacity fleet of over 2,600 MW, and limited fuel supply regardless of non-power sector customer demand. Zone F unserved capacity ranges from 385 MW in Bin 7 up to 2,642 MW under Design Day conditions. Unserved capacity is higher in the Partial Fuel Switch scenario, as generators with dual fuel capabilities may access fuel that is then is not available to single fuel generators.

Scenarios with lower temperatures and therefore higher gas demand for non-power sector uses increase unserved capacity to over 5,000 MW under Design Day conditions. As natural gas supply for power generation decreases with lower temperature assumptions, Zone F unserved capacity increases to over 2,500 MW, and Zone J and K unserved capacity emerges as the downstate area becomes limited on fuel supply. Downstate constraints emerge starting in Bin 1 conditions, with ~800 MW of unserved capacity, and expanding to over 2,100 MW under design day conditions.

Delayed retirements in the downstate areas would increase the Design Day unserved capacity relative to the Reference Scenario by ~400 MW, whereas proposed pipeline projects could all but eliminate some supply shortfalls in certain scenarios. Assumed retirements of generator capacity in the Reference Scenario include several hundred MW of downstate single-fuel generation that, if not retired, would rely on natural gas already in short supply during a Design Day. If these units were not to retire, their capacity would not be served, adding to the total unserved capacity relative to the Reference Scenario.

Several of the proposed pipeline projects would lead to expansion of gas deliveries into most constrained downstate areas as well as Zones E and F, reducing shortfalls by ~500 MW. Impacts under Design Day conditions may be more limited as shortfalls in firm customer demand would be met first, before alleviating single-fuel power plant supply limitations. Under Bin 7 conditions, additional pipeline capacity eliminates the Zone F supply shortfall and unserved capacity, leaving only marginal unserved capacity in Zone D.

43 While there were natural gas supply limitations during Winter Storm Elliott from December 21, 2022, to December 25, 2022, choosing a day during this period for the statewide coincident peak delivery capacity could understate the capacity. The coldest day during this period was Christmas Eve, during which the weather at Albany, New York City, and Buffalo averaged 54 HDDs, but deliveries were lower than on February 3, 2023, due to the holiday and upstream supply issues. The weather at those three stations averaged 44 HDDs on February 3, 2023. If ICF had chosen the day with highest interstate pipeline deliveries during Winter Storm Elliott – December 23, 2022 – the estimate of interstate pipeline capacity would have been 1.1 Bcfd (13%) lower. If ICF had chosen the coldest day during Winter Storm Elliott – December 24, 2025 – the estimate of interstate pipeline capacity would have been 1.8 Bcfd (22%) lower.

While Oil stocks and refueling capacities are sufficient to support backup fuel operations even on several design days in a row, which does however not factor in event-based limitations to fuel supply, or non-supply related limitations to fuel consumption such as permit limits or other operational factors. The reviewed historical peak event over a two-week duration, a peak hour event, as well as the projected demand for oil under the power sector result scenarios tested conditions more extreme than NYISO's firm fuel standards. Across all fuel oil scenarios ICF explored, New York maintains enough oil inventory to support power generation during peak winter conditions, especially in sensitive Zones like J and K, for weeks, and even multiple design days in a row. The assessment also does not account for operational constraints that could limit dispatch beyond fuel availability, such as environmental permit restrictions. Oil stocks and refueling capacities vary regionally but were forecast to be sufficient to support demand significantly above the historical maximum. While oil inventories are generally robust, system reliability hinges on coordinated delivery and fuel switching strategies during peak demand. ICF expects that the main constraint during extreme cold events will not be fuel oil quantity, but the ability to deliver it quickly enough, especially when multiple generators need resupply simultaneously. Event-based factors, such as pipeline interruptions, trucking delays, or freezing rivers, were not modeled and could significantly impact resupply during extended cold weather events.

Appendix

5 Appendix A: Detailed Methodology

ICF analyzed New York's fuel supply infrastructure, transport and storage capabilities, as well as utility demand for non-power generation customers for a peak winter week over the next ten years. The quantity of natural gas supply for power generation depends on the balance of the supply from the pipeline infrastructure and the gas demand from firm utility customers. ICF's analysis examines the pipeline infrastructure and the associated fuel delivery capabilities by NYISO Load Zone,[44] including the impact of proposed pipeline expansion projects on fuel availability.

A range of temperature assumptions influence the non-power generation demand from firm gas utility customers as well as the power sector demand and associated demand for fuel from power generators. The forecasts for utility demand assume temperature trends consistent with NYISO projections over the next ten years and incorporate a range of starting points for peak day[45] temperatures - ranging from relatively warm temperatures consistent with NYISO's Load Bin[46] 7 forecasts, to the coldest temperatures and highest electric loads from NYISO's Load Bin 1, as well as utility design day planning temperatures[47] and weather consistent with a historical peak winter demand week in January 2025.

With an established forecast of fuel supply under a range of scenarios, ICF contrasted the available fuel for power generation with the potential demand for fuel based on the existing fleet of thermal generators and assumed dispatch of generators. Fuel consumption forecasts for fuel switching scenarios as well as gas-only dispatch, combined with insights from generator interviews and NYISO data refined the assumed fuel consumption from generators. Shortfalls of fuel supply then translated into a projection of megawatt (MW) of NYISO's generation fleet by Zone that would be supplied by fuel under the demand and weather conditions considered.

5.1 Data Sources

5.1.1 Data Source Summary

ICF worked with NYISO to conduct a review of existing data sources related to fuel availability in the winter for both natural gas and liquid (oil) fuels and assess source accuracy/quality. Data sources included NYISO data (Climate Impact Study,[48] GFER Survey, 2025 Gold Book, etc.), EIA data (like EIA 860 – Plant and Generator Data, EIA 923, etc.), LDC Long-term Supply Plans, LDC Winter Supply Plans, EPA Clean Air Markets Program Data, and Velocity Suite. ICF also engaged with teams at NYISO to understand how NYISO currently models available fuel supplies in its resource adequacy models, as well as with the Load Forecasting team at NYISO to understand the temperature inputs into NYISO's load forecasting process to determine how to integrate temperature assumptions into gas availability modeling.

ICF evaluated existing data and documentation on historical and future winter fuel constraints related to the natural gas pipeline system in New York and beyond, the delivery, storage, and utilization of liquid fuels by generation units, and how NYISO currently models available fuel supplies in its resource adequacy models.

Table 46 summarizes the main data sources relied upon and the sections of the analysis that the data sources informed.

44 Load Zones are geographically defined areas within the New York Control Area electricity grid/market.
45 Peak day is associated with highest observed energy demand – for natural gas and electricity.
46 Load Bins group hourly electricity demand data by magnitude (quantity of electricity usage) and are commonly used for reliability studies. These Bins are defined within individual Load Zones. ICF incorporated temperature assumptions that drive Load Bin results into the assessment of non-power sector demand.
47 Utilities plan their resources around Design Day conditions as a forecasted benchmark of worst-case gas demand, based on statistical analysis of historical cold weather over a given timeframe. The LDC design day is not used in electric system resource adequacy studies, but it is included as an extreme case here.
48 New York ISO Climate Change Impact Study Phase 1: Long-Term Load Impact

Table 46. Data Source Matrix

Data Source/Task Mapping	**Section 2 - Fuel Supply**		**Section 3 - Fuel Demand**		
	2.1 – Natural Gas Infrastructure	**2.2 – Oil Infrastructure**	**3.1 – Firm Gas Demand**	**3.2 – Firm Power Demand**	**3.3 – Oil Demand**
Hitachi Energy – Velocity Suite	X		X		
Pipeline Bulletin Board	X		X		
NYISO/ICF Interviews	X	X	X	X	X
EIA/EPA Data					
EIA Energy Atlas		X			
EIA PADDs		X			
EIA Form 923	X	X			X
EIA State Energy Data System					X
EPA Clean Air Markets Program Data				X	X
NYISO Data					
NYISO Climate Change Impact Study			X		
NYISO 2025 Gold Book				X	
NYISO Installed Reserve Margin				X	
NYISO Generator Fuel and Emissions Reporting Surveys	X		X	X	X
NYISO Load Bin Data			X	X	
Utility Data					
Long-Term and Winter Supply Plans	X		X	X	

NYISO Generator Fuel and Emissions Reporting (GFER) Surveys

NYISO provided ICF with winter fuel surveys of peak weeks of recent years. NYISO's winter fuel surveys are submitted by generators and provide insight into natural gas contracting, pipeline connections and fuel nominations on pipelines, non-gas fuel operations and stock data, including burn rates and existing non-gas fuel inventories. Data from winter fuel surveys informed the natural gas contracting status of plants, as well as non-gas fuel inventories to inform the assessment of the ability of generators to sustain dispatch of non-gas fuels for extended periods of time.

NYISO Gold Book

The 2025 Load & Capacity Data Gold Book published by NYISO served as a foundational resource for this analysis. It was used to develop the unit universe, retirement assumptions, fuel switching, and capacity assignment for the power sector demand analysis. Zonal power demand is a result of the existing units identified in Table III-2a, using the lower value between their Capacity Resource Interconnection Service (CRIS) or winter rated capacity. Units were classified as dual fuel if Table III-2a identified two fuel types associated with the unit. The retirement scenario applied the retirements listed in Tables IV-3, IV-4, and IV-5 of the Gold Book to ensure consistency with NYISO's planning outlook.

EIA Form 923

ICF used monthly EIA Form 923 stock data and NYISO's weekly GFER survey data to assess non-gas fuel stocks at power plants. For generators lacking EIA 923 stock data, GFER averages were used. Zonal averages were calculated by aggregating unit-level data.

EPA Clean Air Markets Program Data (CAMPD)

The EPA Clean Air Markets Program Data (CAMPD) was utilized to calculate the fuel specific heat rates and provide insight into historical dispatch patterns for the individual units. Average fuel specific heat rates were derived by calculating full load heat rate based on each unit's gas or oil consumption between capability years 2018 and 2024. In cases where units could not be clearly identified in the CAMPD dataset heat rate values from the EPA's National Electric Energy Data System (NEEDs) were applied as a substitute. CAMPD data also informed the assessment of historical dispatch behavior, particularly in identifying units likely to maintain gas demand under fuel-switching scenarios.

5.1.2 Interviews and Research

Further, ICF conducted interviews by video call and over email with generators, pipeline operators, and utilities to identify key concerns related to the ability of generating units in the New York Control Area (NYCA) system to access sufficient fuel supplies during winter weather. More generators, pipelines, and utilities were contacted for the study than were available for interviews. For this study, the study team corresponded with five generators, two interstate pipeline operators, and three LDCs. Any commercially sensitive or confidential information shared during these interviews was not considered a binding commitment and was largely treated by ICF as unattributable. Information provided during interviews is treated as confidential.

