Appendix: Everett Marine Terminal Focus Area Working Group Report to the Energy Transformation Advisory Board

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B. Agenda Items of the EMT FAWG and EMT-related items of the ETAB
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D. Guidance to the LDCs for the EMT Alternatives Analysis
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Appendix A: FAWG Membership

FAWG Stakeholder Membership

The list below reflects OET's list of participants as of the date of publication of this report. Listing does not imply endorsement of the FAWG's findings and recommendations.

Name	Organization
Kate Dineen	A Better City
Joseph LaRusso	Acadia Center
Valessa Souter-Kline	Advanced Energy United
Brooke Thomson	AIM
Magda Garncarz	AIM
Kevin Marquardt	AlphaStruxure
Monica Lamboy	City of Everett
Ryan Murphy	Climate Jobs Massachusetts
Priya Gandbhir	Conservation Law Foundation
Jenny Goldberg	DOER
Marian Harkavy	DOER
Rachel Evans	DOER
Shevie Brown	DOER
MariaBelen Power	EEA
Daniel Engelberg	EEA
Katie Gronendyke	EEA
Ashley Gagnon	EEA
Liz Mettetal	E3
Seth Blum	E3
Rob Hart	Environmental League of MA
Amy Boyd Rabin	Environmental League of MA
Ryan Vazza	Global Partners
Carrie Katan	Green Energy Consumers Alliance
Larry Chretien	Green Energy Consumers Alliance
Sari Kayyali	GreenRoots
Thomas Wall	HFIAW LU#6
Patrick O'Brien	Holtec
Dave Keating	IBEW
Michael Monahan	IBEW

Name	Organization
Kevin Collins	Ironworkers
Rodrigo Badaro	IUPAT DC 35
Daniel Murphy	Local 103 IBEW / NECA Contractor
Matthew Saunders	Attorney General's Office
Nathaniel Haviland-Markowitz	Attorney General's Office
Senator Mike Barrett	Massachusetts Senate
Jean-Luc Pierite	NAICOB
R. Halsey	NAICOB
Boris Brevnov	NEC LNG
Molly Connors	NEPGA
Jordan Rogers	North Shore Labor Council, AFL-CIO
Jose Costa	Northeast Gas Association
Caleb Oaks	Office of Senate Chair Roy
Tim Fandel	Plumbers Local 12 Boston
Heather Takle	PowerOptions
Jordan Kirwin	Repsol
Erik Shilts	Rewiring America
Rob Rio	RR Consulting
Marcos Luna	Salem State University
Alana Cho	Schneider Electric
Mohamed Sadek	Schneider Electric
Nancy Riley	Sense
John Cody	SMART Local 17
Shamiah Turner	SMART Northeast Regional Council
John Buonopane	United Steelworkers
Daniel Leary	Utility Workers Union of America
Jeannie Morris	Vicinity Energy
Matthew O'Malley	Vicinity Energy
Tricia Keegan	Vicinity Energy

Office of Energy Transformation and Support Staff

Name	Organization
Melissa Lavinson	Office of Energy Transformation
Katherine O'Malley	Office of Energy Transformation
Henry Westerman	Office of Energy Transformation
Omid Mahdavi	Office of Energy Transformation
Anika Reynar	Consensus Building Institute (CBI)
Patrick Field	Consensus Building Institute (CBI)
Toby Berkman	Consensus Building Institute (CBI)
Michael Walsh	Groundwork Data

Cognate Parties of the FAWG: Utilities and Constellation

Name	Organization
Caroline Hon	National Grid
Donna Silva	National Grid
Elizabeth Arangio	National Grid
Faye Brown	National Grid
Kasey Elkin	National Grid
Liz Harridge	National Grid
MaryBeth Carroll	National Grid
Michelle Roche	National Grid
Brandy Chambers	Eversource
Eric Soderman	Eversource
Erin Engstrom	Eversource
Gerhard Walker	Eversource
Kerry Britland	Eversource
Ann Hartigan	Unitil
Joseph Conneely	Unitil
Rob Furino	Unitil
John Rudiak	Berkshire Gas
David Creer	Constellation
Greg Patronik	Constellation
Gretchen Fuhr	Constellation
John Lauck	Constellation
Norris Wright	Constellation

Appendix B: Agenda Items of the EMT FAWG and EMT-related items of the ETAB

Meeting Date	Agenda Items / EMT-Related Topics and Actions
September 30, 2024 *[ETAB]*	• Established EMT FAWG mission: develop coordinated strategy to reduce and ultimately eliminate LDC reliance on EMT • Presented background on regional natural gas delivery system, EMT facility, current uses, and supply contracts with National Grid, Eversource, and Unitil • Reviewed three-phase EMT FAWG workplan: (1) understanding EMT and current use, (2) assessment of alternatives, (3) implementation assessment and recommendations • Emphasized importance of considering impacts on the City of Everett (jobs, tax revenue, EJ) • VOTED: to adopt high-level approach to EMT FAWG workplan and Article 3 of EMT FAWG By-Laws
November 4, 2024 *[FAWG]*	• Overview of OET context, and FAWG process • Background on the EMT LNG Facility: operations, role in MA and regional natural gas system, workforce and community, contracts, regulation, and policy • Review of Transitioning Away from EMT LNG workplan and future convenings
December 10, 2024 *[FAWG]*	• OET EMT FAWG mission, scope, policies, ground rules, workplan, and expectations • Review of natural gas systems and regional dynamics (supply/demand, system pressures) • EMT facility overview: operations, workforce, community • Gas supply planning: demand forecasting and planning process • EMT utilization: types (re-gasified vapor or trucks), frequency, geographic scope • Potential alternatives to EMT (demand and/or supply side) • CCP timelines and requirements
December 16, 2024 *[FAWG]*	• Recap of December 10 meeting observations and takeaways • LDC responses to questions from December 10 meeting (liquefaction capabilities, ratepayer impacts, supply prioritization) • Review of FAWG focus and purview • CCP EMT Chapter outline review and discussion • Other workstreams
January 10, 2025 *[FAWG]*	• Key takeaways from December 16 meeting, Northeast Power Coordinating Council (NPCC) January 3 report, and outline feedback • Review of revised EMT CCP Chapter outline and stakeholder feedback incorporation • Overview of Phase 2 assessment work and LDC guidance
January 22, 2025 *[ETAB]*	• EMT FAWG Phase 1 update: developed robust understanding of EMT's role — facility can provide up to one-third of state gas demand on peak days; direct utilization has declined since Mystic closure in 2019 • Reviewed LDC CCP reporting requirements: historical use, system function, demand reduction efforts, and alternative analyses required beginning April 2025 • FAWG developing assessment methodology and rubric for alternatives to EMT, to be incorporated into LDC CCPs

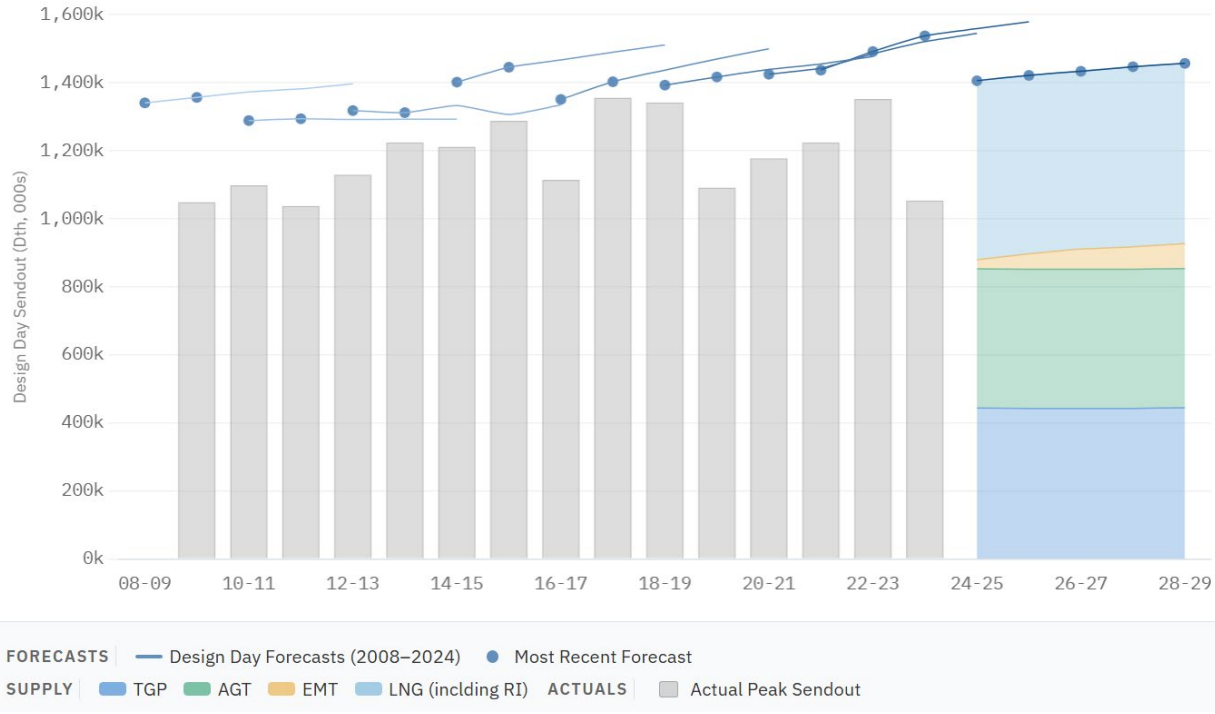
Meeting Date	Agenda Items / EMT-Related Topics and Actions
	• Discussion: potential for public ownership if reliance persists longer than expected; concern about whether reducing EMT reliance simply shifts to other gas sources vs. reducing gas overall • VOTED: CCP outline and informational content reasonably meet D.P.U. order requirements and reflect FAWG guidance
February 24, 2025 *[FAWG]*	• Overview of Alternatives Assessment workstream and LDC guidance • EMT utility zones discussion • Scenarios and forecasted demand and supply assumptions • Alternatives identification and discussion • Evaluation criteria development • Methodology summary and research questions
April 3, 2025 *[ETAB]*	• All FAWGs transition from Phase 1 to Phase 2 (framing/understanding to assessing alternatives) • No specific EMT FAWG presentation at this meeting; focus was on FTT and DTP assessment frameworks • ETAB noted importance of interconnectedness between EMT and DTP FAWGs, with plans to align findings once EMT timeline and results are clearer
May 22, 2025 *[FAWG]*	• Updates on CCP filings and assessment process • Argonne National Laboratory (ANL) Regional Gas Supply Study presentation • FAWG review and discussion of cost and emissions assessment methodology • Overview of summer schedule and Phase 2 LDC assessment process
July 21, 2025 *[FAWG]*	• Review of EMT FAWG background, process, and EMT-reliant zones of focus • Unitil Initial Phase 2 Alternatives Assessment: supply planning context, EMT contract, FAWG guidance review • Unitil alternatives assessment findings and discussion • Unitil conclusions and findings presentation
August 20, 2025 *[FAWG]*	• EGMA Phase 2 Alternatives Assessment: AGT G-System system • Enterprise gas supply planning principles, processes, and standards • EGMA discrete AGT G-System system requirements and EMT contract role • Assessment of alternatives for G-System supply and open discussion
August 22, 2025 *[FAWG]*	• National Grid Phase 2 LNG Supply Alternatives Assessment • National Grid EMT contract review and EMT-reliant zones • Review of FAWG guidance and National Grid LNG facilities • National Grid initial assessments and alternatives summary discussion
August 28, 2025 *[FAWG]*	• Eversource/NSTAR Gas Phase 2 Alternatives Assessment: Cambridge/Boston territory • National Grid Phase 2 Demand Alternatives Assessment • National Grid direct injection to the distribution network and reliability review • Alternative recommendations: LNG supplies, on-system expansion, alternative liquid sources, demand-side strategies
September 10, 2025 *[ETAB]*	• EMT FAWG Phase 2 key findings presented: elimination of LDC reliance on EMT by 2029/2030 is highly unlikely; reduction is possible with associated implications • Findings by alternative category: new on-system LNG requires substantial investment with stranding risk; alternate LNG supplies possible but present

Meeting Date	Agenda Items / EMT-Related Topics and Actions
	transport/diversity risks; pipeline expansion possible in some territories but high challenge for Boston/Cambridge; electrification and DR aligned with climate goals but requires eliminating demand of ~125,000 strategically-located homes • Phase 3 next steps: deeper dive into assessments, formulate recommendations to guide policy over the remainder of current contract and inform future EMT utilization • ETAB small group feedback on EMT: prioritize demand reduction (especially large customers/universities), de-prioritize LNG trucking, build safety net for reliability, develop cost mitigation strategies for remaining ratepayers, begin thinking beyond 2030 • ETAB members expressed disappointment about lack of transparency regarding Eversource's DPU filing for a new gas supply contract to reduce/eliminate EMT reliance
October 30, 2025 ***[FAWG]***	• Recap of Phase 1 and Phase 2 work to date and where we are going • Report out from ETAB • Review of FAWG survey feedback • AGT G-System improvements update (Eversource) • Forecast and Supply Plan analysis: filling in the gaps • EMT as a mid-transition asset: navigating tradeoffs discussion
December 4, 2025 ***[FAWG]***	• Process overview and status update • General updates: utilization, large customer BERDO/BEUDO data, special contracts • Boston Area Clean Thermal presentation (Dennis Carlberg, Boston University) • Eversource geothermal pilot presentation • Eversource DR study results • Discussion: Findings of the EMT FAWG
January 16, 2026 ***[FAWG]***	• Regional gas supply system overview (Groundwork Data) • EMT operations and outlook (Constellation LNG) • Repsol-Saint John LNG facility presentation • NEC LLC presentation on regional gas supply solutions
January 20, 2026 ***[FAWG]***	• IEP overview and 2026 IEP working group • Review of draft FAWG findings and recommendations • LDC Alternative Assessment summary review • Draft recommended pathway discussion
February 4, 2026 ***[ETAB]***	• EMT FAWG now in Phase 3 (developing recommendations); presented draft findings and recommendations to ETAB • Key findings: EMT provides vapor/liquid supply, redundancy, pressure support, and storage; costs are largely fixed and borne by LDC ratepayers; highly unlikely that sufficient demand reduction can be deployed by 2030 to avoid continued reliance • Emergent risks identified: cost shifting to remaining customers, regulatory transitions, reliability gaps, impacts on City of Everett (jobs, tax revenue, EJ) • Three draft recommendations presented: (1) accelerate strategic demand reduction and incorporate EMT into IEP efforts, (2) develop policy recommendations to reduce costs to LDC ratepayers, (3) clarify long-term role of gas storage in the energy transition

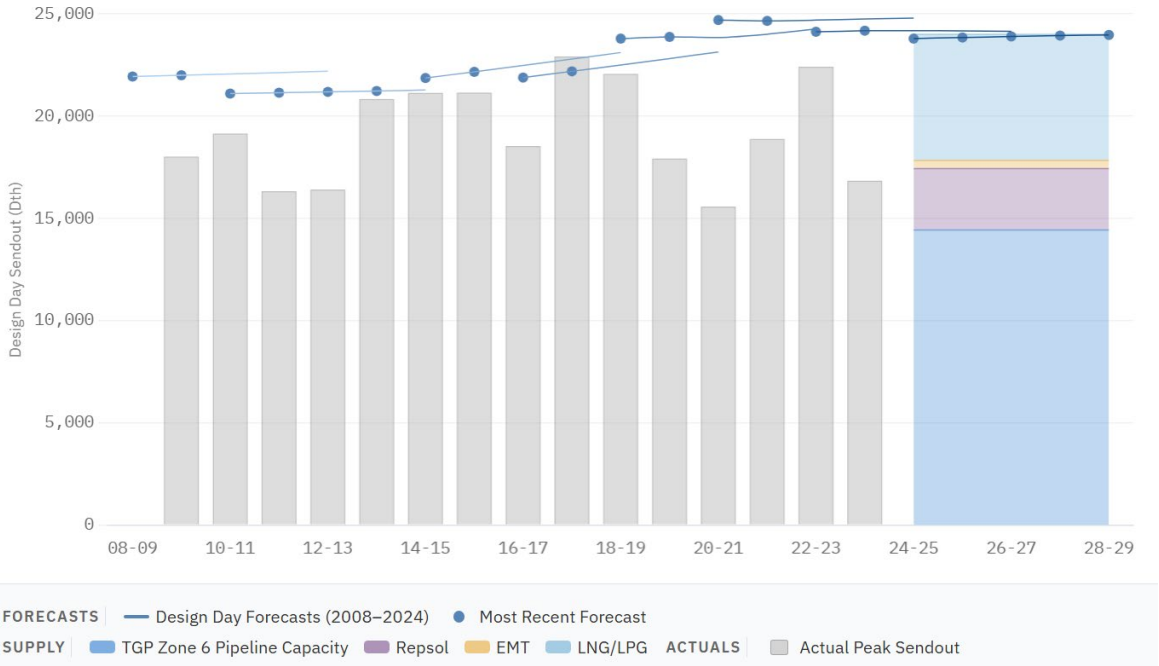
Meeting Date	Agenda Items / EMT-Related Topics and Actions
	• Discussion: concerns about cost burden shifting to dwindling customer base, cost-effectiveness of electrification, need for clearer pathway to reduce (not just affirm) reliance, EJ inclusion, and phased closure roadmap • VOTED: affirmed FAWG Findings and Recommendation Pathway as sufficient basis for additional deliberation; final recommendations to be provided at next ETAB meeting (59 members of the ETAB voted, four did not vote to affirm the findings, 1 abstained)
February 24, 2026 ***[FAWG]***	• Winter/Spring work plan review • ETAB feedback on draft findings and recommendations • Understanding past and current contract arrangements and government authorities • Brainstorm cost mitigation strategies • Brainstorm evaluation criteria for strategies
March 18, 2026 ***[FAWG]***	• LDC Annual Report previews • Data dive: making sense of forecasts (weather trends, HDDs, demand analysis) • Review and evaluate cost mitigation strategies (FAWG discussion)
April 16, 2026 ***[FAWG]***	• Community Perspectives: City of Everett • Community Perspectives: GreenRoots • Discussion of Revisions to Findings and Recommendations
May 14, 2026 ***[FAWG]***	• History of the Everett Site • Berkshire's Contract Renewal with EMT • Additional Deliberation on Findings and Recommendations • Report Overview
June 1, 2026 ***[FAWG]***	• Update on Constellation Levitan Associates Inc. Report and AGT Open Season • Final Review of the Findings and Recommendations and Final Reports • FAWG Approval of the Final Reports
June 11, 2026 ***[ETAB]***	• EMT FAWG Findings and Recommendations Delivered to the ETAB

Appendix C: Forecast and Supply Plans and Historical Send Outs of the LDCs

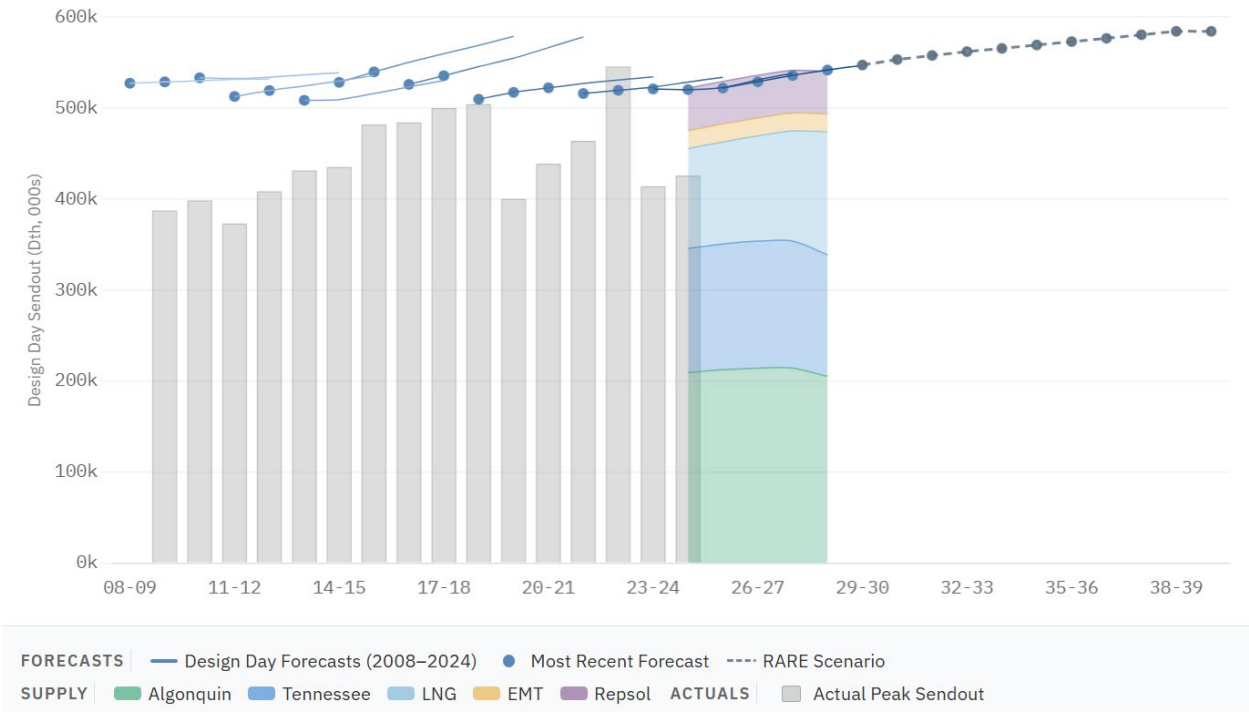
Boston Gas (National Grid)



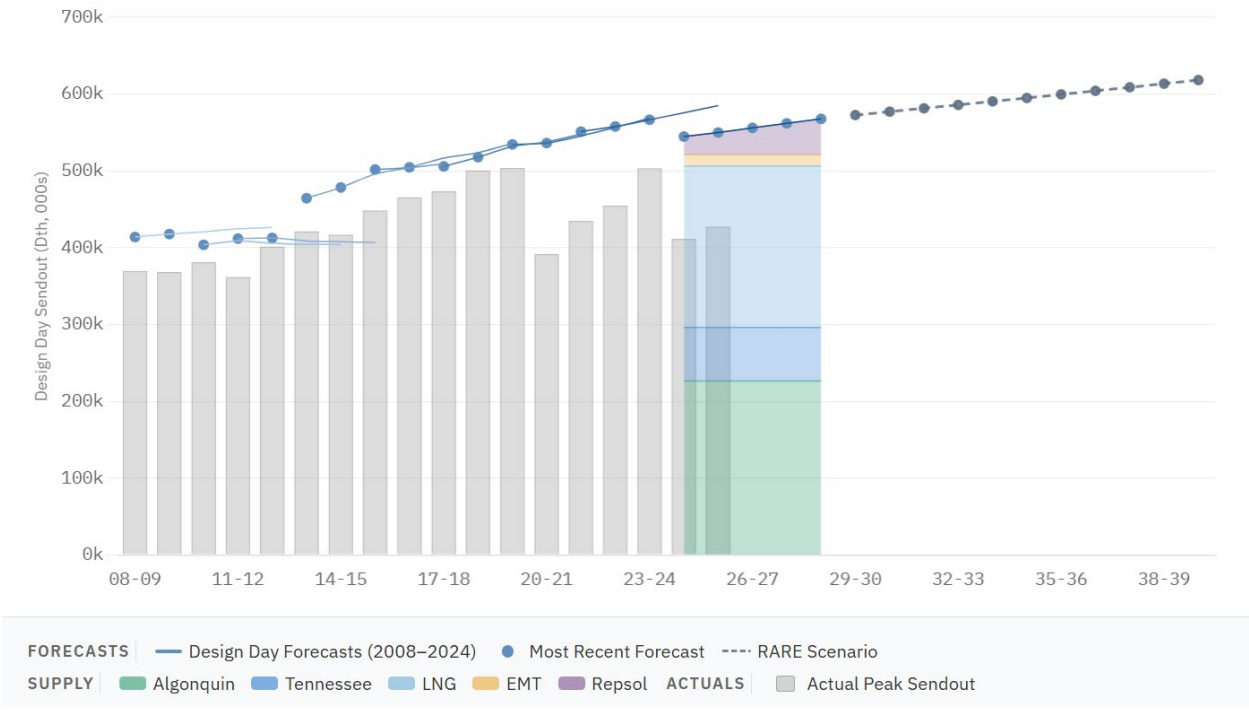
Fitchburg Gas & Electric



EGMA



NSTAR (Eversource)



Appendix D: Assessment Framework

Everett Marine Terminal Focus Area Working Group:

Guidance to the LDCs for the EMT Alternatives Analysis

Introduction

In the approval of the most recent contracts of National Grid, Eversource, and Unitil (collectively the Local Distribution Companies or LDCs) with Constellation LNG (Constellation) for supplies and services from the Everett Marine Terminal (EMT),[1] the LDCs were instructed to take efforts to *reduce or eliminate* their reliance on EMT, evaluate alternatives, and report on progress. The Office of Energy Transformation (OET) subsequently convened a stakeholder process focused on advising the LDCs and providing feedback: The EMT Focus Area Working Group (FAWG). From Fall 2024 through February 2025, the FAWG met: to build understanding of and alignment around the role of EMT; establish expectations for the LDC's reporting on their efforts in their April 1, 2025 Climate Compliance Plan (CCP) filing; and, develop guidance for the alternatives assessment.

In January and February 2025, a subset of the FAWG met to develop guidance for the alternatives assessment workstream. This guidance is presented in this document. The appendix includes a summary of the workstream's meetings, membership, and background resources. The guidance identifies: (1) EMT-reliant zones; (2) outcomes defining reduced and eliminated reliance in the context of gas supply and demand; (3) alternatives; (4) assessment criteria; (5) a summary methodology; and (6) future workstream activities.

On January 29, 2025, the Department of Public Utilities notified the LDCs of EMT-specific filing requirements for their CCPs in a Hearing Officer Memorandum in the 20-80 Docket: *To the extent they have been finalized prior to the filing of the CCPs, discussion of the OET's FAWG on EMT as to: (a) what information should be provided by the LDCs in the CCPs related to EMT; (b) each recommendation received from the EMT FAWG on the EMT section of the CCPs and how the LDCs addressed the FAWG's recommendations; (c) each alternative to EMT; and (d) the method for evaluating the alternatives. In addition, if an LDC declined to incorporate any recommendations from the OET's EMT FAWG, explain why. To the extent the alternatives to EMT have not been finalized or evaluated prior to the filing, the LDCs should discuss the current status of these discussions and provide a workplan for incorporating the OET's EMT FAWG's final recommendations into the CCPs.*

[1] 24-25 (National Grid), 24-26 (Eversource), 24-27 (Eversource NSTAR), 24-28 (Unitil)

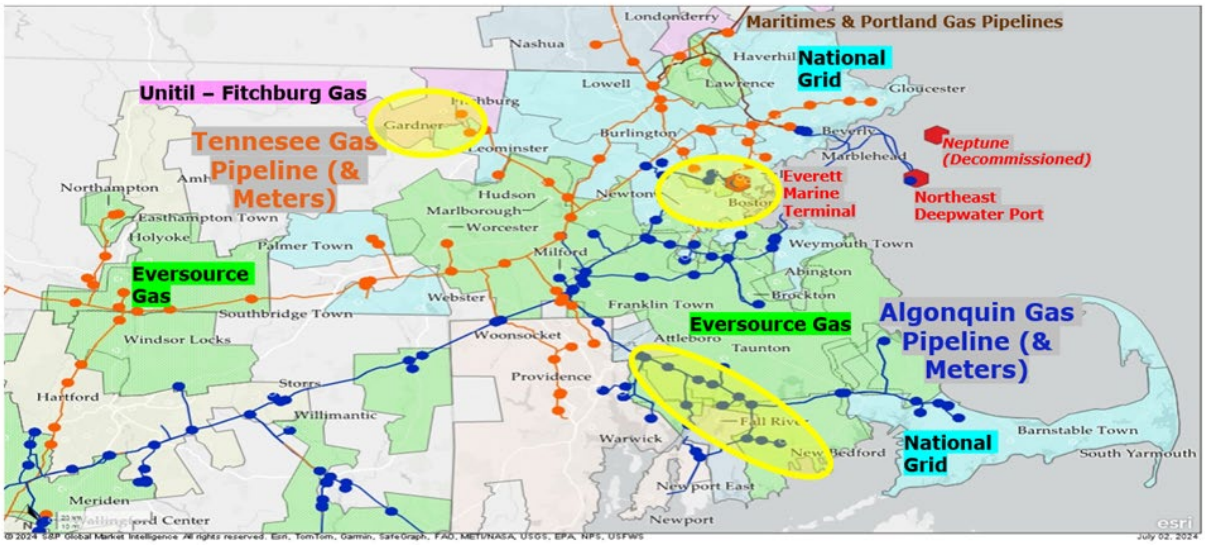
Everett Marine Terminal Focus Area Working Group:
Guidance to the LDCs for the EMT Alternatives Analysis

The EMT FAWG provides the following recommendations for the LDC's assessment of alternatives to reduce or eliminate reliance on EMT. Per the DPU's notification, the LDCs are asked to incorporate these recommendations into their CCPs and explain any recommendation they decline to incorporate.

1. EMT-Reliant Zones

This section provides an overview of EMT Reliance by each LDC. Each LDC should conduct an alternative assessment in the context of each zone's utilization of EMT; however, as the assessment proceeds, the LDCs should consider opportunities for coordinated or pooled effort to achieve the outcomes of reduced or eliminated reliance.

