

Winter Fuel Availability Constraints Modeling Review

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Background

- **Since the initial development of the winter fuel availability constraints model for use in the installed reserve margin (IRM) study, additional information has become available that could potentially inform future modeling assumptions**
 - Firm fuel characteristic elections for the 2027-2028 Capability Year
 - The 2025 Study of Winter Fuel Constraints in New York State by ICF (the “ICF Study”)
 - Winter 2025-2026 cold weather operations experience
- **The NYISO presented the review of the firm fuel characteristic elections at the January 22, 2026 ICS meeting¹**
- **At the March 4, 2026 ICS meeting, the NYISO presented an overview of the ICF Study²**
- **Winter 2025-2026 was a very cold winter with average temperatures well below normal for much of the season,³ and a long duration cold stretch occurring from January 23rd to February 9th**
 - Second lowest average hourly temperature for winter (27.7 °F) since winter 2010- 2011
- **The purpose of today’s presentation is to review the ICF Study and Winter 2025-2026 cold weather operating experience for potential consideration in updating modeling assumptions for the winter fuel availability constraints model**

¹. [Winter Fuel Availability Constraints Modeling Review](#)

². [ICF Winter Fuel Constraints Study](#)

³. [Winter 2025-2026 Cold Weather Operations](#)

ICF Study Considerations

ICF Study Considerations

- **The NYISO assessed historical data to help gauge differences between the theoretical maximum winter fuel availability identified by the ICF Study and operating experience for gas-fired generators in New York**
 - The NYISO analyzed gas consumption for power generation for the two days identified in the ICF Study (2/3/2023 and 1/22/2025) against the estimated available fuel using the ICF Study approach
- **The NYISO adjusted the fuel availability estimates from the ICF Study to exclude consideration of additional supply obtained by local distribution companies (LDCs) to serve retail gas demands as these supplies are not expected to be available for power generation.**
 - Therefore, for this assessment, the NYISO used the maximum coincident peak pipeline supply value of 7,105 MMcf identified by ICF as having occurred on 2/3/2023
- **Deducting firm LDC gas demand, as identified in the ICF Study, this assumed maximum winter fuel availability value (i.e., 7,105 MMcf) results in ~2,850 MMcf of gas available for power generation (~ 318,000 MWh for the entire day)¹**
- **The same approach is applied to data available for 1/22/2025, resulting in an estimate of ~240,000 MWh of available gas-fired generation for the entire day**
- **Actual gas power production on 2/3/2023 and 1/22/2025 was ~134,000 MWh and ~108,000 MWh, respectively, statewide**
 - The peak load on 2/3/2023 was 23,369 MW² and ~24,121 MW on 1/22/2025³
 - Both these peak loads were slightly under the baseline forecast (50/50 forecast) for their respective winter periods and occurred in hour beginning (HB) 18
 - Operational flow orders (OFOs) were issued by the LDCs for both days
- **On these days, the actual gas consumed by power generation was approximately 50% of the maximum theoretical gas-fired generation availability estimated by the ICF Study**

1. Refer to Appendix for details on the calculation

2. [Winter 2022-2023 Cold Weather Operations presentation](#)

3. [Winter 2024-2025 Cold Weather Operations presentation](#). The peak load on 1/22/2025 was reduced by SCR/EDRP activations. The reported value reflects the addition of the estimated SCR/EDRP load reduction to the metered load

Key Takeaways

- **The ICF Study noted several factors not considered in the fuel assessment such as:**
 - Operational constraints from pipeline operators and LDCs such as OFOs, minimum fuel offtake quantities that limit operational flexibility and other limitations that may impact gas supply availability to generators
 - Limitations on gas availability are expected to arise for generators connected to and receiving deliveries solely through LDC systems. This can be particularly impactful for downstate generation, especially within New York City, where nearly all gas-fired generation capability is served by LDC systems
 - The ICF Study was based on consideration of a week-long duration cold weather event. Fuel supply constraints, however, may occur under compounding conditions outside a single week-long event, which can increase the risk of fuel supply availability constraints for the gas-fired and dual fuel fleet
 - Events impacting key pipelines or liquid fuel delivery logistics can reduce the available fuel supply for generators
- **Based on the assessment conducted of historical operating experience, the NYISO recommends placing greater reliance on historical data when evaluating winter grid reliability**
 - Historical operating data better captures the factors not considered by the ICF Study
- **Certain additional information from the ICF Study can help inform the winter fuel availability constraints modeling assumptions for the 2027-2028 IRM study and future IRM cycles**
 - Potential quantities of additional gas supply capability that could arise from future pipeline expansion projects
 - Northeast Supply Enhancement pipeline project with a targeted in-service date of Q4, 2027
 - Iroquois Enhancement by Compression project, with a targeted in-service date of 2028
 - Constitution pipeline project, with a targeted in-service date of Q4, 2027
 - Notably, the ICF Study does not estimate potential increases in firm LDC demand that may be served by future expansions, which is an important consideration in determining how much of the increased gas supply can be relied on for power generation.
 - The ICF Study also identified that the main impact of gas constraints are in Load Zones F-K, for both 2025 and 2035.