Generator Interview Questions

ICF developed a broad list of interview questions for all types of prospective interviewees. For generators, ICF worked with the NYISO project team to refine the list to generator-specific questions best suited for written correspondence vs. virtual meeting discussion and took care not to ask for information that may have already been provided by these parties in other reporting to NYISO (for which the NYISO had already shared data with ICF). Correspondents did not necessarily answer all these questions, and some provided information fully via in-meeting discussions.

Specifically, ICF conducted interviews with power generation facilities across the state to gather information on fuel procurement strategies and practices and existing and potential future fuel supply constraints. Interview questions focused on natural gas contracting approaches, oil storage and refueling capabilities, as well as primary and secondary fuel operations.

ICF contacted generators directly, as did NYISO through its stakeholder services team. Again - participation in the interview was offered on a voluntary basis and responses from generators are treated as confidential. Responses provided by generators inform aspects of the electric fuel demand modeling, including oil supply and restocking characteristics, natural gas contracting practices as well as considerations for fuel shifting.

Operational Questions

For Gas Generators:

- What is the current physical receipt capacity (in Dth/day) of your pipeline interconnects with interstate pipelines and/or utility distribution systems?
- What is the current firm contracted receipt capacity (in Dth/day) of your pipeline interconnects with interstate pipelines and/or utility distribution systems?
- What is the current interruptible contracted receipt capacity (in Dth/day) of your pipeline interconnects with interstate pipelines and/or utility distribution systems?

- For discussion via virtual meeting:
  - How does winter fuel availability affect your ability to dispatch units?
  - What specific constraints do you encounter?
  - Are there measures you are taking to ensure gas supply availability? If so, what are those measures?
  - How does variable winter weather impact your resource adequacy planning? Do you plan differently for a top 0.1% hour vs. a top 0.5% vs. a top 5% winter peak-demand hour?

- Do any of the answers to these questions change during emergency conditions? If so, how? Which constraints are impacted by emergency conditions? (e.g., environmental and fuel constraints)?

For Dual Fuel Generators:

- What is the current physical receipt capacity (in Dth/day) of your pipeline interconnects with interstate pipelines and/or utility distribution systems?
- What is the current firm contracted receipt capacity (in Dth/day) of your pipeline interconnects with interstate pipelines and/or utility distribution systems?
- What is the current interruptible contracted receipt capacity (in Dth/day) of your pipeline interconnects with interstate pipelines and/or utility distribution systems?
- Is there a minimum runtime required to economically justify burning distillate or residual fuel? If so, what is that minimum runtime?
- Can your unit(s) reliably switch between fuels (e.g., gas to oil) during winter peak events?

- For discussion via virtual meeting:
  - What factors drive fuel switching decisions during winter peak events?
  - Is fuel shifting primarily determined by fuel economics? If so, what pricing data/intervals are used to make the economic determination? Please walk us through that decision tree/process? What other factors exist (e.g., environmental factors that could limit oil dispatch)?
  - Are there conditions other than economics that would lead to fuel switching?
  - How does winter fuel availability affect your ability to dispatch units? What specific constraints do you encounter?
  - How do you plan for fuel availability? How does your dispatch planning take into account fuel availability?
  - How does variable winter weather impact your resource planning? Do you plan differently for a top 0.1% hour vs. a top 0.5% vs. a top 5% winter peak demand hour?

- Do any of the answers to these questions change during emergency conditions? If so, how? Which constraints are impacted by emergency conditions? (e.g., environmental and fuel constraints)?

Technological Development Question

- For discussion via virtual meeting: Are there strategies you are implementing to ensure generator availability? If so, which strategies are you considering (in broad categories)?

Market Dynamics Questions

- Do you see a scenario(s) in which additional pipeline capacity might become available in the next 10 years?
- For discussion via virtual meeting: Are you facing any challenges in coordinating with pipeline operations?

Contracting and Procurement (Fuel Oil/Distillate) Questions

- What strategies do you employ for fuel procurement?
- Do you work with marketers and third parties, or do you procure directly from suppliers?
- Do your procurement strategies differ by fuel (in case of dual fuel)?
- Do your procurement strategies differ by the type of operation? For example, do you have different procedures for procuring fuel for routine operations compared to peak load or emergency operations? If so, what triggers the switch from one approach to another?
- Do you have any long-term liquid fuel supply contracts in place? Or do you procure fuel on the spot market?
  - How does this change during winter/peak periods?
  - Do your contracts contain provisions prioritizing delivery during high-demand periods?
  - Are prices tied to a specific benchmark (e.g., New York Harbor)?
  - Are there terms requiring delivery within a certain timeframe?
  - Have you faced issues with your supply contract not being fulfilled during peak periods (e.g., supplier default or delay)?

- For discussion via virtual meeting:
  - What are the drivers for fuel switching (e.g., extreme temperatures, peak days)?
  - Is fuel switching plannable or predictable?
  - What triggers a decision to acquire backup fuel?
  - Do the stringent replenishment requirements of other supplies impact your approach to backup planning?
  - Does replenishment run on a firm schedule or is it flexible?

- Does fuel switching help avoid the generator(s) not meeting the energy commitment(s) in the NYISO's Day-Ahead and Real-Time markets? Does that defray the cost of backup fuel?

Delivery, Storage, and Logistics (Fuel Oil/Distillate) Questions

- Please describe your delivery lead times for distillate and residual fuel, including any variations during peak periods.
- Please outline any logistical, infrastructural, or regulatory constraints that may affect reliability or truck offloading capacity.
- What is your typical strategy heading into winter (e.g., timing of procurement and inventory targets)?
- How do you forecast fuel needs for peak periods? What changes would improve your ability to ensure available supply during petroleum-burning events?

- Do you foresee any constraints or changes in your ability to procure or burn petroleum over the next five years (e.g., due to regulation, supplier shifts, costs, and infrastructure constraints or changes)?

Interstate Pipeline Operators Interview Questions

ICF established a tailored list of questions for pipeline operators as well. Again, correspondents did not necessarily answer all of these questions, and some provided information fully via in-meeting discussions.

Gas System Reliability & Operational Challenges Questions

- What is the current firm and interruptible pipeline capacity allocated to power generators in New York? Are generators shifting toward firm service for greater reliability?
- Are there physical constraints—like bottlenecks at compressor stations or interconnects—that could impact future demand? Which NY regions or delivery points are most vulnerable during winter?
- How often do gas pipeline constraints occur during peak electric demand periods, and what are the typical causes (e.g., maintenance, weather, upstream issues)?
- What operational or strategic changes were made following Winter Storm Elliott? What key lessons were learned?
- How is maintenance and system upgrading scheduled to avoid disruptions to power generators during winter?
- What measures are in place to prevent winter service disruptions? What expansion or modernization plans are underway to support long-term reliability?

Gas Delivery Companies Interview Questions

ICF also established a set of questions for utilities. Again, correspondents did not necessarily answer all questions, and some provided information fully via in-meeting discussions; these questions set the foundation for conversation with utilities.

Operational Challenges Questions

- What are the primary logistical challenges faced in gas delivery within NYISO?
- How do you ensure reliability in your operations? What measures are being taken to plan for future gas delivery challenges?
- How does variable winter weather impact your resource planning?
- What pipeline limitations exist for your LDC?
- How do natural gas prices impact resource adequacy considerations in the winter?

Market Dynamics Questions

- What are the current challenges and opportunities in the NYISO landscape?
- How are you addressing shifts in energy demands? How has fuel switching impacted your business/ how do you expect that to evolve in the next 10 years?
- How are customer needs evolving?
- Are there efforts being made to reduce emissions from LDC or customer operations that might change the fuel supply mix?

Technological Developments Questions

- How are alternative fuel energy sources like RNG and hydrogen being integrated into your gas supply?
- Are there strategies you’re implementing to improve energy storage?

Electric Utilities Interview Questions

As mentioned above, ICF established a tailored list of questions for utilities. These covered gas and electric operations, including power generation, where relevant. Correspondents did not necessarily answer all questions, and some provided information fully via in-meeting discussions.

Grid Management Questions

- What strategies are used to ensure reliability and resilience in the electrical grid?
- How are outages and disruptions mitigated?

Market Dynamics Questions

- What are the current challenges and opportunities in the NYISO landscape?
- How are you addressing shifts in energy demands? How has fuel switching impacted your business/ how do you expect that to evolve in the next 10 years?
- How are customer needs evolving?
- Fuel Oil: Are there design conditions that would lead to fuel switching?

Contracting and Procurement (Fuel Oil/Distillate) Questions

- Are there system-level concerns around procurement timing, fuel contract structure, or delivery guarantees that affect reliability during peak conditions?
- Have you observed any system-level issues during peak periods stemming from fuel contract failures (e.g., supplier delays, inability to replenish stock)?
- How do you assess whether there is sufficient redundancy in the supplier network across your service area to mitigate delivery disruptions?
- Are there any utility-level strategies in place to anticipate or respond to widespread fuel switching events (e.g., gas-to-oil transitions) during peak demand?

Delivery, Storage, and Logistics (Fuel Oil/Distillate) Questions

- What visibility do you have into fuel delivery timelines and transportation modes (e.g., truck, barge) to key generators within your system?
- Are there known system-wide logistical or regulatory constraints (e.g., infrastructure limits, permitting, weather disruptions) that could affect fuel deliveries during winter peaks?
- How do you track or assess petroleum storage levels at critical generation sites ahead of the winter season?
- Are there standard planning practices or winter readiness protocols that help ensure reliable delivery and storage across the system?
- Are you anticipating infrastructure, regulatory, or supply chain changes over the next five years that could impact fuel availability or delivery timelines?
- Are there any logistical or storage-related costs or risks that you believe are not fully captured in current NYISO market structures or compensation mechanisms?