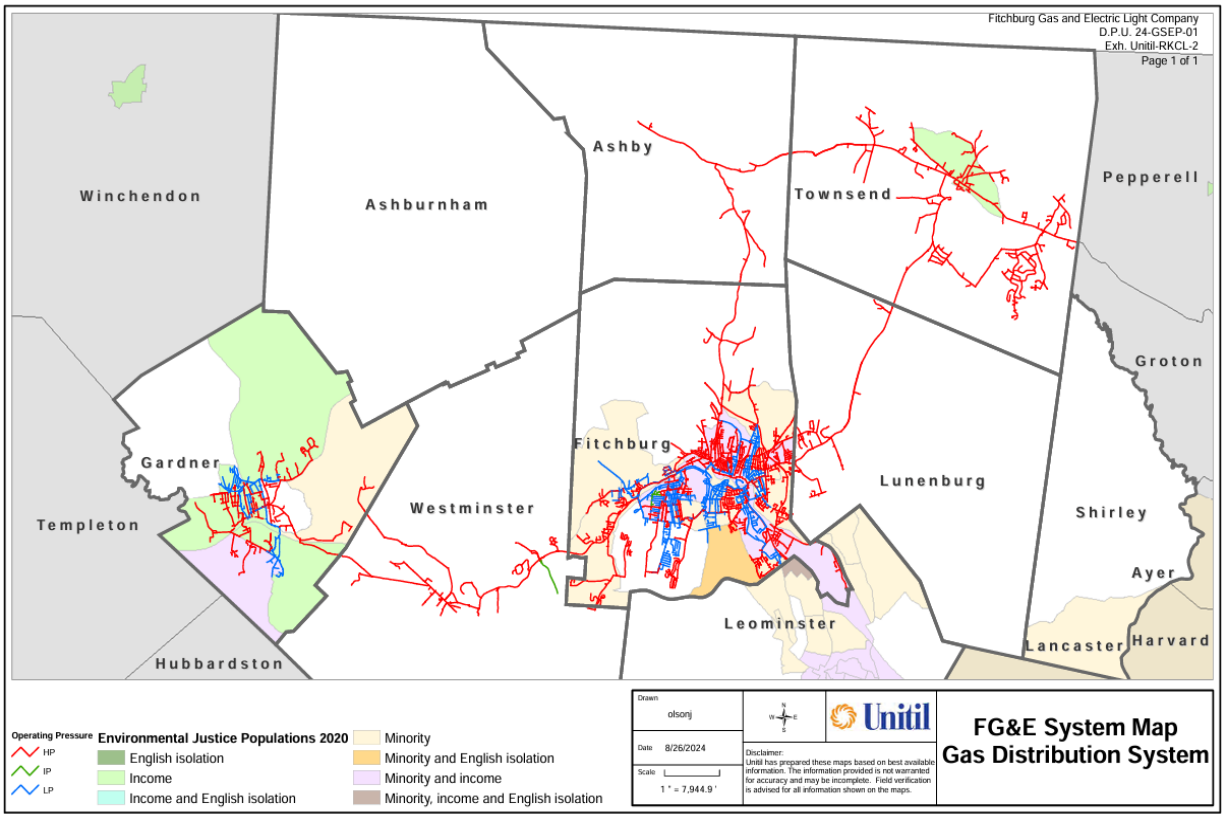
Statewide Summary of Zones



Summary of Contracts (Source: D.P.U. 24-[25-28]-B)

LDC	Specification	Maximum Daily Quantity (MDQ-dth)		Maximum Seasonal Quantity (MSQ-dth)	
		24/25	29/30	24/25	29/30
National Grid	Liquid or Vapor	27,000	78,000	500,000	2,100,000
EGMA	Up to 50% as Liquid	19,600	19,600	882,000	882,000
NSTAR (AGT-G)	Liquid or vapor	5,000	5,000	450,000	450,000
NSTAR (AGT-J) or TGP	Liquid or vapor	15,000	15,000		
Unitil	Liquid	3,000	3,000	84,000	84,000
	Vapor via TGP	400	400		

Unitil



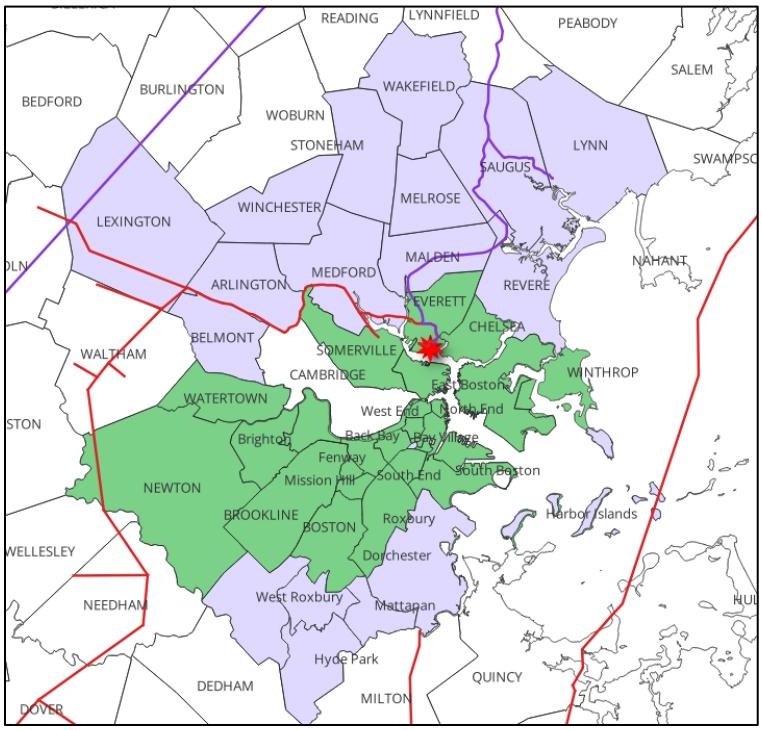
LNG Injection (One Location): Gardner (~1,658 meters) and Westminster (~501 meters) are served by a single pipe that is unable to meet peak supply needs on its own. The Westminster LNG Vaporization Facility provides additional capacity for peak demand in these service areas. The facility's maximum daily quantity (MDQ) for injection is 3,172 Dth, the same as its on-site storage capacity (3,172 Dth), which is roughly equivalent to 3 truckloads of LNG. Given its limited on-site storage, the plant must be refueled regularly. In order to inject the full MDQ in one day and still be fully available for the next gas day, the plant would need to receive 3 truckloads of LNG. The plant is utilized ~50 days per year, for injections that are typically much less than its MDQ. Gardner (~15% of FG&Es gas customers) is served by National Grid electric.

Vapor System Support: Unitil connects to the Tennessee Gas Pipeline (TGPL) in Lunenburg. EMT vapor into TGPL also supports peak service to the entire Unitil (Fitchburg Gas) territory up to 400 MCF/day. An LPG vaporization plant in Lunenberg (at the TGPL connection site) provides additional support to the entire Unitil system.

Unitil's zonal needs can be combined into one assessment due to the small size and overlapping impact of alternatives.

National Grid

Direct Vapor Injection for Boston Gas: EMT directly provides direct vapor and supply capacity support to Boston Gas' north-Boston systems and through Algonquin (red line) and Tennessee (purple line) connections at design hour, day, and season levels.



Utilization across the regional system is shown in the above map and described in *D.P.U. #24-25 Exhibit NG-Agreement-1 at 33-34: "Further, takeaway at this site under design day conditions can meet approximately fifteen percent of total design hour requirements and supply approximately 95,000 customers in the (**green**) communities of Belmont, Boston, including the neighborhoods of Charlestown, East Boston, Jamaica Plain, Roxbury, and South Boston, Brookline, Chelsea, Everett, Newton, Somerville, Watertown, and Winthrop. Under non-peak conditions, Everett is capable of supplying over fifty percent of National Grid's total sendout in Massachusetts, approximately 350,000 customers, with distribution system capacity to reach the communities (**lilac**) of Arlington, Belmont, Boston, including the neighborhoods of Brighton, Charlestown, East Boston, Jamaica Plain, Roxbury and Sout Boston, Brookline, Chelsea, Everett, Lexington, Lynn, Malden, Medford, Melrose, Newton, Revere, Saugus, Somerville, Stoneham, Wakefield, Watertown, Winchester and Winthrop."*

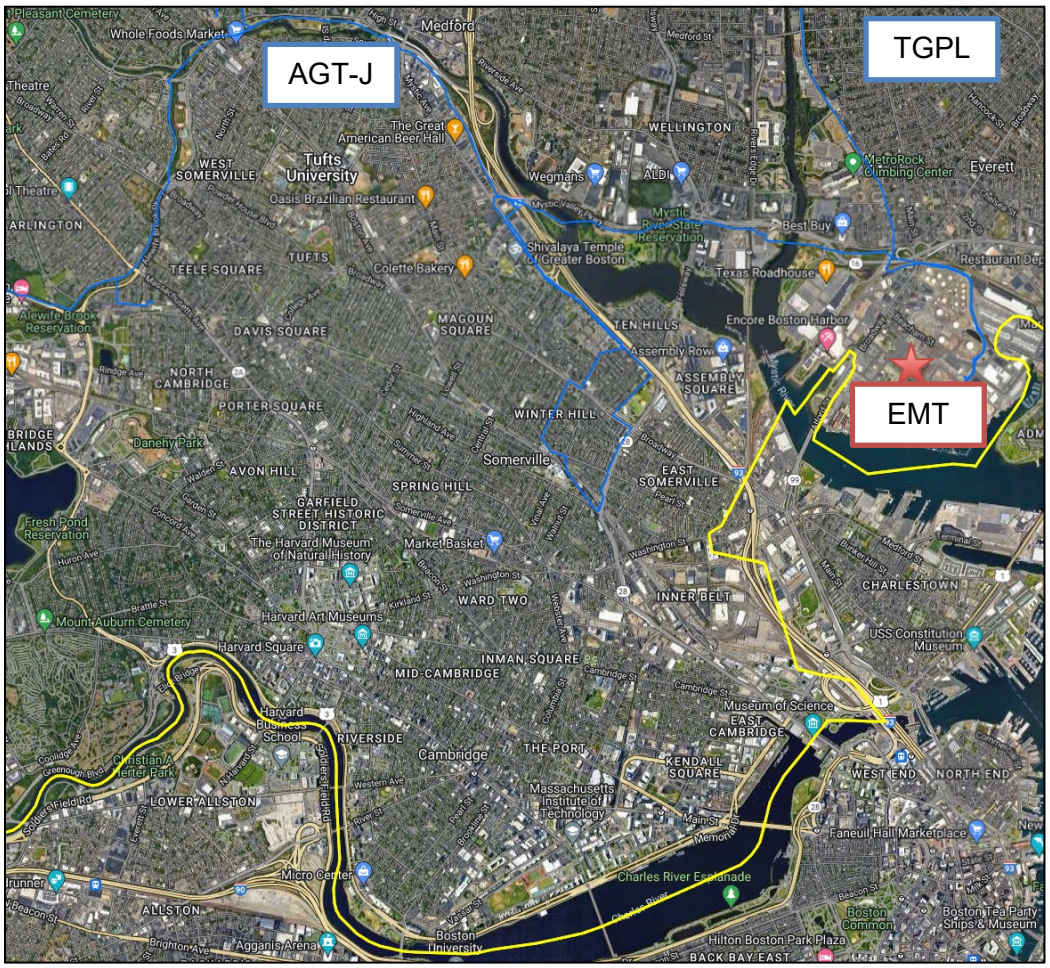
LNG Injection (Various Locations): EMT Supplies LNG storage facilities at Commercial Point, Lynn, Salem, Haverhill, and portable locations, which provide capacity to each facility's local system. These deliveries are made by truck.

Eversource

Eversource does not rely on EMT for trucked/liquid supply. Eversource does not have a direct connection for EMT. Eversource's reliance on EMT stems from EMT's support of the interstate pipeline system, largely two parts of the Algonquin Pipeline (AGT):

AGT System Support for NSTAR AGT-G Branch Meters: EMT provides AGT system support so NSTAR can receive via AGP G-Branch (see statewide map above). Eversource maintains several LNG liquefaction, storage, and injection facilities on the AGT-G Branch to maintain supply needs on part of its system.

AGT Vapor Injection for NSTAR Cambridge/Somerville: EMT provides vapor and supply support to Cambridge / Somerville Territory via a proximate connection to AGT service into Somerville and Cambridge. These territories can be isolated to EMT during AGT-J maintenance. There is no LNG storage in this zone.



2. Recommended Outcomes and Forecasts

Illustrative Narratives for DPU-Specified Outcomes to Consider

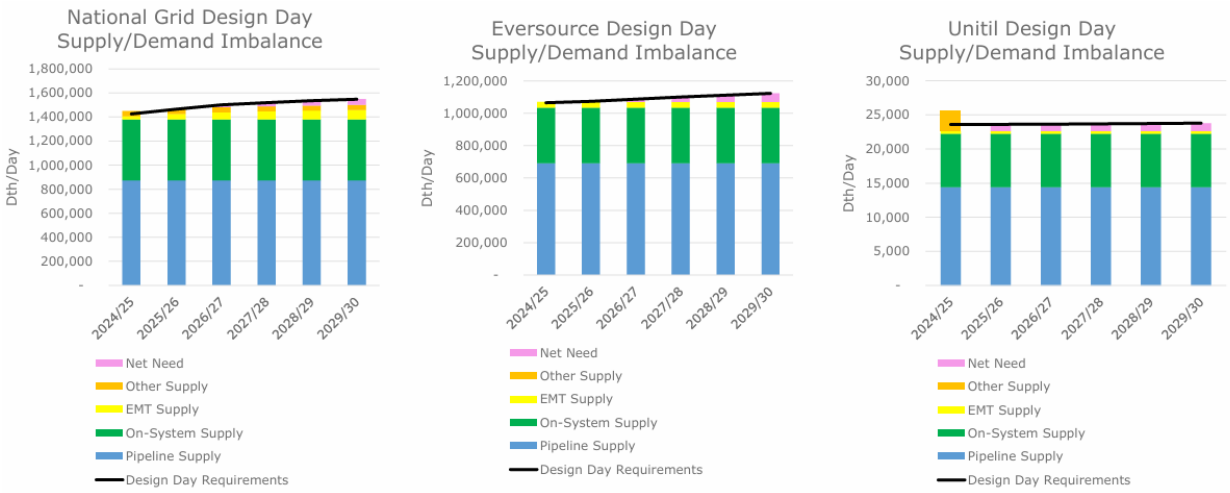
The following narratives are provided to orient stakeholders on the conditions that could result in the DPU-specified outcomes of "reduced" or "eliminated" reliance on EMT. These narratives do not reflect a single choice but aim to illustrate the factors leading to each outcome. Each LDC should propose a definition for meaningfully reduced reliance in each zone.

Outcome	Narrative
Reliance is <u>reduced</u>	Generally, reliance on EMT as a supply resource is greatly reduced, but it still supports specific needs. As alternatives become viable and deployed, the LDCs' reliance on EMT is greatly reduced. Simultaneously, EMT finds another customer. One scenario for how this could play out would see the deployment of renewables and/or region-wide electrification leading to electric generation becoming more reliant on gas in the winter due to peak and firming needs (e.g., cold, windless, low-sun days). EMT and the interstate transmission systems shift from supporting LDCs to supporting electric generation. A non-LDC entity (e.g., ISO-NE / interstates / generators / state(s)) steps in to backstop EMT and keep it operational indefinitely. *EMT remains a resource available to the LDCs for trucked LNG, outage support, and lower peak demand contracts. However, utilization is significantly smaller than today.*
Reliance is <u>eliminated</u>	EMT faces a more challenging operational juncture than in 2023. The growing adoption of alternatives by LDCs has reduced the potential revenue that EMTs can obtain from them. An unexpected technological breakthrough reduces the need for gas capacity resources. Other potential customers are not interested. Commercial interest in transforming the EMT site has grown. Facing these pressures, EMT ceases operations temporarily or permanently. *LDCs need to utilize a comprehensive strategy for completely decoupling from EMT.*

Stakeholders did recognize that there are other scenarios possible, including *status quo*. However, the DPU order directed the utilities to focus efforts on reducing or eliminating reliance.

Gas Demand and Supply Forecast

Gas supply forecasts ("the black line") show flat-to-increasing peak-day demand over the next 5 years. Bars represent different supply sources.



The LDCs should evaluate alternatives from the most recent LDC 2030 gas system utilization forecast as the demand and supply baselines. This would reflect the maximum needed level of alternatives under current planning practices. While this serves as a benchmark for assessing the level of potential alternatives needed, it may not be an appropriate reference point for attributing impacts to some alternatives. This is discussed in more detail in section 4 (Assessment Criteria).

3. Recommended Alternatives Inventory

The FAWG has reviewed the following alternatives. Given the diverse LDC needs and the complexity of EMT, a portfolio of alternatives will likely be needed for each LDC. Given constraints on scaling all these, a mix of alternatives will likely be needed. However, it may be worthwhile to consider bookend scenarios to determine: (1) if the outcomes are feasible without gas infrastructure, and (2) the scale of action needed for specific strategies.

Alternative		Description	Methods for Determining Resource
Distributed LNG Capacity	*Alternative LNG supplies*	Truck LNG from Canada, PA, or other source.	Identify sources and estimate the cost and impacts of acquiring those resources
	On-system LNG expansion (e.g., liquefaction, storage, injection)	Expansion of capabilities at existing sites. Development of new sites.	Identify locational needs in the absence of EMT resources.
Pipeline System Changes	*Distribution system upgrades.*	Connect critical parts of the system to ensure reliability (“looping”).	Systems analysis of potential distribution system upgrades.
	Transmission-level strategies	Transmission capacity upgrades, utilization of Northeast Gateway, etc.	Systems analysis of potential transmission system upgrades
Non-gas infrastructure (demand reduction)	*Energy efficiency* *Demand response* *Distributed peaking fuels* *Electrification* *Thermal and high-temperature networks*	Accelerate gas reduction in EMT-reliant zones.	Assess the level of gas reduction and electrification in and distributed across EMT-zones. Identify the most effective strategies based on zonal needs.

4. Alternatives Assessment Criteria

The LDCs should utilize the following criteria in assessing alternatives and portfolios. Quantitative and qualitative methodologies should be used as appropriate. If the application of certain criteria is unclear, the LDCs should seek clarification from the FAWG. Additional guidance on cost and emissions impacts is provided below.

Category	Criteria
System Operations	Resource reliability (hourly, day, season) a.k.a. resource adequacy / supply
	Pressure support
	Energy system resilience. For example, consideration of EMTs nature as a single large asset versus a mixed portfolio of alternatives that are smaller and more distributed; how do these alternative approaches respond to unanticipated events?
	TGP/AGP redundancy for LDC operations
Infrastructure (demand and supply)	Feasibility and practicality
	Categories of cost to implement alternatives (to be further defined by cost assessment workgroup)
	Timing for implementation
	Location-specific impacts
	Electric load implications
Policy & Broader Impact Goals	Emissions reductions and climate policy alignment (to be further defined by climate policy workgroup)
	Alignment with affordability goals (separate proceedings will influence how customers realize cost)
	Environmental justice: imposed new burdens on other EJ communities that will bear new or expanded infrastructure
	Others

Additional Guidance on Cost and Emissions Impacts

Both the FAWG and the Alternative Assessment workstream observed significant complexities associated with assessing cost and emissions. In March 2025, the FAWG will charge two working groups of FAWG members to further define cost and emissions assessment criteria. The LDCs are expected to participate in these workgroups and incorporate their feedback.

5. Assessment Summary

The table below lays out the key elements for the assessment. Each LDC will evaluate a portfolio of alternatives for how to reduce/eliminate EMT reliance on each zone. LDCs are instructed to evaluate several portfolio mixes that represent a range of ambitious yet practical efforts to achieve the listed outcomes. The LDCs will propose initial portfolios to the Workstream members before conducting a detailed analysis.

Zones (Section 1)	Unitil: Gardner Branch and Fitchburg System Eversource/NSTAR: Cambridge/Somerville Territory Eversource/NSTAR: AGT-G Branch needs National Grid: Boston Gas / EMT-Adjacent Territory National Grid: Satellite LNG Facilities
Outcomes (Section 2)	Scenarios reflecting *reduced* and *eliminated reliance* from a level comparable to forecasted 2030 demand with currently available supply resources.
Alternatives (Section 3)	Depending on zonal needs, each LDC should develop a sufficient number of portfolios reflecting distinctly different mixes of the alternatives listed above. Book-end portfolios can illustrate the scale of specific alternatives needed to achieve the outcomes.
Assessment Criteria (Section 4)	Alternatives and portfolios should be assessed using the provided list of criteria with respect to each zone's context. Assessment should be conducted in the context of evolving policy and market trends.

Research Questions

The analysis should be conducted with a focus on the following research questions:

- *What level of reduced reliance is achievable by the end of the current contract (2030)?*
- *Is it possible to eliminate reliance in any zone or across all zones, by end of the contracts (2030)?*
- *Given the significant electrification of LDC gas loads that measurably reduce LDC utilization of EMT, what are the system needs that remain reliant on EMT? What are the alternatives for those needs that would allow for reliance on EMT to be eliminated? If the LDCs were to become a secondary customer, how would those alternatives compare to EMT?*
- *What is the earliest possible date after existing contracts for the LDCs to eliminate EMT reliance in any zone or across all zones? What alternatives or portfolio of alternatives could achieve this?*
- *What categories of costs and impacts are directly attributable to achieving the specified outcomes compared to those that align with other policy goals or market changes?*

Alternatively, what alternatives are likely to emerge through external policy or market changes that would influence the role of EMT?

- *If EMT obtained other customers (e.g., generators), the cost to the LDCs for some services (e.g., seasonal trucked LNG) could be lowered. This could potentially open avenues to maintain or even increase the utilization of EMT for some services in some locations (e.g., more utilization of trucked LNG). Under what conditions could this occur? Are there cost and climate benefits to be gained in such instances?*
- *What are the ways that EMT could be utilized as an asset to support decarbonization?*
- *What opportunities exist for combined or pooled efforts across LDCs?*

Level of Analysis

The LDC's analysis should be conducted at a "high level" that contextualizes the system operation needs and the appropriate alternatives for each zone. The goal is to identify key issues associated with each alternative or portfolio of alternatives, but not thoroughly address them. LDCs should map out what is needed to reduce/eliminate reliance on EMT but not have to develop a specific zonal gas transition plan.

The analysis should identify items that will need further investigation prior to the pursuit of any one alternative. These could include:

- More detailed technical, feasibility, and cost assessments
- Customer-specific issues
- Workforce needs
- Siting needs
- Who needs to be involved in further assessment of alternatives in a specific zone

6. Future Workstream Process

- **Phase II Alternative assessment:**
    - **March – April:** FAWG will convene workgroups to further define cost and emissions assessment criteria to inform LDC approach.
    - **Mid-April FAWG Meeting**: LDC's to provide proposals for the shape of the work product incorporating further cost and emissions guidance. Work products should be consistent across LDCs.
    - **Ongoing Education & Further Stakeholder Elicitation:** informational sessions to further inform or discuss certain topics. Topics could include:
        - Targeted electrification, geothermal, and DR, in EMT zones
        - Portable and permeant LNG infrastructure
        - Interstate infrastructure, LNG commodities, GHG assessment
        - Intersection with Decarbonizing the Peak
        - *Additional suggestions requested by the FAWG*
    - **Late Summer**: FAWG reviews initial assessment
- **September 2025 – ETAB Meeting**
    - Present initial assessments

- **January 2026 – ETAB Meeting**
- **March 2026 – CCP annual report**

Appendix

Workstream Charge for Scoping the EMT Alternatives Assessment

The workstream will develop a framework for evaluating alternatives that “reduce or eliminate” the LDC's reliance on the EMT LNG Facility. The rubric will include the following items:

1. Align around an inventory of clearly defined alternatives and/or a methodology for identifying potential alternatives, using alternatives discussed during the December 10th FAWG meeting as a basis
2. Definition of EMT-reliant zones
3. Outcome scenarios achieved (i.e., reduce reliance, eliminate reliance) in the context of changing demand.
4. Criteria for assessing alternatives vis-à-vis outcomes (e.g., reliability impact, emissions impact, cost, feasibility, timing, policy alignment, etc.)
5. Align around approach for evaluation of options using criteria

The document below will be used as a working draft for the workstream members to review and revise. The information contained in it summarizes items discussed and referenced at the EMT FAWG. The final document will guide the LDCs' assessment and will be reported on in the 2025 CCPs.

The framework will be used to guide the inventorying and assessment of alternatives:
WS Action 1: Identify EMT zones and align them around the alternatives and assessment criteria inventory. (*Workstream Meeting 1*)
WS Action 2: Align around the application of criteria vis-à-vis alternatives. (*Workstream Meeting 2*)
WS Action 3: Work with LDCs to review their alternative assessments based on the evaluation approach. (Starting May 2025)
WS Action 4: Synthesize with broader impacts: land use, workforce, and community. (Immediately Following WS Action 3)

Scoping Phase Timeline & Meeting Agendas

- **Monday, 1/27 (4pm):** *Workstream Meeting #1* – Review Rubric Approach; Identify EMT Reliant Zones, Define Outcomes ("reduced" and "eliminate" reliance), Inventory Alternatives (virtual)
- **Monday, 2/3 (4pm):** *Workstream Meeting #2* – National Grid presentation on Aquidneck Island. Continue Inventorying Alternatives, Define Evaluation Criteria and Evaluation Approach (virtual)
- **Monday, 2/10 (4pm):** Continue Inventorying Alternatives, Define Evaluation Criteria and Evaluation Approach (virtual)
- **Friday, 2/14:** Share draft workstream framework with FAWG (e-mail)
- **Week of 2/24:** FAWG meeting to discuss a draft framework for incorporation into CCPs (hybrid)
- **Friday, 2/28:** Final framework delivered to LDCs to include in CCPs
- **May:** LDCs launch Alternatives Assessment

Workstream Membership

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Relevant Orders, Proceedings & Other Resources

Future of Gas Investigation: 20-80
Sets "beyond gas" vision for the state, "sets the table" for further efforts to achieve this goal, and defines requirements for Climate Compliance Plans.

EMT Constellation Contracts: 24-25 (National Grid), 24-26 (Eversource), 24-27 (Eversource NSTAR), 24-28 (Unitil). Each docket contains details (some of which are redacted) on LDC RFPs or alternative assessments conducted before the EMT contract proceedings.

Office of Energy Transformation EMT Focus Area Working Group: Website

Mission Statement: "To develop a coordinated strategy to reduce and ultimately eliminate the local gas distribution companies' reliance on the Everett Marine Terminal LNG facility aligned with DPU Order 20-80 and the state's climate and clean energy mandates, including those established in the Global Warming Solutions Act."

National Grid Evaluation of Aquidneck Island (RI). Example needs and alternatives assessment of gas capacity at Aquidneck Island: an end of the pipeline zone with growing demand and constrained existing infrastructure.

