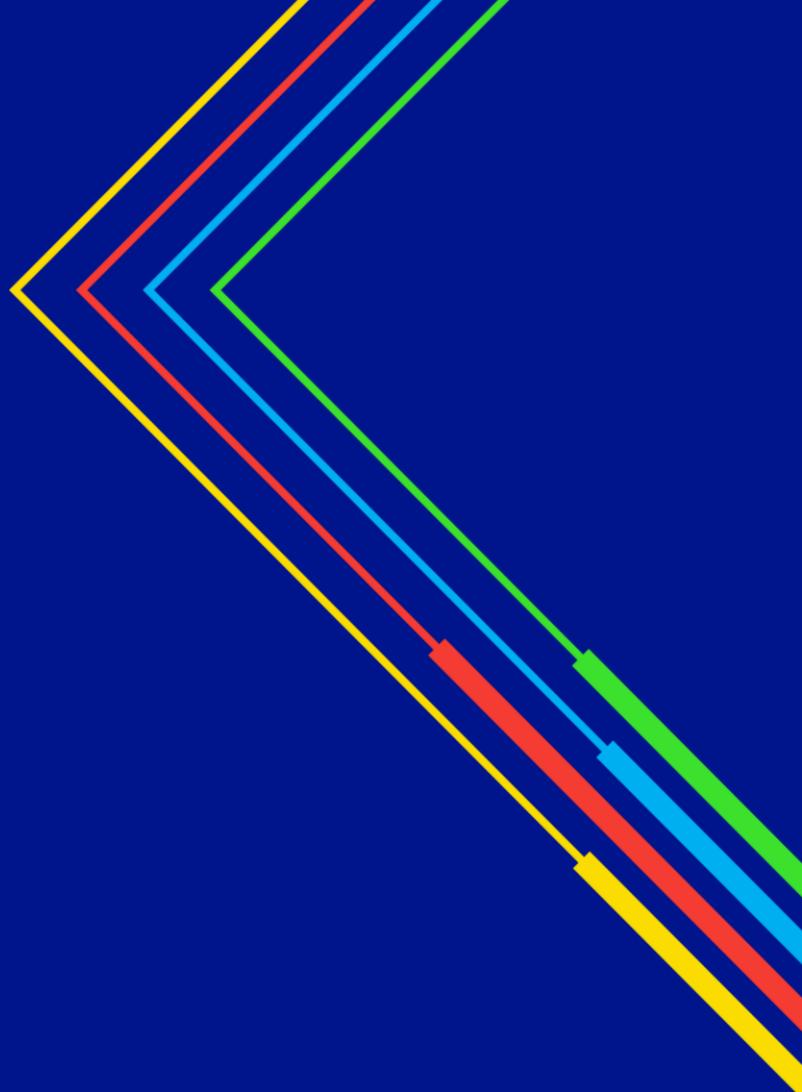


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Aquidneck Island Review

Long-Term Solution Update

October 7th, 2021



Agenda

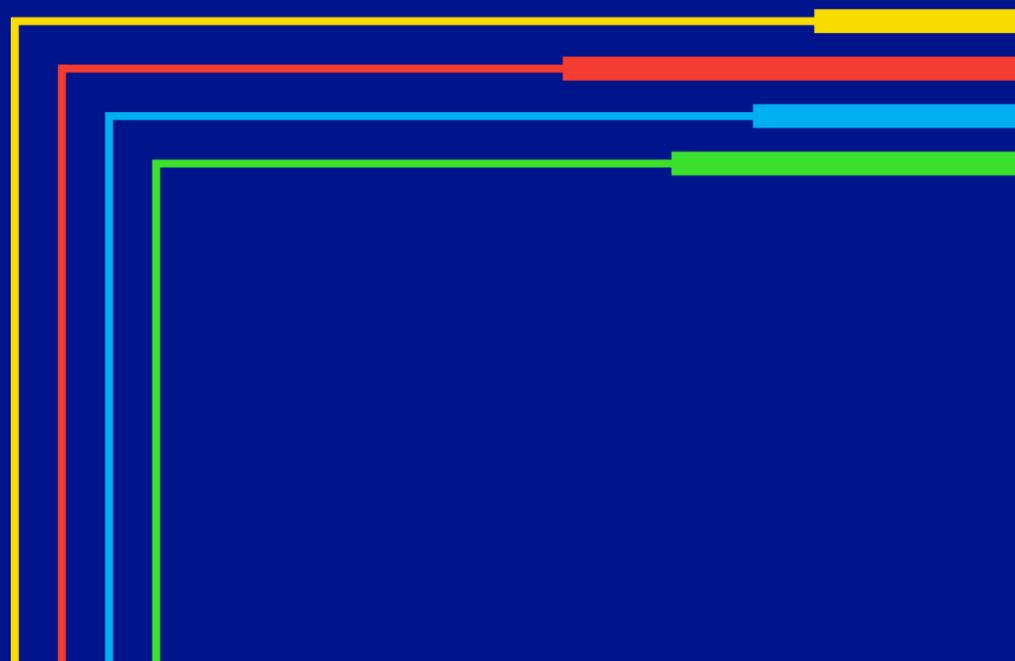
01 Background

02 Update on Recent Work

03 Recommendations and Next Steps

01

Background



Aquidneck faces challenges of capacity and vulnerability

1 Capacity Constraint

National Grid plans for potential restrictions / reduced flexibility from the AGT pipeline under extremely cold conditions, which limits the gas capacity available at the Portsmouth take station

The Company has identified a gap between projected peak gas demand and the AGT pipeline capacity on which the Company can rely