5.2 Fuel Supply

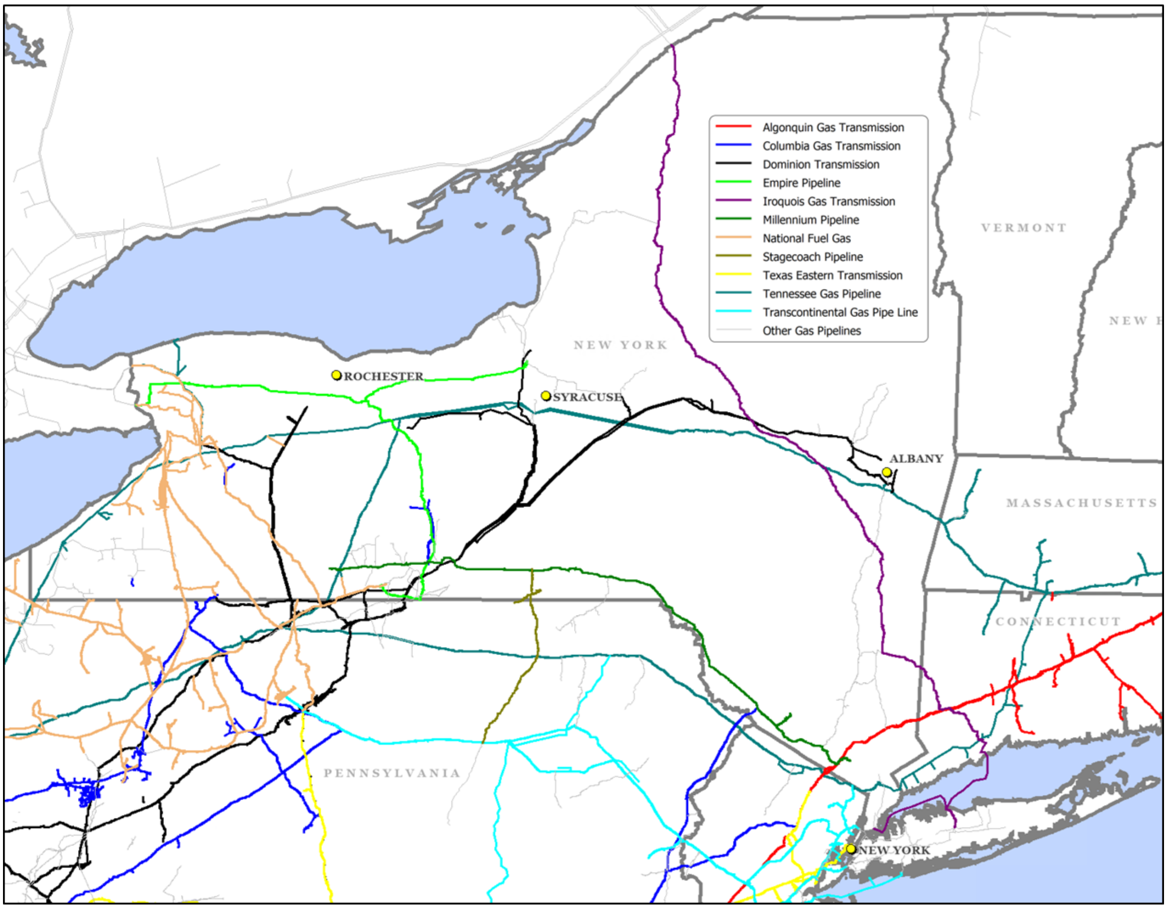
5.2.1 Supply Sources and Sinks

Sources

New York is served by 11 interstate natural gas pipelines as shown in Figure 18. ICF used the daily interstate pipeline nominations data aggregated by Hitachi Energy's Velocity Suite for the 11 interstate pipelines,[49] analyzing the customer nominations data between 1/1/2019 and 2/28/2025 to determine the maximum volumetric deliveries from each pipeline to each delivery point in the state.

49 Interstate natural gas pipeline daily volumetric nominations via Hitachi Energy.

Figure 18. New York Interstate Pipeline Infrastructure



Source: Hitachi Energy, ICF

The mapping of interstate pipelines, delivery points, and customer mapping are shown in Table 47 below.

Table 47. Interstate Pipeline LDC and Electric Plant Delivery Points in New York

Interstate Pipeline	Delivery Point	Delivery Point Customer	Customer Type
Texas Eastern Transmission LP	BUG Co - Brooklyn Union Gas Co (National Grid)	Brooklyn Union Gas Co	LDC
Texas Eastern Transmission LP	ConEd-Manhattan Delivery	Consolidated Edison Co of New York Inc	LDC
Transcontinental Gas Pipe Line Corp	MARINACE FBF - LI MP 3.2	KeySpan Gas East Corp	LDC
Transcontinental Gas Pipe Line Corp	Rockaway FBF-BUG MP 3.2	Brooklyn Union Gas Co	LDC
Transcontinental Gas Pipe Line Corp	New York Facilities Group	KeySpan Gas East Corp	LDC
Algonquin Gas Transmission Co	Cortlandt	Consolidated Edison Co of New York Inc	LDC
Algonquin Gas Transmission Co	North Somers	Consolidated Edison Co of New York Inc	LDC
Algonquin Gas Transmission Co	Peekskill	Consolidated Edison Co of New York Inc	LDC
Algonquin Gas Transmission Co	Yorktown	Consolidated Edison Co of New York Inc	LDC
Algonquin Gas Transmission Co	Somers	Central Hudson Gas & Electric Corp	LDC
Algonquin Gas Transmission Co	Southeast (Putnam NY)	New York State Electric & Gas Corp	LDC
Algonquin Gas Transmission Co	Stony Point	Orange & Rockland Utilities Inc	LDC
Algonquin Gas Transmission Co	Suffern	Orange & Rockland Utilities Inc	LDC
Iroquois Gas Transmission System	Hunts Point	Consolidated Edison Co of New York Inc	LDC
Iroquois Gas Transmission System	South Commack	KeySpan Gas East Corp	LDC

Iroquois Gas Transmission System	Northport	Northport	Electric Plant
Iroquois Gas Transmission System	Boonville	Niagara Mohawk Power Corp	LDC
Iroquois Gas Transmission System	Burdicks Crossing	New York State Electric & Gas Corp	LDC
Iroquois Gas Transmission System	Croghan	Niagara Mohawk Power Corp	LDC
Iroquois Gas Transmission System	Edwards	St Lawrence Gas Co Inc	LDC
Iroquois Gas Transmission System	Lisbon	St Lawrence Gas Co Inc	LDC
Iroquois Gas Transmission System	New Bremen	St Lawrence Gas Co Inc	LDC
Iroquois Gas Transmission System	Pleasant Valley	Central Hudson Gas & Electric Corp	LDC
Iroquois Gas Transmission System	Athens	Athens Power	Electric Plant
Iroquois Gas Transmission System	Dover	Cricket Valley Energy	Electric Plant
Tennessee Gas Pipeline Co	Con Ed/TGP White Plains Ny Westchester	Consolidated Edison Co of New York Inc	LDC
Tennessee Gas Pipeline Co	Con Ed/TGP Pearl River Ny Rockland	Orange & Rockland Utilities Inc	LDC
Tennessee Gas Pipeline Co	Con Ed/TGP Rye Ny Westchester	Consolidated Edison Co of New York Inc	LDC
Tennessee Gas Pipeline Co	Con Ed/TGP Tappan Ny Rockland	Orange & Rockland Utilities Inc	LDC
Tennessee Gas Pipeline Co	Con Ed/TGP Knollwood Ny Westchester	Consolidated Edison Co of New York Inc	LDC
Tennessee Gas Pipeline Co	Hudson/TGP Cedar Hill Ny Albany	Central Hudson Gas & Electric Corp	LDC
Tennessee Gas Pipeline Co	NYSEG/TGP Lockport Ny Niagara	New York State Electric & Gas Corp	LDC
Tennessee Gas Pipeline Co	NYSEG/TGP Prattsburgh Sales Steuben	New York State Electric & Gas Corp	LDC
Tennessee Gas Pipeline Co	NYSEG/TGP Rushville Sales Yates	New York State Electric & Gas Corp	LDC
Tennessee Gas Pipeline Co	NYSEG/TGP Canaan Sales Columbia	New York State Electric & Gas Corp	LDC
Tennessee Gas Pipeline Co	NYSEG/TGP Carlisle Sales Schoharie	New York State Electric & Gas Corp	LDC
Tennessee Gas Pipeline Co	NYSEG/TGP Richfield Springs Herkimer	New York State Electric & Gas Corp	LDC
Tennessee Gas Pipeline Co	NYSEG/TGP Wallace Sales Steuben	New York State Electric & Gas Corp	LDC
Tennessee Gas Pipeline Co	Niagmoh/TGP South Albany Albany	Niagara Mohawk Power Corp	LDC
Tennessee Gas Pipeline Co	Bp Energ/TGP Selkirk Sms Albany	Selkirk Cogeneration	Electric Plant
Tennessee Gas Pipeline Co	Empiregn/TGP Schodack Rensselaer	Empire Generating	Electric Plant
Tennessee Gas Pipeline Co	G A S - Syracuse\Co-Gen Sales	Syracuse Generating Facility	Electric Plant
Tennessee Gas Pipeline Co	Nornew/TGP Nornew Energy Supply Cha	Samuel A Carlson	Electric Plant
Tennessee Gas Pipeline Co	Sprague/TGP Bethlehem Sales Albany	Bethlehem Energy Center	Electric Plant
Millennium Pipeline	National Fuel Distribution	National Fuel Gas Distribution	LDC
Millennium Pipeline	Central Hudson	Central Hudson Gas & Electric Corp	LDC
Millennium Pipeline	Corning Natural Gas MP	Corning Natural Gas Corp	LDC
Millennium Pipeline	Buena Vista	Orange & Rockland Utilities Inc	LDC
Millennium Pipeline	Oru Tuxedo	Orange & Rockland Utilities Inc	LDC
Millennium Pipeline	Oru Warwick	Orange & Rockland Utilities Inc	LDC
Millennium Pipeline	Oru Westtown	Orange & Rockland Utilities Inc	LDC
Millennium Pipeline	Endicott	New York State Electric & Gas Corp	LDC
Millennium Pipeline	Nys Willis Road	New York State Electric & Gas Corp	LDC
Millennium Pipeline	Port Dick	New York State Electric & Gas Corp	LDC
Millennium Pipeline	Bowline M.S.	Bowline	Electric Plant
Millennium Pipeline	Cpv Valley Energy Center	CPV Valley Energy Center	Electric Plant
Columbia Gas Transmission Corp	Central Hudson	Central Hudson Gas & Electric Corp	LDC
Columbia Gas Transmission Corp	Corning Natural Gas TCO	Corning Natural Gas Corp	LDC
Columbia Gas Transmission Corp	Nyseg Op-02	New York State Electric & Gas Corp	LDC