Review of Winter 2025- 2026 Cold Weather Operations

Highlights from Winter 2025-2026 Cold Weather Operations

- **At the 4/10/2026 NYSRC Executive Committee meeting, the NYISO presented its review of cold weather operations for winter 2025-2026,¹ with the following key observations:**
 - Average temperatures were well below normal for much of the season, with a long duration cold stretch occurring from January 23rd to February 9th
 - OFOs and natural gas supply limitations resulted in forced outages due to fuel restrictions
 - Supplemental Resource Evaluation (SRE) commitments were required shortly after the posting of Day-Ahead Market (DAM) results during the cold stretch due, in part, to limited flexibility on the gas system
 - NYCA peak forecasts for Winter 2025-2026: 24,200 MW (50/50 baseline) and 25,239 MW (90th percentile)
 - Winter 2025-2026 peak (to date) was 24,317 MW on Saturday, February 7, 2026 (HB 18) prior to any adjustments for demand response reductions
 - Estimated demand of 24,717 MW when accounting for initial estimated impact of Special Case Resource/Emergency Demand Response Program (SCR/EDRP) load reductions
 - If similar weather conditions occurred on a weekday, peak load would likely have exceeded 25,000 MW
 - Liquefied natural gas (LNG) injections east of New York likely eased pipeline constraints across the New York System by providing fuel supply alternatives for New England generators
 - The NYISO took actions, working in coordination with generators, pipelines, LDCs, and regulatory agencies, to manage liquid fuel inventory based on energy assessments to meet load and reserve requirements for the duration of the event.

1. [Winter 2025-2026 Cold Weather Operations](#). A similar presentation was also made at the March 19, 2026 NYISO Operating Committee meeting.

Winter 2025-2026 Fuel Assessments

- The NYISO's winter 2025-2026 capacity assessment (conducted prior to the start of the season) assumed ~6,000 MW of capacity to be unavailable due to the potential loss of non-firm gas supply,¹ including 693 MW in Load Zones A-E and 5,272 MW in Load Zones F-K
- During the cold stretch from 1/29/2026 to 2/9/2026, the NYCA grid experienced fuel-related unavailable capacity ranging from 500 MW and 3,000 MW, with about 80% located in Load Zones F-K
 - Total unavailable capacity during this period ranged from approximately 3,500 MW – 7,500 MW
 - See Appendix for additional details including daily information
- In addition, during this period, ~1,500 MW of thermal capacity in Load Zones F-K remained unscheduled based on their day-ahead offers
 - See Appendix for additional details including daily information
 - Potential fuel limitations on the unscheduled capacity are not clear
- During the cold stretch, natural gas index prices for the pipelines serving NY generation were in the \$50-\$250/MMBtu range, with reports of spot quotes in excess of \$300/MMBtu
 - For reference, the Henry Hub spot price was forecasted to average \$3.64/MMBtu for the winter
- At the peak of this cold stretch, there was ~2,500 MW of production from gas-only units in Load Zones F-K

1. [Winter 2025-2026 Assessment & Winter Preparedness](#)