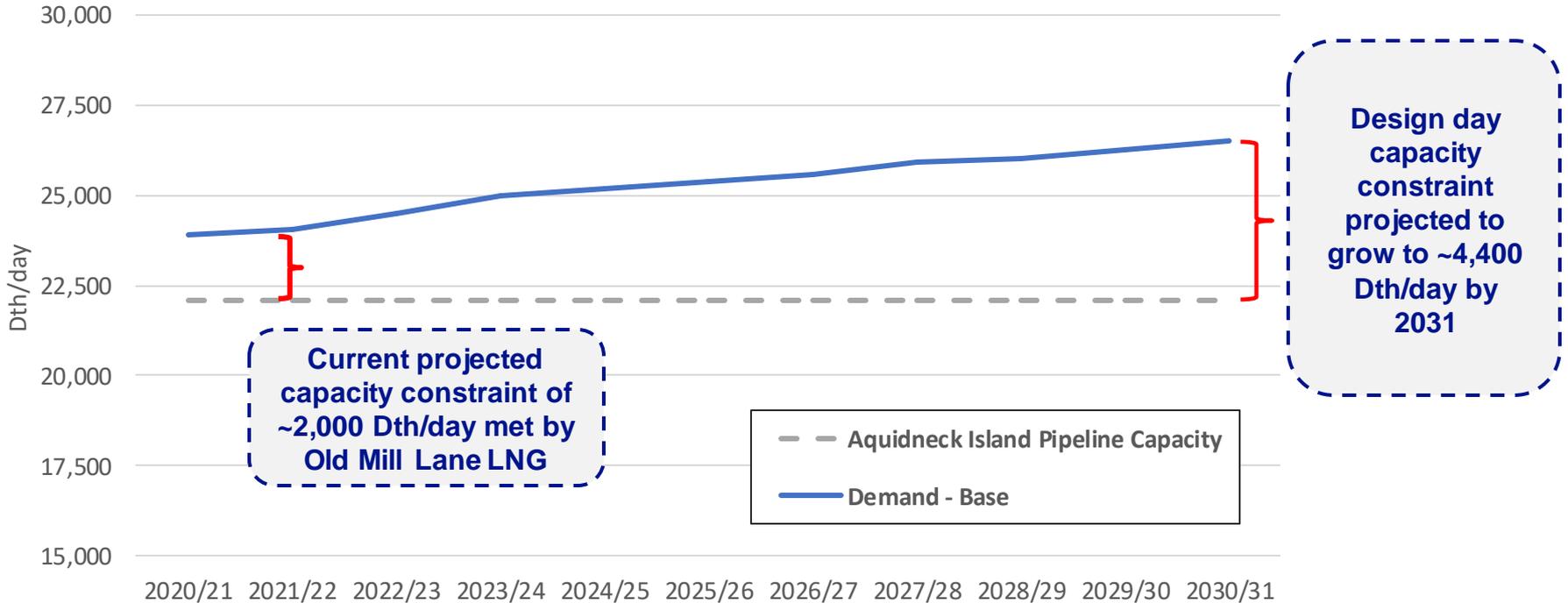
2 Capacity Vulnerability

Aquidneck Island's positioning at the "end of the pipe" on the AGT G-4 lateral makes it vulnerable to upstream disruptions on the AGT pipeline

Capacity Constraint on Aquidneck Island

Forecasted Design Day Demand vs. Pipeline Capacity

Aquidneck Island (June 2021 Forecast)



Note: Aquidneck Island-specific gas demand forecast reflects planned EE, including assuming incremental EE savings from the Company's next state-wide gas EE plan.

Capacity Vulnerability on Aquidneck Island

Broad trends	Location-Specific Vulnerability	Mitigation Available Today
<p>Pipelines are more constrained than in the past, leading to reliability challenges.</p>	<p>PHMSA Report dated August 13, 2019: the 4 mile - 6" pipeline at the tail end of Enbridge's G-System that feeds the Portsmouth meter and regulator (M&R) station experiences a large pressure drop, making it the most vulnerable location on the G-System.</p>	<p>Under design day conditions (i.e., -3° F), Old Mill Lane portable LNG capacity can support service to all customers on Aquidneck Island even with the loss of almost 50% of the AGT capacity at Portsmouth take station.</p>
<p>Compressor and integrity-related incidents have introduced greater pipeline reliability issues across the industry.</p>	<p>Relative to other areas on the Algonquin Gas Transmission (AGT) system, reliability issues impact Aquidneck Island first and most severely due to its position on the system.</p>	<p>Under warmer conditions, Old Mill Lane portable LNG provides even more resilience. E.g., at 20° F, the LNG capacity can support the entire island with up to a 75% AGT pipeline disruption.</p>