Columbia Gas Transmission Corp	Nyseg Op-08	New York State Electric & Gas Corp	LDC
Columbia Gas Transmission Corp	Orange & Rockland	Orange & Rockland Utilities Inc	LDC
Columbia Gas Transmission Corp	Bowline	Bowline	Electric Plant
Columbia Gas Transmission Corp	Empire-Indeck Olean	Indeck Olean Energy Center	Electric Plant
Dominion Transmission Inc	Rochester Gas And Electric	Rochester Gas & Electric Corp	LDC
Dominion Transmission Inc	Corning Natural Gas DTI	Corning Natural Gas Corp	LDC
Dominion Transmission Inc	New York State Electric And Gas	New York State Electric & Gas Corp	LDC
Dominion Transmission Inc	Niagara Mohawk Power Corporation (East)	Niagara Mohawk Power Corp	LDC
Dominion Transmission Inc	Niagara Mohawk Power Corporation (West)	Niagara Mohawk Power Corp	LDC
Dominion Transmission Inc	Allegany Generating Station LLC	Allegany Cogeneration	Electric Plant
Dominion Transmission Inc	Bethlehem Energy Center TL-470	Bethlehem Energy Center	Electric Plant
Dominion Transmission Inc	Cornell University	Cornell Univ Central Heating	Electric Plant
Dominion Transmission Inc	Indeck Energy (Barber Rd-Silver Spg)	Silver Springs	Electric Plant
Dominion Transmission Inc	Sithe Energies (Lower Leroy-Seneca)	Batavia Power Plant	Electric Plant
National Fuel Gas Supply Corp	NFGDC NY	National Fuel Gas Distribution	LDC
National Fuel Gas Supply Corp	NFG Dist. Line XM8	National Fuel Gas Distribution	LDC
National Fuel Gas Supply Corp	Nfg Dist. Nash Road	National Fuel Gas Distribution	LDC
National Fuel Gas Supply Corp	NFG Distribution Vicksburg	National Fuel Gas Distribution	LDC
National Fuel Gas Supply Corp	Indeck Olean (DEL)	Indeck Olean Energy Center	Electric Plant
Empire Pipeline Inc	NMPCANGC - Phoenix Line 39 - Ni Mo	Niagara Mohawk Power Corp	LDC
Empire Pipeline Inc	NMPCANGC - Phoenix Line 63 - Sithe	Niagara Mohawk Power Corp	Electric Plant
Empire Pipeline Inc	NYSE&GC - Arcadia	New York State Electric & Gas Corp	LDC
Empire Pipeline Inc	NYSE&GC - Royalton	New York State Electric & Gas Corp	LDC
Empire Pipeline Inc	RG&EC - Mendon	Rochester Gas & Electric Corp	LDC
Empire Pipeline Inc	GPL - Milo	Greenidge Power Plant	Electric Plant

Some power generation plants are connected directly to the interstate pipelines that serve the state, but most of the natural gas consumed in New York is delivered from interstate pipelines to natural gas utilities, also known as local distribution companies (LDCs), which then deliver natural gas to consumers.

While much of the design day (peak day) demand is served through the interstate pipelines and underground storage, the three downstate utilities, which share a distribution system known as the New York Facilities Group (NYFG), also rely on gas supply from liquified natural gas (LNG) peak shaving storage, compressed natural gas (CNG), and renewable natural gas (RNG). These other supply sources in addition to the pipeline supply for natural gas factor into the overall supply portfolio of the NYFG. These include 560.5 MMcf/d from Holtsville, Greenpoint, & Astoria LNG, 79.2 MMcf/d from KEDNY & KEDLI CNG, 65.056 MMcf/d from KEDNY & KEDLI Cogen Supplies, and 0.76 MMcf/d from KEDNY & KEDLI RNG; names explained below.

Sinks

There are 11 large, investor-owned LDCs, six much smaller LDCs, and three small municipal utilities in New York. The 11 large, investor-owned LDCs that serve the vast majority of the state's residential, commercial, industrial, and power generation demand are: Brooklyn Union Gas Company (KEDNY, also known as BUG – of National Grid), Central Hudson Gas and Electric (CHG), Consolidated Edison Company of New York (ConEd/CECONY), Corning Gas Corporation (Corning), KeySpan Gas East Corporation (KEDLI – also of National Grid), Liberty Utilities (St. Lawrence Gas) Corp., National Fuel Gas Distribution Corporation (NFG), New York State Electric & Gas (NYSEG), Niagara Mohawk Power Corporation (NiMo), Orange and Rockland

(O&R), and Rochester Gas and Electric (RG&E). Together, the 11 utilities operate a distribution system comprised of approximately 48,900 miles of transportation and distribution pipeline.

To assess the interstate pipeline capacity available for power generation in New York, ICF allocated the non-coincidental delivery capacity to NYISO Load Zones A through K. ICF utilized a county-to-Load Zone mapping approach to assign each pipeline delivery point to its respective Zone and estimated peak natural gas demand at the Zonal level. For two Zones (D and H), special handling was applied: Zone D includes an isolated part of NYSEG's utility service territory with its own design day demand forecast and it uses a small pipeline (North Country), which is supplied directly from TC Energy in Canada, with known capacity; Zone H, lacking direct interstate capacity, was allocated a share of capacity from adjacent Zone I. Since Zone D has a specified supply and demand level, its metrics are held constant throughout the analysis. The 2024-25 NYSEG design day forecast for the North Country portion of its service territory was used to determine the design day demand for Zone D and it was held constant because ICF did not have access to a 10-year forecast for that service territory.

5.2.2 Allocation of Supply Capacity to NYISO Zones

Table 48 below shows the interstate pipeline capacity and other supplies-including LNG, CNG, and RNG-is allocated to each of the Zones. The capacity determination is based on historical pipeline deliveries to each of the points and the location of the delivery points.

The Non-Coincident Peak Supply capacity is derived from the greatest single-day delivery volumes to each delivery point between December 1, 2019, and February 28, 2025. The Statewide Coincident Peak Supply is derived from the greatest single-day delivery volumes to New York between December 1, 2019, and February 28, 2025. The Non-Coincident Peak represents the high end of the interstate pipeline delivery capacity in New York while the Statewide Coincident Peak Supply represents the low end of the delivery capacity determination. It is likely that the interstate pipelines would not be able to achieve simultaneous deliveries equivalent to the historically highest deliveries at each individual point on the same day while it is also likely that the interstate pipelines could deliver higher volumes than were delivered on the historical statewide coincident peak day.[50]

Table 48. Interstate Pipeline Delivery Point Capacity and Other Supplies by Load Zone

Load Zone	Interstate Pipeline or Other Supply	2025 Capacity - Non-Coincident Peak Supply (MMcf/d)	2025 Capacity - Statewide Coincident Peak Supply (MMcf/d)
A	Columbia Gas Transmission Corp	15	6
A	Dominion Transmission Inc	299	265
A	Empire Pipeline Inc	30	19
A	National Fuel Gas Supply Corp	1,009	882
A	Tennessee Gas Pipeline Co	39	26
B	Dominion Transmission Inc	14	7
B	Empire Pipeline Inc	250	220
C	Columbia Gas Transmission Corp	12	11
C	Dominion Transmission Inc	268	251
C	Empire Pipeline Inc	284	261
C	Millennium Pipeline	35	21
C	Tennessee Gas Pipeline Co	31	12
E	Dominion Transmission Inc	1,039	890

50 Interstate pipelines report "operational capacity" at each delivery point but that value is higher than the historical, non-coincident peak and not achievable at each point on one day.

E	Iroquois Gas Transmission System	136	60
E	Tennessee Gas Pipeline Co	1	0
F	Dominion Transmission Inc	90	0
F	Tennessee Gas Pipeline Co	300	116
G	Algonquin Gas Transmission Co	158	66
G	Columbia Gas Transmission Corp	178	154
G	Iroquois Gas Transmission System	465	257
G	Millennium Pipeline	518	237
G	Tennessee Gas Pipeline Co	92	66
I	Algonquin Gas Transmission Co	20	15
I	Tennessee Gas Pipeline Co	161	145
J	Iroquois Gas Transmission System	279	117
J	Texas Eastern Transmission LP	1,562	1,057
J	Transcontinental Gas Pipe Line Corp	1,721	1,559
J	Other Supplies	353	353
K	Iroquois Gas Transmission System	673	549
K	Transcontinental Gas Pipe Line Corp	39	38
K	Other Supplies	353	353
H	Algonquin Gas Transmission Co	20	15
H	Tennessee Gas Pipeline Co	161	145
D	North Country Pipeline	81	81

5.2.3 Supply Scenarios

Coincident Peak Supply Scenario

Coincident pipeline deliveries to the delivery points make up the first supply scenario. This approach reflects the highest observed supply across the state, and reports the deliveries at each delivery point on that day. Over the past six years, this day occurred on February 3, 2023.

The Coincident Peak Supply scenario reflects the highest reported deliveries on any given day since 2019. The Coincident Peak Supply scenario, however, potentially understates the available capacity that could be achieved on days with higher overall demand – such as a design day.

For example, for the Transco NYFG delivery point, the maximum observed deliveries over the past six years occurred on January 8, 2025 at 1,541 MMcf, whereas the deliveries on the coincident day were 1,434 MMcf.

Table 49. Statewide Coincident Peak Day Interstate Pipeline Deliveries by Load Zone

Pipeline Name	Flow Point	Load Zone	Statewide Coincident Peak Day 2/3/23 (MMcf/d)
Texas Eastern Transmission LP	BUG Co - Brooklyn Union Gas Co (National Grid)	J	650
Texas Eastern Transmission LP	ConEd-Manhattan Delivery	J	407
Transcontinental Gas Pipe Line Corp	MARINACE FBF - LI MP 3.2	K	38
Transcontinental Gas Pipe Line Corp	Rockaway FBF-BUG MP 3.2	J	125
Transcontinental Gas Pipe Line Corp	New York Facilities Group	J	1,434
Algonquin Gas Transmission Co	Cortlandt	I	0
Algonquin Gas Transmission Co	North Somers	I	0
Algonquin Gas Transmission Co	Peekskill	I	30
Algonquin Gas Transmission Co	Yorktown	I	0
Algonquin Gas Transmission Co	Somers	G	38