Key Takeaways

- **The cold stretch from 1/29/2026 to 2/9/2026 represented operating conditions at slightly above 50/50 load levels,¹ but with longer duration of a cold stretch than experienced in recent past winters**
 - NYCA all-time winter peak load was 25,738 MW on 1/7/2014, about 1,400 MW higher than the recent cold stretch
 - Average peak load for the recent cold stretch was the highest since winter 2014-2015
- **During this cold stretch, some fuel availability constraints were experienced, but ~2,500 MW of gas-only unit production from Load Zones F-K occurred. A number of factors should be considered for the amount of available fuel:**
 - Significant amount of LNG was available (higher than prior years) in New England, likely increasing gas availability to New York power generators and helping ease gas pipeline constraints. However, the LNG availability can be volatile due to global market conditions
 - Liquid fuel inventory was actively being managed to ensure sufficient fuel remained available for the entire duration of the cold stretch
- **The operating data from this cold stretch, particularly the gas-fired power production and available oil inventory data, will be included in the data used to assess potential updates to the winter fuel availability constraint modeling assumptions for the 2027-2028 IRM study**
 - Gas production is expected to be higher compared to prior years, largely due to availability of LNG to support generation in New England
 - Oil inventory level is expected to be maintained near historical levels due to active management

1. Refer to the Appendix for actual loads during the cold stretch

Next Steps: Winter Fuel Availability Constraints Model Considerations

Next Steps

- **Update the prior historical assessment of “available gas” and “available oil” to include data from winter 2025-2026**
 - Assess the impact from the added winter data
- **Identify potential refinement of the winter fuel availability constraints model assumptions based on the updated data and the review of the additional information**
 - Potential improvements may include modifications to the allocation of fuel constraint derates, consideration of potential pipeline expansion impacts, and reassessing triggering load conditions
 - Updates to the winter fuel availability constraints model assumptions can be considered for the 2027-2028 IRM study Preliminary Base Case (PBC) or PBC Sensitivity Cases
- **Whitepaper milestones:**
 - Q2 2026: Review findings of the NYISO’s 2025 Fuel Constraint Study and potential implications for the winter fuel availability constraint modeling in the IRM study
 - Q3/Q4 2026: Consider potential modeling updates to fuel availability assumptions for the 2027-2028 IRM study

Questions?

Appendix

Assessment of February 3, 2023 and January 22, 2025

■ February 3, 2023

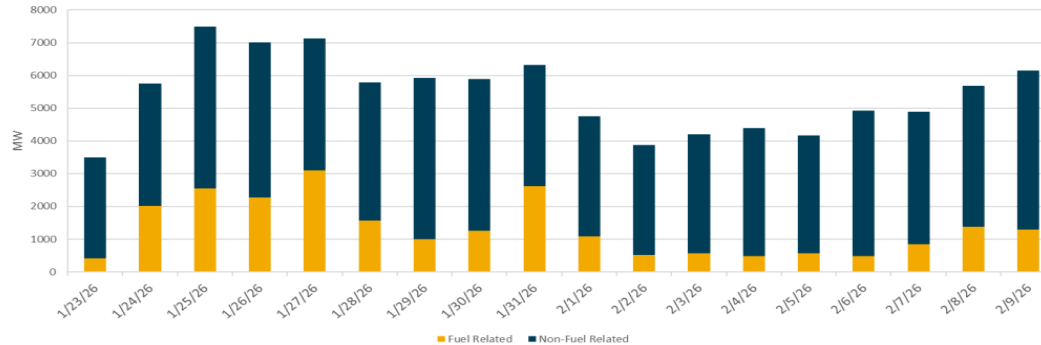
- Total assumed gas supply = 7,105 MMcf/d
- Firm LDC demand = 4,238 MMcf/d
 - With the absence of firm LDC gas demand on 2/3/2023 from the ICF Study, forecasted peak day firm gas demand under the similar weather conditions (i.e., Load Bin 4) is estimated at 4,238 MMcf
- Estimated maximum supply available for power generation = $7,105 - 4,238 = 2,867$ MMcf/d
- Converting gas volume to MWh/d.
 - $\text{MWh/d} = (\text{MMcf/d} * (\text{MMbtu/Mcf})) / \text{Heat rate}$
 - Heat rate is assumed to be 9 Mmbtu/MWh
 - 1 MMcf = 1.000 Mmbtu
- Therefore, $2,867 \text{ MMcf/d} = 318,555 \text{ MWh/d}$