Feedback + Evaluation Led to “Hybrid” Approach

Elements of the Hybrid Approach

- 1 Advance Non-Infrastructure Solutions***
 - New energy efficiency and demand response programs to **offset future demand growth**
- 2 Alternative LNG***
 - New LNG to replace Old Mill Lane and **solve the island’s current capacity constraint and vulnerability**
 - Potential for hydrogen blending capabilities
- 3 Old Mill Lane Enhancements**
 - Investments to **minimize local impacts** while Old Mill Lane remains in use

* Areas of ongoing work

- Continued evaluation of DSM programs to determine if they meet SRP requirements (e.g. cost effectiveness)
- Additional assessments for Alternative LNG site required

Subsequent to Hybrid Solution Roll Out...

Stakeholder engagement and RIPUC Tech Session yielded several concerns:

- Cost of the hybrid solution
- Lack of clear criteria to justify investing in resilience to capacity vulnerability
- Opposition to new gas infrastructure components of the hybrid solution

In response, the Company performed additional analyses and investigated:

- Opportunities to mitigate OML impacts by buying properties, site reconfiguration, or other means
- Preliminary BCA comparing cost of addressing gas capacity vulnerability (avoided outage costs) with various solutions
- Restrictions on new customer connections to affect the gas capacity needs and solutions

These analyses, coupled with stakeholder feedback, led the Company to modify its recommendation

Based on the Company's analysis to date and ongoing stakeholder feedback, the seasonal and temporary operation of LNG at Old Mill Lane is the recommended solution for addressing the capacity constraint and capacity vulnerability needs on Aquidneck Island