- Long-Term Gas Capacity Study (September 2020)
- Long-Term Energy Solutions Presentation (October 2020)
- Next Steps to Ensure Long-Term Capacity (January 2021)
- Long-Term Solution Update (October 2021)

NPCC Northeast Gas / Electric System Study

Appendix E: LDC Alternative Assessment Presentations

Everett Marine Terminal

Initial Phase 2 Alternatives Assessment

July 21, 2025

Unitil
energy for life

Unitil Initial Alternatives Assessment

Introduction and Outline

Opening Comments

- EMT Contract is a supply decision that solves reliability need
- Explore realm of alternatives
- Reliability is primary focus
  - Does it work?
  - Then cost, then emissions
- Today's session set up to promote discussion and get your feedback before we dig any deeper

Plan to Cover 3 Basic Areas

- Framing
  - Context for supply planning
  - Unitil EMT contract
  - Review FAWG guidance
- Unitil initial assessments
- Initial Takeaways & Discussion
  - Alternatives Summary
  - Research Questions

Framing – Supply Planning

General Principles

- Involves projecting design requirements over time and acquiring a portfolio of natural gas resources to meet these requirements
- Design planning standards meant to ensure adequate supplies available
- Focus on resource adequacy, minimizing cost and acquiring viable resources
- Due to resources limitations and consumption patterns, different time scales must be addressed – season, day and hourly
- Weather data is used to model customer demand and supply needs
- Demand forecasts correlate historical usage data to weather data and projections of economic and demographic data

Framing – Supply Planning (con't)

Forecast and Supply Plan (F&SP)

F&SP Highlights

- Demonstrate adequate planning
  - MDPU filing every two years
  - 5 year planning period
- Document Forecast of demand requirements (and growth rates)
  - Planning Load
  - Design conditions
- Document supply resources
  - Resource adequacy

Unitil Recent F&SP

- Filed January 2025
- Unitil 1-in-30 year design standard for both Design Day and Year
- Design Weather
  - 81 EDD Design Day
  - 6139 EDD Design Winter
- Growth rates
  - 0.34% Design Day growth
  - 0.39% Design Year growth

Framing - Unitil's EMT contract

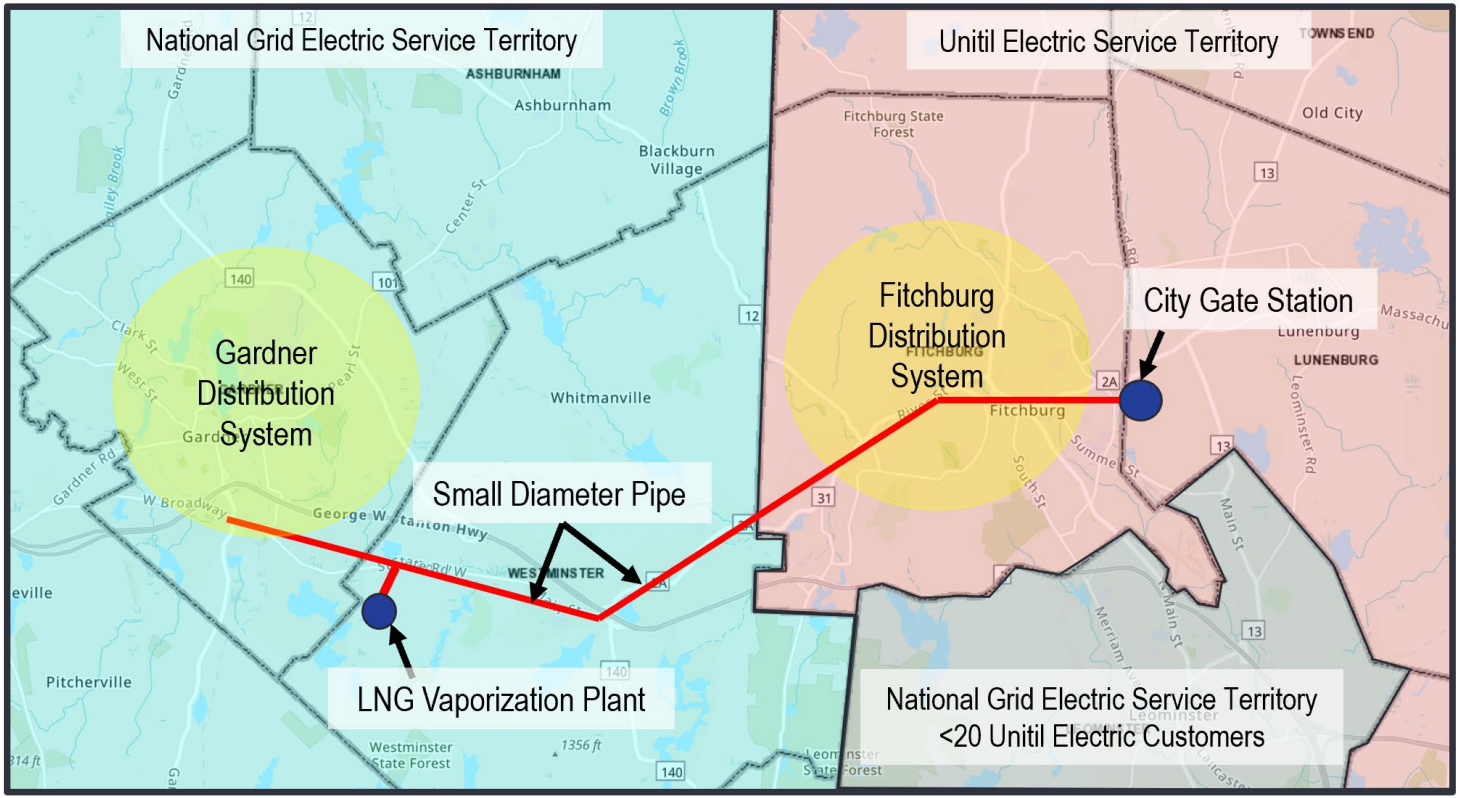
Unitil's contract with Constellation LNG

- Contract provides up to 3,400 Dth per day and 83,000 Dth per year of peaking supply
- Up to 3,000 Dth (~3 truckloads) per day of LNG for use at the Company's Westminster LNG facility
- Up to 400 Dth per Day of pipeline supply delivered to the TGP citygate
- Term is June 2024 thru May 2030

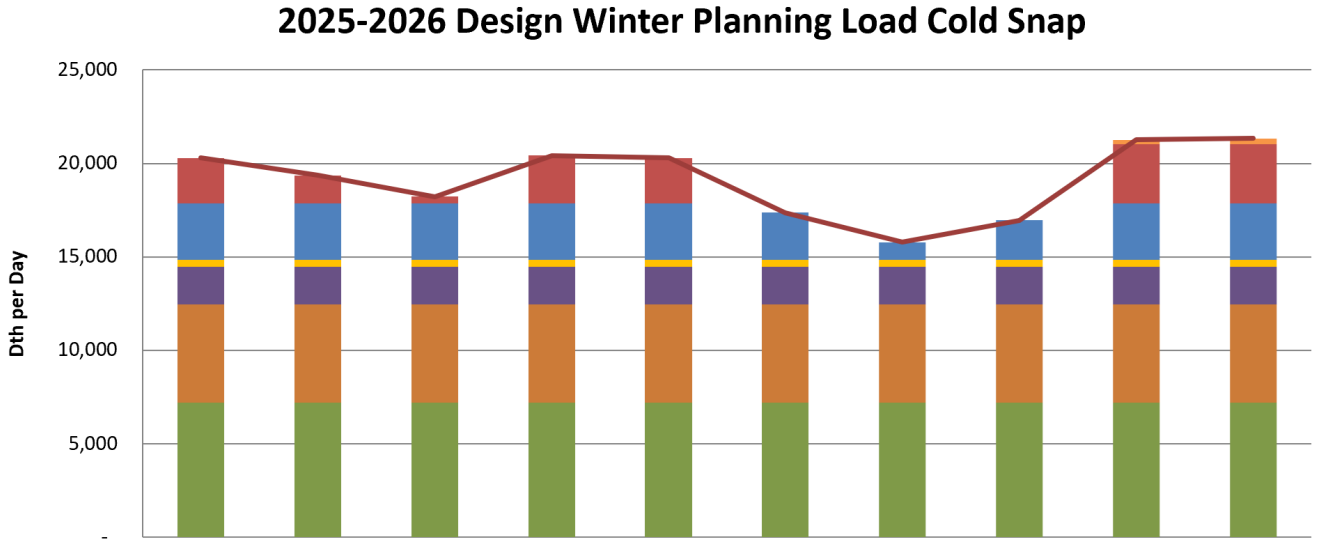
Unitil System Constraint

- Unitil's distribution system unable to deliver adequate supply to Gardner during colder days
- Westminster LNG facility provides pressure support to Gardner during colder days (~50 days per year)
- Westminster LNG has limited on-site storage and must be refueled regularly
  - To inject the full MDQ of 3,172 Dth/day in one day and still be fully available for the next gas day, the plant would need to receive 3 truckloads of LNG

Unitil System Constraint



Unitil 10-Day Cold Snap



	01/22/26	01/23/26	01/24/26	01/25/26	01/26/26	01/27/26	01/28/26	01/29/26	01/30/26	01/31/26
PROPANE-AIR	-	-	-	-	-	-	-	-	252	323
Westminster LNG	2,441	1,501	373	2,559	2,441	-	-	-	3,153	3,153
OFF-SYSTEM PEAKING	3,000	3,000	3,000	3,000	3,000	2,503	929	2,104	3,000	3,000
Constellation Delivered	400	400	400	400	400	400	400	400	400	400
TGP ZONE 6	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
TGP STORAGE	5,273	5,273	5,273	5,273	5,273	5,273	5,273	5,273	5,273	5,273
TGP LONG-HAUL	7,166	7,166	7,166	7,166	7,166	7,166	7,166	7,166	7,166	7,166
LNG Boiloff	19	19	19	19	19	19	19	19	19	19
Cold Snap Loads	20,299	19,359	18,231	20,417	20,299	17,361	15,787	16,962	21,263	21,334

Framing – FAWG Guidance - Alternatives Inventory

Five Categories recommended

- Distributed LNG Capacity
  - Alternative LNG Supplies
  - On-system LNG Expansion
- Pipeline system changes
  - Distribution System Upgrades
  - Transmission Level Strategies
- Non-Gas / Demand Reduction

Unitil approach

- Review recommended Alternatives for relevance & feasibility
- Describe best fit where relevant
- Initial review to assess viability, scale
- Recommend further review where viability alternatives are identified

Framing – FAWG Guidance - Assessment Criteria

Assessment Criteria Categories

- System Operations (does it work?)
  - Resource reliability / Pressure support
  - Energy system resilience / Upstream pipeline redundancy
- Infrastructure (scope, availability)
  - Feasibility and practicality / Cost categories / Timing
  - Location impacts / Electric load implications
- Policy & Broader Impact Goals
  - Emissions reductions and climate policy alignment
  - Alignment with affordability goals / Environmental justice impacts

Initial Assessment

Unitil EMT Reliant Zones

- Alternatives Assessment focuses on Gardner Distribution System
- Market alternatives exist for TGP Citygate supply (not assessed)

Outcomes

- Unitil goal for “Reduced” reliance is 50% reduction
  - Goal is to pursue demand and supply strategies that provide clear cost savings, emissions or other practical benefits that are achievable and meaningfully lessen Unitil’s reliance on LNG
- “Eliminated” means 100% reduced
  - Unitil recognizes EMT’s critical role in the region and the indirect benefits EMT provides to Unitil’s pipeline capacity and electric customers

Initial Assessment – Alternative LNG Supplies

Description relative to Unitil

- Regional supplies of LNG are available from MA, PA and Montreal
- Assessing such alternatives already a key requirement and practice
- Compressed natural gas (CNG) could be explored as well

Assessment Criteria Categories

- System Operations (does it work?)
  - Limiting factor primarily refill time as LNG must be replaced quickly and more distance LNG sources can take > 3 days, Border issues can arise
  - Refill time driven by limited on-system storage at Westminster LNG
  - Deliveries required often during worst weather conditions, adding risk

Initial Assessment – Alternative LNG Supplies (con't)

Assessment Criteria Categories (con't)

- Infrastructure (scope, availability)
  - Alternative sources of LNG generally available, though some are distant
  - Trucking arrangements (and driver availability) can present challenges
  - Costs confidential / LNG supplies
- Policy & Broader Impact Goals
  - Regionally produced LNG may have lower or higher emissions than overseas imports but we have not studied and given limited volumes expect not material

Initial Assessment – On-system LNG Expansion

Description relative to Unitil

- Expansion or replacement of Unitil's LNG facility would be very costly. Built in 1973, the facility is grandfathered with respect to codes.
- Unitil has received approval to add temporary storage trailers, including installation and integration of this equipment with the existing Westminster LNG Facility this coming winter that will increase available storage by 40%

Assessment Criteria Categories

- System Operations (does it work?)
  - Unitil will test the temporary storage this coming winter
  - Anticipate increased resource reliability but no capacity addition
  - Increases refill time at rated capacity from ~24 hours to ~36 hours

Initial Assessment – On-system LNG Expansion (con't)

Assessment Criteria Categories (con't)

- Infrastructure (scope, availability)
  - Temporary storage project is approved and underway
  - No electric load impacts
- Policy & Broader Impact Goals
  - No incremental emissions impact

Portable Storage Tank

To be delivered this fall

Initial Assessment – Distribution System Upgrades

Description relative to Unitil

- We considered the following 3 items but quickly ruled them out
- Replacing the constrained pipeline would be very costly and the TGP lateral feeding Unitil's citygate is constrained so might not provide adequate supply
- Gardner system has both low pressure (LP) and high pressure (HP) pipeline
  - Studied impact of eliminating the LP systems, thereby reducing the differential between HP and LP systems, requiring less pressure support, by the reducing end of line pressure set point
  - The current max hourly flow rate from the LNG plant is 303 mcfh, under study condition max flow rate dropped to 223 mcfh, a 26% reduction
  - However, further review reveals much of the LP system has recently been replaced so such a project would be uneconomic

Initial Assessment – Distribution System Upgrades (con't)

Description relative to Unitil (con't)

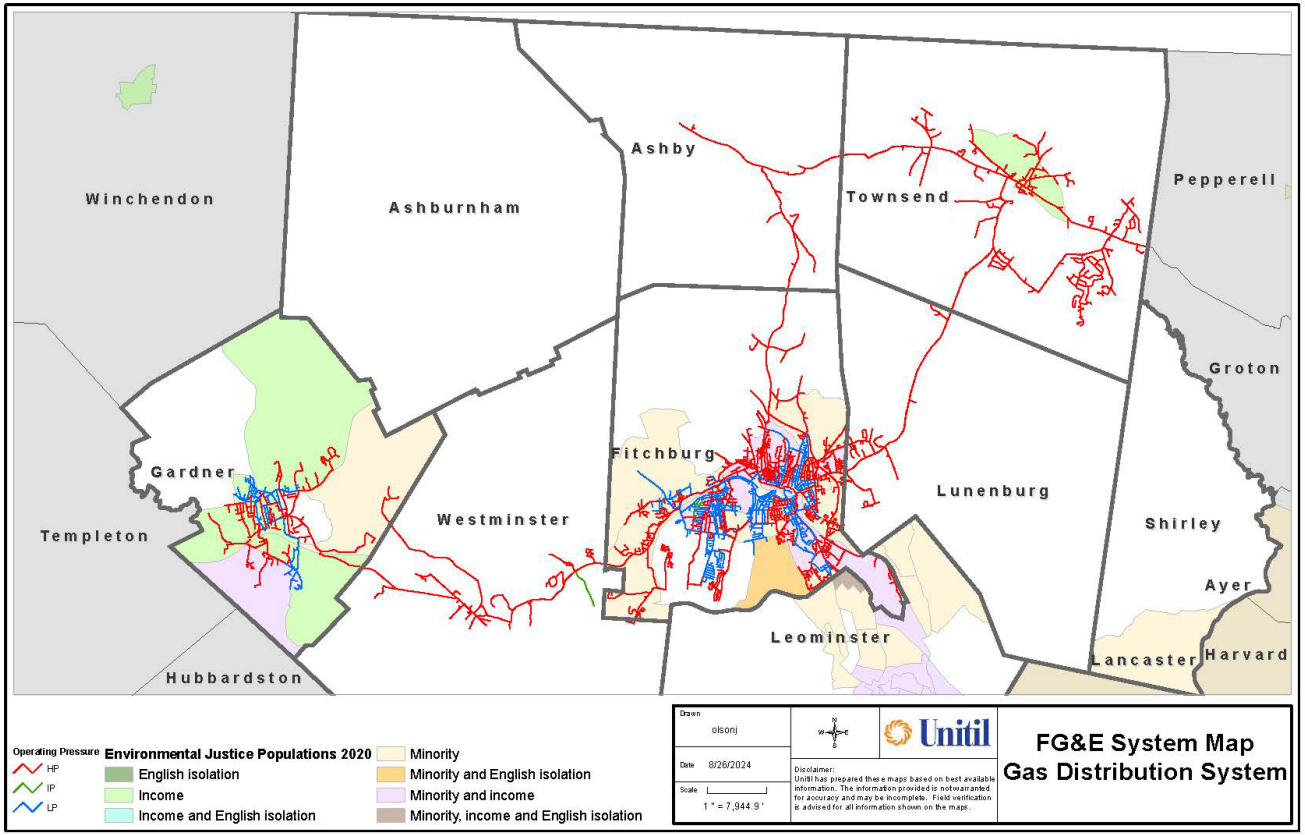
- Unitil also looked for opportunities to avoid GSEP replacement of leak prone pipe in Gardner, however Unitil's GSEP work in Gardner will be finished in 2026 and the timing of the projects is driven by municipal schedules

Assessment Criteria Categories

- System Operations (does it work?)
  - Unable to identify a distribution system upgrade

Unitil System Map

Shows LP & HP systems, Overlays Environmental Justice Communities



Initial Assessment – Transmission Level Strategies

Description relative to Unitil

- Unitil's small demand doesn't allow us to drive transmission level projects
- Northeast Gateway would not provide a source of liquid LNG

Assessment Criteria Categories

- System Operations (does it work?)
  - No opportunities identified

Initial Assessment – Non-Gas / Demand Reduction

Description relative to Unitil

- Gas demand reductions can take the form of customers electrifying heat or any other levels of energy efficiency
- Unitil studied the impact of electrifying customers to reduce the hourly flows from the Westminster LNG plant needed to maintain adequate EOL pressure
  - Hourly flow rate reduced in 5% increments to 50% (“Reduced” definition)
  - There are 1705 customers in Gardner, including 1296 residential
  - Three groups of customers modeled – LP residential, HP residential, G41
  - Found that if all residential customers in Gardner were electrified, LNG requirement would be reduced by only 20% (yellow highlight)

Initial Assessment – Non-Gas / Demand Reduction (con't)

Description relative to Unitil (con't)

- Reducing LNG requirements by 50% requires also electrifying 57 G41 customers (orange highlight)

Assessment Criteria Categories

- System Operations (does it work?)
  - Demand reduction does reduce reliance
  - Concerns over "valley shaving" since customers want energy security

Customers to be Electrified to Achieve Step Reductions in LNG Requirement			
	LNG Flow	Difference	Customers to Be Electrified
100%	303.355		
95%	288.187	15.168	184
90%	273.020	30.336	570
85%	257.852	45.503	844
80%	242.684	60.671	1299
75%	227.516	75.839	1304
70%	212.349	91.007	1310
65%	197.181	106.174	1316
60%	182.013	121.342	1324
55%	166.845	136.510	1335
50%	151.678	151.678	1353

Order of customer removals (highest loads to lowest in group):
1) Residential customers on LP system (509)
2) Residential customers on HP system (787)
3) G41 - High Winter Use customers (70)

Initial Assessment – Non-Gas / Demand Reduction (con't)

Assessment Criteria Categories (con't)

- Infrastructure (scope, availability)
  - Infrastructure needs, cost, timing to electrify loads at the scale of a city like Gardner is still being understood and is not scalable in the immediate future
  - National Grid's electric load in Gardner would increase
- Policy & Broader Impact Goals
  - Deep reductions in the use of combustible fuels aligns with ambitious climate goals, but the specific targeting of LNG may not be the most effective place to prioritize such reductions
  - Affordability has not been studied / Gardner has high concentration (73%) of designated Environmental Justice block groups

Initial Takeaways – Alternatives Summary

Alternative	Initial Assessment
Alternative LNG Supplies	Currently assess LNG offers from other parties Operational concerns need to be addressed
On-system LNG Expansion	Adding temporary storage, provides operational & reliability benefit
Distribution System Upgrades	No opportunities found
Transmission Level Strategies	No opportunities found
Non-Gas / Demand Reduction	Demand reductions do help, but residential customers have small impact

Discussion – Research Questions - Targets

Questions coming out of Phase 1 and *Initial Reactions*

What level of reduced reliance is achievable by the end of the current contract (2030)?

- *Supply substitution may be possible but demand reduction is not feasible by 2030*

Is it possible to eliminate reliance in any zone or across all zones, by end of the contracts (2030)?

- *Demand requirements in Unitil's Gardner system currently met with LNG from EMT cannot be eliminated by 2030*
  - *Supply alternatives exist, but operational impacts would need to be understood and carefully managed*

Given the significant electrification of LDC gas loads that measurably reduce LDC utilization of EMT, what are the system needs that remain reliant on EMT?

- *Premise of question assumes electrification is reducing gas demand, but we have not seen this*
- *See 10-Day Cold Snap diagram, which visually depicts the modelled dispatch of the LNG facility*

What is the earliest possible date after existing contracts for the LDCs to eliminate EMT reliance in any zone or across all zones?

- *Remember that contracts require two parties, and EMT could exit market*
- *Too early to predict if and when supply requirements currently served by EMT can be eliminated*

Discussion – Research Questions - Alternatives

Questions coming out of Phase 1 and *Initial Reactions*

What are the alternatives for those needs that would allow for reliance on EMT to be eliminated? What alternatives or portfolio of alternatives could achieve this?

- *Supply substitutes may exist, but present operational challenges; demand reductions can chip away requirements*

Alternatively, what alternatives are likely to emerge through external policy or market changes that would influence the role of EMT?

- *A wholesale power market fuel security requirement or state requirements could promote EMT supply contracts*
- *A commitment to affordability would likely support an ongoing role for EMT*

If the LDCs were to become a secondary customer, how would those alternatives compare to EMT?

- *"Secondary customer" typically means an indirect customer; however Unitil must contract directly for gas supply*
- *Unitil's requirements alone could not support the facility (or other major projects)*

What opportunities exist for combined or pooled efforts across LDCs?

- *Limited opportunities because LDCs face different challenges and have unique systems and supply portfolios*

Discussion – Research Questions - Assessment

Questions coming out of Phase 1 and *Initial Reactions*

What categories of costs and impacts are directly attributable to achieving the specified outcomes compared to those that align with other policy goals or market changes?

- *Supply resources or alternatives must be reliable and effective; cost and other impacts are secondary*

If EMT obtained other customers (e.g., generators), the cost to the LDCs for some services (e.g., seasonal trucked LNG) could be lowered. This could potentially open avenues to maintain or even increase the utilization of EMT for some services in some locations (e.g., more utilization of trucked LNG). Under what conditions could this occur?

- *Disagree with premise that EMT serving Gen load would reduce cost to LDCs (costs went way up due to Mystic RMR contract); ISO New England market rule changes or state contracting would be needed*

Are there cost and climate benefits to be gained in such instances?

- *Apart from direct LDC contracts, retaining EMT will have regional cost and climate benefits for the foreseeable future*

What are the ways that EMT could be utilized as an asset to support decarbonization?

- *EMT already supports decarbonization; losing EMT would increase GHG emissions*

Office of Energy Transformation
Everett Marine Terminal
Focused Area Working Group
Initial Phase 2 Alternatives Assessment:

Eversource Gas Company of Massachusetts

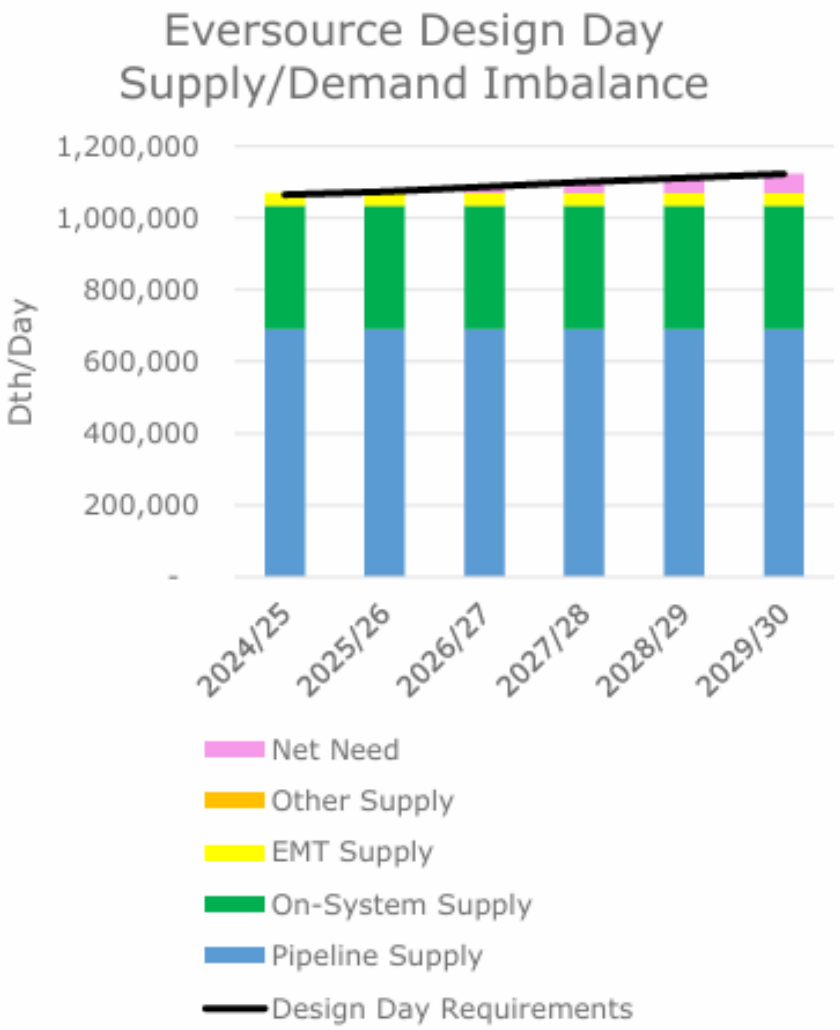
August 20, 2025

Introduction and Outline

- ***The EMT contract is part of a gas supply resource planning portfolio to ensure the companies have a sufficient reliable supply in place to serve customers under all weather conditions.***

1. Enterprise gas supply planning principles, processes and standards
2. Eversource Gas of Massachusetts (EGMA) –
   - ❑ Discrete “AGT G-lateral” system requirements
3. Assessment of Alternatives
4. Open Forum

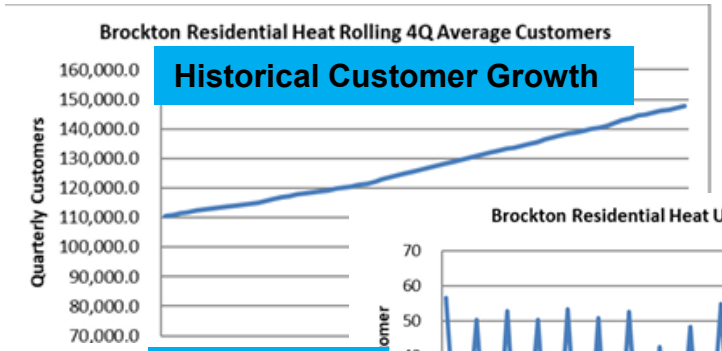
Supply Planning Principles



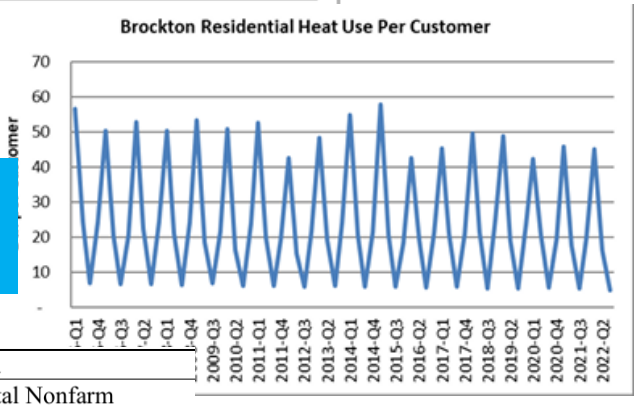
Purpose of the *Forecast and Supply* plan is to ensure the companies have a sufficient supply in place (left: stack bars) to serve customer demands under all weather conditions (*left: black line*).

- Forecasts of customer demand are based upon historic trends in customer demand and economic factors and projections of those correlated factors.
- Discrete system requirements to meet **hourly**, **daily,** and **seasonal** demands are concurrently evaluated under these conditions for the current year and into the future.
- The Companies are actively engaged in targeted electrification efforts and provide all customers with information on electrification options but the companies remain committed to ensuring reliable service to customers using natural gas. These efforts and the pace of customer adoption will affect the shape of the black line going forward.

Supply Planning Processes: Demand



Historical Customer Growth



Historical Customer Utilization

Economic and Demographic Data

- Employment (NAICS), Total Nonfarm
- Employment (NAICS), Manufacturing
- Average Personal Income per Household
- Real Per Capita Income
- Gross Metro Product
- Number of Households
- Housing Completions
- Population

Economic Forecasts (Moody's Analytics)

Weather

Brockton 151 Day Winter			
Mean	5,001	EDD	
Stand Dev	439.374	Level	Rec Per
Maximum	2014-15	5,798	28.7
2nd highest	2013-14	5,629	13.1
3rd highest	1968-69	5,627	13.0
4th highest	1967-68	5,620	12.6
5th highest	1969-70	5,601	11.6

A demand forecast model incorporates:

- Historical customer count and utilization data based upon billing data.
- Economic forecasts to predict future customer counts and commercial demand
- Other influencing factors such as company use, lost and unaccounted for gas, and energy efficiency.
- Weather Variable -Effective Degree Days ("EDDs") were utilized as the weather measure. Daily NOAA weather data was purchased for three of the Company's four divisions from DTN, a weather data firm with offerings including weather research. The data were used by the Company to calculate EDDs. EDDs are Heating Degree Days ("HDDs") adjusted for average daily wind speed.

** 5 year F&SPs are filed with the Department every two years, if in fact there is a reduction in gas demand due to electrification, this reduction will be included in the historical data compiled by the Company and reflected in the Company's forecast. A departure from the Company's current approach of forecasting would only jeopardize the Company's ability to provide reliable gas service to its customers by replacing actual historical data with conjecture and unknowable assumptions about future load.*

Supply Planning Processes

Weather Variables:

- LDC's develop its design planning standards for normal year, design year, and design day.

- The "**normal year**" is typically defined as a weather pattern consistent with a distribution of EDDs on average from the most recent 20-30 years

- The "**design year**" is typically defined as a weather pattern consistent with a distribution of coldest or highest number of EDDs from the most recent years and calculated based upon various occurrence probabilities of the standard exceeding these standards once in 33 years (or 1:33) (typically 10-15% colder than "normal year" or average year)

- The design year also contains the "**design day**" and a "**cold snap**" is also calculated using a similar methodology as design year but over shorter time periods like a single day or 10-24 days

- The LDCs also review the hourly demand fluctuations have a dramatic impact on the upstream supply availability and pressures which are critical to safely and reliably serving the dynamic customer demand in highly variable weather conditions.

Supply Planning Standards

"Design" Standards

- The Companies have established "Design" or extremely cold weather standards for planning purposes for natural gas usage is mostly correlated to weather conditions which can be extremely volatile and unpredictable in New England. If appropriate planning is not adopted to address periods of extreme cold weather, the demand for gas may exceed available supply resulting in shortages, the consequences of which could be severe, ranging from large pipeline penalties to system depressurization and customer outages. To avoid the potential negative effects of shortages, the Company plans its resource portfolio to ensure that adequate resources are available during very severe weather conditions.
- The Company reviews the historical weather data for each division for the 55 gas years between November 1967 and October 2022 to determine the five coldest winter periods and their respective recurrence periods, or probabilities. Using the distribution of the historical winter season EDD data, the Company calculated design winter standards for various occurrence probabilities and also noted the frequency of a potential design standard being exceeded during the 55-year historical period.
- The Company has established a design winter standard of 1:33, which the Department has approved since the Company's order in D.P.U. 06-84. Given the current winter capacity and supply constraints in the New England market and the fact that the constraints will not likely be lessened by the construction of incremental capacity, the retention of the long standing 1:33 standard is appropriate.