■ January 22, 2025

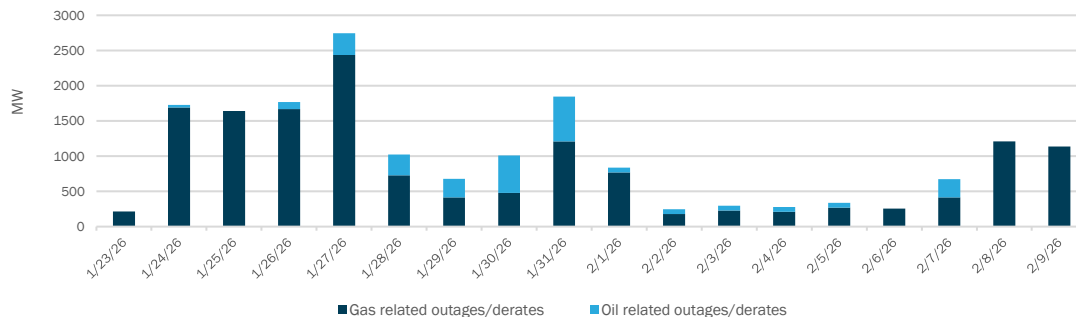
- Total supply = 7,105 MMcf/d
- Firm LDC demand = 4,981 MMcf/d
 - Values is from the ICF Study as this is one of the identified gas demand scenarios
- Estimated maximum supply available for power generation = $7,105 - 4,981 = 2,169$ MMcf/d
- Converting to MWh/d = $(2,169 * 1000) / 9 = 241,000 \text{ MWh/d}$

Unavailable Capacity During 2025-2026 Winter Cold Stretch

Fuel and Non-Fuel Related Outages during Daily Peak Hour (Excludes SCR/EDRP and Intermittent Resources)