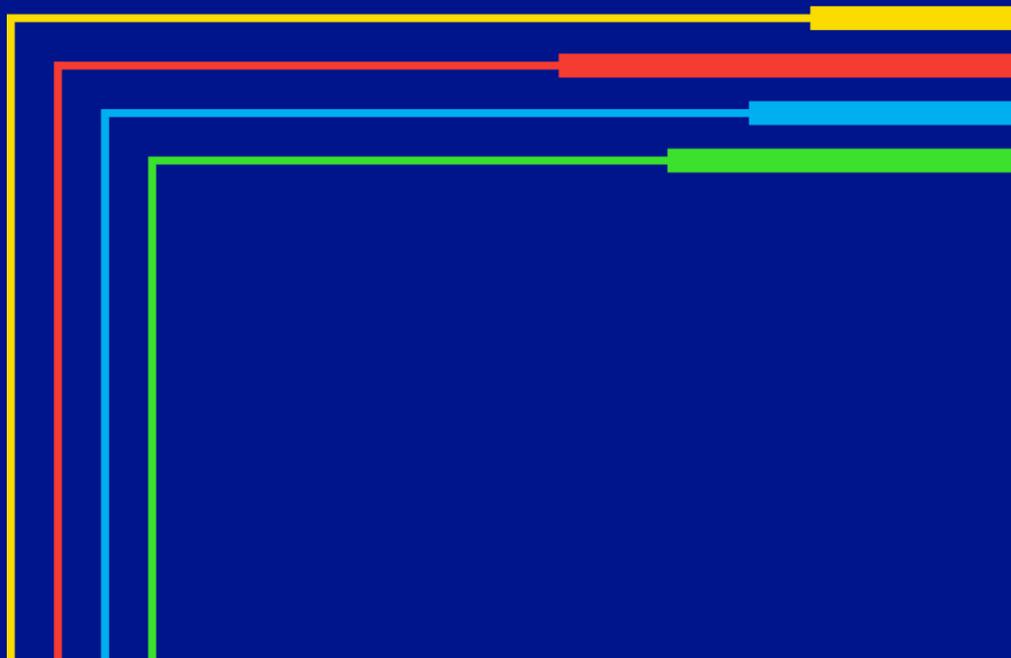
- The other alternatives may require significant infrastructure investments, do not offer the operational advantages provided by Old Mill Lane, and are more expensive.
- The Company is exploring a revised site design and layout in an effort to mitigate the seasonal visual and noise impacts.

To advance this recommendation, the Company plans to:

- Pursue OML portable LNG public impact mitigation measures
- Present the full analysis of the selection to the EFSB in a subsequent filing
- Deprioritize new Navy LNG solution
- Continue to refine BCA regarding capacity vulnerability and explore DSM to augment or eventually replace OML portable LNG

02

**Update on
Follow Up
Work**



Why create a contingency standard to quantify benefits of addressing capacity vulnerability?

- In addition to resolving the capacity constraint, the LNG Facilities at Old Mill Lane also currently serve as a contingency resource to mitigate against Aquidneck Island's vulnerability to other supply disruptions.
- The current set up and protocol includes:
 - Contracting for incremental winter liquid to meet a two-day event (650 Dth/hr x 48 hours)
 - Staff Old Mill Lane at 45 HDD (20°F)
- During the RIPUC Tech Session, there was discussion regarding the lack of clear criteria to guide investments in resilience to address the capacity vulnerability and interest expressed in more analysis.
- A novel framework was built to compare the costs and benefits of investments to relieve vulnerability. The preliminary results show benefits of addressing the capacity vulnerability justify the investments in infrastructure or incremental DSM at OML.

Hybrid Proposal – Evaluation of SRP Proposal

As part of the RI System Reliability Procurement (SRP) Plan Three-Year Plan filed in June 2020, National Grid proposed a phased approach to developing its Non-Pipeline Alternatives (NPA) Program. Following that plan, a benefit-cost analysis (BCA) tool and framework will be filed in June 2022.

- The result of this preliminary analysis concluded that the program would not be cost-effective per the SRP Standards
- The Company will continue to refine the NPA BCA framework but will not include the Non-Infrastructure component of the Hybrid Proposal as an NPA through an SRP investment filing.