Supply Planning Standards

"Design" Standards

- While the rationale for establishing a design day standard is straight forward, the need for a design winter standard is less obvious. Because many winter seasonal supplies, such as underground storage, and peak shaving LNG and propane facilities are subject to seasonal capacity constraints and re-supply requirements, a winter seasonal standard is required to insure that supplies are available on the last cold day of the winter. When load requirements can simply be met by increasing purchases of flowing supplies, seasonal volume limitations are not important. However, if the marginal supply is a source that has seasonal capacity constraints, a winter design standard is essential.
- A design winter concern could be caused by diminished levels of underground storage or LNG inventories after a period of higher than normal EDDs. These inventories can be stretched by substituting available alternative supplies, such as purchasing flowing supplies in Appalachia to displace withdrawals from nearby underground storage fields. A delivered city-gate supply might be available to be arranged to avoid an LNG inventory shortfall. However, in a capacity constrained market such as New England, a Company cannot assume that such supplies would be available whenever they might be necessary. Such supplies need to be purchased in advance to guarantee their availability. The Company is required to make a trade-off between acquiring expensive winter seasonal supplies and providing an adequate level of reliability to avoid the extreme consequences of a loss of load.

Supply Planning Standards

"Design Winter"

Figure 36: EGMA Design Winter EDD Analysis
(Data from November 1967 through October 2022)

Brockton 151 Day Winter			
Mean	5,001	EDD Level	Rec Per
Stand Dev	439.374		
Maximum	2014-15	5,798	28.7
2nd highest	2013-14	5,629	13.1
3rd highest	1968-69	5,627	13.0
4th highest	1967-68	5,620	12.6
5th highest	1969-70	5,601	11.6
Alternative Standards		6,023.4	100.0
		5,975.0	75.0
		5,903.6	50.0
		5,825.7	33.0
		5,807.0	30.0
		5,770.4	25.0
Proposed Standard		5,826	33.1

Springfield 151 Day Winter			
Mean	5,191	EDD Level	Rec Per
Stand Dev	373.899		
Maximum	1968-69	5,832	23.2
2nd highest	1969-70	5,792	18.6
3rd highest	2014-15	5,710	12.1
4th highest	2013-14	5,702	11.7
5th highest	1993-94	5,681	10.5
Alternative Standards		6,060.3	100.0
		6,019.2	75.0
		5,958.4	50.0
		5,892.1	33.0
		5,876.2	30.0
		5,845.1	25.0
Proposed Standard		5,892.0	33.0

Lawrence 151 Day Winter			
Mean	5,239	EDD Level	Rec Per
Stand Dev	447.684		
Maximum	2014-15	6,096	35.9
2nd highest	2013-14	5,951	17.9
3rd highest	2002-03	5,919	15.5
4th highest	1968-69	5,879	13.1
5th highest	1967-68	5,872	12.7
Alternative Standards		6,280.7	100.0
		6,231.4	75.0
		6,158.6	50.0
		6,079.2	33.0
		6,060.2	30.0
		6,023.0	25.0
Proposed Standard		6,079.0	33.0

Supply Planning Standards

"Design Cold Snap"

- The Company conducts a similar statistical analysis of 24-day cold snaps for each of the EGMA divisions, based on the highest 24-day EDD level experienced during each winter season. The 24-day cold snap is an important component of a design winter. The Company used the actual pattern of EDDs for the period of January 7, 2004 through January 30, 2004 as the basis for the 24-day cold snap; which included the Company's historical peak days. Adjustments were made to make the adjusted total EDDs for the period to match the 1:33 level.

Figure 37: EGMA Cold Snap EDD Analysis

(Data from November 1967 through October 2022)

Brockton 24-Day Cold Snap			
Mean	1,089.6	EDD Level	Rec Per
Stand Dev	119.592		
Maximum	1/07/04 to 1/30/04	1,325	40.8
2nd highest	1/28/15 to 2/20/15	1,287	20.2
3rd highest	1/28/79 to 2/20/79	1,286	19.9
4th highest	1/6/82 to 1/29/82	1,275	16.5
5th highest	1/12/71 to 2/4/71	1,271	15.5
Alternative Standards		1,367.8	100.0
		1,354.6	75.0
		1,335.2	50.0
		1,314.0	33.0
		1,308.9	30.0
		1,298.9	25.0
Proposed Standard		1,314	33.0

Sprinfield 24-Day Cold Snap			
Mean	1,125.3	EDD Level	Rec Per
Stand Dev	117.676		
Maximum	1/07/04 to 1/30/04	1,330	24.4
2nd highest	12/25/80 to 1/17/81	1,328	23.5
3rd highest	1/29/79 to 2/21/79	1,325	22.3
4th highest	1/1/70 to 1/24/70	1,294	13.2
5th highest	1/6/82 to 1/29/82	1,288	12.0
Alternative Standards		1,399.1	100.0
		1,386.1	75.0
		1,367.0	50.0
		1,346.1	33.0
		1,341.1	30.0
		1,331.3	25.0
Proposed Standard		1,346.0	32.9

Lawrence 24-Day Cold Snap			
Mean	1,129.4	EDD Level	Rec Per
Stand Dev	119.634		
Maximum	1/07/04 to 1/30/04	1,371	46.0
2nd highest	1/25/15 to 2/17/15	1,342	26.5
3rd highest	1/4/94 to 1/27/94	1,317	17.1
4th highest	12/26/67 to 1/18/68	1,314	16.3
5th highest	1/6/82 to 1/29/82	1,308	14.8
Alternative Standards		1,407.7	100.0
		1,394.6	75.0
		1,375.1	50.0
		1,353.9	33.0
		1,348.8	30.0
		1,338.9	25.0
Proposed Standard		1,354.0	33.1

Supply Planning Standards

"Design Day Standards"

- The Company also conducted a similar statistical analysis of peak days for each of the EGMA divisions, based on the highest EDD experienced during each winter season to match the 1:33 level.

Figure 38: EGMA Design Day EDD Analysis
(Data from November 1967 through October 2022)

Brockton Design Day			
Mean	66.0	EDD	
Stand Dev	6.333	Level	Rec Per
Maximum	01/08/68	79	50.6
2nd highest	01/17/82	**78**	34.9
3rd highest	01/15/04	**78**	34.9
4th highest	01/04/81	77	24.6
5th highest	01/22/76	75	13.0
Alternative Standards		80	75.0
		79	50.6
		78	34.9
		77	24.6
		76	17.7
Alternative Standards		80.7	100.0
		80.0	75.0
		79.0	50.0
		77.8	33.0
		77.6	30.0
		77.1	25.0
Proposed Standard		**78**	**34.9**
Note: Brockton Standard exceeded 1 time			
Proposed Brockton standard is:			**78**

Springfield Design Day			
Mean	66.6	EDD	
Stand Dev	6.103	Level	Rec Per
Maximum	12/25/80	81	111.0
2nd highest	01/08/68	80	72.2
3rd highest	01/15/04	**78**	32.8
4th highest	02/13/16	77	22.9
5th highest	12/25/68	74	9.0
Alternative Standards		80	72.2
		79	48.1
		78	32.8
		77	22.9
		76	16.4
Alternative Standards		80.8	100.0
		80.1	75.0
		79.1	50.0
		78.0	33.0
		77.8	30.0
		77.2	25.0
Proposed Standard		**78**	**32.8**
Note: Springfield Standard exceeded 2 times			
Proposed Springfield standard is:			**78**

Lawrence Design Day			
Mean	68.1	EDD	
Stand Dev	6.219	Level	Rec Per
Maximum	01/08/68	84	190.0
2nd highest	01/15/04	82	79.0
3rd highest	12/25/68	78	18.0
4th highest	12/25/80	77	13.2
5th highest	01/17/82	76	9.8
Alternative Standards		84	190.0
		83	121.1
		82	79.0
		81	52.7
		80	36.0
Alternative Standards		82.6	100.0
		81.9	75.0
		80.9	50.0
		79.8	33.0
		79.5	30.0
		79.0	25.0
Proposed Standard		**80**	**36.0**
Note: Lawrence Standard exceeded 2 times			
Proposed Lawrence standard is:			**80**

**On Friday, February 3, 2023, Gas Day, EGMA observed a 79 EDD in the Springfield Division, a 79 EDD in its Lawrence Division and a 72 EDD in its Brockton Division.*

EGMA Total System Design Day Forecasts by Division

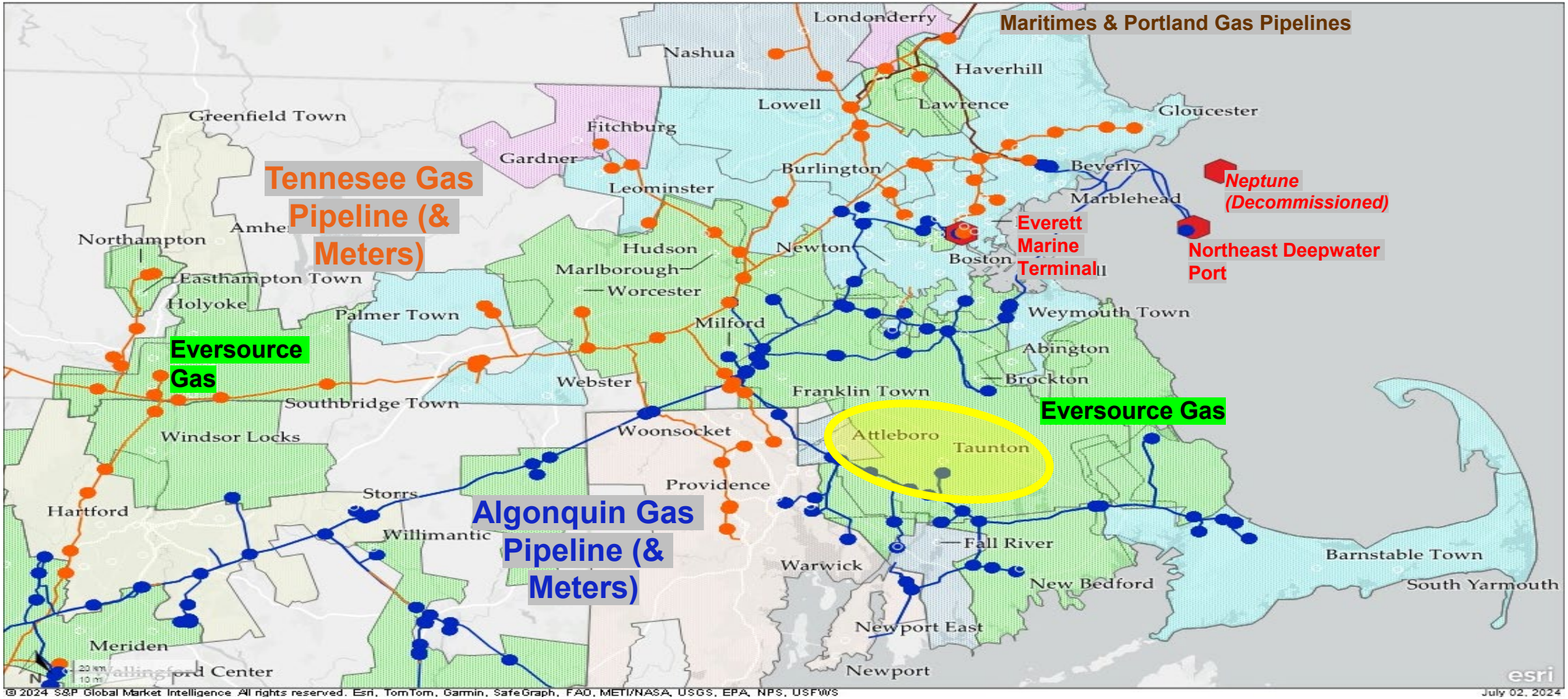
EGMA Gas Design-Day Firm Requirements (BBtu)
Base Case

Year	Brockton	Lawrence	Springfield	Total
2025-26	273,989	89,517	158,549	522,055
2026-27	279,015	90,365	160,044	529,424
2027-28	282,330	91,463	162,244	536,037
2028-29	285,281	92,303	164,023	541,607
2029-30	288,475	93,172	165,771	547,418
CAGR	1.3%	1.0%	1.1%	1.2%

**Impacts of energy efficiency programs are already included in these projections*

EGMA Algonquin Gas "G-Lateral" Area (CIRCLED)

- The EGMA – CLNG EMT contract delivers gas on the AGT pipeline to its two meter stations of South Attleboro and Taunton on the constrained "G-Lateral" which is part of the Brockton Division



EGMA CLNG EMT Contract

Contract Details:

- The Agreement is for a six-year term beginning with a start date of June 1, 2024, and ending March 31, 2030.
- 19,600 MMBtu per day of delivery capacity to AGT Meter stations South Attleboro and Taunton
- 882,000 MMBtu of supply per season (Nov-Mar)
- EGMA has option to take gas in liquid form at its discretion when not needed as vapor

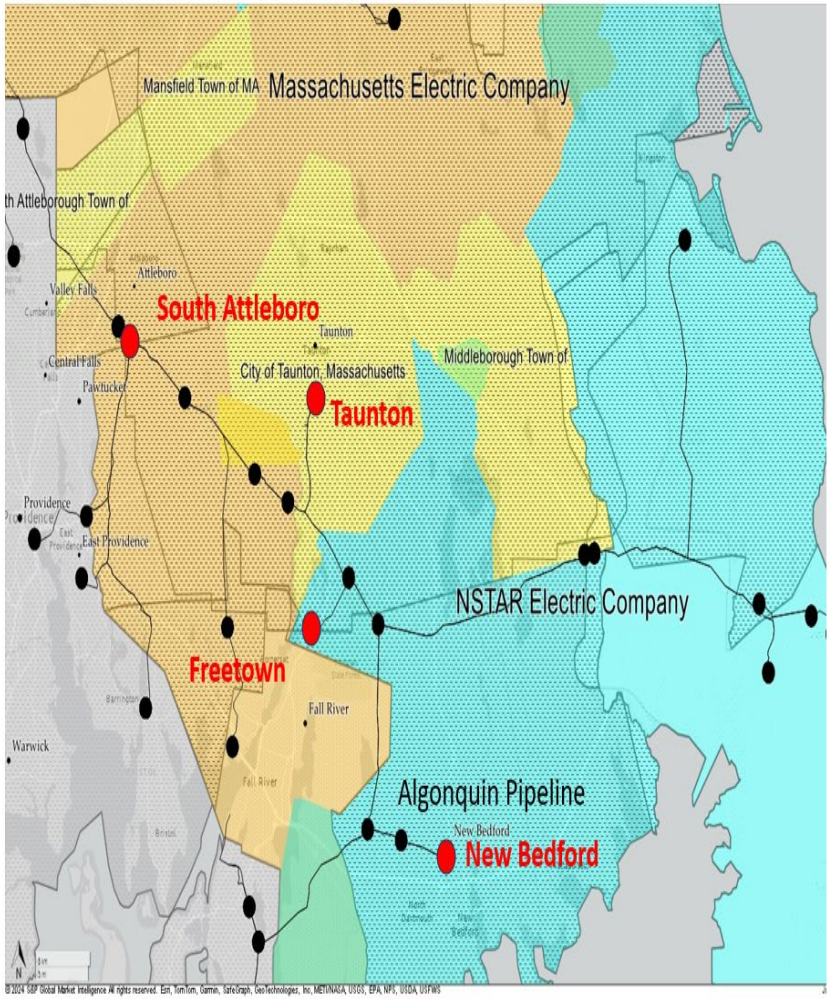
Eversource Gas Areas Served by EMT:

Eversource Gas of Mass.
- South Attleboro Meter Station
- Taunton Meter Station

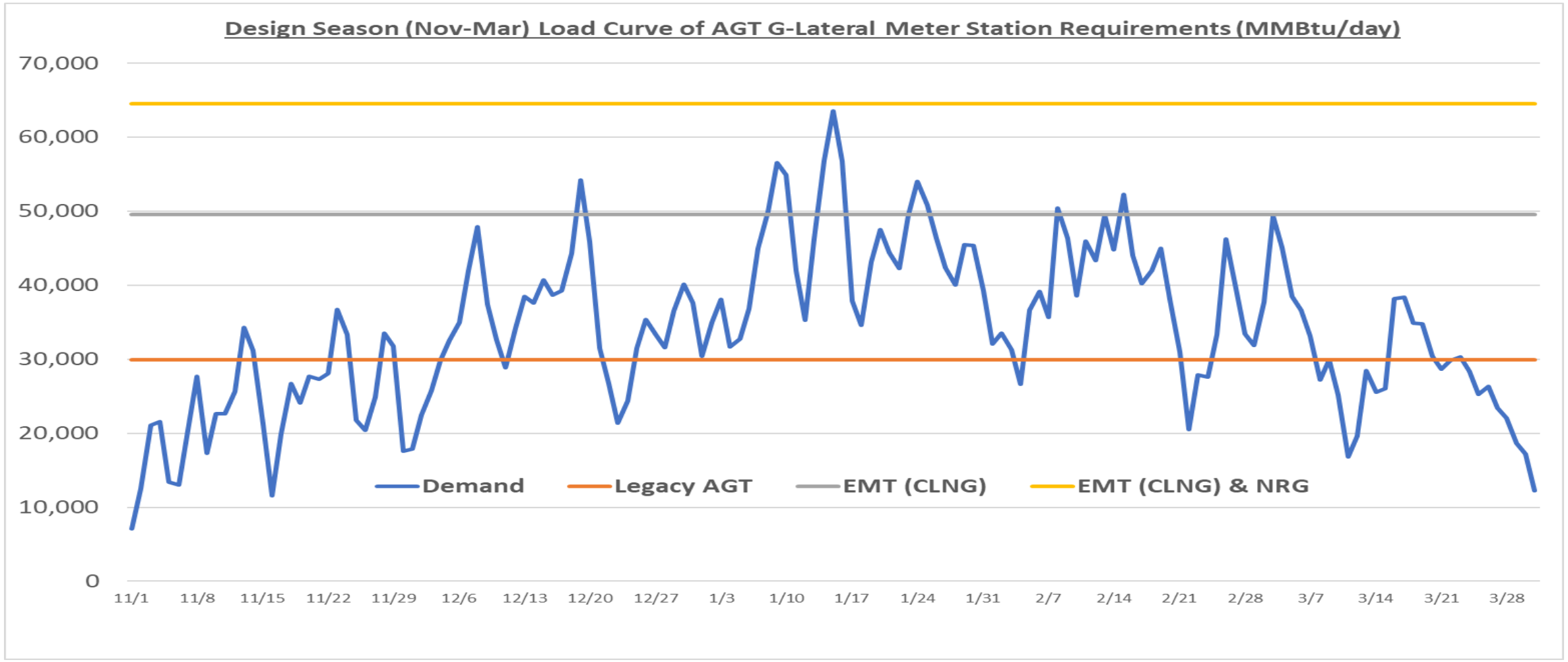
NSTAR Gas
- New Bedford Meter Station
- Free Town Meter Station

Electric IOU
- NSTAR Electric
- NGRID Electric

Electric Municipality
- Taunton Municipal Power & Light
- Middleborough Power and Light
- Mansfield Municipal Electric
- Attleborough in NGRID Territory but in Supply Aggregation



AGT – G Lateral Meter Design Winter Load Curve



- Daily design demand curve for the 151 day winter season and supply resources of legacy AGT pipeline capacity, EMT (CLNG) contract and an NRG supplier contract

Transitioning Away from EMT FAWG: Alternatives to be Assessed

Alternative	Description
Non-gas Alternatives: Energy Efficiency/Demand Response Electrification	Reduce natural gas demand to obviate its need as an energy resource in sufficient amounts to replace and/or eliminate the contractual commitments with EMT
On-system Infrastructure: LNG/Pipeline	LDC building the requisite amount of LNG and/or pipeline infrastructure to replace and/or eliminate the contractual commitments with EMT
Off-system Infrastructure: Interstate pipeline	Interstate pipeline development of the requisite amount capacity to replace and/or eliminate the contractual commitments with EMT

Transitioning Away from EMT FAWG: Alternative Assessment Criteria

Category	Criteria
System Operations	Resource reliability (hourly, day, season) a.k.a. resource adequacy / supply
	Pressure support
	Energy system resilience. For example, consideration of EMTs nature as a single large asset versus a mixed portfolio of alternatives that are smaller and more distributed; how do these alternative approaches respond to unanticipated events?
	TGP/AGP redundancy for LDC operations
Infrastructure (demand and supply)	Feasibility and practicality
	Categories of cost to implement alternatives (to be further defined by cost assessment workgroup)
	Timing for implementation
	Location-specific impacts
	Electric load implications
Policy & Broader Impact Goals	Emissions reductions and climate policy alignment (to be further defined by climate policy workgroup)
	Alignment with affordability goals (separate proceedings will influence how customers realize cost)
	Environmental justice: imposed new burdens on other EJ communities that will bear new or expanded infrastructure
	Others

Energy Efficiency/Demand Response Initial Assessment

Resource Adequacy	Potentially reduce need but unlikely eliminate demand sufficiently as it would require a 30% reduction in demand to eliminate contract.
Regional Implications	Reduced need for EMT could lead to its closure which could have adverse impacts on regional gas and electric energy supplies due to constrained pipeline supplies.
Policy Objectives	Is fully compliant with Commonwealth climate objectives. Stakeholders will consider affordability in all future policy discussions.
Feasibility/Timing	It is not feasible to reduce demand sufficiently in this targeted area by 2029/30

Electrification Initial Assessment

Resource Adequacy	Potentially reduce and/or eliminate need for EMT if customers fully electrify their energy requirements would require over 20,000 Residential customer conversions (only 137 observed in 2024).
Regional Implications	Reduce of need for EMT could lead to its closure which could have adverse impacts on regional gas and electric energy supplies due to constrained pipeline supplies. Need for EMT could become even greater if regional remains reliant upon gas as one of its marginal fuels.
Policy Objectives	Becomes compliant with Commonwealth climate objectives as the regional displaces natural gas and oil as marginal fuels for electric generation. Stakeholders will consider affordability in all future policy discussions.
Feasibility/Timing	It is not feasible to reduce demand sufficiently in this targeted area by 2029/30.

ON-system Gas Infrastructure Initial Assessment

Resource Adequacy	Development of an LDC owned and operated on-system LNG storage tank and connected distribution pipeline would be capable of eliminating the EMT contract.
Regional Implications	While development of more regional LNG storage would be beneficial to the region, the reduction of need for EMT could lead to its closure which could have adverse impacts on regional gas and electric energy supplies due to constrained pipeline supplies.
Policy Objectives	Gas supplies are substituted. This solution would shift from international sourcing of LNG to domestic extraction and liquefaction. The result would be marginal changes to emissions that depend on several factors. Affordability is a core consideration when evaluating alternatives.
Feasibility/Timing	It is likely not feasible by the end of the EMT contract in 2029/30 due to the long lead time of approvals by the EFSB and construction.

OFF-system Gas Infrastructure Initial Assessment

Resource Adequacy	Development of an interstate pipeline project with sufficient capacity could replace the deliverability of the EMT facility.
Regional Implications	The reduction of need for EMT could lead to its closure which could have adverse impacts on regional gas and electric energy supplies due to constrained pipeline supplies.
Policy Objectives	This solution depending on supply source could improve global emissions by eliminating the shipping and LNG processing portion of an existing supply resource EMT. Affordability is a core consideration when evaluating alternatives.
Feasibility/Timing	It is potentially feasible by the end of the EMT contract in 2029/30 but not without challenges due to permits and construction.

Other Research Questions

- *What categories of costs and impacts are directly attributable to achieving the specified outcomes compared to those that align with other policy goals or market changes? Alternatively, what alternatives are likely to emerge through external policy or market changes that would influence the role of EMT?*
  - *Customer supply, distribution and public policy costs are directly impacted by the efforts to achieve specific outcomes and its ultimately state/federal laws and FERC tariffs that could impact the role of EMT*
- *If EMT obtained other customers (e.g., generators), the cost to the LDCs for some services (e.g., seasonal trucked LNG) could be lowered. This could potentially open avenues to maintain or even increase the utilization of EMT for some services in some locations (e.g., more utilization of trucked LNG). Under what conditions could this occur? Are there cost and climate benefits to be gained in such instances?*
  - *It is unclear what if any other customers would execute long term agreements with owners of EMT or what the owners of EMT would be willing to offer at the time of those negotiations.*
- *What are the ways that EMT could be utilized as an asset to support decarbonization?*
  - *EMT remains a critical storage facility with unique attributes to support the region's gas demand as well its decarbonization efforts. Those efforts which could lead periods of increased peaking usage of gas as the energy landscape of region evolves.*
- *What opportunities exist for combined or pooled efforts across LDCs?*
  - *If a resource fits the discrete needs of the all of the LDCs then there are opportunities for economies of scale on resources that have similarly situated infrastructure.*

OPEN FORUM

AND

DISCUSSION

Office of Energy Transformation
Everett Marine Terminal
Focused Area Working Group
Initial Phase 2 Alternatives Assessment:

NSTAR Gas

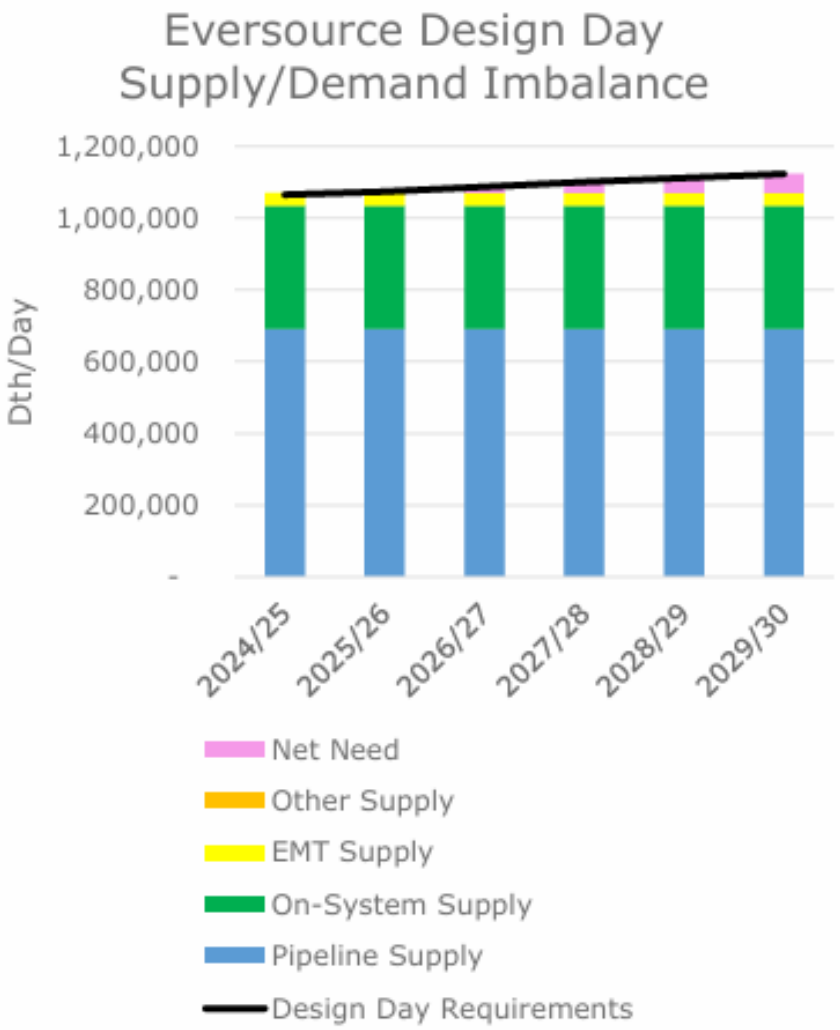
August 28, 2025

Introduction and Outline

- ***The EMT contract is part of a gas supply resource planning portfolio to ensure the companies have a sufficient reliable supply in place to serve customers under all weather conditions.***

1. Enterprise gas supply planning principles, processes and standards
2. NSTAR Gas (NSTAR) –
   - ❑ Discrete “AGT G-lateral” system requirements
   - ❑ Discrete “AGT J-lateral” system requirements
3. Assessment of Alternatives for AGT J-lateral
4. Open Forum

Supply Planning Principles



Purpose of the *Forecast and Supply* plan is to ensure the companies have a sufficient supply in place (left: stack bars) to serve customer demands under all weather conditions (*left: black line*).

- Forecasts of customer demand are based upon historic trends in customer demand and economic factors and projections of those correlated factors.
- Discrete system requirements to meet **hourly**, **daily,** and **seasonal** demands are concurrently evaluated under these conditions for the current year and into the future.
- The Companies are actively engaged in targeted electrification efforts and provide all customers with information on electrification options but the companies remain committed to ensuring reliable service to customers using natural gas. These efforts and the pace of customer adoption will affect the shape of the black line going forward.

Supply Planning Processes

Weather Variables:

- LDC's develop its design planning standards for normal year, design year, and design day.

- The "**normal year**" is typically defined as a weather pattern consistent with a distribution of EDDs on average from the most recent 20-30 years

- The "**design year**" is typically defined as a weather pattern consistent with a distribution of coldest or highest number of EDDs from the most recent years and calculated based upon various occurrence probabilities of the standard exceeding these standards once in 33 years (or 1:33) (typically 10-15% colder than "normal year" or average year)

- The design year also contains the "**design day**" and a "**cold snap**" is also calculated using a similar methodology as design year but over shorter time periods like a single day or 10-24 days

- The LDCs also review the hourly demand fluctuations have a dramatic impact on the upstream supply availability and pressures which are critical to safely and reliably serving the dynamic customer demand in highly variable weather conditions.