Algonquin Gas Transmission Co	Southeast (Putnam NY)	G	4
Algonquin Gas Transmission Co	Stony Point	G	23
Algonquin Gas Transmission Co	Suffern	G	0
Iroquois Gas Transmission System	Hunts Point	J	117
Iroquois Gas Transmission System	South Commack	K	546
Iroquois Gas Transmission System	Northport	K	3
Iroquois Gas Transmission System	Boonville	E	0
Iroquois Gas Transmission System	Burdicks Crossing	E	5
Iroquois Gas Transmission System	Croghan	E	47
Iroquois Gas Transmission System	Edwards	E	3
Iroquois Gas Transmission System	Lisbon	E	3
Iroquois Gas Transmission System	New Bremen	E	1
Iroquois Gas Transmission System	Pleasant Valley	G	37
Iroquois Gas Transmission System	Athens	G	0
Iroquois Gas Transmission System	Manheim	E	1
Iroquois Gas Transmission System	Dover	G	35
Tennessee Gas Pipeline Co	Con Ed/TGP White Plains Ny Westches	I	260
Tennessee Gas Pipeline Co	Con Ed/TGP Pearl River Ny Rockland	G	66
Tennessee Gas Pipeline Co	Con Ed/TGP Rye Ny Westchester	I	31
Tennessee Gas Pipeline Co	Con Ed/TGP Tappan Ny Rockland	G	0
Tennessee Gas Pipeline Co	Con Ed/TGP Knollwood Ny Westchester	I	0
Tennessee Gas Pipeline Co	Hudson/TGP Cedar Hill Ny Albany	F	23
Tennessee Gas Pipeline Co	NYSEG/TGP Lockport Ny Niagara	A	22
Tennessee Gas Pipeline Co	NYSEG/TGP Prattsburg Sales Steuben	C	1
Tennessee Gas Pipeline Co	NYSEG/TGP Rushville Sales Yates	C	0
Tennessee Gas Pipeline Co	NYSEG/TGP Canaan Sales Columbia	F	0
Tennessee Gas Pipeline Co	NYSEG/TGP Carlisle Sales Schoharie	F	2
Tennessee Gas Pipeline Co	NYSEG/TGP Richfield Springs Herkime	E	0
Tennessee Gas Pipeline Co	NYSEG/TGP Wallace Sales Steuben	C	1
Tennessee Gas Pipeline Co	Niagmoh/TGP South Albany Albany	F	40
Tennessee Gas Pipeline Co	HAMVIL/TGP Village of Hamilton NY M	F	1
Tennessee Gas Pipeline Co	Bp Energ/TGP Selkirk Sms Albany	F	7
Tennessee Gas Pipeline Co	Empiregn/TGP Schodack Rensselaer	F	43
Tennessee Gas Pipeline Co	G A S - Syracuse\Co-Gen Sales	C	10
Tennessee Gas Pipeline Co	Nornew/TGP Nornew Energy Supply Cha	A	4
Tennessee Gas Pipeline Co	Sprague/TGP Bethlehem Sales Albany	F	0
Millennium Pipeline	National Fuel Distribution	C	0
Millennium Pipeline	Central Hudson	G	13
Millennium Pipeline	Corning Natural Gas MP	C	2
Millennium Pipeline	Buena Vista	G	36
Millennium Pipeline	Oru Tuxedo	G	0
Millennium Pipeline	Oru Warwick	G	7
Millennium Pipeline	Oru Westtown	G	0
Millennium Pipeline	Endicott	C	15
Millennium Pipeline	Nys Willis Road	C	0
Millennium Pipeline	Port Dick	C	4

Millennium Pipeline	Bowline M.S.	G	72
Millennium Pipeline	Cpv Valley Energy Center	G	108
Columbia Gas Transmission Corp	Central Hudson	G	32
Columbia Gas Transmission Corp	Corning Natural Gas TCO	C	1
Columbia Gas Transmission Corp	Nyseg Op-02	G	67
Columbia Gas Transmission Corp	Nyseg Op-08	C	9
Columbia Gas Transmission Corp	Orange & Rockland	G	54
Columbia Gas Transmission Corp	Bowline	G	0
Columbia Gas Transmission Corp	Empire-Indeck Olean	A	6
Dominion Transmission Inc	Rochester Gas And Electric	A	265
Dominion Transmission Inc	Corning Natural Gas DTI	C	22
Dominion Transmission Inc	New York State Electric And Gas	C	215
Dominion Transmission Inc	Niagara Mohawk Power Corporation (East)	E	391
Dominion Transmission Inc	Niagara Mohawk Power Corporation (West)	E	499
Dominion Transmission Inc	Allegany Generating Station LLC	B	6
Dominion Transmission Inc	Bethlehem Energy Center TL-470	F	0
Dominion Transmission Inc	Cornell University	C	15
Dominion Transmission Inc	Indeck Energy (Barber Rd-Silver Spg)	A	0
Dominion Transmission Inc	Sithe Energies (Lower Leroy-Seneca)	A	0
Dominion Transmission Inc	Fillmore	B	1
Dominion Transmission Inc	Woodhull	C	0
National Fuel Gas Supply Corp	NFGDC NY	A	581
National Fuel Gas Supply Corp	NFG Dist. Line XM8	A	16
National Fuel Gas Supply Corp	Nfg Dist. Nash Road	A	0
National Fuel Gas Supply Corp	NFG Distribution Vicksburg	A	13
National Fuel Gas Supply Corp	Indeck Olean (DEL)	A	14
Empire Pipeline Inc	NMPCANGC - Phoenix Line 39 - Ni Mo	C	44
Empire Pipeline Inc	NMPCANGC - Phoenix Line 63 - Sithe	C	194
Empire Pipeline Inc	NYSE&GC - Arcadia	B	20
Empire Pipeline Inc	NYSE&GC - Royalton	A	19
Empire Pipeline Inc	RG&EC - Mendon	B	200
Empire Pipeline Inc	GPL - Milo	C	22
North Country Pipeline	Imports	D	81
Total			**7,105**

Non-Coincident Peak Supply Scenario

Non-coincident peak pipeline deliveries to the delivery points make up the second supply scenario. This approach reflects the highest potential supply to NYISO Load Zones as it combines the maximum deliveries for each delivery point into one scenario, even as those deliveries occurred on different days. This presents a historical maximum observed over the last six years for each delivery point and a supply scenario that likely overstates potential peak day deliveries as those maxima have not been coincidentally observed. For example, while the non-coincident peak day deliveries on Texas Eastern (TETCO) reach over 1,500 MMcf/d, this sum of maximum deliveries on individual delivery points has not occurred on any given day over the past six years. On any given day, TETCO supply is spread across multiple delivery points and the delivery points have not shown to combine for more than 1,110 MMcf/d, which is significantly lower than the non-coincident supply of around 1,500 MMcf/d. While TETCO presents the most significant discrepancy between coincident and non-coincident supply, the non-coincident supply present an upper bound of supply that is unlikely to be reached on any given day.

Table 50 below shows the deliveries to each of the pipelines and the days on which they occurred.

Table 50. Non-Coincident Peak Day Interstate Pipeline Deliveries by Load Zone

Pipeline Name	Flow Point	Load Zone	Date	Non-Coincident Peak Day
Texas Eastern Transmission LP	BUG Co - Brooklyn Union Gas Co (National Grid)	J	1/21/2019	1,102
Texas Eastern Transmission LP	ConEd-Manhattan Delivery	J	1/5/2025	461
Transcontinental Gas Pipe Line Corp	MARINACE FBF - LI MP 3.2	K	1/20/2019	39
Transcontinental Gas Pipe Line Corp	Rockaway FBF-BUG MP 3.2	J	1/31/2019	180
Transcontinental Gas Pipe Line Corp	New York Facilities Group	J	1/8/2025	1,541
Algonquin Gas Transmission Co	Cortlandt	I	9/1/2024	0
Algonquin Gas Transmission Co	North Somers	I	11/12/2021	0
Algonquin Gas Transmission Co	Peekskill	I	2/3/2023	40
Algonquin Gas Transmission Co	Yorktown	I	1/29/2025	0
Algonquin Gas Transmission Co	Somers	G	7/31/2024	72
Algonquin Gas Transmission Co	Southeast (Putnam NY)	G	9/12/2022	6
Algonquin Gas Transmission Co	Stony Point	G	6/23/2020	52
Algonquin Gas Transmission Co	Suffern	G	6/24/2020	27
Iroquois Gas Transmission System	Hunts Point	J	1/19/2019	279
Iroquois Gas Transmission System	South Commack	K	1/21/2019	583
Iroquois Gas Transmission System	Northport	K	2/16/2025	90
Iroquois Gas Transmission System	Boonville	E	12/9/2019	5
Iroquois Gas Transmission System	Burdicks Crossing	E	3/6/2019	6
Iroquois Gas Transmission System	Croghan	E	2/3/2023	47
Iroquois Gas Transmission System	Edwards	E	11/30/2021	15
Iroquois Gas Transmission System	Lisbon	E	11/30/2021	26
Iroquois Gas Transmission System	New Bremen	E	6/16/2022	11
Iroquois Gas Transmission System	Pleasant Valley	G	8/4/2022	102
Iroquois Gas Transmission System	Athens	G	10/17/2024	183
Iroquois Gas Transmission System	Manheim	E	1/4/2019	25
Iroquois Gas Transmission System	Dover	G	8/11/2020	180
Tennessee Gas Pipeline Co	Con Ed/TGP White Plains Ny Westches	I	1/29/2021	291
Tennessee Gas Pipeline Co	Con Ed/TGP Pearl River Ny Rockland	G	12/24/2022	92
Tennessee Gas Pipeline Co	Con Ed/TGP Rye Ny Westchester	I	1/20/2019	31
Tennessee Gas Pipeline Co	Con Ed/TGP Tappan Ny Rockland	G	-	0
Tennessee Gas Pipeline Co	Con Ed/TGP Knollwood Ny Westchester	I	-	0
Tennessee Gas Pipeline Co	Hudson/TGP Cedar Hill Ny Albany	F	12/14/2023	31
Tennessee Gas Pipeline Co	NYSEG/TGP Lockport Ny Niagara	A	2/3/2023	22
Tennessee Gas Pipeline Co	NYSEG/TGP Prattsburgh Sales Steuben	C	1/17/2020	2
Tennessee Gas Pipeline Co	NYSEG/TGP Rushville Sales Yates	C	1/17/2020	1
Tennessee Gas Pipeline Co	NYSEG/TGP Canaan Sales Columbia	F	1/19/2024	0
Tennessee Gas Pipeline Co	NYSEG/TGP Carlisle Sales Schoharie	F	1/19/2024	2
Tennessee Gas Pipeline Co	NYSEG/TGP Richfield Springs Herkimer	E	1/19/2024	1
Tennessee Gas Pipeline Co	NYSEG/TGP Wallace Sales Steuben	C	12/18/2019	2