Hybrid Proposal – Alternative LNG Proposal

Portable LNG on Navy-Owned Property

- We investigated a new LNG site to resolve abutter noise concerns from the Old Mill Lane site
- We identified two potential sites on Navy-owned property:
 - Tank Farm 3
 - More complex due to historic use of site
 - Some wetlands present on a portion of the site
 - Former Transfer Station
 - Less complex due to historic use of site
 - No wetlands present on site
- Both sites require additional gas pipeline infrastructure on public ways
- Both sites require extensive permitting requirements due to Navy-owned parcels
 - Several RIDEM, CRMC
 - RI EFSB License
 - National Environmental Policy Act (NEPA) process for the Federal Site
- **After investigation between alternate LNG sites, the Former Transfer Station was the preferred location**

Mitigation of Old Mill Lane Impacts

In addition to previously implemented site improvements, the Company has continued to evaluate noise and visual impacts and associated mitigation measures

- We are performing extensive noise propagation modeling which will help us evaluate effective mitigation measures

Existing site and equipment layout limits options for further noise and visual mitigation measures

In order to mitigate these impacts, we are evaluating the following mitigation measures:

- Conceptual site development of new layout to use Company's parcel formerly used for propane storage
 - Civil site engineering of area will be performed to develop alternative equipment layouts to determine wetlands impact and viable mitigation measures (risk: further encroachment of surrounding wetlands; need RIDEM approval)
 - Implement our own sound mitigation such as a sound wall and landscaping enabled by having more room at the front of the site (waiting for topography study)
- Purchase of abutter properties
 - Conceptual plan estimates accepted offers to direct abutters to Company property, although this may be adjusted based on additional modeling

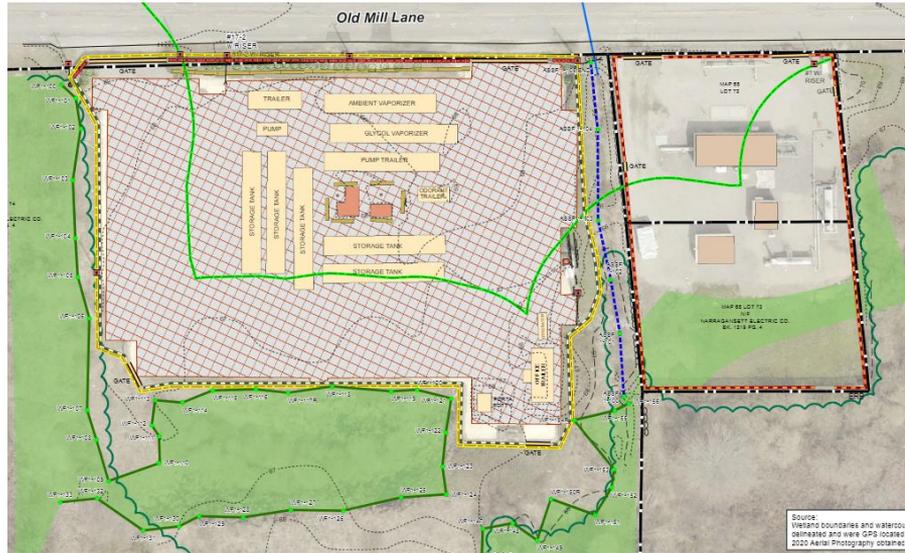
EFSB supplemental application will include a combination of mitigation scenario measures.

Aerial View of Old Mill Lane



Existing and Conceptual

Current Existing Equipment Layout



Note: Current equipment placed along Old Mill Lane to allow room for LNG transport truck deliveries and access to portable LNG storage units.

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Conceptual Site Development of Southern Area of Parcel with Potential Equipment Layout



Can the capacity constraint be addressed with DSM with and without a Moratorium?

By halting load growth at 2023-24 levels, aggressive levels of DSM could supplant the need for Old Mill Lane to address the capacity constraint by 2030

Scenario/Solution	3/4: DSM (No Contingency under Moratorium; w/ & w/o site modifications)	5/6: DSM (No Contingency; No Moratorium; w/ & w/o site modifications)
Moratorium Scenario	Demand held constant at 2023-24 levels	No Moratorium
1st season without OML	2029-30	2029-30
Demand Response	C&I (Daily) for current dual fuel + new dual fuel; C&I (Hourly); Res/SMB BYOT (Hourly)	C&I (Daily) for current dual fuel + new dual fuel; C&I (Hourly); Res/SMB BYOT (Hourly)
Energy Efficiency	Maximum achievable potential of weatherization with 6-yr ramp-up	Maximum achievable potential of weatherization with 6-yr ramp-up
Electrification	20% of HVAC turnover electrifies after 5-yr ramp-up – approx. 7% of AI gas customers	40% of HVAC turnover electrifies after 5-yr ramp-up – approx. 15% of AI gas customers