NSTAR Total System Design Day Forecasts by Division

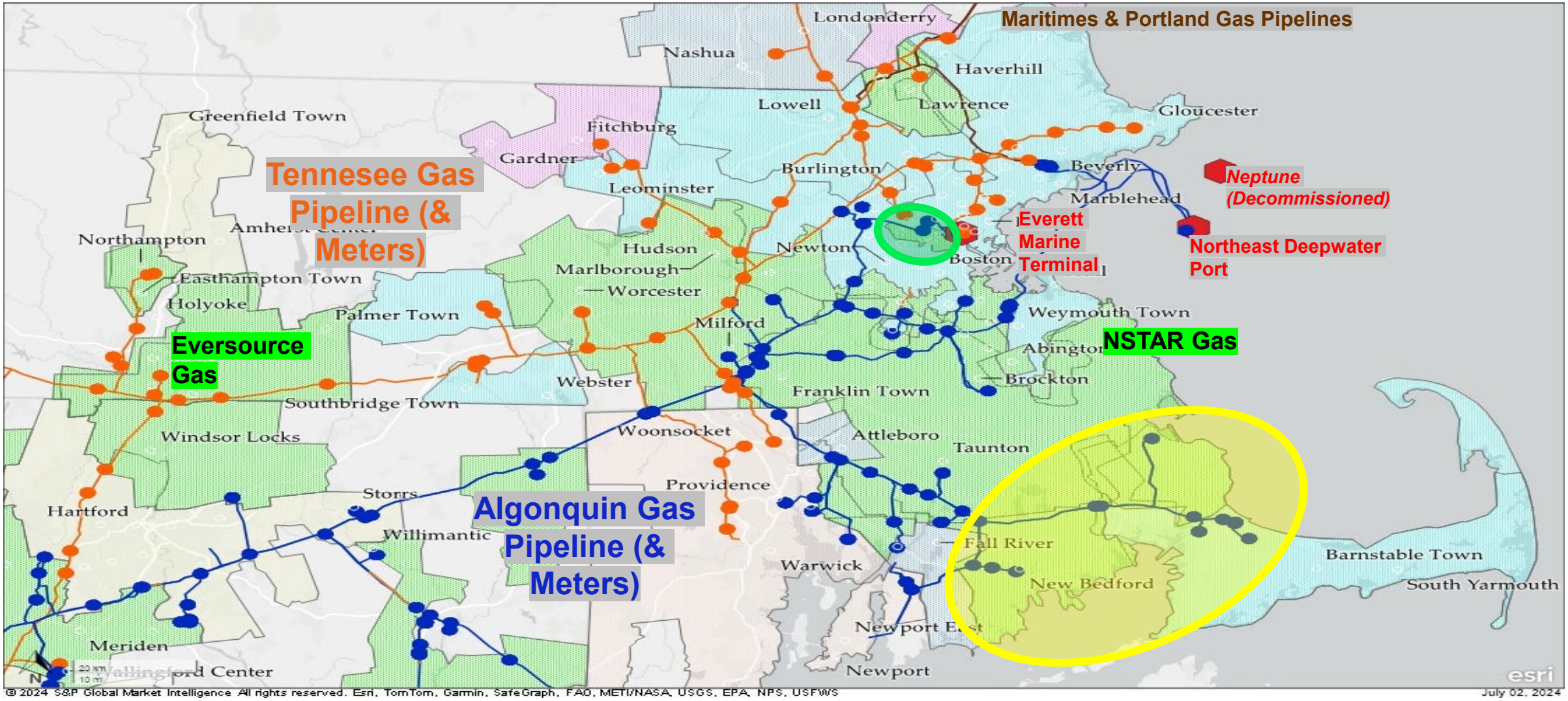
NSTAR Gas Design-Day Firm Requirements (BBtu)
Base Case

Year	Worcester	Framingham	New Bedford	Cambridge	Total
2025-26	215,108	122,735	106,448	106,211	550,502
2026-27	217,236	124,393	107,831	107,085	556,545
2027-28	219,322	126,080	109,241	107,895	562,539
2028-29	221,331	127,792	110,640	108,861	568,625
CAGR	1.0%	1.4%	1.3%	0.8%	1.1%

**Approved on July 14, 2025 which includes the impacts of energy efficiency programs.*

NSTAR Algonquin Gas "G-Lateral" & "J-lateral"

- The NSTAR CLNG EMT contract delivers gas on the AGT pipeline J lateral and to its two meter stations of New Bedford and Plymouth on the constrained "G-Lateral"



NSTAR CLNG EMT Contract

Contract Details:

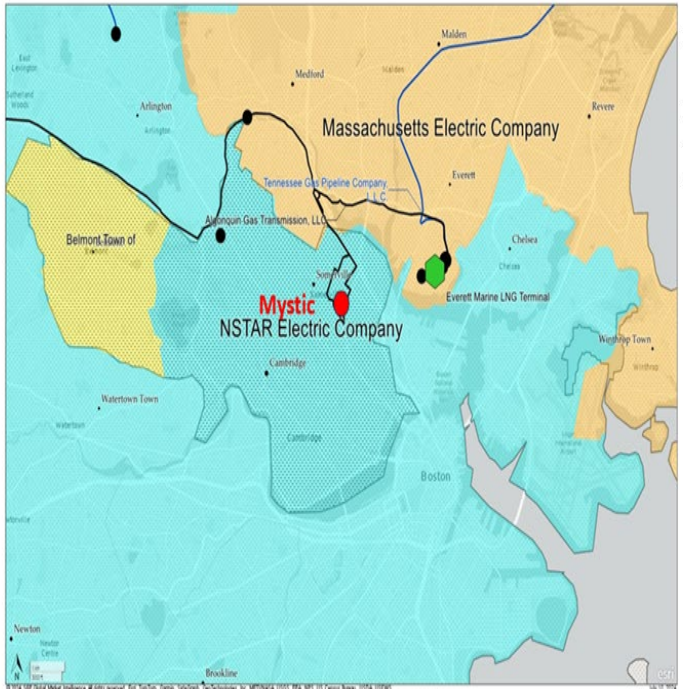
- The Agreement is for a six-year term beginning with a start date of June 1, 2024, and ending March 31, 2030.
- 15,000 MMBtu per day of delivery to AGT Meter stations Mystic (up to 15k) – (New Bedford 3k and Plymouth 2k)
  - 15,000 MMBtu per day of delivery flexibility to TGP receipt point
- 450,000 MMBtu of supply per season (Nov-Mar) – rollover option for maintenance (300k)
- NSTAR has option to take gas in liquid form at its discretion when not needed as vapor

Eversource Gas Areas Served by EMT:

NSTAR Gas
- Mystic Meter Station
- Other TGP Served Areas

**NGRID have remaining Gas Service in area*

Electric IOU
- NSTAR Electric
- NGRID Electric

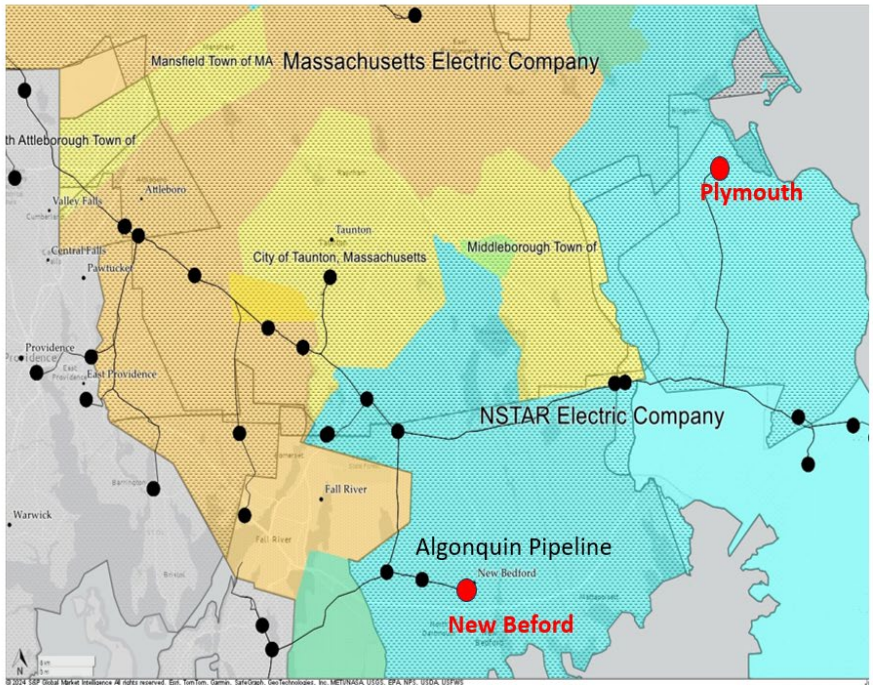


Eversource Gas Areas Served by EMT:

NSTAR Gas
- Plymouth Meter Station
- New Bedford Meter Station

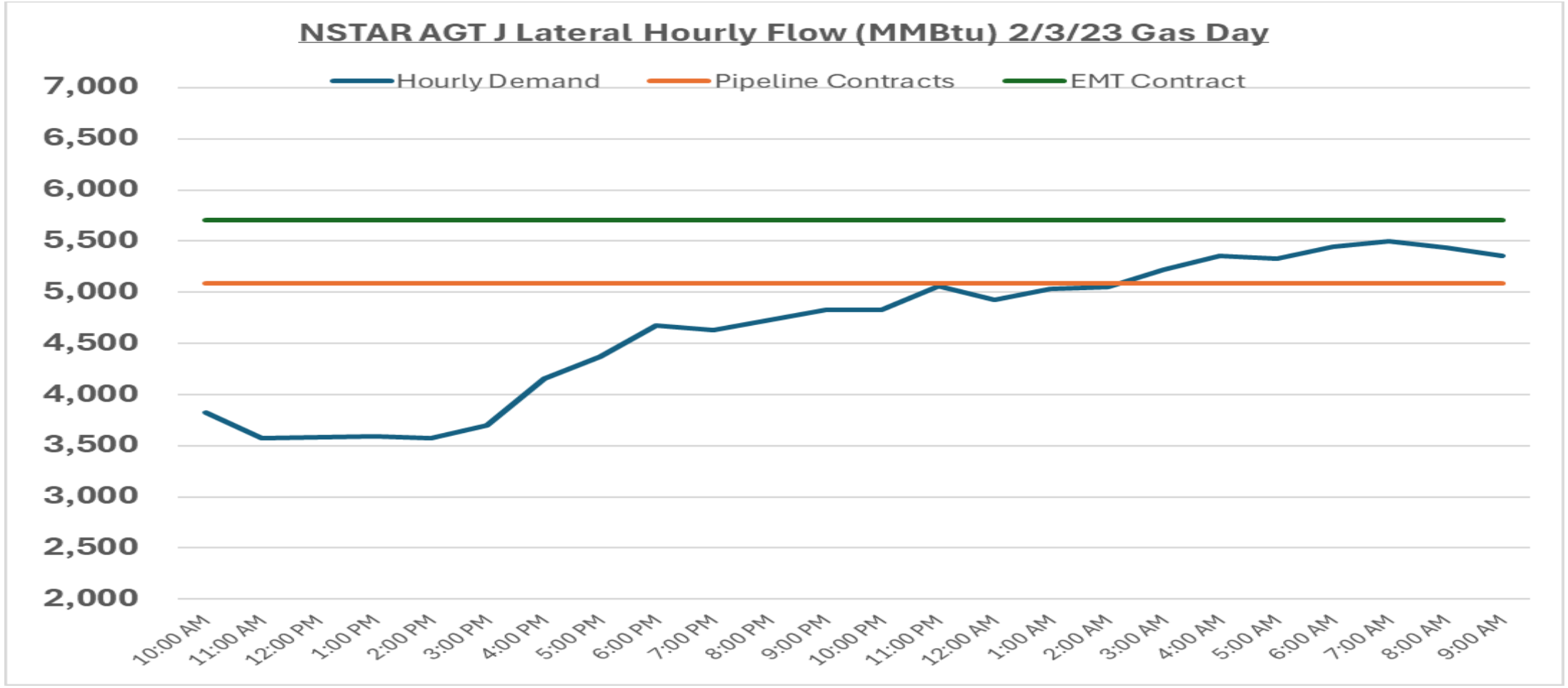
Electric IOU
- NSTAR Electric
- NGRID Electric

Electric Municipality



**There are other AGT meter stations in the area*

AGT – J Lateral Hourly Demand Curve

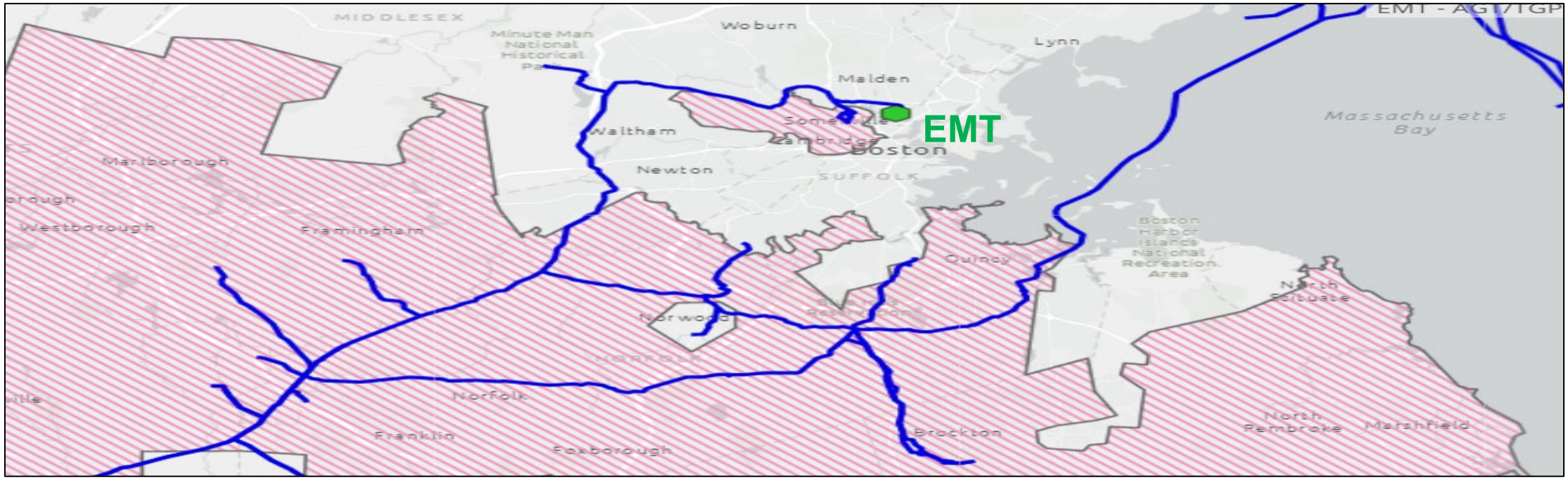


**February 3, 2023 was an extremely cold day 77 EDD, it was not a "Design Day" as it was Friday Gas Day – ending at 10AM EST on Saturday and it was preceded by a relatively warm day 38 EDD by Design Standards*

Cambridge – AGT J-Lateral Pressure Support

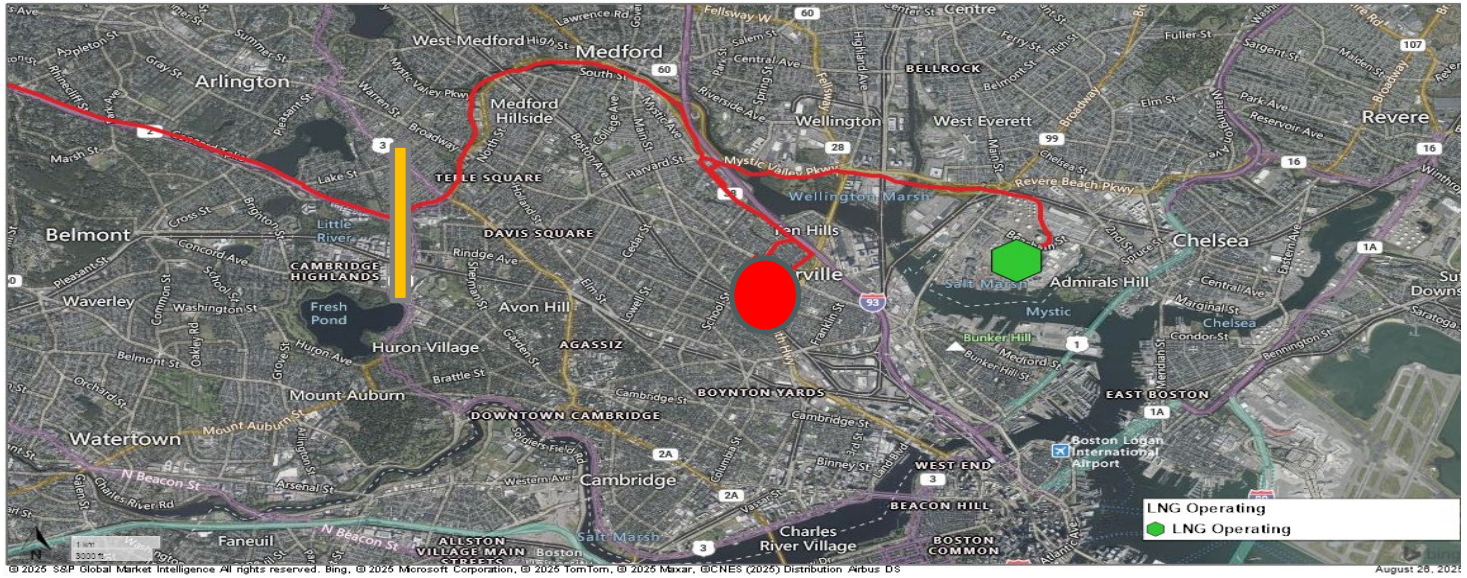
- While New England is figuratively at the end of the United States pipeline network, Cambridge is literally at the end of network
- Cold weather or force majeure events that cause curtailments or pressure drops on the system will result in amplified effects on Cambridge
- EMT has provided east end volumes and pressures on the coldest days over past several years.

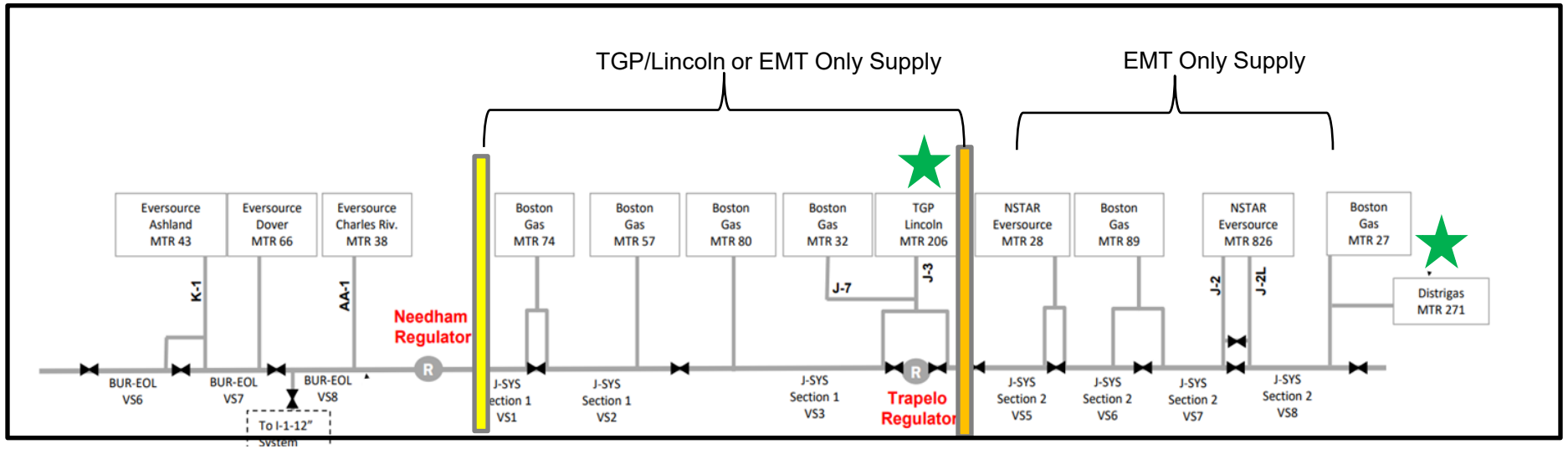
Cambridge on an Island at End of Line



NSTAR AGT J-Lateral Summer Maintenance Needs

- AGT must comply with federal PHMSA regulations which have become more stringent since a number of incidents in recent years and the nature of the inspections provides little no notice of need to interrupt service and complete work
- AGT J-Lateral Maintence that requires an isolation in certain sections of the pipeline shown below require EMT supply as portable CNG/LNG is not viable in the area





Transitioning Away from EMT FAWG: Alternatives to be Assessed

Alternative	Description
Non-gas Alternatives: Energy Efficiency/Demand Response Electrification	Reduce natural gas demand to obviate its need as an energy resource in sufficient amounts to replace and/or eliminate the contractual commitments with EMT
On-system Infrastructure: LNG/Pipeline	LDC building the requisite amount of LNG and/or pipeline infrastructure to replace and/or eliminate the contractual commitments with EMT
Off-system Infrastructure: Interstate pipeline	Interstate pipeline development of the requisite amount capacity to replace and/or eliminate the contractual commitments with EMT

Transitioning Away from EMT FAWG: Alternative Assessment Criteria

Category	Criteria
System Operations	Resource reliability (hourly, day, season) a.k.a. resource adequacy / supply
	Pressure support
	Energy system resilience. For example, consideration of EMTs nature as a single large asset versus a mixed portfolio of alternatives that are smaller and more distributed; how do these alternative approaches respond to unanticipated events?
	TGP/AGP redundancy for LDC operations
Infrastructure (demand and supply)	Feasibility and practicality
	Categories of cost to implement alternatives (to be further defined by cost assessment workgroup)
	Timing for implementation
	Location-specific impacts
	Electric load implications
Policy & Broader Impact Goals	Emissions reductions and climate policy alignment (to be further defined by climate policy workgroup)
	Alignment with affordability goals (separate proceedings will influence how customers realize cost)
	Environmental justice: imposed new burdens on other EJ communities that will bear new or expanded infrastructure
	Others

NSTAR Gas J Lateral Energy Efficiency/Demand Response Initial Assessment

Resource Adequacy	Potentially reduce the need for EMT if customers but the single fed system is challenged to meet its hourly demand and summer time maintenance periods. The are a number of large customers in the area.
Regional Implications	Reduced need for EMT could lead to its closure which could have adverse impacts on regional gas and electric energy supplies due to constrained pipeline supplies.
Policy Objectives	Is fully compliant with Commonwealth climate objectives. Stakeholders will consider affordability in all future policy discussions.
Feasibility/Timing	It is not yet feasible to reduce demand sufficiently in this targeted area by 2029/30.

NSTAR Gas J Lateral Electrification Initial Assessment

Resource Adequacy	Potentially reduce the need for EMT if customers but the single fed system is challenged to meet its hourly demand and summer time maintenance periods. The are a number of large customers in the area.
Regional Implications	Reduce of need for EMT could lead to its closure which could have adverse impacts on regional gas and electric energy supplies due to constrained pipeline supplies. Need for EMT could become even greater if regional remains reliant upon gas as one of its marginal fuels.
Policy Objectives	Becomes compliant with Commonwealth climate objectives as the regional displaces natural gas and oil as marginal fuels for electric generation. Stakeholders will consider affordability in all future policy discussions.
Feasibility/Timing	It is not yet feasible to reduce demand sufficiently in this targeted area by 2029/30.

NSTAR Gas J Lateral ON-system Gas Infrastructure Initial Assessment

Resource Adequacy	Development of an LDC owned and operated on-system LNG storage tank and connected distribution pipeline would be capable of eliminating the EMT contract.
Regional Implications	While development of more regional LNG storage would be beneficial to the region, the reduction of need for EMT could lead to its closure which could have adverse impacts on regional gas and electric energy supplies due to constrained pipeline supplies.
Policy Objectives	Gas supplies are substituted. This solution would shift from international sourcing of LNG to domestic extraction and liquefaction. The result would be marginal changes to emissions that depend on several factors. Affordability is a core consideration when evaluating alternatives.
Feasibility/Timing	It is not feasible by the end of the EMT contract in 2029/30 due to locational issues as area is extremely congested and the long lead time of approvals by the EFSB and construction.

NSTAR Gas J Lateral OFF-system Gas Infrastructure Initial Assessment

Resource Adequacy	Development of an interstate pipeline project with sufficient capacity could reduce and/or replace the deliverability of the EMT facility. But would not resolve the redundancy of the EMT facility to the system.
Regional Implications	The reduction of need for EMT could lead to its closure which could have adverse impacts on regional gas and electric energy supplies due to constrained pipeline supplies.
Policy Objectives	This solution depending on supply source could improve global emissions by eliminating the shipping and LNG processing portion of an existing supply resource EMT. Affordability is a core consideration when evaluating alternatives.
Feasibility/Timing	It is likely not feasible by the end of the EMT contract in 2029/30 due to challenges with location as area is extremely congested, permits and construction.