Tennessee Gas Pipeline Co	Niagmoh/TGP South Albany Albany	F	1/30/2019	55
Tennessee Gas Pipeline Co	HAMVIL/TGP Village of Hamilton NY M	F	1/1/2020	2
Tennessee Gas Pipeline Co	Bp Energ/TGP Selkirk Sms Albany	F	7/25/2022	68
Tennessee Gas Pipeline Co	Empiregn/TGP Schodack Rensselaer	F	6/9/2025	137
Tennessee Gas Pipeline Co	G A S - Syracuse\Co-Gen Sales	C	6/10/2025	26
Tennessee Gas Pipeline Co	Nornew/TGP Nornew Energy Supply Cha	A	8/16/2019	17
Tennessee Gas Pipeline Co	Sprague/TGP Bethlehem Sales Albany	F	1/3/2025	5
Millennium Pipeline	National Fuel Distribution	C	1/1/2019	0
Millennium Pipeline	Central Hudson	G	1/19/2024	31
Millennium Pipeline	Corning Natural Gas MP	C	1/28/2022	2
Millennium Pipeline	Buena Vista	G	12/20/2019	62
Millennium Pipeline	Oru Tuxedo	G	5/23/2019	0
Millennium Pipeline	Oru Warwick	G	1/29/2019	16
Millennium Pipeline	Oru Westtown	G	1/1/2019	0
Millennium Pipeline	Endicott	C	1/21/2025	17
Millennium Pipeline	Nys Willis Road	C	1/1/2019	0
Millennium Pipeline	Port Dick	C	1/31/2019	16
Millennium Pipeline	Bowline M.S.	G	1/18/2022	284
Millennium Pipeline	Cpv Valley Energy Center	G	2/19/2022	126
Columbia Gas Transmission Corp	Central Hudson	G	2/3/2023	32
Columbia Gas Transmission Corp	Corning Natural Gas TCO	C	1/1/2019	2
Columbia Gas Transmission Corp	Nyseg Op-02	G	1/31/2019	70
Columbia Gas Transmission Corp	Nyseg Op-08	C	12/23/2022	11
Columbia Gas Transmission Corp	Orange & Rockland	G	1/21/2019	76
Columbia Gas Transmission Corp	Bowline	G	-	0
Columbia Gas Transmission Corp	Empire-Indeck Olean	A	6/24/2025	15
Dominion Transmission Inc	Rochester Gas And Electric	A	2/7/2021	275
Dominion Transmission Inc	Corning Natural Gas DTI	C	3/6/2019	26
Dominion Transmission Inc	New York State Electric And Gas	C	1/30/2019	226
Dominion Transmission Inc	Niagara Mohawk Power Corporation (East)	E	11/29/2023	442
Dominion Transmission Inc	Niagara Mohawk Power Corporation (West)	E	2/13/2021	596
Dominion Transmission Inc	Allegany Generating Station LLC	B	12/29/2024	12
Dominion Transmission Inc	Bethlehem Energy Center TL-470	F	7/14/2020	90
Dominion Transmission Inc	Cornell University	C	1/5/2019	15
Dominion Transmission Inc	Indeck Energy (Barber Rd-Silver Spg)	A	2/4/2024	13
Dominion Transmission Inc	Sithe Energies (Lower Leroy-Seneca)	A	3/23/2019	11
Dominion Transmission Inc	Fillmore	B	2/27/2019	2
Dominion Transmission Inc	Woodhull	C	1/30/2019	0
National Fuel Gas Supply Corp	NFGDC NY	A	3/9/2025	650
National Fuel Gas Supply Corp	NFG Dist. Line XM8	A	2/3/2023	16
National Fuel Gas Supply Corp	Nfg Dist. Nash Road	A	-	0
National Fuel Gas Supply Corp	NFG Distribution Vicksburg	A	8/26/2021	13
National Fuel Gas Supply Corp	Indeck Olean (DEL)	A	6/19/2024	16
Empire Pipeline Inc	NMPCANGC - Phoenix Line 39 - Ni Mo	C	2/3/2023	44
Empire Pipeline Inc	NMPCANGC - Phoenix Line 63 - Sithe	C	1/31/2022	210
Empire Pipeline Inc	NYSE&GC - Arcadia	B	2/3/2023	20

Empire Pipeline Inc	NYSE&GC - Royalton	A	1/21/2025	30
Empire Pipeline Inc	RG&EC - Mendon	B	1/30/2019	230
Empire Pipeline Inc	GPL - Milo	C	2/28/2022	30
North Country Pipeline	Imports	D	-	81
Total				**9,667**[51]

Pipeline Expansion Scenario

In addition to the supply scenarios assessing the pipeline supply on a coincident and non-coincident conditions, ICF assessed the impacts of potential pipeline expansion on the ability to serve power generation load. The projects included in Table 51 below are assumed to come into operation by the end of 2027. This analysis was completed prior to the granting of water permits from New York and New Jersey for NESE, which is not assumed in the base scenario.

Table 51. Pipeline Projects assumed for Pipeline Expansion Scenario

Project Name	Pipeline Expansion Capacity (MMcf/d)	Zone Name	Load Zone Capacity Impact (MMcf/d)	Potential In-Service Date
Iroquois Enhancement by Compression (ExC)	125	J	62.5	November 1, 2027
		K	62.5	
Transco Northeast Supply Enhancement (NESE)	400	J	400	November 1, 2027
Williams Constitution Pipeline	200	E	75	July 1, 2027
		F	75	
		J	25	
		K	25	

5.3 Firm Gas Demand

ICF's demand assessment forecasts utility and NYISO Zonal demand for a seven-day, high demand, low temperature winter period over the next ten years. The seven-day demand forecast for future years is based on pipeline deliveries, temperature [expressed in heating degree days (HDD) on an HDD 50 basis[52]], and utility demand for non-power sector use over the course of the seven days from January 19, 2025 to January 25 2025, the week during which the peak energy demand day of the 2024/2025 winter occurred. ICF developed regressions that project the firm gas demand for each of the seven days of a peak demand week for the next ten years, based on Zonal temperature trend assumptions from NYISO's Climate Change Impact Study[53] and relative annual utility demand growth projections from design day forecasts. The regression results paired with the temperature forecasts results in utility and Zonal specific demand forecasts for each year over a seven-day period.

Within the seven-day forecasts, a peak-day demand forecast examines the highest potential demand on any given day. To examine the range of potential demand levels, this peak day forecast was constructed with four different weather input assumptions as well as the projected utility design day, for a total of five scenarios:

51 Does not include the 314 MMcf of additional supply from National Fuel's 2024-25 Winter Supply Plan and 706 MMcf of "Other Supplies" for the NYFG utilities.
52 HDD is indicative of heating energy demand; using HDD 50 means how cold it is (in terms of HDDs) is measured by a recorded mean outdoor temperature relative to a base temperature of 50°F.
53 https://www.nyiso.com/documents/20142/10773574/NYISO-Climate-Impact-Study-Phase1-Report.pdf

1. Historical January 22, 2025 weather
2. Design Day from utility design day forecasts
3. Peak day weather consistent with NYISO load forecasting Bins 1, 4, and 7, creating three distinct demand forecasts

The following sections discuss the demand methodology for the Design Day scenario, the Non-Design Day forecast based on January 2025 weather, as well as the methodology to incorporate weather consistent with the assumptions that drive NYISO's Load Bins 1, 4, and 7.

5.3.1 Design Day

The "design day" is the 24-hour period of the greatest theoretical gas demand at a given 24-hour average temperature; during Design Day conditions, natural gas usage is forecasted to peak for LDCs. Given that pipeline operators must first deliver gas to firm transportation and storage contract holders, which include LDCs, this can significantly constrain the availability of gas for electricity generation. As a result, dual-fuel units may be required to operate using oil. The assessment of available fuel for power generation customers is therefore a critical aspect of assessing winter fuel supply to power generators and in this analysis serves as the highest demand scenario, as a design day has not occurred in recent years. While the same logic holds for all scenarios, the Design Day scenario presents the highest demand scenario and is therefore the scenario with lowest natural gas availability for power generation.

Design day forecasts for natural gas demand were gathered from utility-specific forecasts. Utility reporting of demand requirements under each utility's preferred scenario for regulatory proceedings is considered a reliable source of data; utility design day demand forecasts represent the maximum possible gas demand from utilities on the coldest day. As the design day demand is defined by utility, design-day projections needed to be allocated to each NYISO Load Zone. ICF allocated utility demand to each Load Zone using the proportion of historical peak day deliveries to each Load Zone, consistent with the methodology shown in Section 5.2.2. Design-day forecasts from utilities vary in their input assumptions with respect to temperature – downstate utilities model a zero-degree Fahrenheit (65 HDD on an HDD 65 basis), whereas upstate utilities rely on a 75 or even 85 HDD assumption. The Design Day forecasting in this analysis also assumes that all utility design days occur coincidentally, an assumption that leads to a high demand projection as design days may not occur coincidentally across the state.

The change in the Design Day forecasts between 2025 and 2035 were based on the forecasts from each utility, as shown in Table 52. The percentage change shown below, while derived from utility design-day demand, also forms the basis for utility demand growth in Non-Design Day scenarios.

Table 52. Annual Percent Change in Design Day Demand with Respect to 2025 by Load Zone

Zone Name	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Zone A	0.40%	0.40%	0.39%	0.42%	0.41%	0.41%	0.40%	0.40%	0.39%	0.38%
Zone B	-0.49%	-0.48%	-0.41%	-0.42%	-0.43%	-0.44%	-0.44%	-0.42%	-0.43%	-0.43%
Zone C	-1.39%	-1.30%	-1.21%	-1.16%	-1.14%	-1.13%	-1.12%	-1.11%	-1.11%	-1.09%
Zone D	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Zone E	0.82%	0.87%	0.85%	0.80%	0.89%	0.74%	0.74%	0.74%	0.73%	0.71%
Zone F	-0.01%	0.02%	0.01%	0.00%	-0.08%	-0.24%	-0.30%	-0.35%	-0.39%	-0.53%
Zone G	-1.14%	-1.09%	-1.06%	-1.05%	-1.11%	-1.15%	-1.18%	-1.29%	-1.38%	-1.52%
Zone H	0.15%	0.15%	0.05%	0.00%	-0.12%	-0.20%	-0.30%	-0.37%	-0.47%	-0.54%
Zone I	0.15%	0.15%	0.05%	0.00%	-0.12%	-0.20%	-0.30%	-0.37%	-0.47%	-0.54%
Zone J	0.43%	0.43%	0.34%	0.42%	0.46%	0.48%	0.47%	0.52%	0.55%	0.55%

Zone K	0.83%	0.82%	0.82%	0.92%	1.13%	1.19%	1.25%	1.14%	1.06%	1.03%

5.3.2 Non-Design Day

In addition to design day conditions, ICF assessed the availability of natural gas to supply electricity generators during a range of cold winter conditions, focusing on a seven-day period consistent with the coldest week observed over the past eight years. ICF's seven-day model for the ten-year forecast uses historical weather data to simulate winter peak week demand. For Days 1, 2, 3, 5, 6, and 7, the model applies the HDDs recorded during the January 19–25, 2025 period. Since natural gas demand for each of the utilities and subsequently NYISO Zones is not available for different weather conditions anticipated during the next 10 years and across NYISO load bins, ICF developed regression analysis to forecast natural gas demand based on temperature projections for the next ten years.