Summary of Follow up Work

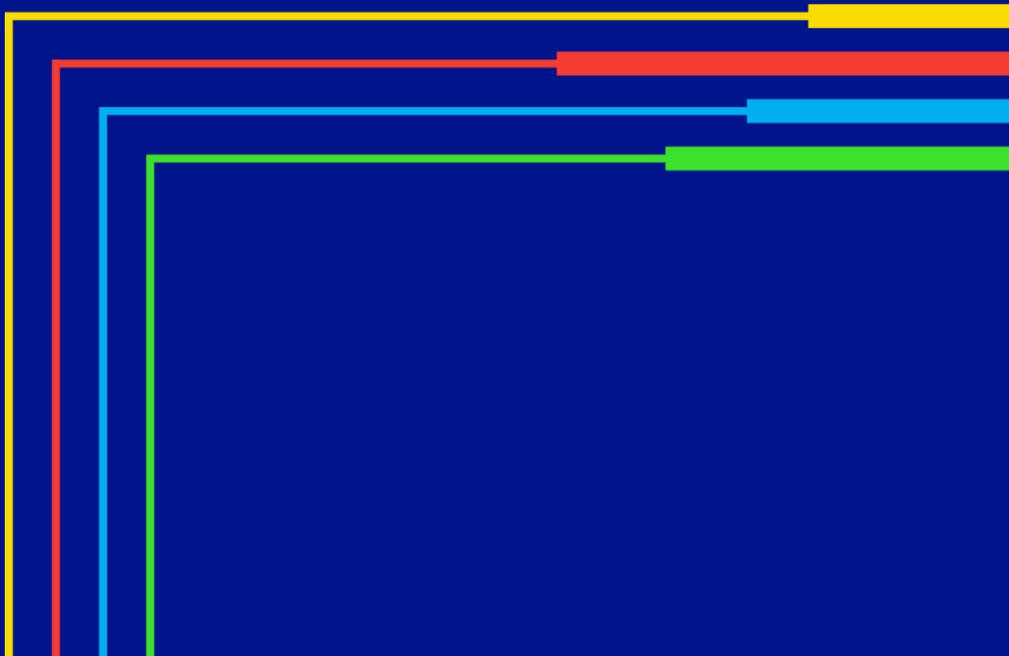
	Hybrid (Transfer Station Site, with and without DSM)	Portable LNG @ OML	Portable LNG @ OML paired w/ DSM	DSM for Capacity Constraint paired w/ Moratorium	DSM for Capacity Constraint paired w/out Moratorium
Infrastructure	Progressed environmental engineering work to identify feasible alternative LNG location	<ul style="list-style-type: none"> Advanced analysis of ways to mitigate OML impacts via noise and visual mitigation measures Exploring conceptual site development to southern property line and equipment layouts to determine wetlands impact and viable mitigation measures Estimated costs of site development coupled with noise mitigation measures (including real estate purchase) 		N/A	N/A
DSM	<p>Refined cost of incremental DSM</p> <p>Did preliminary cost effectiveness evaluation of non infrastructure proposal leveraging emerging NPA BCA</p>		Refined cost of incremental DSM	Modelled amount of DSM required to address <u>solely the capacity constraint</u> paired <u>with</u> a moratorium holding demand constant at 2023/24 levels	Modelled amount of DSM required to address <u>solely the capacity constraint without</u> a moratorium on new service requests
Other Analysis	In-progress: development of quantification of capacity vulnerability solutions				