Other Research Questions

- *What categories of costs and impacts are directly attributable to achieving the specified outcomes compared to those that align with other policy goals or market changes? Alternatively, what alternatives are likely to emerge through external policy or market changes that would influence the role of EMT?*
  - *Customer supply, distribution and public policy costs are directly impacted by the efforts to achieve specific outcomes and its ultimately state/federal laws and FERC tariffs that could impact the role of EMT*
- *If EMT obtained other customers (e.g., generators), the cost to the LDCs for some services (e.g., seasonal trucked LNG) could be lowered. This could potentially open avenues to maintain or even increase the utilization of EMT for some services in some locations (e.g., more utilization of trucked LNG). Under what conditions could this occur? Are there cost and climate benefits to be gained in such instances?*
  - *It is unclear what if any other customers would execute long term agreements with owners of EMT or what the owners of EMT would be willing to offer at the time of those negotiations.*
- *What are the ways that EMT could be utilized as an asset to support decarbonization?*
  - *EMT remains a critical storage facility with unique attributes to support the region's gas demand as well its decarbonization efforts. Those efforts which could lead periods of increased peaking usage of gas as the energy landscape of region evolves.*
- *What opportunities exist for combined or pooled efforts across LDCs?*
  - *If a resource fits the discrete needs of the all of the LDCs then there are opportunities for economies of scale on resources that have similarly situated infrastructure.*

OPEN FORUM

AND

DISCUSSION

Everett Marine Terminal

Initial Phase 2 LNG Supply Alternatives Assessment

August 22, 2025

nationalgrid

National Grid LNG Injection Alternatives Assessment

Introduction and Outline

Opening Comments

1. EMT Contract provides pressure support, redundancy, and contingency supply during outages or extreme weather
2. Explore LNG injection alternatives and solutions to reduce reliance on EMT. **Additional alternatives to be discussed 8/28**.
3. Ensuring reliability is the central objective
   - How will it work
   - Risk
4. Today's session is designed to encourage conversation and hear your thoughts

Objectives of Assessment

1. National Grid EMT contract
2. EMT reliant Zones
3. Review FAWG guidance
4. National Grid LNG Facilities

Assessments and Takeaways

1. National Grid initial assessments
2. Initial takeaways & discussion
   - Alternatives Summary

National Grid's Supply Planning

Forecast and Supply Plan (F&SP)

F&SP Highlights

- Demonstrate adequate planning
  - MADPU filing every two years
  - 5-year planning period
- Document Forecast of demand requirements (including growth rates)
  - Planning load
  - Design conditions
- Document supply resources
  - Resource adequacy

National Grid's F&SP

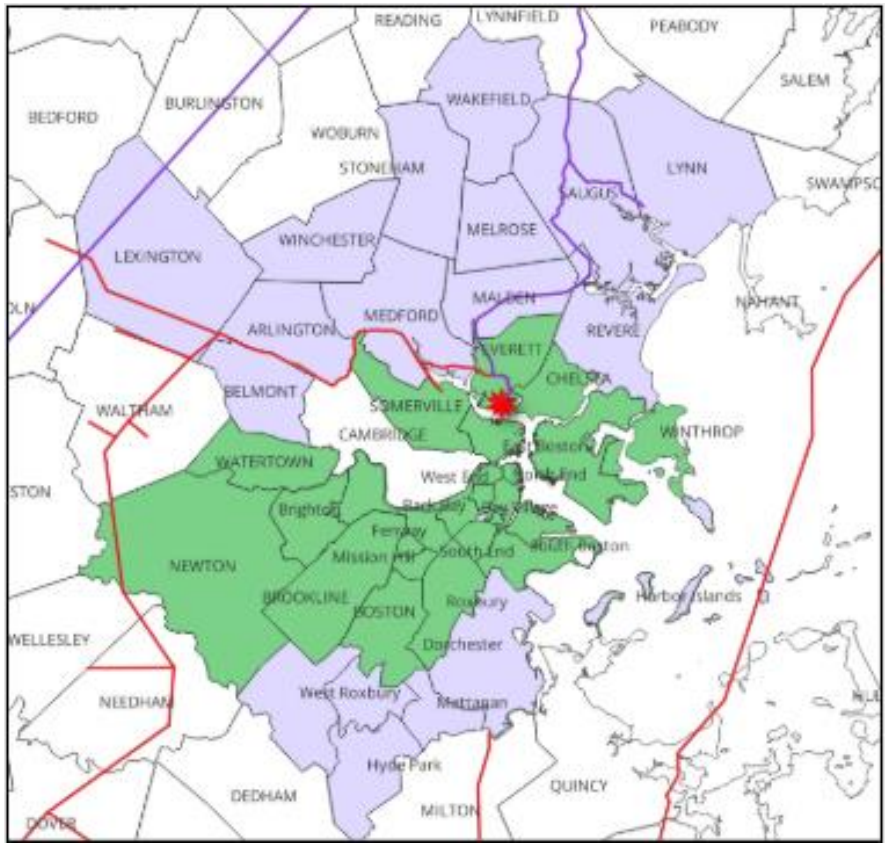
- Filed November 2024
- National Grid 1-in-30-year design standard for both Design Day and Year
- Design Weather[1]
  - 78 EDD Design Day
  - 5586 EDD Design Winter
- Growth Rates
  - 0.9% Design Day Growth
  - 0.9% Design Year Growth

[1]Design weather based on Boston Logan Airport

Review: EMT plays a major role to maintain system reliability

- **Year-round LNG resource:** can provide support year-round, including during peak weather conditions, allowing National Grid to preserve seasonal LNG supply
- **Critical facility redundancy** injects directly into National Grid's system, Enbridge J and Kinder Morgan CDP 3 laterals. This mitigates operational and supply challenges due to potential unplanned outages at a gate station feeding this system
- **Gas pressure support:** MA is at the end of each pipeline system and can experience low inlet pressures at gate stations. If Constellation supplies are not available, LNG will be used more often to maintain inlet pressures to other critical Tennessee Gas Pipeline (TGP) and Algonquin (AGT) Gate Stations
- **Outages and pipeline flow restrictions mitigation:** regular pipeline maintenance occurs for both the TGP and AGT pipelines between April and October. In addition, AGT is continuing extensive work on the J lateral, limiting gas supply to our system. At times, Constellation has been the only source of supply into the J lateral

Direct Vapor Injection for Boston Gas: EMT provides direct vapor and supply capacity support to Boston Gas' north-Boston systems and through Algonquin (red line) and Tennessee (purple line) connections at design hour, day, and season levels



Footnote: ***Green-shaded communities,*** *Under design day conditions, EMT can meet around 15% of total design hour demand, supplying approximately 95,000 customers.* ***Lilac-shaded communities,*** *During non-peak conditions, EMT can deliver over 50% of National Grid's total sendout in Massachusetts, serving roughly 350,000 customers.*

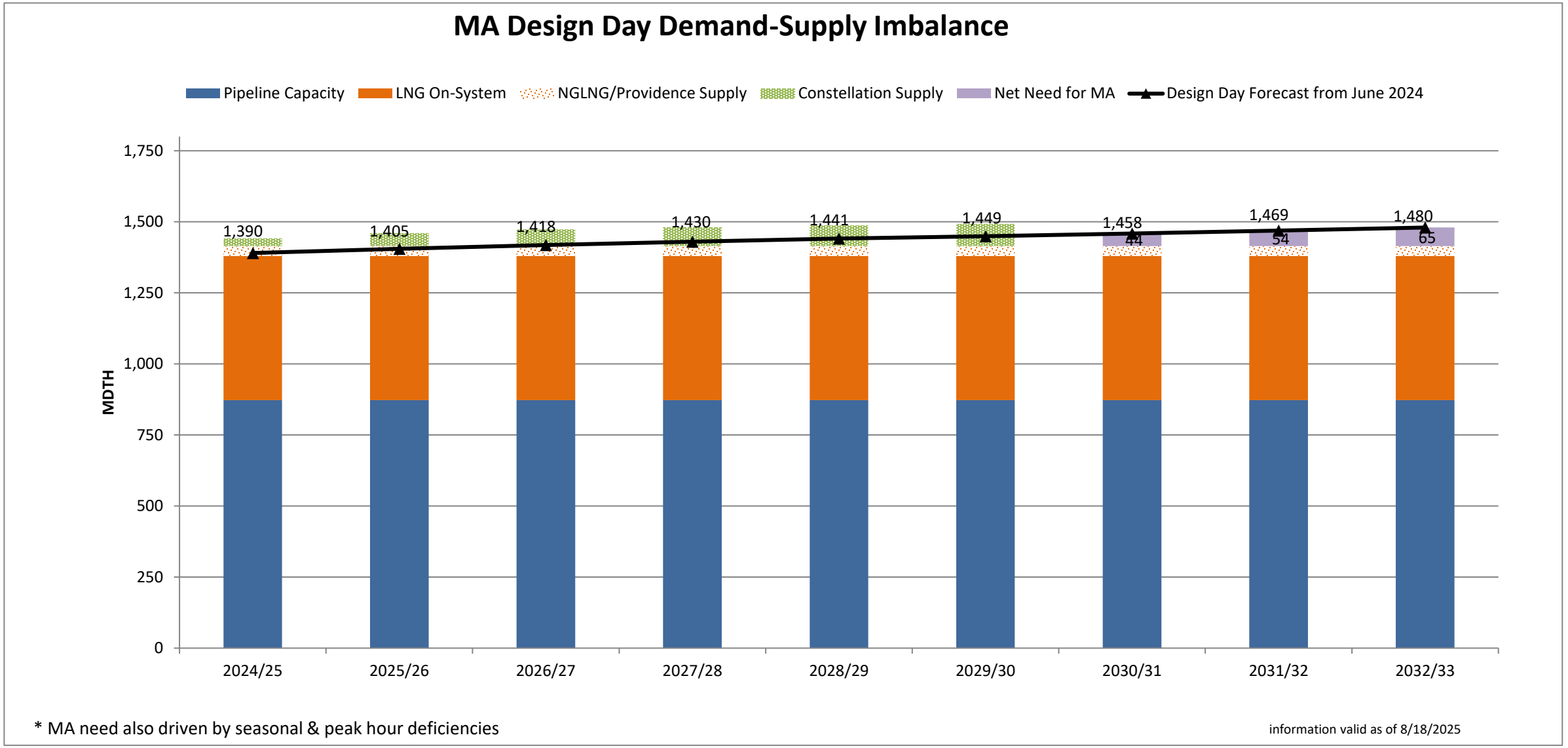
National Grid's Current EMT Contract

National Grid's Contract with Constellation LNG

- Current contract is a six-year contract (2024-2030) approved by the DPU to ensure stable LNG supply
- Delivery Mode: LNG is delivered as either:
  - Vapor: Directly into Boston Gas's distribution system in Everett, MA
  - Liquid: Trucked to Boston Gas's LNG facilities
- Ensures reliable gas supply, especially during peak demand
- Supports National Grid's operational challenges with flexibility for vapor or liquid LNG
- The contract supports price stability for customers
- National Grid's contract volume is shaped over time to match forecast demand while minimizing excess supply and controlling costs

Contract Year	Max Daily Quantity (Dth)	Max Seasonal Quantity (Dth)
2024/25	**27,000**	**500,000**
2025/26	**45,000**	**950,000**
2026/27	**59,000**	**1,450,000**
2027/28	**66,000**	**1,705,000**
2028/29	**73,000**	**1,925,000**
2029/30	**78,000**	**2,100,000**

National Grid MA Design Day Demand-Supply Imbalance



* MA need also driven by seasonal & peak hour deficiencies

information valid as of 8/18/2025

FAWG Guidance – Assessment Criteria

Assessment Criteria Categories

System Operations: How well an alternative can maintain or enhance the operational reliability of the gas system

- Resource reliability (hourly, daily, seasonal adequacy)
- Pressure support
- System resilience (ability to respond to unplanned events)
- Redundancy for critical pipeline systems

Infrastructure (Demand and Supply): Assess the practicality and logistics of implementing the alternative

- Feasibility and practicality
- Cost to implement
- Timing for implementation

Policy and Broader Impact Goals: Ensure alignment with state climate and equity goals

- Location-specific impacts
- Electric load implications
- Greenhouse gas emissions and climate target alignment
- Affordability goals
- Environmental justice

Initial Assessment : LNG Injection to EMT Reliant Zones

Direct Vapor Injection for Boston Gas

- Alternatives assessment focuses on EMT reliant zones under both design day and non-peak conditions

LNG Injection (Various Locations)

- EMT may supply liquid to LNG storage facilities[1] and supplies liquid for portable LNG vaporization facilities, which provide capacity to each facility's local system. Deliveries made by truck.

Outcomes

- National Grid's goal for reduced reliance is to minimize the number of customers impacted by a pipeline issue
  - We're focused on achieving measurable reduction progress by pursuing practical supply and demand-side measures that support cost savings, emissions reductions, and dependable service with decreased EMT dependency.
- Eliminate reliance on EMT
  - National Grid acknowledges EMT's vital role in the region and the support it provides to maintaining reliable gas supply. While striving for reduction, fully eliminating reliance is not currently a reliable solution in the near term.

[1]National Grid has contracted for off-peak liquefaction services from the Northeast Energy Center and from National Grid LNG

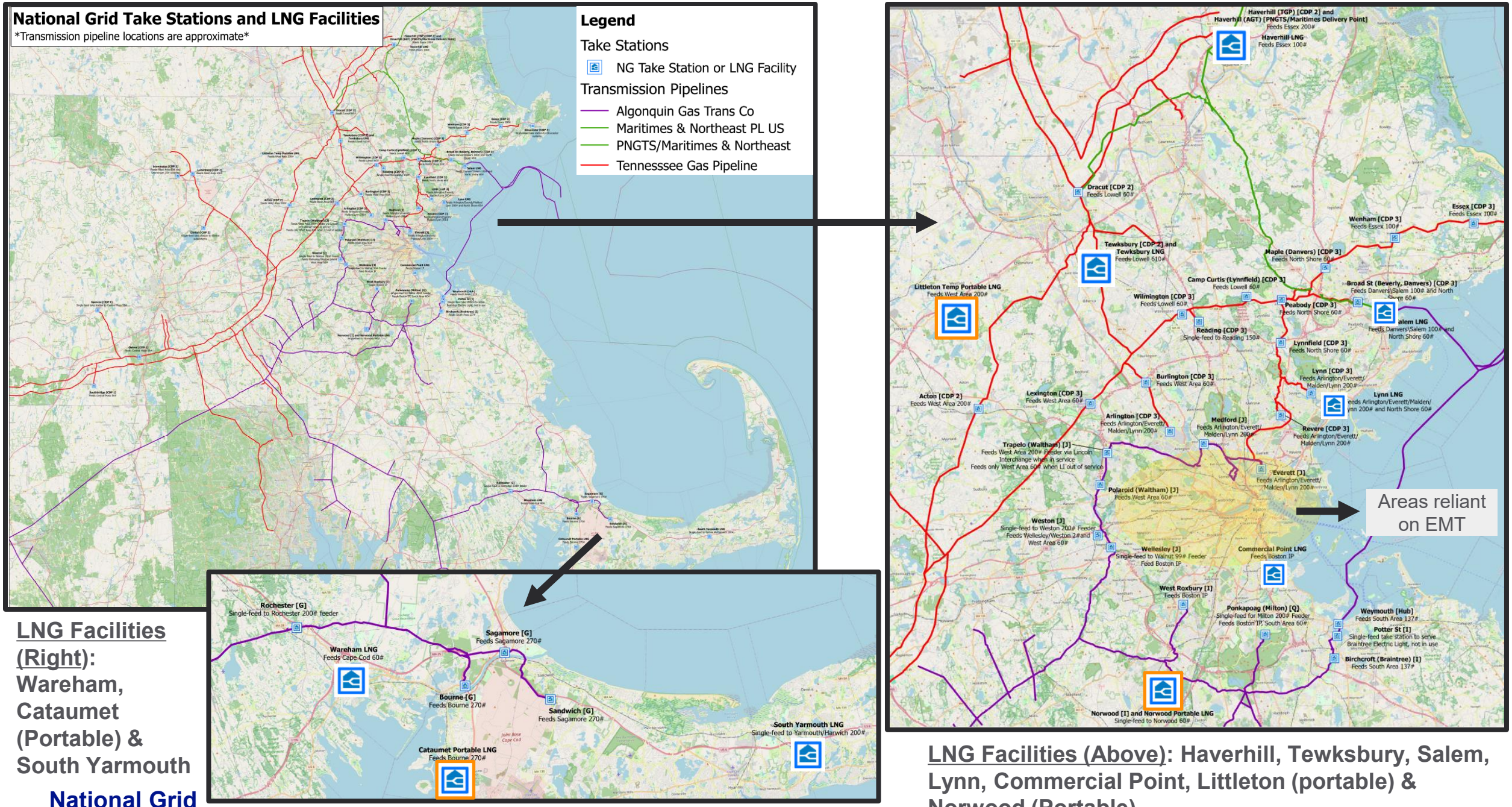
Initial Assessment: Current LDC-Owned LNG Storage Facilities

LNG Facility	How Its Used	Tank Size (BCF)	Send-Out (dth/d)	Customers
Commercial Point (distribution/storage)	Stores & vaporizes LNG for distribution into National Grid's natural gas network	**1.2**	**198,968**	**125,000**
Lynn (distribution/storage)	Stores & vaporizes LNG for distribution into National Grid's natural gas network	**1.0**	**120,142**	**186,000**
Salem (distribution/storage)	Stores & vaporizes LNG for distribution into National Grid's natural gas network	**1.0**	**31,768**	**22,000**
Tewksbury (distribution/storage)	Stores & vaporizes LNG for distribution into National Grid's natural gas network	**1.0**	**83,600**	**72,000**
Haverhill (distribution/storage)	Stores & vaporizes LNG for distribution into National Grid's natural gas network	**0.4**	**41,069**	**33,000**
South Yarmouth (distribution/storage)	Stores & vaporizes LNG for distribution into National Grid's natural gas network	**0.2**	**27,600**	**25,000**
Wareham (distribution/storage)	Stores & vaporizes LNG for distribution into National Grid's natural gas network	**0.01**	**5,000**	**5,000**
Total		**4.9 BCF**	**507,641**	**468,000**

Initial Assessment: Current Portable LNG Facilities

LNG Facility	How it is used	Facility Capacity
Norwood (portable)	• Vaporizes LNG for distribution into National Grid's natural gas network during high demand hours and to adhere to contractual limitations imposed by AGT	• Vaporization – 750 Dth/hr
Cataumet (portable)	• Vaporizes LNG for distribution into National Grid's natural gas network during high demand hours and to adhere to contractual limitations imposed by AGT	• Storage - 5 MDth • Vaporization – 750 Dth/hr
Littleton, MA (portable)	• Vaporizes LNG for distribution into National Grid's natural gas network during high demand hours for localized pressure support needs	• Storage – 5.5 MDth • Vaporization – 750 Dth/hr

At <u>each</u> site, daily vaporization is limited to 7,500 Dth



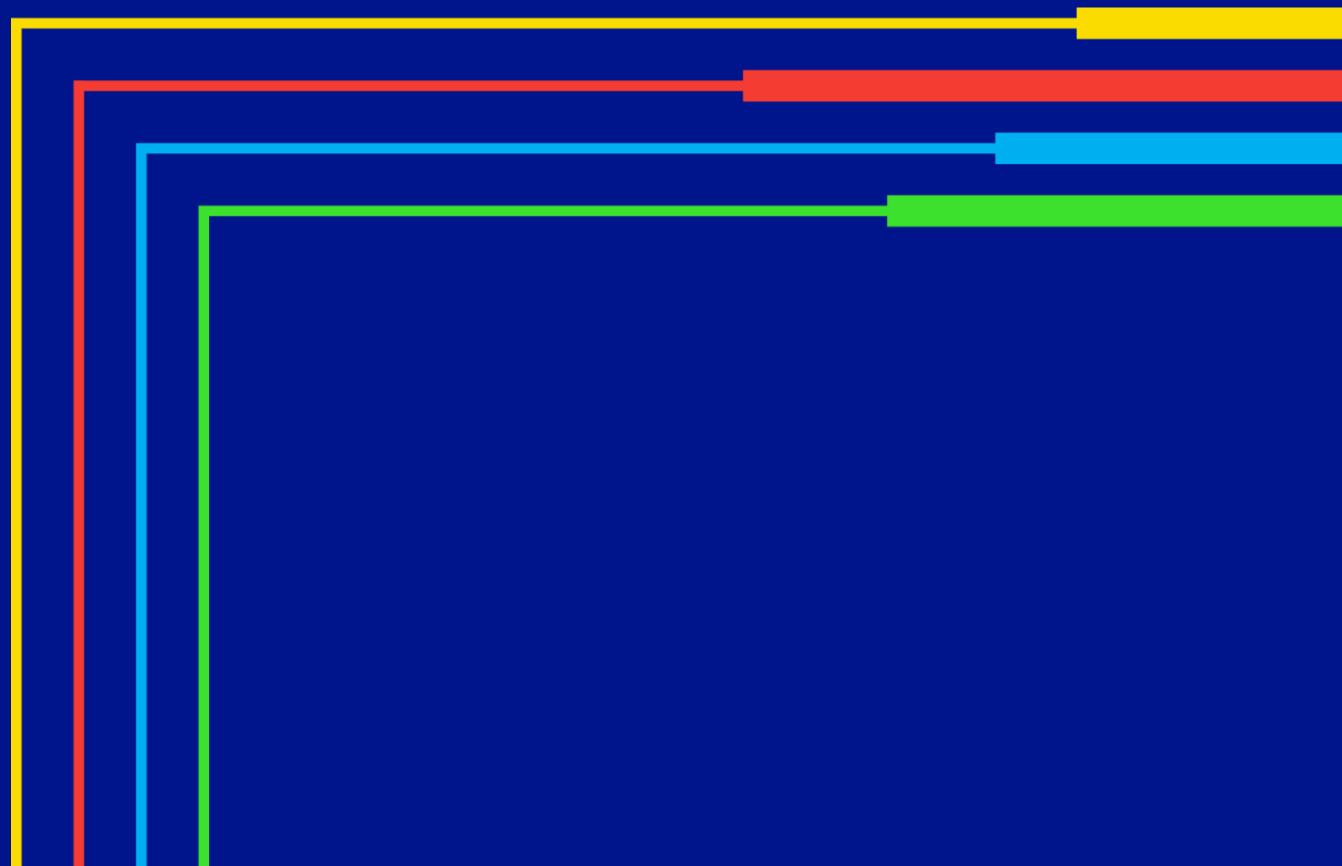
LNG Facilities (Right): Wareham, Cataumet (Portable) & South Yarmouth

LNG Facilities (Above): Haverhill, Tewksbury, Salem, Lynn, Commercial Point, Littleton (portable) & Norwood (Portable)

National Grid

[1]National Grid Portable Sites are outlined in orange

LNG Injection Alternatives



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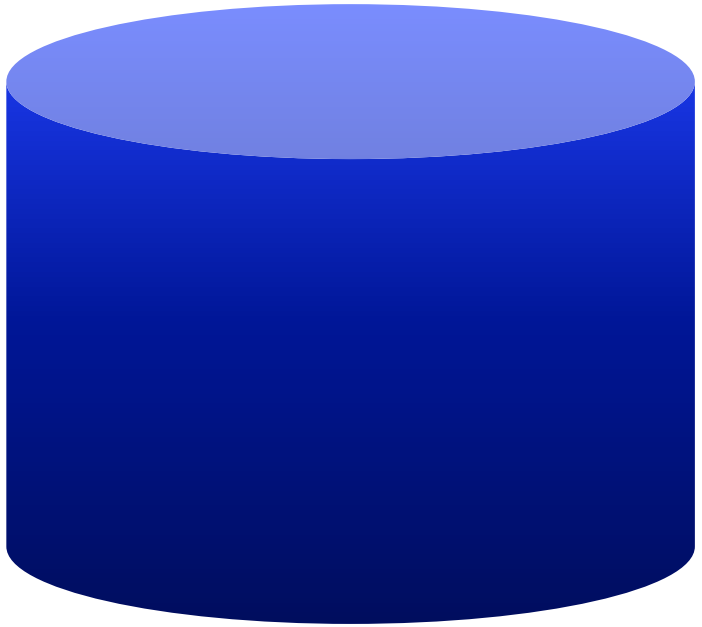
LNG Storage & Vaporization vs. Portable Vaporization

Commercial Point LNG Site

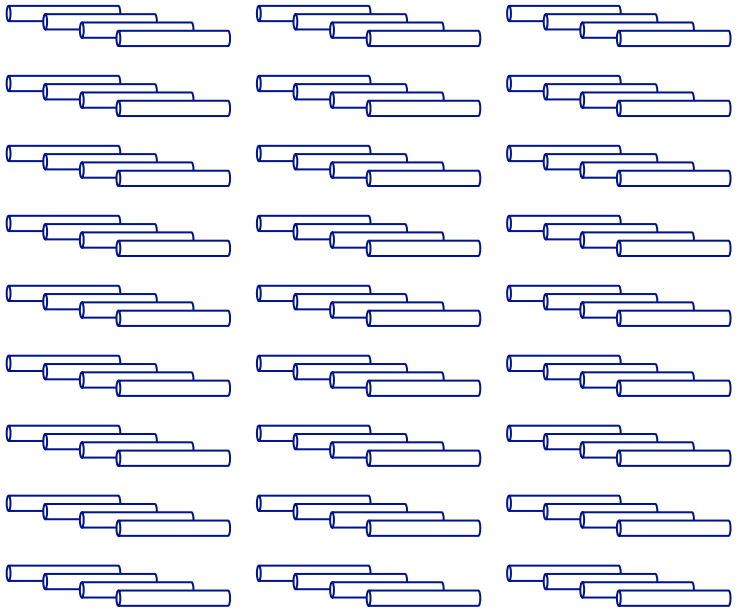
Cataumet Portable Site

Comparing LNG Plant Capacity to LNG Portables & Trucking

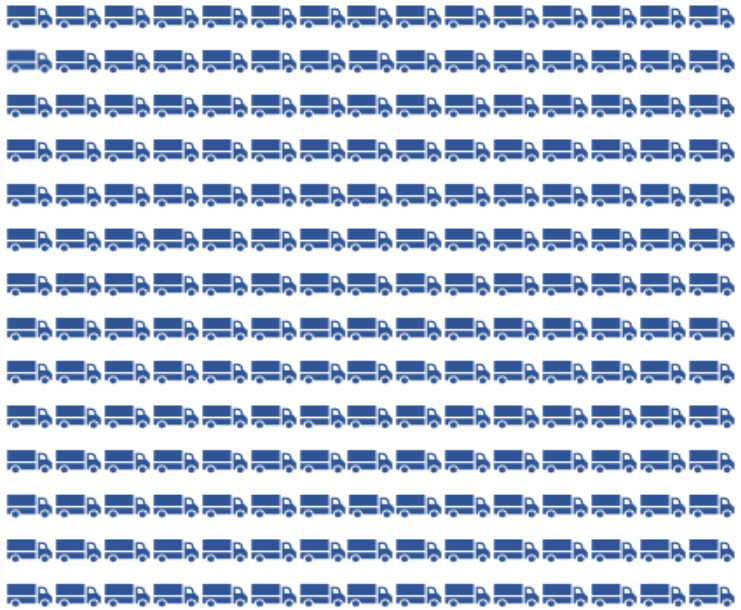
Commercial Point Plant



27 Portable LNG Injection Sites



210 LNG Trucks



Commercial Point LNG Plant & Portable LNG Comparison		
Commercial Point LNG Vaporization Capacity	~200,000	Dth/day
Portable Site Daily Injection Capacity	7,500	Dth/day
Equivalent Portable Sites	**26.5**	**sites**

Commercial Point LNG Plant & LNG Trucking Comparison		
Commercial Point LNG Vaporization Capacity	~200,000	Dth/day
LNG Truck Capacity	950	Dth/truck
Total Trucks Needed	**210**	**trucks/day**

National Grid

Potential Vaporization Increase Projects

Across our LNG facilities, we've identified five potential plant enhancements that could improve vaporization and reduce reliance—though not fully before the EMT contract expires

Plant	Added (dth/day)	Year In-Service (per BP25)
- Haverhill - Lynn - Salem - Tewksbury - South Yarmouth	Total vaporization increase across 5 plants **adding ~130,000 dth/day**	In service dates range from 2028-2033

System Operations

- Vaporization projects will replace the current LNG vaporizers and associated vaporization equipment, incorporate vaporization redundancy, and increase the plant's send-out capacity
- A new redundant vaporization system with increased capacity will provide a more reliable, robust, long-term operational solution for the LNG facilities

Risk

- NE Supply-Demand imbalances exist on select pipeline laterals on design day and peak hour under current and future conditions
- As pipelines become more constrained, chances of pipeline Operational Flow Orders (OFO) increase limiting supply volumes to laterals and/or stations

National Grid *Prior to Vaporization increase at South Yarmouth, tank replacement is needed. Project in service FY31*

Potential Portable Site Projects

Four potential new Portable Sites have been identified that could reduce reliance—though not fully before the EMT contract expires

New Portable Site	dth/hr	Year In-Service (per BP25)
- Everett - Gloucester - Leominster - Westford	Each portable site will add - **750 dth/hr (7,500 dth/day)**	In service dates range from 2029-2031

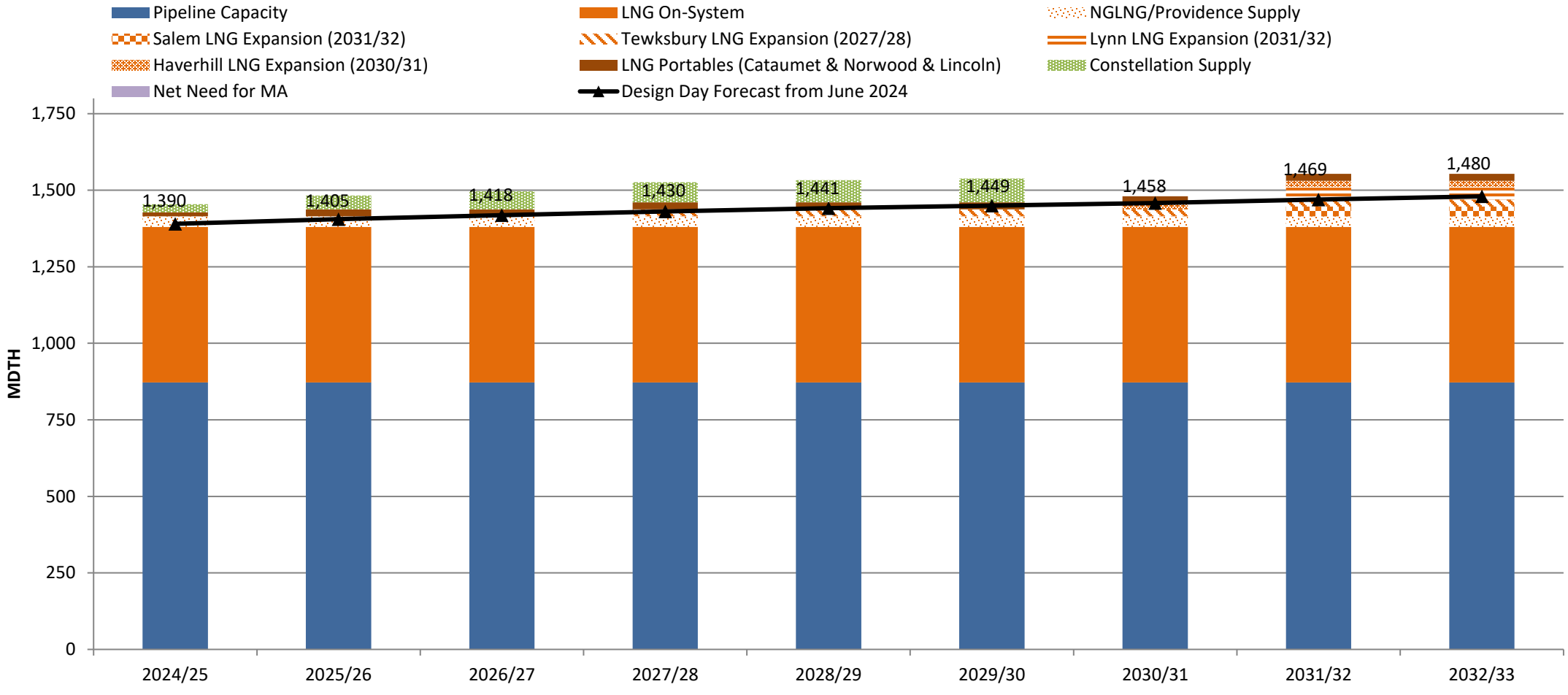
System Operations

- New portable sites to provide localized supplies during high demand hours

Risk

- With new Portables, imbalances will still exist on J Lateral (Design day and Peak Hour) and CDP3 (Peak Hour)
- Without new Portables, there is a surplus supply demand balance on design day and deficit on peak hour at State level
  - Negative imbalances will exist on laterals (J Lateral, G Lateral, CDP2, and CDP3)
- Increasing Portables will increase trucking often during harsh weather conditions adding risk

National Grid MA Design Day Demand-Supply Imbalance with Additional LNG Injection Capability