Approach to Zonal Demand Regressions

To estimate Zonal LDC consumption under cold weather conditions, ICF established a historical relationship between Zonal LDC natural gas demand and HDDs. This Zonal LDC natural gas demand excludes volumes delivered to power plants located behind the utility citygates and this relationship enables the use of HDDs as an input to predict Zonal LDC demand over the modeled seven-day period.

ICF analyzed daily interstate pipeline nominations data, aggregated by Hitachi Energy, across five winter seasons (December through February) spanning 2020/2021 to 2024/2025. Based on the Zonal demand allocation methodology outlined above, ICF translated the pipeline nominations data to Zonal natural gas demand. ICF also identified power plants located behind utility citygates and subtracted their associated volumes from daily interstate pipeline deliveries to the citygates. This adjustment enabled an estimation of firm LDC natural gas demand by Zone and the development of Zonal datasets comprising HDDs and interstate pipeline deliveries to serve firm LDC demand.

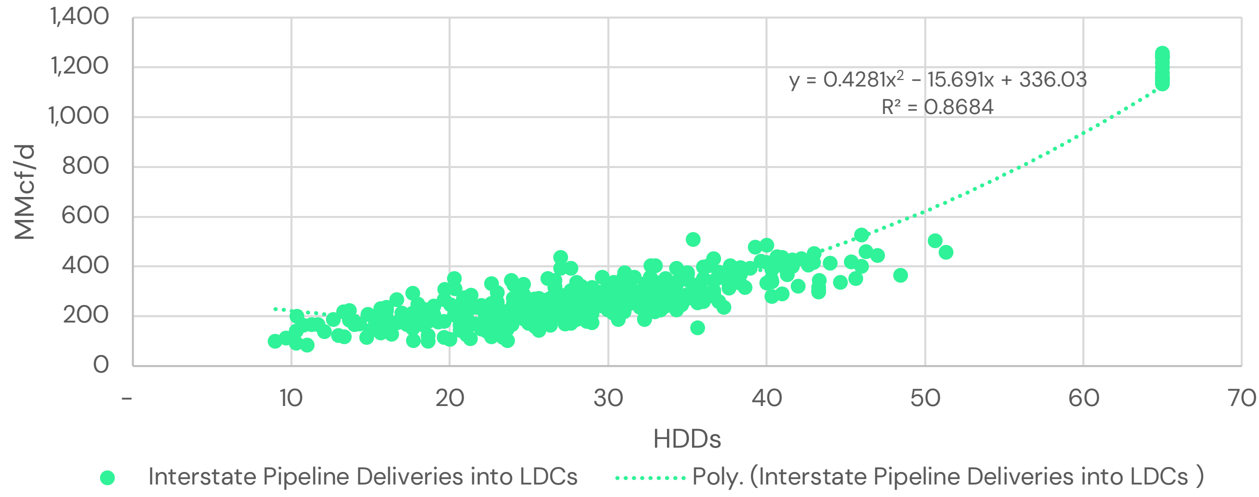
Using these datasets, ICF estimated the statistical relationship between Zonal LDC demand and HDDs. The equation below describes the calculation to arrive at the Zonal modeled LDC demand.

- *Zonal Modeled LDC Demand = (A + B * Default_HDD + C * Default_HDD^2) * Annual Growth Rate*

As the regressions rely on historically observed data for temperature and pipeline deliveries, data is limited for colder temperatures that approach design day conditions, but do not reach design day conditions. The closer (higher) HDDs get to design day conditions, the fewer data points are available. To enhance the robustness of regressions at the top end of the curve that approaches design day conditions, ICF included the eleven design days projections from utility data for the upcoming 2024/25–2034/35 winters for both demand and HDD. The resulting modeled LDC demand at the Zonal level is expressed as a regression-based function of HDDs.

- Figure 19 highlights the regression performed for Zone K showing the interstate pipeline delivery to LDC citygate versus the HDDs.

Figure 19. NYISO Zone K Regression (Interstate Pipeline Deliveries into LDCs vs HDDs)



Historical Temperature Inputs

One of the inputs into the regressions used to determine Zonal demand is projected HDD by Zone. ICF worked with NYISO to develop HDD projections based on historical temperature data for New York weather stations sourced from Hitachi Energy and inputs from NYISO for the projected HDD trends over the next 10 years. ICF developed Zonal weather profiles for modeling and analysis, applying NYISO-provided weighting factors to weather station data across New York to develop Zonal HDD data. Table 53 summarizes the weighting of weather stations **in each NYSO Zone.**

For Zones A, B, C, H, I, J, and K the data was available for all the stations as detailed by NYISO. **However, certain limitations in data availability affected the modeling process, particularly for Zones D, E, F, and G and ICF reallocated the weights and the detail for these Zones as outlined below:**

- Zone D: Due to the unavailability of data for the Plattsburgh station, the Massena station was assigned 100% weight.
- Zone E: Only the Binghamton station was used, as data from other relevant stations was not available.
- Zone F: With Plattsburgh station data unavailable, ICF reassigned weights among available stations as follows: Albany (73%), Glens Falls (16%), and Poughkeepsie (11%).
- Zone G: The following station weights were applied: Albany (18%), Poughkeepsie (63%), and White Plains (20%).

Using these weights and historical HDD data, ICF created the historical **Zonal HDD data that is used in the Zone-level regressions.**

Table 53. NYISO Zonal Weather Station Weights[54]

Zone	Stations	Weights
A - West	Buffalo	70%
	Rochester	21%
	Wellsville	9%
B - Genesee	Rochester	83%
	Syracuse	5%
	Wellsville	12%
C - Central	Binghamton	30%
	Elmira	38%
	Syracuse	32%
D - North	Massena	20%
	Plattsburgh	80%
E - Mohawk Valley	Binghamton	8%
	Monticello	15%
	Plattsburgh	5%
	Utica	72%
F - Capital	Albany	67%
	Glens Falls	15%
	Plattsburgh	8%
	Poughkeepsie	10%
G - Hudson Valley	Albany	9%
	Monticello	4%
	Newburgh	45%
	Poughkeepsie	32%
	White Plains	10%
H - Millwood	Poughkeepsie	47%
	White Plains	53%
I - Dunwoodie	Central Park	18%
	Poughkeepsie	12%
	White Plains	70%
J - New York City	Central Park	56%
	JFK Airport	30%
	LaGuardia	14%
K - Long Island	Farmingdale	35%
	Islip	65%

Regression Results

- These regressions are carried out for each of the Load Zones and the regressions are included in a model provided to NYISO that allows for the selection of the forecast year, the NYISO Zone, the supply scenario as well as an override to replace the regression data with the design day forecast. These changes dynamically influence the Zone-level modeled LDC demand, to which an annual growth rate is applied to reflect the projected movement in Zone-level design day demand.

Table 54. Regression Parameters: Firm LDC Demand

	Zones	A	B	C	D	E	F	G	H	I	J	K
Regression Parameters	A (Intercept)	572.00	14.07	159.17	1.00	214.35	28.79	126.69	123.25	116.99	415.83	336.03
	B (Default _HDD)	(21.09)	0.36	(7.70)	1.00	10.07	(2.04)	(1.37)	(1.21)	(0.76)	(11.26)	(15.69)
	C (Default _HDD^2)	0.39	0.04	0.12	1.00	0.00	0.03	0.08	0.06	0.05	0.74	0.43

Table 55. Regression Results: 2025 Firm LDC Demand with Day 4 LDC Design Day HDDs

Days	Default_ HDDs	A	B	C	D	E	F	G	H	I	J	K
1	35	314	79	41	13	570	(1)	178	149	154	939	315
2	48	461	129	73	13	700	8	246	192	198	1,586	570
3	55	593	162	108	13	770	18	294	223	229	2,035	766
4	75	1,189	280	274	13	974	65	476	343	347	3,742	1,567

54 https://www.nyiso.com/documents/20142/51579307/NYISO%20Zonal%20Weather%20Station%20Weights.pdf/d4270e7f-d641-a533-cd1f-6cd2ec77c8d1

5	46	427	120	65	13	678	6	233	184	189	1,458	516
6	46	424	119	64	13	676	6	232	183	189	1,446	512
7	45	418	117	63	13	672	5	229	182	187	1,426	503

Incorporation of NYISO Load Bin Weather Data

In addition to the peak day within the seven-day forecast reflecting design day conditions and conditions consistent with the temperature conditions on January 22, 2025, ICF's projections for peak day natural gas demand also include a representation of three temperature scenarios that are consistent with the temperature assumptions used to derive the electric load projections under NYISO's Load Bins 1, 4, and 7.

NYISO's Bin 1 forecast is based on the coldest temperatures, which results in the highest electric and utility natural gas demand, whereas Bin 4 represents the midpoint and Bin 7 the highest temperatures and lowest demand in the winter.

ICF's forecast of Zonal natural gas demand incorporates NYISO Load Bin weather assumptions by swapping in the peak day temperature data for each of the load bins into the regression analysis, resulting in an alternate peak day forecast of utility demand. Table 56 below compares the HDD for the peak day between the design day, the January 2025 peak day, and the three NYISO Load Bins.

Table 56. Peak Day HDDs

Zonal HDD50 (2025)	Design Day	January 22, 2025	NYISO Bin 1	NYISO Bin 4	NYISO Bin 7
Zone A	60	46	54	39	24
Zone B	60	44	53	39	25
Zone C	60	44	56	40	24
Zone D	70	46	64	46	28
Zone E	60	47	60	43	26
Zone F	58	45	57	40	23
Zone G	50	44	51	36	21
Zone H	50	42	49	34	19
Zone I	50	39	47	33	19
Zone J	50	34	44	30	16
Zone K	50	36	44	30	16

Resulting from the regressions and forecasted HDDs, ICF projected firm utility natural gas demand by Zone, year, and temperature scenario. Combined with the wo supply scenarios, the five-temperature scenario create a total of ten projections for available supply for power generation. For each of those scenarios, the pipeline expansion scenarios adds supply to the respective Zones of pipeline extension. The scenarios of available supply for power generation form the basis for the comparison of supply against fuel demand from the power sector.