Preliminary Results: Follow Up Work

	Hybrid (Transfer Station Site, with and without DSM)	Portable LNG @ OML	Portable LNG @ OML paired w/ DSM	DSM for Capacity Constraint paired w/ Moratorium ¹	DSM for Capacity Constraint without Moratorium
Size	12,000 Dth/day	15,600 Dth/day	15,600 Dth/day	4,000 Dth/day	5,750 Dth/day
Provides Contingency Benefits	Yes ²	Yes ²	Yes	No	No
Last Yr Old Mill Ln Needed	2026-27	N/A	N/A	2029-2030	2029-30
Utility Implementation Cost³	\$91M-\$125M	\$32M-\$43M	\$56M-\$66M	\$52M-\$63M ⁴	\$75-\$86M
DSM Implementation Cost <i>(subset of utility implementation cost)</i>	\$0-\$23M	\$0	\$23M	\$32M	\$54M
Net Present Cost per Rhode Island Cost Test⁵	\$91M-\$115M	\$32M-\$43M	\$45M-56M	\$38M-\$49M ⁶	\$47M-\$58M
Reliability	🕒	🕒	🕒	🕒	🕒
Community	🕒 - 🕒	🕒	🕒	🕒	🕒
Local Environmental	🕒	🕒	🕒	🕒	🕒
Implementation	🕒	🕒	🕒	🕒	🕒

03

Recommendations and Next Steps



Summary and Next Steps

Recommendation

The seasonal and temporary operation of LNG at Old Mill Lane is the recommended solution for addressing the capacity constraint and capacity vulnerability needs on Aquidneck Island in consideration of:

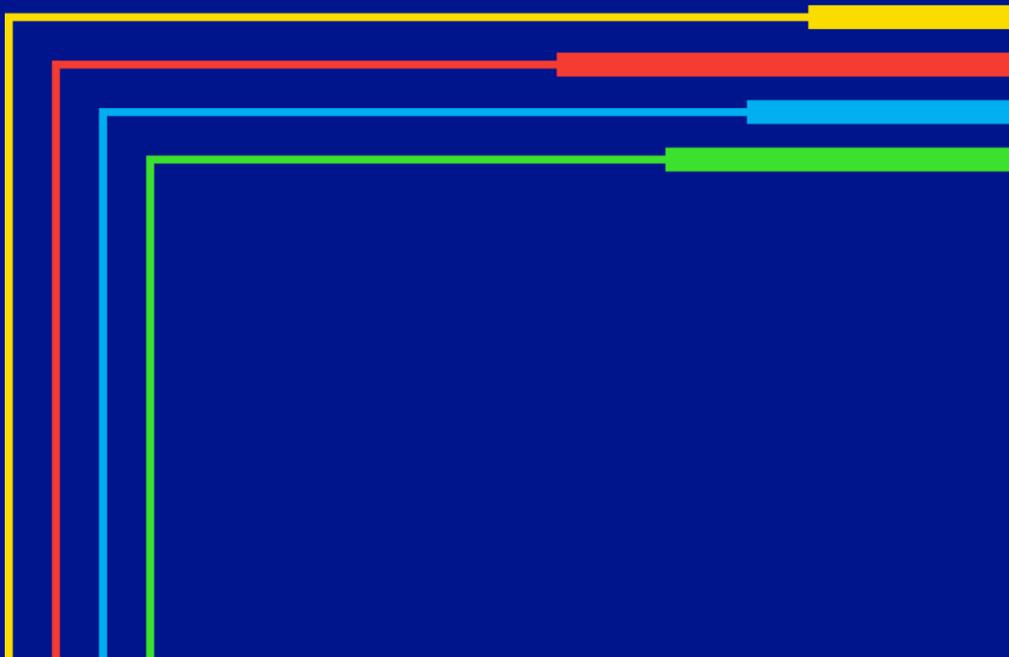
- **Local Impact:** The Company is exploring a revised site design and layout to mitigate the seasonal visual and noise impacts
- **Optionality:** Portable LNG is a flexible asset which can be decommissioned or adapted to support Rhode Island's clean-energy transition
- **Cost-effectiveness:** The other alternatives are more expensive, may require significant infrastructure investments and do not offer the operational advantages provided by Old Mill Lane

Next Steps

- Providing updates to stakeholders over the next month
- Following up on a series of analyses needed for potential new site design and as requested by EFSB
 - Finalize GHG Emissions Analysis
 - Refine Non-Infrastructure Analysis
 - Further explore purchase of abutter properties
 - Evaluate potential additional sound mitigation measures for this winter
- Presenting the supplemental application for the continued use of Old Mill Lane to the EFSB in early 2022.