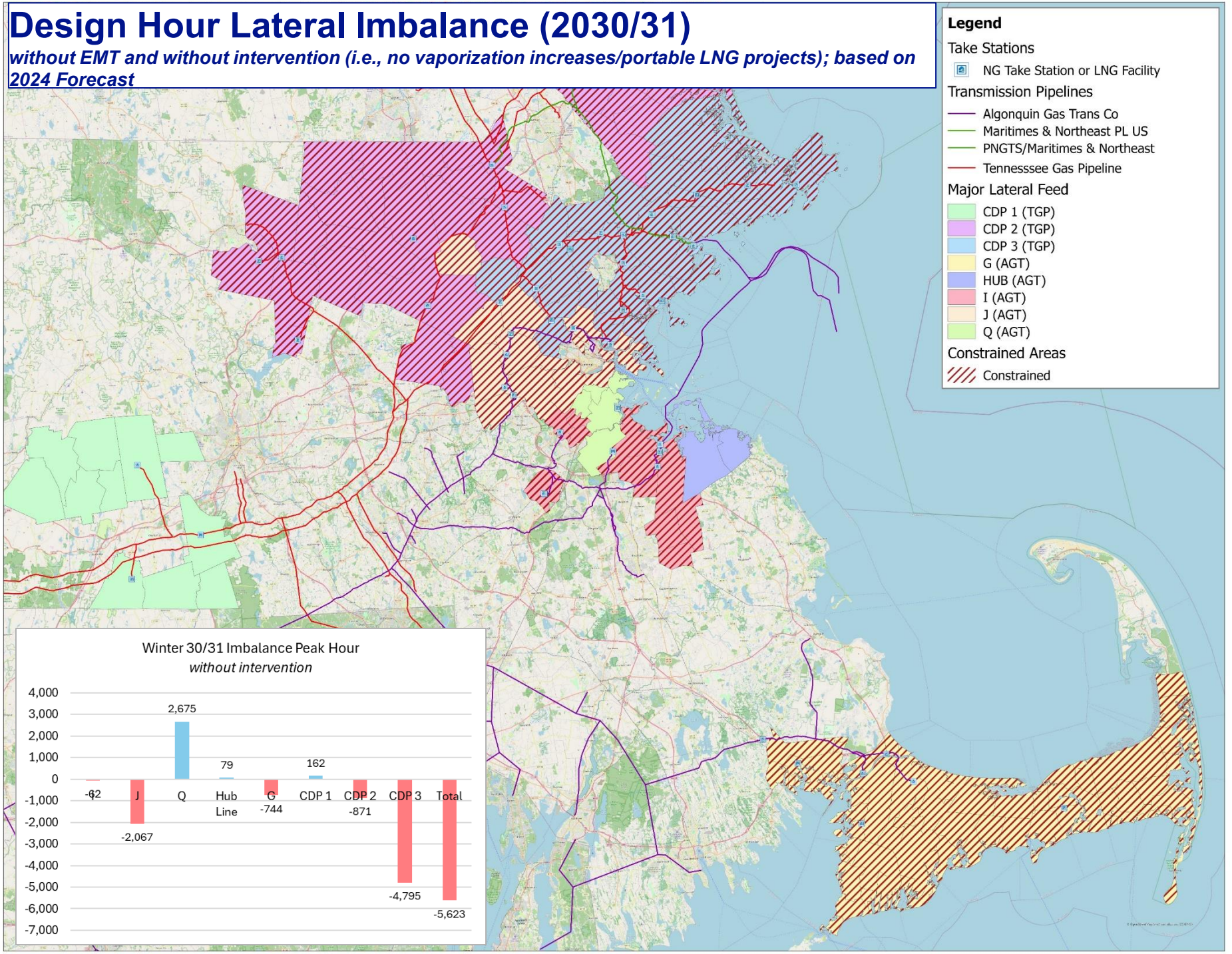


* MA need also driven by seasonal & peak hour deficiencies

information valid as of 8/18/2025

Design Hour Lateral Imbalance (2030/31)

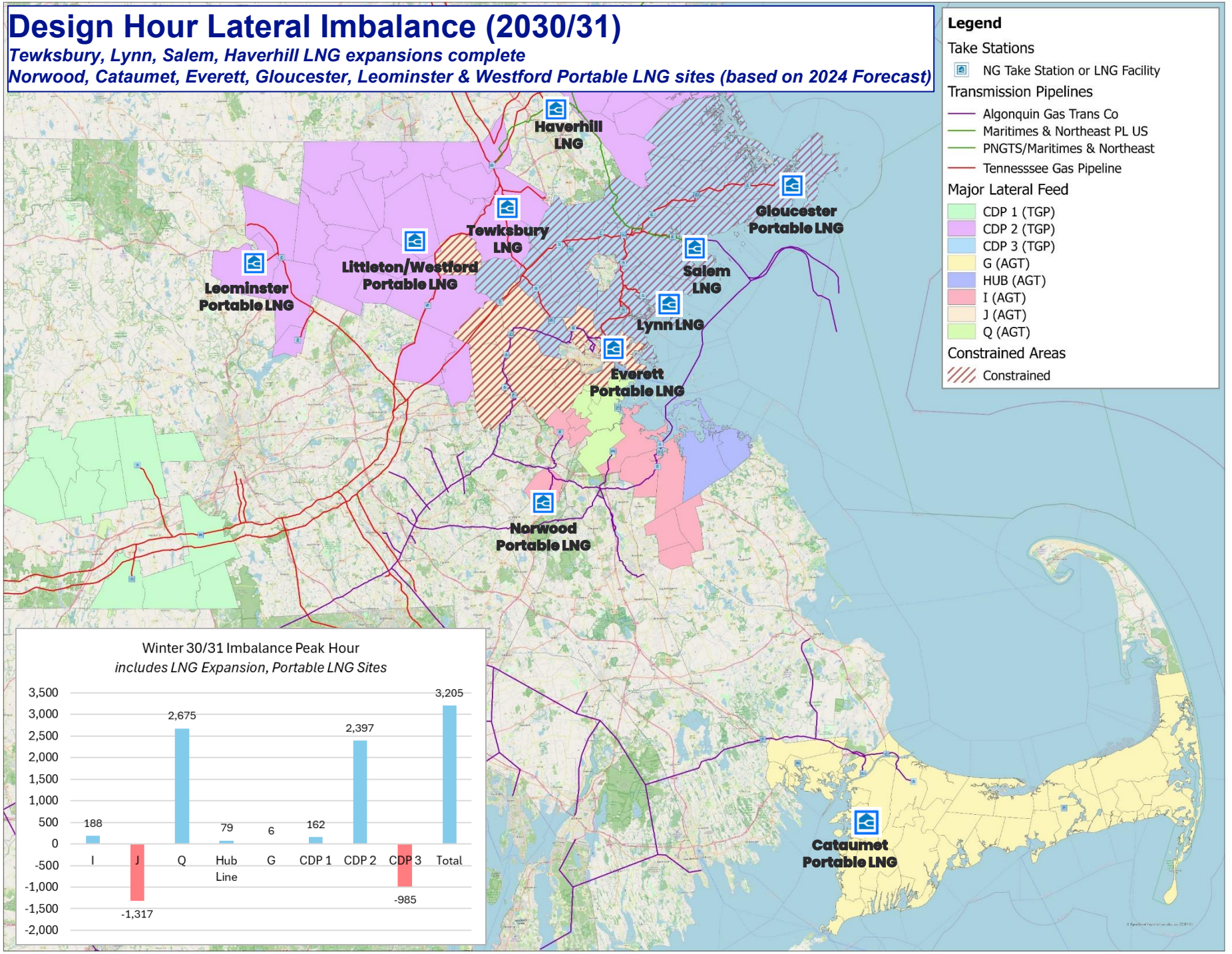
without EMT and without intervention (i.e., no vaporization increases/portable LNG projects); based on 2024 Forecast



Design Hour Lateral Imbalance (2030/31)

Tewksbury, Lynn, Salem, Haverhill LNG expansions complete

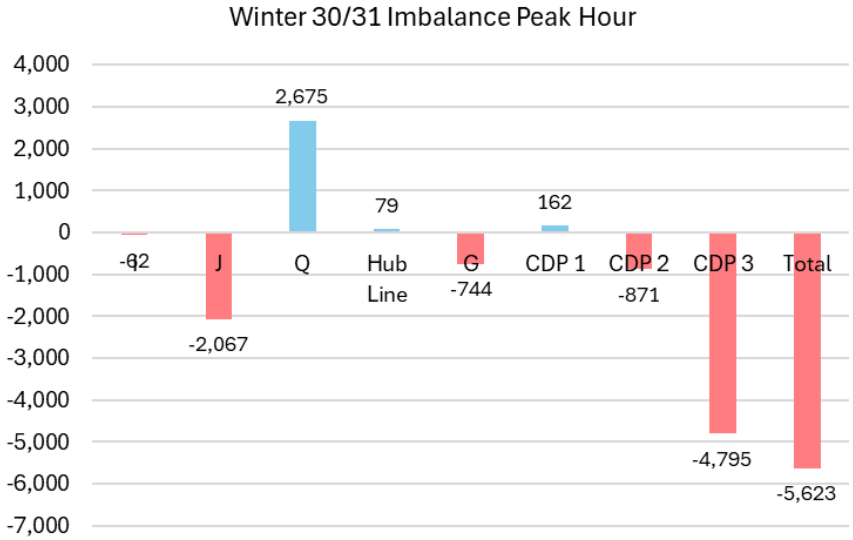
Norwood, Cataumet, Everett, Gloucester, Leominster & Westford Portable LNG sites (based on 2024 Forecast)



Peak Hour Lateral Imbalance (2030/31)

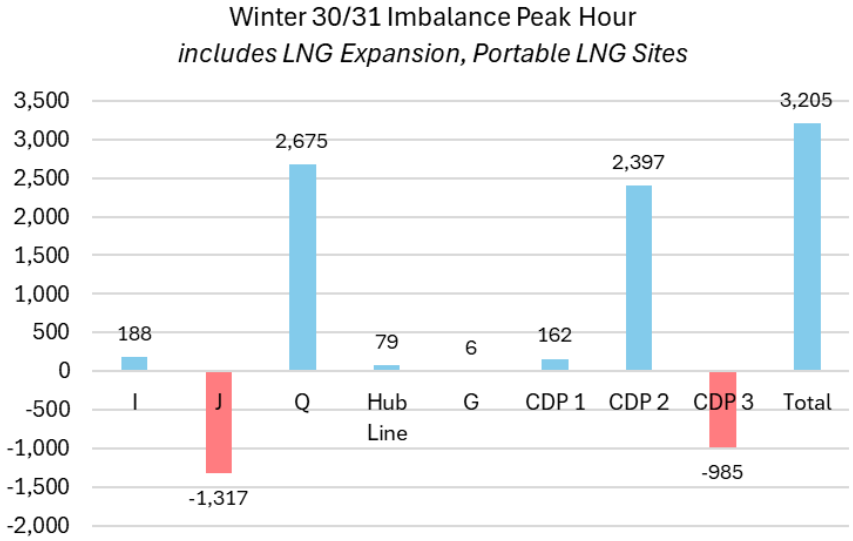
Baseline Assumptions:

- Constellation Contract Expires in 2030
- No LNG Plant Expansion
- No Portable LNG



Revised Assumptions:

- Tewksbury, Salem, Lynn, Haverhill and S. Yarmouth LNG Expansions complete
- Norwood, Cataumet, Everett, Gloucester, Leominster, & Westford Portable LNG complete



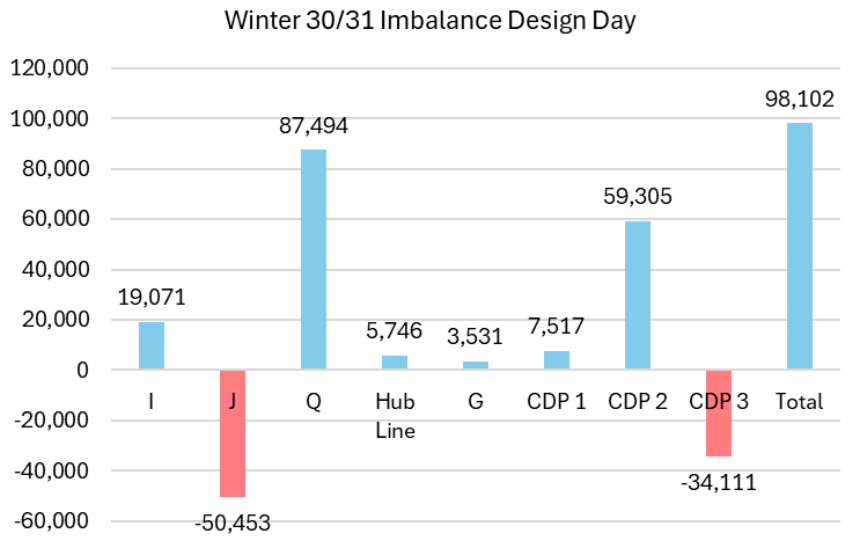
Average Design Day Residential Use ~ 1 Dth/day or 0.05 Dth/hr

Based on 2024 Forecast

Design Day Lateral Imbalance (2030/31)

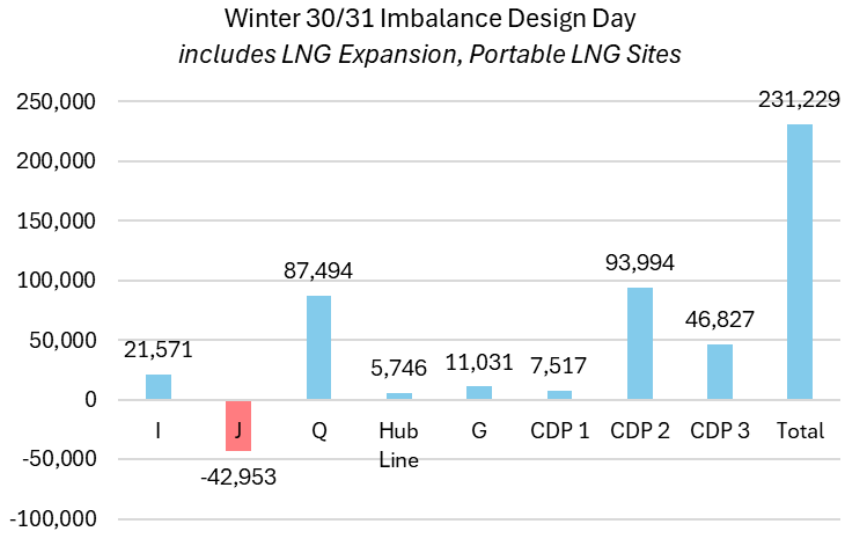
Baseline Assumptions:

- Constellation Contract Expires in 2030
- No LNG Vaporization Increases
- No Portable LNG



Revised Assumptions:

- Tewksbury, Salem, Lynn, Haverhill and S. Yarmouth LNG Expansions complete
- Norwood, Cataumet, Everett, Gloucester, Leominster, & Westford Portable LNG complete



Average Design Day Residential Use ~ 1 Dth/day or 0.05 Dth/hr

Based on 2024 Forecast

Initial Assessment – Demand Reduction

Description relative to National Grid

- To reduce gas demand hourly flow through the alternative of electrification to reliant zones (shaded green), a significant portion of the 95,689 customers served by EMT would need to be electrified.
    - As a benchmark, to achieve a 50% reduction of the peak hour flow of EMT in 2029/30, 1,950 Dth/hr of firm load would need to be electrified.

Peak Hour Demand by Customer Type in Area Served by EMT			
Demand Group	**Customers (Green Zone)** Count	**Total Load (Green Zone)** *(dth)*	**EMT Attributed Portion of Load** *(dth)*
Transportation	554	2,962	920
Commercial	7,779	3,249	1,190
Residential	87,356	4,922	1,790
Total	95,689	11,133	3,900

Considerations

- Reliance would be reduced, but not eliminated
- Infrastructure needs, costs, and timing to electrify loads at large is not feasible before 2030

Initial Takeaways – LNG Supply Alternatives Summary

Alternative	Assessment	Opportunity to REDUCE reliance on EMT	Opportunity to ELIMINATE reliance on EMT
LNG Vaporization increase	Total 108,150 dth/day (4,506 dth/hr) including Tewksbury, Lynn, Salem & Haverhill	●	●
Portable LNG facilities	New facilities to be built include Everett, Gloucester, Leominster and Westford	●	●
Demand Reduction	Initial related analyses indicate substantial EE needed to be effective, costs estimates of NPA are 3X+ vaporization/portable project costs	●	●

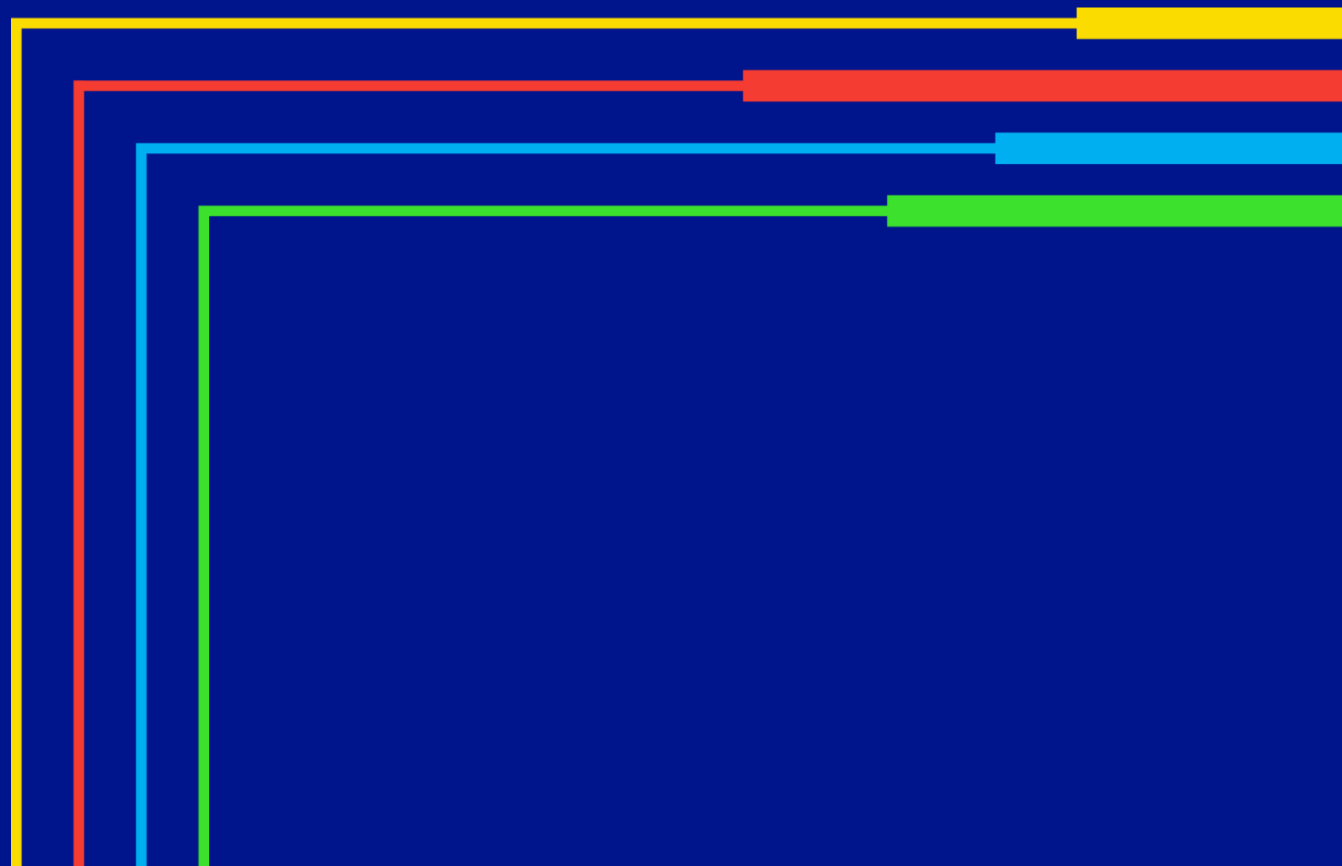
Key

● Feasible Opportunities

● Limited Opportunities

● No Opportunities

Appendix



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National Grid's Supply Planning

General Principles

- **Design Load Projection:** Supply planning begins with projecting design load requirements over time. This ensures that the system can meet demand under various weather and consumption scenarios using methodology approved by the DPU.
- **Resource Portfolio Management:** A diverse portfolio of natural gas resources is used to meet projected requirements. This includes pipeline supply, LNG, and storage assets.
- **Cost Minimization:** The planning process aims to minimize portfolio costs while maintaining adequate supply levels.
- **Security and Reliability:** Ensuring system reliability and security is a core objective. This includes planning for contingencies like abrupt temperature drops or supply disruptions.
- **Contract Flexibility:** Supply contracts are structured to allow flexibility in delivery timing and volume, which is critical for managing hourly and daily demand fluctuations.
- **Viable Resource Acquisition:** Resources must be viable in terms of availability, cost, and operational feasibility. This includes considering infrastructure constraints and market dynamics.

nationalgrid

Everett Marine Terminal

Initial Phase 2 LNG Demand Alternatives Assessment

August 28, 2025

nationalgrid

National Grid Alternatives Assessment

Introduction and Outline

Opening Comments

1. Review EMT direct injection to National Grid's distribution network
2. Explore alternatives and solutions to reduced reliance on EMT
3. Ensuring reliability is the central objective
   - How will it work
   - CCP and GHG reduction goals
4. Today's session is designed to encourage conversation and hear your thoughts before moving forward

Objectives of Assessment

1. Alternative recommendations
2. Review FAWG guidance

Assessments and Takeaways

1. National Grid initial assessments
2. Initial takeaways & discussion
   - Alternatives Summary
   - Research Questions

EMT Operational Support and Reliability

- EMT has served as a critical resource to avoid outages and maintain reliability, especially during peak demand
- Strategically located at Boston Gas “Back Door” and interconnects with the Tennessee Gas Pipeline (TGP) and Algonquin Gas Transmission (AGT) providing direct supply and pressure support to all three networks
- Large storage resource with short notification window and large hourly flexibility
- As a reliability asset, during non-peak conditions, EMT could deliver over 50% of National Grid’s total sendout in Massachusetts, serving roughly 350,000 customers
- EMT also serves as a resource for liquid throughout the winter season for portables, boil-off replacement, and to ensure sufficient inventory exists in National Grid’s LNG tanks during and after cold snaps

Role of EMT at Back Door

- **EMT allows for direct injection capability to National Grid's distribution network**
- **Provides incremental supply during critical periods of high demand, mitigating risk of Operational Flow Orders (OFOs)**
- **Mitigates operational and supply challenges resulting from unplanned abnormal operating conditions or emergent work**

Emergent Support Example:

- In 2016, a crack on the 433# line from Everett take station to Everett Stabilization Plant
- Segment of pipe was to be replaced in October
- EMT was able to support supply capacity while replacement was being completed

- **Can provide supply and pressure support during planned pipeline maintenance**

Alternative Recommendations

Suggested Alternatives	Goal
✓ **LNG Supplies**	• Trucking LNG from other sources such as Canada, Pennsylvania, or other regional terminals
✓ **On-System LNG Expansion**	• Expanding existing LNG infrastructure within Massachusetts
Alternative Sources of Liquid for Portables	• Identification of one or more alternate sources of winter LNG supplies for use at existing and potential new portable LNG sites
Distribution System Upgrades	• Connecting segments of the distribution network to create redundancy and improve gas flow during peak demand or supply disruptions
Transmission Level Strategies	• Enhancing the throughput of existing transmission pipelines
✓ **Demand Reduction**	• Demand Response: Shift or reduce gas usage during peak periods through customer incentives • Energy Efficiency and Electrification: Replace fossil fuel-based heating and appliances with electric alternatives

National Grid's Approach

- Evaluate the proposed alternatives to determine their suitability and feasibility
- Short-Term, continue use of EMT for reliability through current contract (2024-2030)
- Continued development on Integrated Energy Planning (IEP)
- Initial analysis to understand feasibility and implementation scale

National Grid

✓ Discussed 8/22/25

FAWG Guidance – Assessment Criteria

Review

Assessment Criteria Categories

System Operations: How well an alternative can maintain or enhance the operational reliability of the gas system

- Resource reliability (hourly, daily, seasonal adequacy)
- Pressure support
- System resilience (ability to respond to unplanned events)
- Redundancy for critical pipeline systems

Infrastructure (Demand and Supply): Assess the practicality and logistics of implementing the alternative

- Feasibility and practicality
- Cost to implement
- Timing for implementation

Policy and Broader Impact Goals: Ensure alignment with state climate and equity goals

- Location-specific impacts
- Electric load implications
- Greenhouse gas emissions and climate target alignment
- Affordability goals
- Environmental justice

Alternative LNG Supplies

Description relative to National Grid

- Regional supplies of LNG are available from Montreal, MA, RI, and PA
- Primary opportunity to truck from NG-owned storage
- Secondary opportunity to truck from Pennsylvania and/or Montreal

Assessment Criteria Categories

System Operations (does it work?)

- Current contracts with NEC and NGLNG support refilling as needed in the off-peak season
  - No current peak season liquefaction contracts with these facilities
  - Unpredictable windows to liquefy given high customer demand, LNG tank capacity
- LNG facility refill increases in peak season if there is difficulty refilling in the off-peak season
- The Company may refill its tanks at any point to stay ahead of any potential supply-demand imbalance
- Deliveries required often during harsh weather conditions adding risk

Alternative LNG Supplies

Assessment Criteria Categories

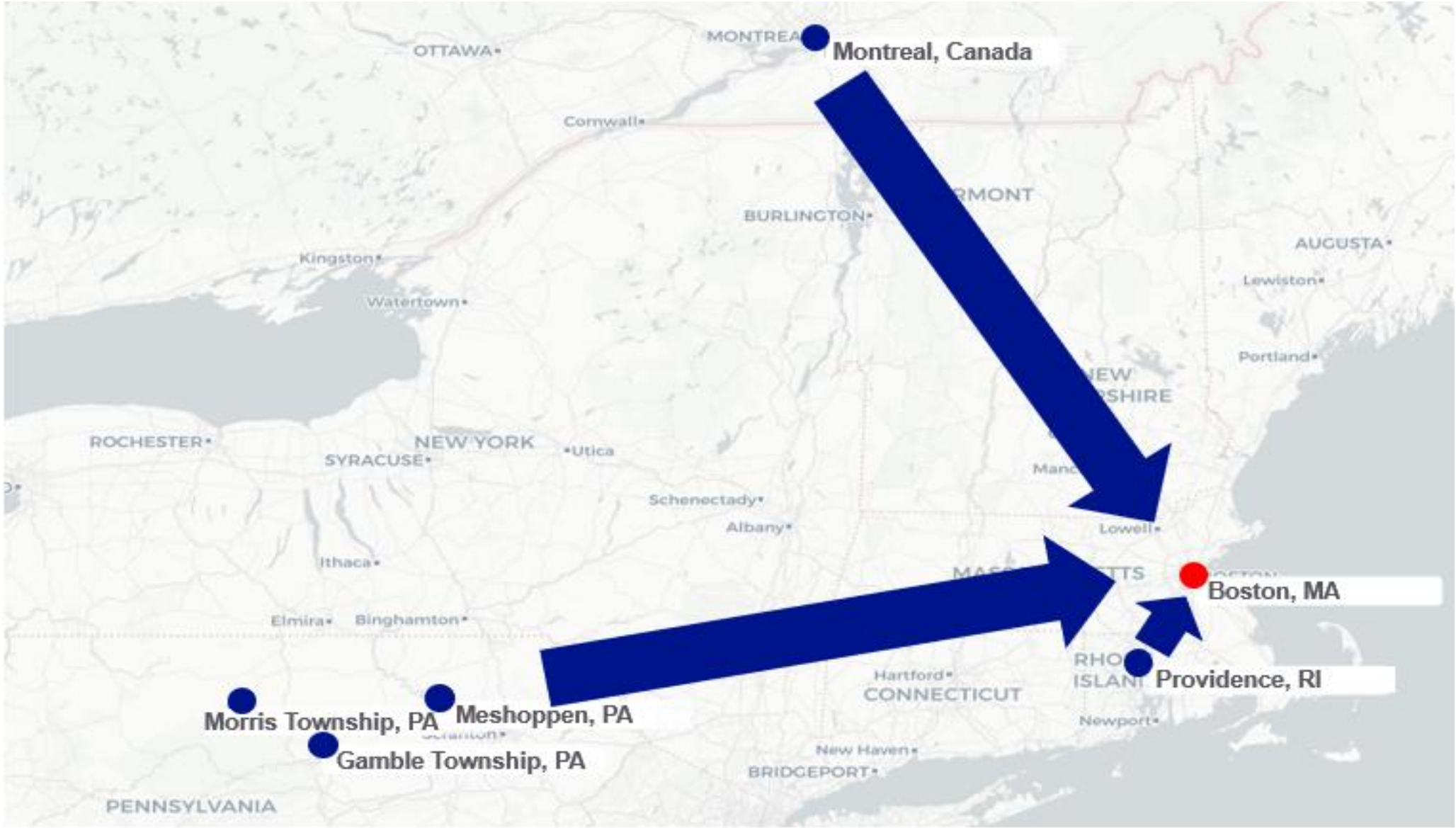
Infrastructure

- Preference to use company owned LNG stations
- LNG could be purchased from Canada and PA during the winter months
  - 13 total trucks would be needed on design day to support existing Norwood, Cataumet and Littleton portables
- Due to storage at Littleton and Cataumet, trucking could be done in advance of cold weather
- Potential four new Portable Sites would need 8 additional trucks per site per day (950 Dth/truck) during coldest days of the year necessitating incremental 32 trucks during potentially harsh weather conditions
- Unclear if trucking industry can support long-distance trucking during the peak season at this scale (45 trucks per day)
- On design day conditions, other LDCs will also be requiring trucking
- Increased trucking can lead to increase in public risk (accidents, liability, and driver shortages)

Policy & Broader Impact Goals

- Locally obtained LNG may have lower trucking emissions than sourcing from Canada or Pennsylvania