Forecasted Temperature

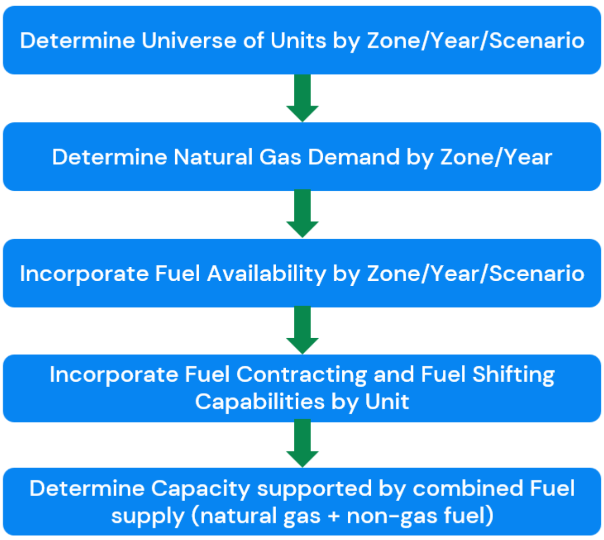
Starting in 2026, ICF incorporated year-over-year change in HDDs based on projected monthly changes provided by NYISO, ensuring alignment with NYISO long-term weather-driven demand expectations. NYISO's Climate Change Impact study includes projected change in temperature for each NYISO Zone. The projected changes in temperature for each Zone were applied to the historical HDD data to forecast the HDDs for the 2025 – 2035 period.

5.4 Power Demand

ICF's projection of available natural gas for power generation feeds into an assessment of fuel demand for power generation from the fleet of thermal generators in New York. Figure 11 below summarizes ICF's approach to determining the fuel demand from power generation.

The objective of this analysis is to determine whether power plants will have sufficient access to fuel under a range of fuel demand scenarios. As this analysis focuses on the ability of generators to generate based on fuel availability, the question of whether plants will be called upon to dispatch under various electric load conditions is not answered in this analysis. The potential demand for fuel from power plants is independent of load conditions and calculated as the sum of all fuel demand from all generators, and the same in every hour and for every day. The variation in the determination of the amount of capacity supported by the fuel quantities available therefore depends on the fuel availability under the range of supply scenarios relative to the demand from power generators, and the potential of generators to adjust their fuel source to the available supply.

Figure 20. Overview of Power Sector Fuel Demand Methodology



5.4.1 Power Sector Fuel Demand

The potential maximum fuel demand from the power sector incorporates two assumptions that characterize the fleet of power generators in the NYISO footprint:

1. Winter capacity
2. Fuel-specific heat rates

Winter capacities for generators with natural gas as a primary or secondary fuel source are sourced from the NYISO Gold Book, specifically the lower of the two winter capacity ratings listed – the CRIS capacity and winter Dependable Maximum Net Capability (DMNC)). The second input is fuel-specific heat rate for each generator to translate MW capacity into hourly fuel consumption. Fuel-specific heat rates were developed from generation and fuel consumption data reported in EPA's Clean Air Markets Program Database (EPA CAMPD)[55], where fuel consumption and gross load for each generator was filtered for full-load hours during the period of 2019-2024. For units with limited or no data availability in EPA CAMPD, EPA's NEEDs[56] served as a backup source for unit-specific heat rates.

Universe of Generators

ICF included two scenarios for the universe of generators in its assessment of fuel demand in the NYCA. The first scenario includes a set of generators retirements consistent with the 2025 NYISO Gold Book. Retirements are primarily driven by compliance with the New York State Peaker Rule and plans from the New York Power Authority (NYPA) to phase out small peaker plants in line with the Small Natural Gas Power Plant Transition Plan and as directed in the 2023-24 state budget. Generator retirements are subject to change based on NYISO's short term reliability process. Retirement of generators leads to lower potential fuel demand from power generators, in particular natural gas, as several of the retirements are single-fuel units that are unable to operate on backup fuel and therefore reliant on natural gas supply.

To capture the uncertainty around generator retirements, ICF's analysis includes a scenario where the retirements listed in the Gold Book do not take place and the fleet of thermal generators stays constant from 2025 to 2035.

Table 57 and Table 58 summarize the capacity by fuel type sourced from the Gold Book, as well as the retirement assumptions.

Table 57. Capacity by Fuel Type

Zone Name	Gas Only	Oil Only	Dual Fuel	Total
Zone A	-	-	503	5,03
Zone B	122	-	7	128
Zone C	1,298	819	1,050	3,167
Zone D	365	-	-	365
Zone E	61	-	155	216
Zone F	2334	-	1,183	3,517
Zone G	1,644	-	3,216	4,860
Zone J	1,948	-	7,389	9,337
Zone K	224	1,362	3,672	5,257
Total	**7,995**	**2,180**	**17,174**	**27,349**

Source: NYISO Gold Book, NYISO GFER Survey

Table 58. Unit Retirement Assumptions

Unit	Load Zone	Date	Winter Capacity (MW)
Coxsackie GT	G	5/31/2026	25
Gowanus CT02	J	5/1/2027	182
Gowanus CT03	J	5/1/2027	180
Narrows CT01	J	5/1/2027	187
Narrows CT02	J	5/1/2027	187
Gowanus 5	J	12/31/2030	40
Gowanus 6	J	12/31/2030	40

55 https://campd.epa.gov/data/custom-data-download
56 https://www.epa.gov/power-sector-modeling/national-electric-energy-data-system-needs

Kent	J	12/31/2030	46
Pouch	J	12/31/2030	46
Hellgate 1	J	12/31/2030	40
Hellgate 2	J	12/31/2030	40
Harlem River 1	J	12/31/2030	40
Harlem River 2	J	12/31/2030	40
Vernon Blvd 2	J	12/31/2030	40
Vernon Blvd 3	J	12/31/2030	40
Brentwood	K	12/31/2030	46

Fuel Switching Scenarios

The determination of demand for natural gas outlined above provides a theoretical ceiling for fuel demand from generators supplying NYCA. A large part of NYISO's power generators is dual fuel capable and on a cold winter day could operate on fuel oil. As Table 57 shows, over 60% of NYISO's generator fleet is dual fuel capable. Therefore, on a peak day, most generators, even without access to natural gas, have the technical capability to shift to secondary fuels such as fuel oil and kerosene.

ICF's analysis incorporates two fuel switching scenarios that assess the demand for natural gas with varying assumptions of fuel switching.

- Under the **Fuel Switching Scenario**, generators capable of shifting to backup fuel do so on a peak day where the available natural gas would otherwise be unable to serve all demand from power generators, reducing natural gas demand from the power sector as only single-fuel generators consume natural gas.
- Under **the Partial Fuel Switching Scenario**, the list of units shifting to natural gas is adjusted based on unit-specific contracting and dispatch patterns observed in historical generation and fuel consumption data, interviews with generators, and NYISO GFER data. This adjustment reflects that not all units that have dual-fuel capabilities would also be expected to shift to their respective backup fuel during a cold weather event. Generators with firm fuel supply for some or all their fuel requirements, as well as generators that have historically consistently relied only on natural gas during peak winter day operations are assumed to continue operating on natural gas in the partial fuel switching scenario. This adjustment leads to higher natural gas consumption and "reserves" gas supply for these units, reducing the supply available for generators that rely on natural gas as the only fuel source.

5.4.2 Fuel Balancing to Meet Firm Customer Demand

Prior to applying power sector demand to the gas supply for power sector generation, supply is reallocated in Zones with shared LDCs to address potential supply deficits and ensure demand from firm gas customer is met. Regions experiencing negative gas supply for power sector generation vary from scenario to scenario, but across the study can include Zones like A, B, E, H, I, and K. Allocation of supply from delivery points to NYISO Zones is not a direct representation of supply allocation for utilities as supply can be allocated across the utility territory and across NYISO Zones once the supply has been delivered to the delivery point/city gate. Therefore, allocation of supply across NYISO Zones within utility service territories more closely approximates real-world supply allocations. Beyond the allocation of supply across utility areas, supply allocation across NYISO Zones is also shared in the downstate Zones where utilities are part of the New York Facilities Group, as those utilities share distribution infrastructure. The following approach to balancing supply across NYISO Zones is applied as indicated by supply shortfalls:

- Zones A and B share supply for firm demand that is connected to the NYSEG and RG&E

- Zones E and F share supply for firm demand that is connected to the NiMo distribution system
- Zones J shares supply for firm demand with Zones K, I, and H as the majority of supply in J connects to utilities that share a distribution system in those Zones.

5.4.3 Determination of Unserved Capacity

ICF calculated the remaining natural gas after power generation demand in each NYISO Zone from three components:

1. The natural gas availability across Coincident and Non-Coincident Peak Supply scenarios, as determined in Section 5.2,
2. The natural gas demand from firm customers across firm demand scenarios across a seven-day winter period, including five scenarios for peak day demand, as determined in Section 5.3,
3. The natural gas demand from power generation under the two retirement and three fuel switching scenarios.

For each of the scenario combinations, ICF's analysis calculates the remaining natural gas in each year for each day over the seven-day winter period. In cases where the fuel availability is sufficient to serve power generators, the available capacity for generation is consistent with the capacities reported in Table 57. In cases where there is not sufficient gas supply to support generation, ICF determined the unserved capacity in MW for each NYISO Zone.

First, the supply deficits for power demand were balanced with remaining supply if the generator that would be unserved is located in a Zone that is served by an LDC that has remaining supply in other Zones. For example, if supply deficits in Zone F would cause capacity to be unserved, ICF reviewed the LDC serving that capacity to determine if other Zones served by the same LDC, in this example Zone E given the shared service territory of NiMo in Zones E and F, had remaining gas supply. If sufficient gas supply was available in other Zones that share the LDC of the otherwise unserved generators, the unserved MW of capacity was eliminated.

Second, in cases where there was not sufficient fuel available to balance the gas demand from power generators, ICF calculated the unserved capacity from the fuel supply deficit. For each Zone, ICF sorted the list of generators by heat rate from lowest to highest and allocated natural gas to the generators until all supply available has been allocated to generators. Once the fuel supply in each Zone has been exhausted, remaining capacity that has not been allocated fuel is counted as unserved capacity.

Fuel allocation to generators follows the logic of each power demand scenario.

- In the fuel switching scenario, where all dual-fuel generators operate on oil, gas-only units receive natural gas in order of heat rate - starting with the lowest heat rate and progressing to higher heat rates within the Zone. If gas supply is insufficient, either within the Zone or from Zones sharing an LDC, the remaining unserved capacity equals the combined output of partially served and fully unserved generators along the heat rate curve.
- In the partial fuel switching scenario, some dual-fuel units are assigned gas based on generator and utility interviews, NYISO GFER data, and historical dispatch and fuel consumption patterns. In the absence of fuel supply, generators that are dual fuel capable are assumed to run on oil. If there is gas available, the gas allocation within each Zone begins with the firm fuel units based on heat rate. Any remaining gas is then allocated to single-fuel non-firm gas units, also starting with the lowest heat rate. This allocation process determines the megawatts of unserved capacity by Zone, scenario, day of the week, and year.

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