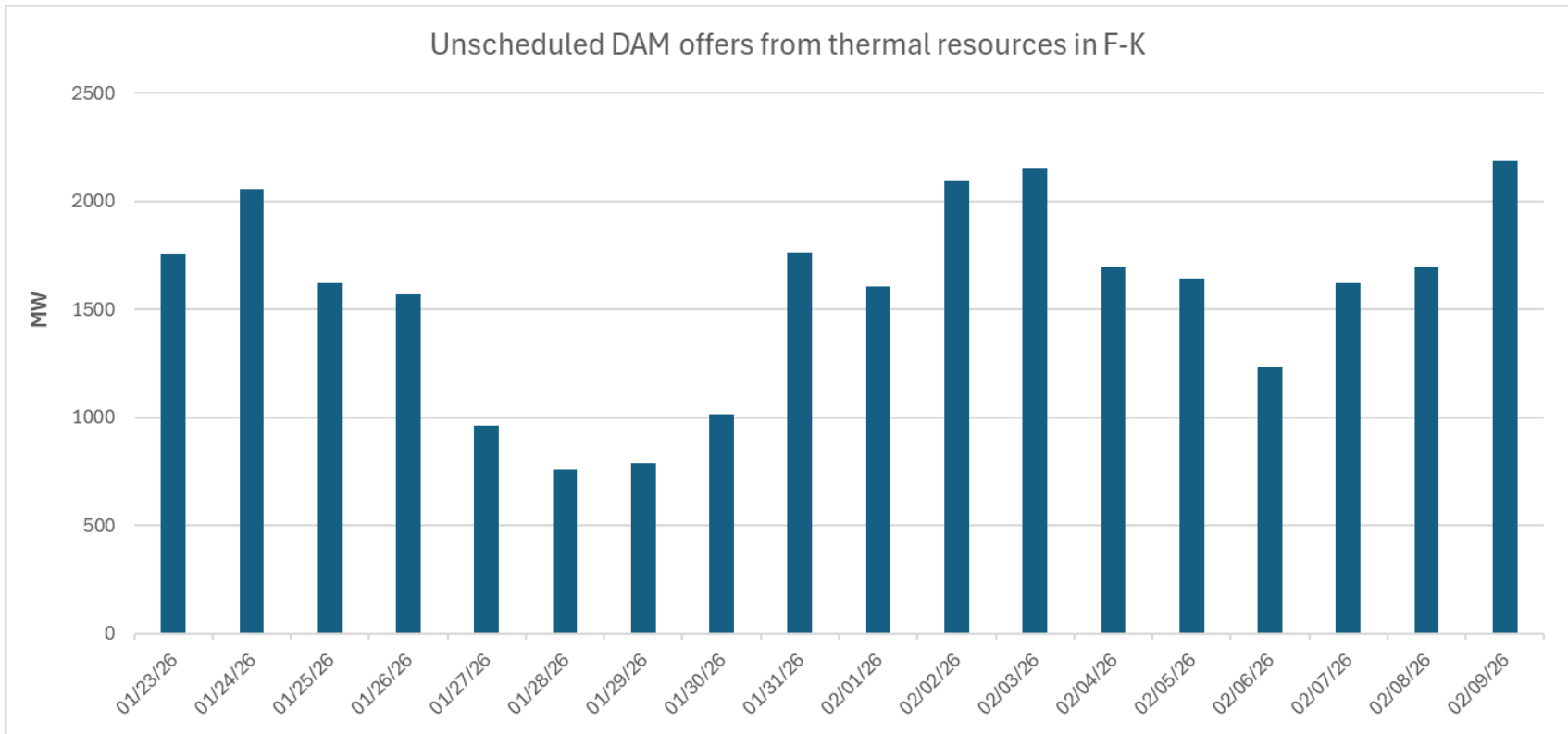


Natural gas and Oil related fuel outages and derates during Daily Peak Hour (Load Zones F-K)



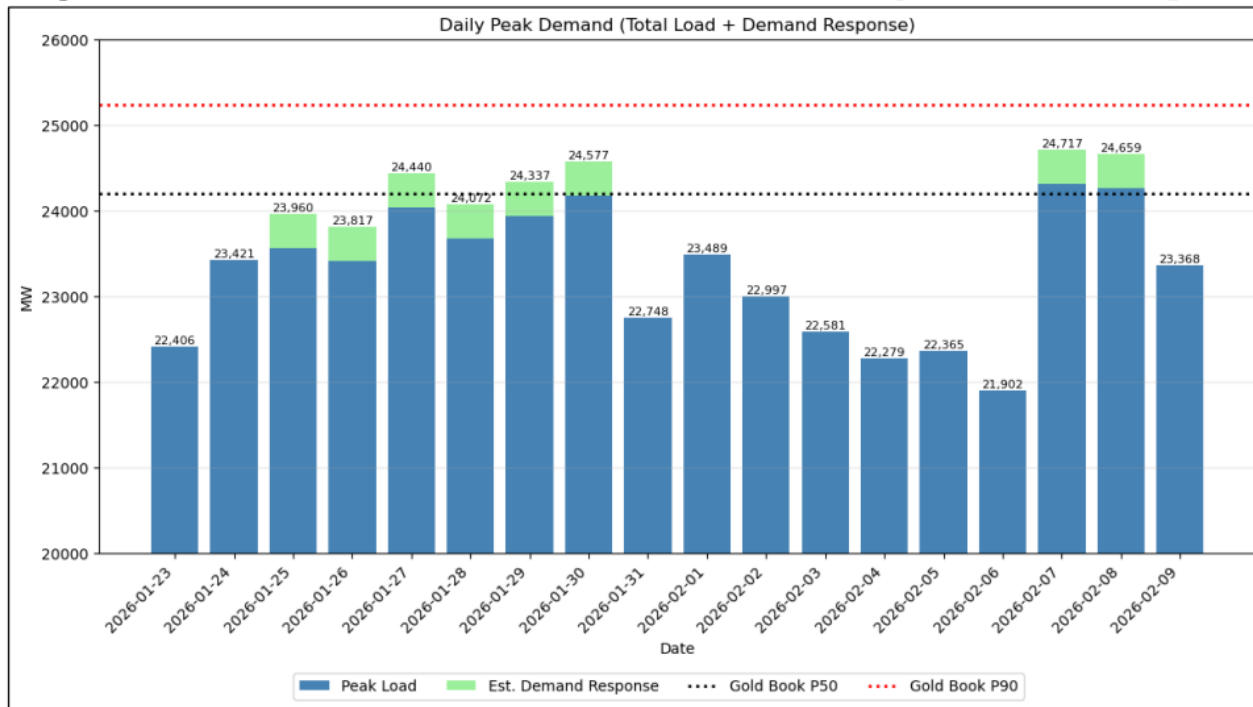
- This top graph shows the unavailable capacity from all non-intermittent resources statewide
- This bottom graph shows the fuel related outages in Load Zones F-K and only focuses on gas and oil related outages and derates

Source: Slide 15 from Winter 2025-2026 Cold Weather Operations presentation



- This graph is calculated by summing the upper operating limit (UOL) of thermal resources in load Zones F-K that were offered in the Day-Ahead Market (DAM) but not scheduled through the DAM

Daily Peak Load and Estimated SCR/EDRP Impact



Slide 6 of the [Winter 2025-2026 Cold Weather Operations presentation](#)
 Note that the peak load over this cold stretch occurred on a Saturday 2/7/2026

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Mission

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