Map of Purchase Sites to Boston



National Grid

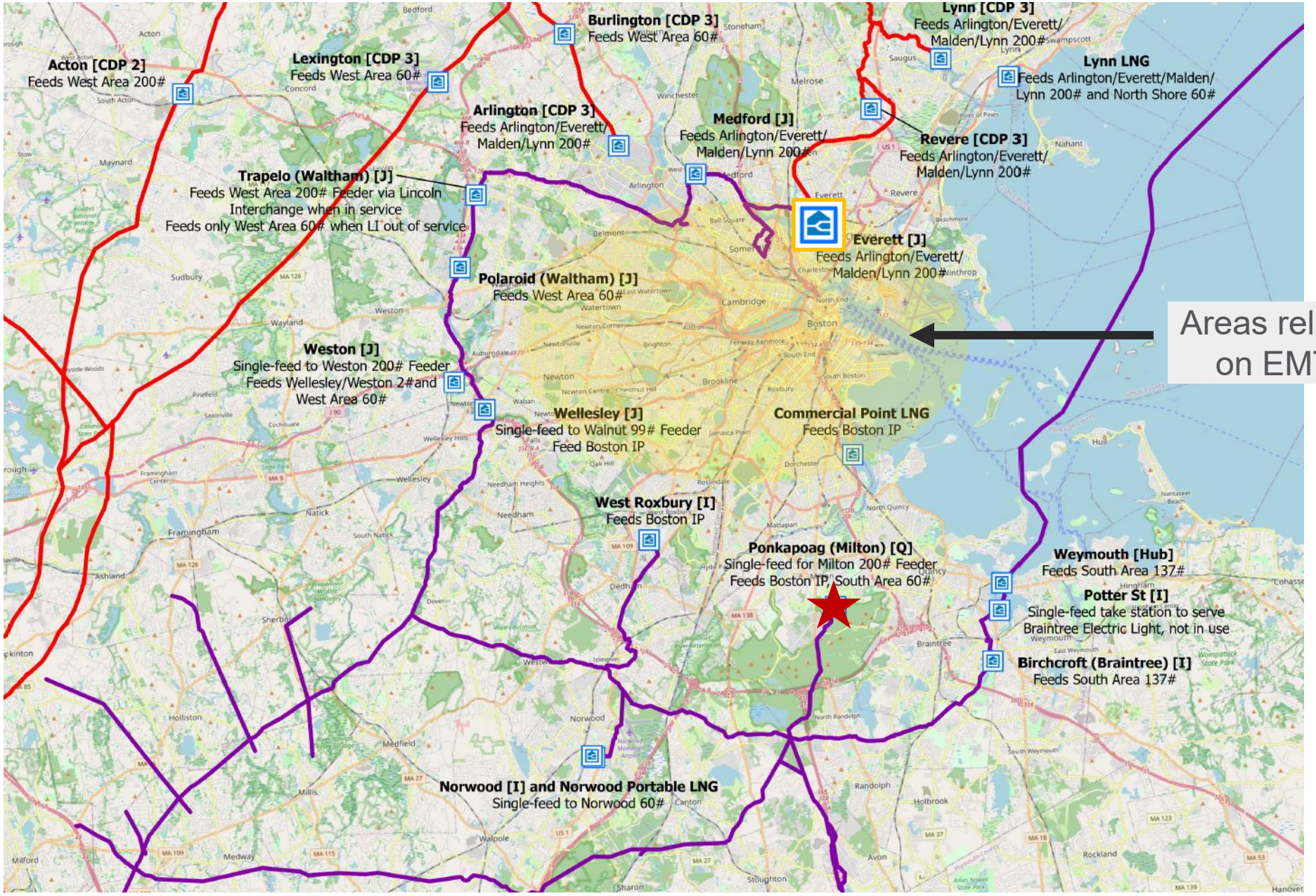
Trucking LNG from Supply Site to Boston

Sources of Liquid	Distance Per Truck (Estimated to Boston)	Trucks to Portables (Norwood, Cataumet and Littleton)	Approximate % Increase in Trucking Miles from Purchase sites and EMT
NGLNG (Providence, RI)	50 Miles	13 total trucks on design day	+19%
Gaz Metro (Montreal, Canada)	300 Miles	13 total trucks on design day	+614%
UGI (Meshoppen, PA)	325 Miles	13 total trucks on design day	+674%
NextEra (Gamble Township, PA)	380 Miles	13 total trucks on design day	+805%
NextEra (Morris Township, PA)	450 Miles	13 total trucks on design day	+971%

Approximate % increase is based on average distance from EMT (Boston) to portable sites Norwood, Cataumet, and Littleton is 42 miles

National Grid Take Stations and LNG Facilities

Review



Distribution System Upgrades

Description relative to National Grid

- Connecting segments of the distribution network to create redundancy and improve gas flow during peak demand or supply disruptions
- South Boston to North End Extension
  - Reallocate existing surplus of gas at Ponkapoag (Milton) Take Station to Everett

Assessment Criteria Categories

System Operations (does it work?)

- Leverage excess supply on the Q Lateral to supplement J Lateral
- Install 21,900’ of pipeline from S. Boston to N. Boston
- Install (2) 22 psig regulators on Dorchester Ave & Commercial St @ Prince St
- Everett flows decrease by 2,300 dth/hr (W Roxbury by 100 dth/hr and Wellesley by 300 dth/hr)
- Milton flows increase by 2,750 dth/hr
- Reduced reliance to EMT reliant zones

Distribution System Upgrades

Infrastructure (scope, ability)

- Scope is *not* feasible
  - Due to location, project construction would be needed through Downtown Boston, (1) bridge crossing over railroad tracks and (1) bridge crossing over Fort Point Channel
  - Costs and location of project were found not viable
  - Would not fully replace volumes from EMT
- Unable to identify a viable distribution system upgrade

Policy & Broader Impact Goals

- EFSB Permitting required

South Boston to North End Extension

National Grid

Transmission Level Strategies

Description relative to National Grid

- Enhancing the throughput of existing transmission pipelines to reduce bottlenecks and improve reliability during peak demand periods
- Upgrades to TGP and AGT to increase incremental gas supplies to the greater Boston region

Assessment Criteria Categories

System Operations (does it work?)

- Incremental pipeline capacity would be needed and is reliable
- Scope of work would need to be developed with transmission companies to determine possible project(s)
- Does not fully eliminate current benefits provided by EMT
  - Could reinforce either/both interstate pipelines
  - Could introduce flexibility for maintenance
  - Could be designed with redundancy
  - Could provide a limited contingency role
  - Could support gas supply for power generation

Transmission Level Strategies

Assessment Criteria Categories

Infrastructure (scope, ability)

- Exact scopes TBD. Would require cooperation among shippers (LDCs most likely but could include EDCs/power generators).
- Expansion of AGT and/or TGP facilities
  - Up to 750 MDth/day (AGT Project Maple)
  - TGP TBD
  - Opportunity to support gas supply for power generation on non-peak days (increase fuel reliability)
  - In-service date 5 years+

Policy & Broader Impact Goals

- Interstate pipeline expansion would require near term initiation to be in service due to likely long regulatory and permitting process at MA DPU, FERC
- Would require Commonwealth support to move forward
- No clear pathway for cost recovery from power generators or EDCs (if applicable); would require change in law and/or market reform
- Does not eliminate EMT assuming current benefits should be retained (e.g., diversity, contingency supply)

Demand Reduction

Review

Description relative to National Grid

- Energy efficiency and electrification (demand reduction): balancing supply needs while providing safe, reliable and affordable energy alternatives

Assessment Criteria Categories

System Operations (does it work?)

- Energy efficiency, while vital to reducing overall demand, is not expected to eliminate the need of resources such as EMT in the near term
- Electrification, geothermal, steam, and other technologies would depend on size/location
- Does not fully address short-term reliability needs especially during periods of peak demand
- Generally, assumes electric system reliability

Demand Reduction

Eliminating the demand of the top 10 largest customers served by EMT would reduce overall reliance on EMT by 15%

10 Largest Customers in Area Fed by EMT (by Total Load)		
	Year 5 Load (dth)	EMT-Attributed Load (peak hour)
1.	970	81
2.	800	312
3.	170	73
4.	77	33
5.	70	30
6.	70	30
7.	47	20
8.	41	12
9.	38	3
10.	36	15
Total	**2,319**	**609**

Peak Hour Demand by Customer Type in Area Served by EMT			
Demand Group	**Customers** count	**Total Load** *(dth)*	**EMT Attributed Portion of Load** *(dth)*
Transportation	554	2,962	920
Commercial	7,779	3,249	1,190
Residential	87,356	4,922	1,790
Total	**95,689**	**11,133**	**3,900**

Summary

- Targeted electrification to customers with highest EMT attributed load would not make a significant impact to reduce reliance on EMT
- To reduce gas demand hourly flow, larger scale electrification would be needed
- Infrastructure needs, costs, and timing to electrify loads at large is not feasible before 2030

Demand Reduction

Review

Assessment Criteria Categories

Infrastructure

- Electrification/geothermal/steam solutions will ultimately depend on the scale, scope and pace of the customer adoption in discrete locations over time as electrification pilots and clean energy supply development are just beginning and economic factors remain challenging
- To achieve a 50% reduction of the peak hour flow of EMT in 2029/30, 1,950 Dth/hr of firm load would need to be electrified of the EMT attributed 3,900 Dth/hr load

Policy & Broader Impact Goals

- While advancing the region's broader decarbonization objectives, EMT operations play a direct and essential role in addressing the challenges associated with transitioning to renewable energy and electrification
- Electrification may be supported by fossil-fuel based generation
- Balance decarbonization with affordability and equitable service, especially in EMT-reliant zones

Initial Takeaways – Alternatives Summary

Alternative	Assessment	Opportunity to REDUCE reliance on EMT	Opportunity to ELIMINATE reliance on EMT
LNG Supplies	Regional supplies of LNG are available from Montreal, MA, RI and PA		
On-System LNG Expansion	• Potential five vaporization increase projects ~ Adding 130,000 dth/day total • Potential four new portable sites ~ Adding 750 dth/hr (7,500 dth/day) per site		
Distribution System Upgrades	No significant feasible opportunities identified		
Transmission Level Strategies	Opportunities likely exist but will require a supportive coalition		
Demand Reduction	Initial analyses indicate substantial EE and demand destruction needed to be effective		

Key

Feasible Opportunities

Limited Opportunities

No Opportunities

Discussion – Research Questions

Questions coming out of Phase 1 *and Initial Reactions*

What level of reduced reliance is achievable by the end of the current contract (2030)?

- Achieving measurable supply substitution via enhanced vaporization capacity and portable LNG sites to reduce dependency on EMT may be possible to a limited degree. Some projects will extend beyond 2030.
- Demand-side options can meaningfully contribute to reduced reliance, but the degree is highly dependent on economics and customer choice.
- Reduced reliance on EMT for winter liquid is not feasible given risk concerns.

Is it possible to eliminate reliance in any zone or across all zones, by end of the contracts (2030)?

- Supply reliance alternatives exist, but operational impacts would need further evaluation as systems cannot fully support all zones EMT can provide reliable service to. Fully eliminating EMT reliance is not feasible by 2030

Given the significant electrification of LDC gas loads that measurably reduce LDC utilization of EMT, what are the system needs that remain reliant on EMT?

The Company's forecast is net of expected MassSave reductions.

What is the earliest possible date after existing contracts for the LDCs to eliminate EMT reliance in any zone or across all zones?

Depending on risk tolerance, it may be possible to eliminate reliance in the mid- or late-2030s, assuming broad support/cooperation. However, the Company has not identified viable alternatives to replace the contingency, flexibility, and diversity benefits of EMT.

Discussion – Research Questions

Questions coming out of Phase 1 *and Initial Reactions*

What are the alternatives for those needs that would allow for reliance on EMT to be eliminated? What alternatives or portfolio of alternatives could achieve this?

Depending on risk tolerance, a combination of pipeline expansion, LNG vaporization increases, and demand destruction could potentially eliminate reliance. However, the Company has not identified viable alternatives to replace the contingency, flexibility, and diversity benefits of EMT.

Alternatively, what alternatives are likely to emerge through external policy or market changes that would influence the role of EMT?

Substantial electric market reform and/or fuel reliability standards could influence the role of EMT.

If the LDCs were to become a secondary customer, how would those alternatives compare to EMT?

In theory, additional customers of EMT should lower costs to individual LDCs. However, there are regulatory/policy barriers that prevent some other customers (e.g. generators) from securing firm contracts and all costs are subject to market conditions during contracting.

What opportunities exist for combined or pooled efforts across LDCs?

Pipeline expansion and demand destruction will be more effective as combined LDC efforts.

Discussion – Research Questions

Questions coming out of Phase 1 *and Initial Reactions*

What categories of costs and impacts are directly attributable to achieving the specified outcomes compared to those that align with other policy goals or market changes?

- Reliability and effectiveness of supply resources or alternatives must take precedence, while cost and other considerations are secondary

If EMT obtained other customers (e.g., generators), the cost to the LDCs for some services (e.g., seasonal trucked LNG) could be lowered. This could potentially open avenues to maintain or even increase the utilization of EMT for some services in some locations (e.g., more utilization of trucked LNG). Under what conditions could this occur?

EMT could remain competitive for peaking services and as a source for winter liquid.

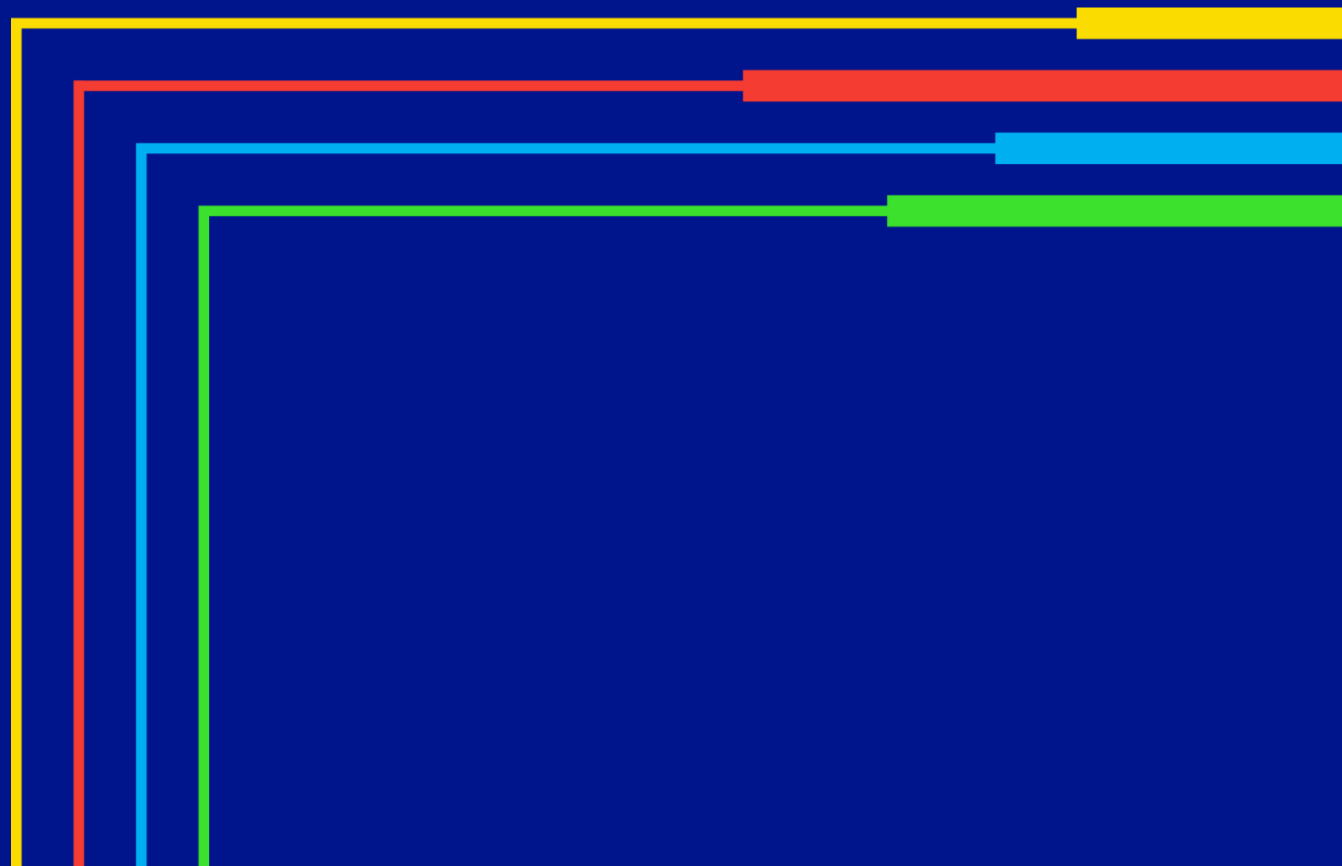
Are there cost and climate benefits to be gained in such instances?

The potential exists for cost benefits to be realized. However barriers remain to equitable cost allocation.

What are the ways that EMT could be utilized as an asset to support decarbonization?

- EMT operations play a direct and essential role in addressing the challenges associated with transitioning to renewable energy and electrification
- EMT helps safeguard against supply disruptions and maintains reliable service during peak demand and pipeline maintenance, particularly in areas with constrained capacity
- EMT may be a valuable resource to fuel gas-fired power generation in the event that the increase in power requirements by electrified customers outstrips available supply of renewable resources. i.e., Electrification can still proceed, and gas-fired power generation can be offset by renewable power as new projects come online.

Appendix



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National Grid's Supply Planning

General Principles

- **Design Load Projection:** Supply planning begins with projecting design load requirements over time. This ensures that the system can meet demand under various weather and consumption scenarios
- **Resource Portfolio Management:** A diverse portfolio of natural gas resources is used to meet projected requirements. This includes pipeline supply, LNG, and storage assets
- **Cost Minimization:** The planning process aims to minimize portfolio costs while maintaining adequate supply levels
- **Security and Reliability:** Ensuring system reliability and security is a core objective. This includes planning for contingencies like abrupt temperature drops or supply disruptions
- **Contract Flexibility:** Supply contracts are structured to allow flexibility in delivery timing and volume, which is critical for managing hourly and daily demand fluctuations
- **Viable Resource Acquisition:** Resources must be viable in terms of availability, cost, and operational feasibility. This includes considering infrastructure constraints and market dynamics

National Grid's Supply Planning (con't)

Forecast and Supply Plan (F&SP)

F&SP Highlights

- Demonstrate adequate planning
  - MDPU filing every two years
  - 5-year planning period
- Document Forecast of demand requirements (including growth rates)
  - Planning load
  - Design conditions
- Document supply resources
  - Resource adequacy

National Grid's F&SP

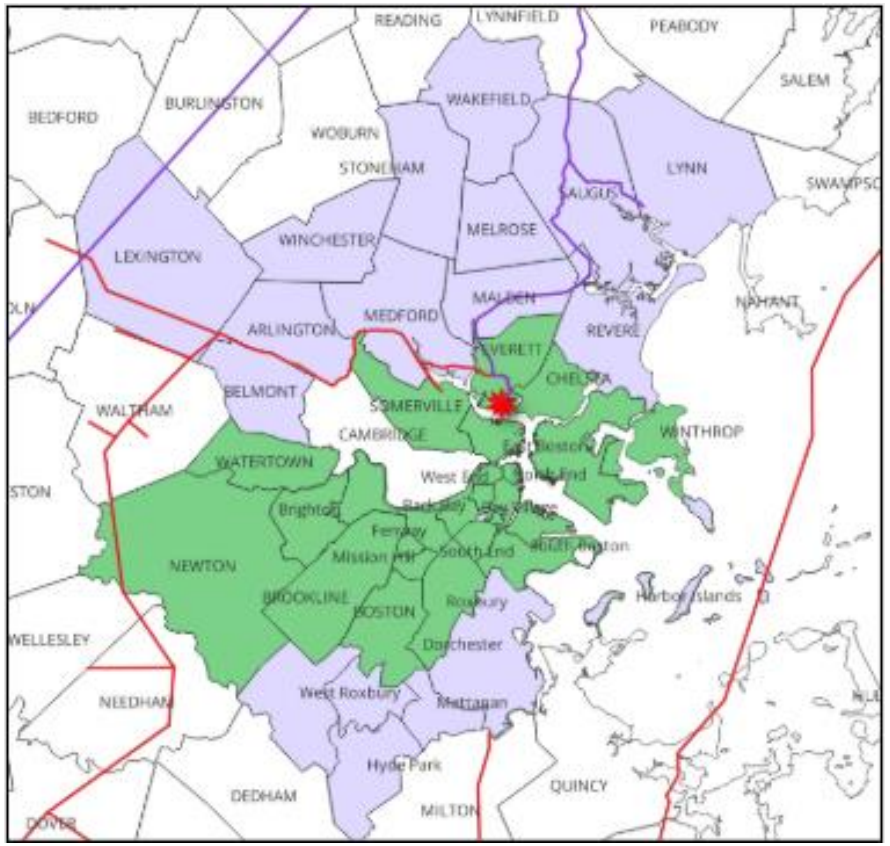
- Filed November 2024
- National Grid 1-in-30-year design standard for both Design Day and Year
- Design Weather
  - 78 EDD Design Day
  - 5586 EDD Design Winter
- Growth Rates
  - 0.9% Design Day Growth
  - 0.9% Design Year Growth

[1]Design weather based on Boston Logan Airport

Review: EMT plays a major role to maintain system reliability

- **Year-round LNG resource:** can provide support year-round, including during peak weather conditions, allowing National Grid to preserve seasonal LNG supply
- **Critical facility redundancy** injects directly into National Grid's system, Enbridge J and Kinder Morgan CDP 3 laterals. This mitigates operational and supply challenges due to potential unplanned outages at a gate station feeding this system
- **Gas pressure support:** MA is at the end of each pipeline system and can experience low inlet pressures at gate stations. If Constellation supplies are not available, LNG will be used more often to maintain inlet pressures to other critical Tennessee Gas Pipeline (TGP) and Algonquin (AGT) Gate Stations
- **Outages and pipeline flow restrictions mitigation:** regular pipeline maintenance occurs for both the TGP and AGT pipelines between April and October. In addition, AGT is continuing extensive work on the J lateral, limiting gas supply to our system. At times, Constellation has been the only source of supply into the J lateral

Direct Vapor Injection for Boston Gas: EMT provides direct vapor and supply capacity support to Boston Gas' north-Boston systems and through Algonquin (red line) and Tennessee (purple line) connections at design hour, day, and season levels



Footnote: ***Green-shaded communities,*** *Under design day conditions, EMT can meet around 15% of total design hour demand, supplying approximately 95,000 customers.* ***Lilac-shaded communities,*** *During non-peak conditions, EMT can deliver over 50% of National Grid's total sendout in Massachusetts, serving roughly 350,000 customers.*

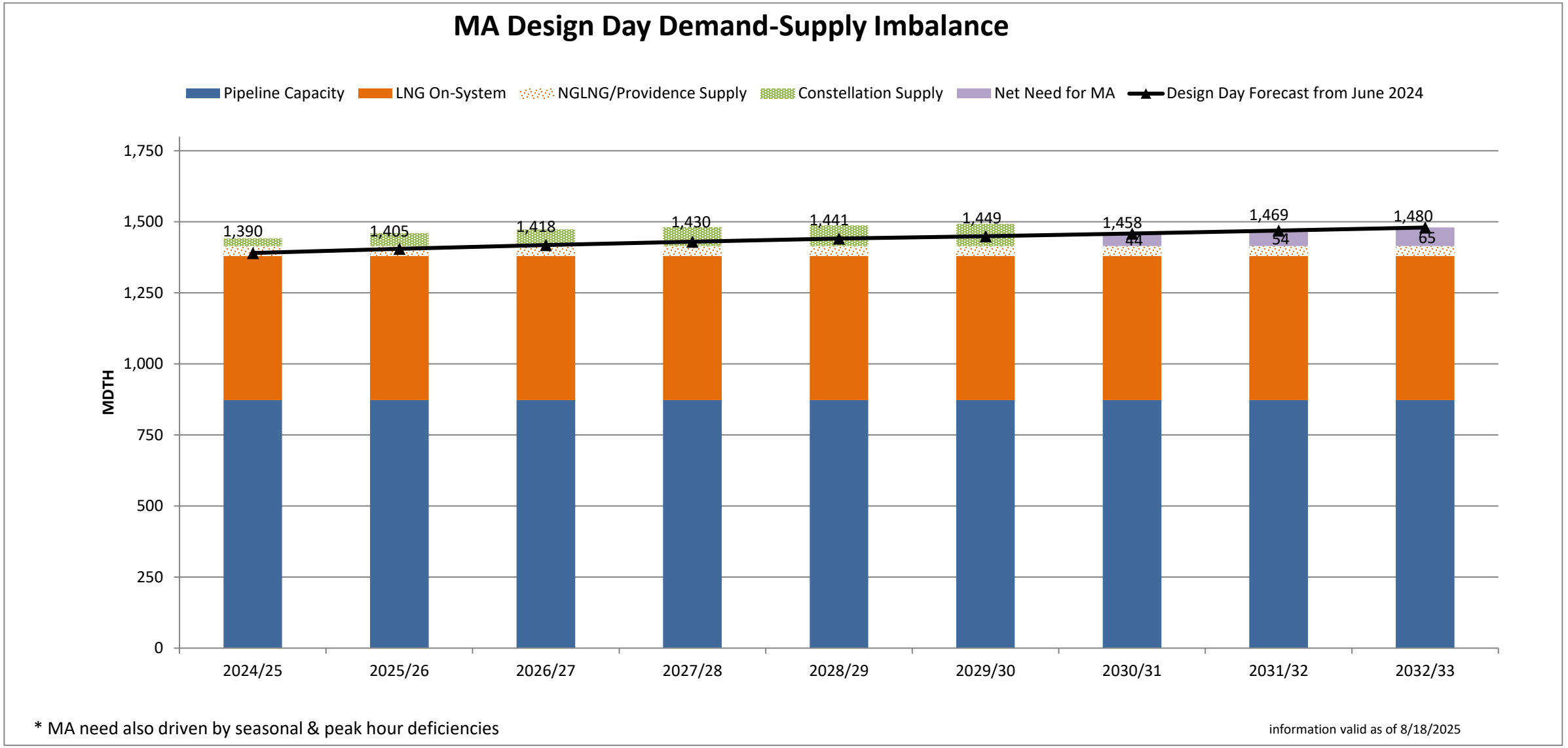
Current: National Grid's EMT Contract

National Grid's Contract with Constellation LNG

- Current contract is a six-year contract (2024-2030) approved by the DPU to ensure stable LNG supply
- Delivery Mode: LNG is delivered as either:
  - Vapor: Directly into Boston Gas's distribution system in Everett, MA
  - Liquid: Trucked to Boston Gas's LNG facilities
- Ensures reliable gas supply, especially during peak demand
- Supports National Grid's operational challenges with flexibility for vapor or liquid LNG
- The contract supports price stability for customers
- National Grid's contract volume is shaped over time to match forecast demand while minimizing excess supply and controlling costs

Contract Year	Max Daily Quantity (Dth)	Max Seasonal Quantity (Dth)
2024/25	**27,000**	**500,000**
2025/26	**45,000**	**950,000**
2026/27	**59,000**	**1,450,000**
2027/28	**66,000**	**1,705,000**
2028/29	**73,000**	**1,925,000**
2029/30	**78,000**	**2,100,000**

National Grid MA Design Day Demand-Supply Imbalance



* MA need also driven by seasonal & peak hour deficiencies

information valid as of 8/18/2025

What do LDCs do to avoid a loss of pressure, what can cause a loss, and what is the consequence?

What preventions are taken?

- **Planning and Maintenance**
  - ✓ Long Range Forecast and Supply Planning
  - ✓ Gas infrastructure reliability upgrades
  - ✓ Ongoing safety and maintenance

- **Active system management and reliability resources**
  - ✓ Gas System Operations, including automated controls, instrumentation and pressure regulation
  - ✓ LNG storage and vaporization
  - ✓ Portable LNG

What causes a loss of pressure?

- **Disruption of upstream supply**
  - Upstream equipment failure or pipeline disruption
  - Planned pipeline system outages for maintenance or repairs
- **Supply / Demand Imbalance**
  - On-system or upstream demand surge
  - Market failure
  - Insufficient supply or pipeline capacity secured

What happens when there is a loss of pressure?

- Appliance malfunction
- Pilot light extinguishment
- Higher risk of CO
- Loss of gas service

Restoration after loss of Natural Gas Service v. Electric Service

Supply-related outages tend to be wide-spread in nature relative to pipeline damage

NATURAL GAS vs. ELECTRIC OUTAGE RESPONSE

Natural Gas (Local Distribution Companies)

- Gas emergencies are almost always unanticipated.
- Gas infrastructure is generally buried underground, so damage is not always visible to the public or easily accessible to field crews.
- Most gas emergencies are due to construction equipment damaging buried lines. Repair of damaged or leaking pipes usually involves excavation in streets or property.
- During outages, LDC crews will have to physically turn off affected customer meters.
- For gas outages, the restoration process involves:
  - Repairing the damaged line.
  - Removing, or purging air from damaged pipelines to restore 100% gas to the system.
  - Visiting each customer home or business twice; first to shut off gas flow, and then, after repairs are complete, to conduct a safety check and relight gas appliances.

Electric (Electric Distribution Companies)

- Most major emergencies are storm related outages and typically have a few days' warning.
- Damage to facilities is usually highly visible and accessible and repairable by trained crews.
- EDCs are usually able to prepare well in advance by positioning:
  - Line crews at potential high-risk areas
  - Replacement equipment and parts in advance
- Many substations have switching mechanisms that automatically restore or reroute electricity flow.
- Many parts of the electric grid are highly interconnected, with multiple energy pathways.
- In most cases, restoration to individual customer meters is done automatically once energy flow through power lines and transformers is restored.
- For outage restoration, our crews will go to the scene to remove obstructions, and repair damaged wires/ equipment as necessary.

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