04

Appendix



Footnotes for Preliminary Results

¹ “Moratorium” scenario assumes that 2023-24 design day demand is held constant through 2034-35

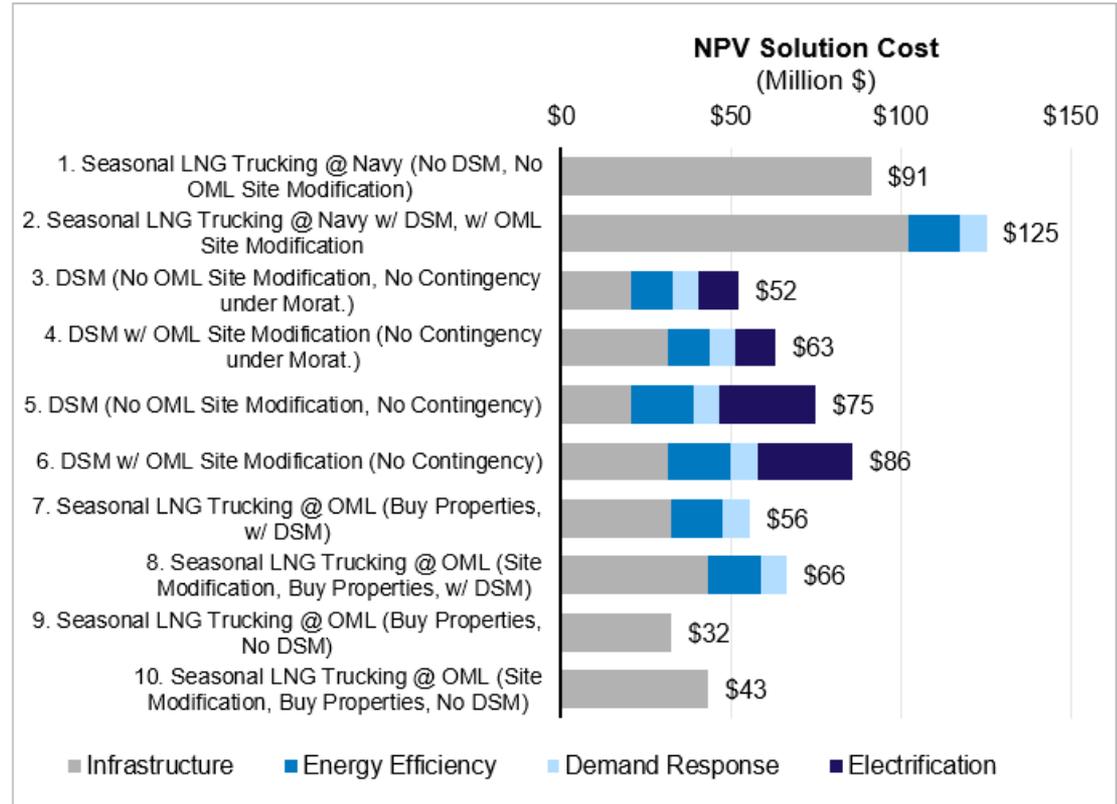
² Without DSM to offset forecasted demand growth, the contingency that these solutions provide decreases over time

³ 2020\$ net present value of costs incurred through 2034, assuming a 7.54% discount rate

⁴ This excludes the cost to the utility to implement and enforce a moratorium

⁵ 2020\$ net present value of costs incurred through 2034 net of DSM lifetime benefits, assuming a 7.54% discount rate; utility system and non-embedded emissions benefits monetized using 2021 AESC CF #4 for Rhode Island, where 100% of electric peak capacity reduction is assumed to be bid into the ISO-NE FCM

⁶ This excludes the cost to the utility to implement and enforce a moratorium, and excludes the societal costs of a natural gas moratorium such as a relative increase in fuel oil usage and associated emissions



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