



Petition before the Massachusetts Energy Facilities Siting Board for

**Analysis in Support of Approval of
Holyoke Gas & Electric's
Liquefied Natural Gas Infrastructure & Resiliency Project**

EFSB 22-07



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COMMONWEALTH OF MASSACHUSETTS

ENERGY FACILITIES SITING BOARD

HOLYOKE GAS & ELECTRIC DEPARTMENT

EFSB 22-07

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3.0 PROJECT NEED

3.1 Overview of Project Need

HG&E operates and maintains a natural gas distribution system within the City and also serves a portion of Southampton. HG&E is responsible for the safe and reliable delivery of natural gas distribution service to meet the energy needs of more than 11,500 customers. HG&E regularly analyzes its resource portfolio in terms of its ability to provide reliable, least-cost service under existing and forecasted conditions. HG&E develops updated peak day and related forecasts for testing system reliability. HG&E has also recognized the challenges associated with maintaining reliable service during extended periods of design or near design weather or cold snaps.

On a peak winter day, HG&E's distribution system has an existing energy demand of approximately 20,000 Dth. HG&E maintains contracted rights for up to 11,800 Dth/day of firm pipeline capacity from TGP while its remaining gas supply needs must be served by LNG dispatched from the West Holyoke Facility. Therefore, more than 40% of system load is dependent upon peaking service from the West Holyoke Facility. The West Holyoke Facility has less than two days' of on-site storage capacity if faced with peak or near peak demand and less than one day of on-site storage capacity if there is a pipeline curtailment. The Northampton Lateral, a single dead-end pipeline, is the sole supply of pipeline gas to the HG&E distribution system.

HG&E's analyses demonstrate that additional LNG storage capacity (or some other resource such as the CMA MOU) has been and continues to be needed in order to maintain reliable service during peak or near peak demand conditions, particularly in response to the lack of available pipeline capacity and ongoing developments in the natural gas market in the Commonwealth. While this reliability concern is the primary focus, HG&E also recognized that additional environmental and economic benefits might be secured by a resource that also allows HG&E to strategically add customers.

3.2 Overview of Forecast Methodology

HG&E conducts an annual resource plan analysis reflecting observed and forecasted conditions as well as performance during certain conditions, such as more extreme cold weather. HG&E develops a sophisticated peak demand forecast incorporating system baseload demand as well as weather-related demand (i.e., heating load) that is impacted by temperature, as measured in heating degree days (HDD). An HDD represents a measurement designed to quantify the demand for energy to heat a building based on the difference of the mean temperature and a base temperature of 65°F. An important planning standard for HG&E is its design day standard, namely 68 HDD (or -3°F mean temperature) as it represents the peak HDD recently observed in Holyoke. The actual peak day design weather occurred on February 14, 2016 (see Table 3.1). Table 3.1 also shows a number of recent years with near design day weather which confirms the appropriateness of this peak day standard.

While HG&E’s peak system load demand has grown substantially since the original installation of the LNG facility in the early 1970’s, load growth has not been experienced in recent years given the moratorium. In the last ten years, HG&E’s system has continued to see new peak day events occur with the current peak send-out of 19,668 Dth occurring on January 21, 2019, on a day with 63 HDD, a figure well below HG&E’s Planning Standard of 68 HDD. In fact, a top 10 send-out day occurred earlier during the same heating season on a day with only 62 HDD. Table 3.1 presents recent natural gas peak events by send-out and winter heating season within HG&E’s system and confirms the appropriateness of HG&E’s planning standard.

Winter Season	Peak Sendout	HDD on Peak	Peak Date	Day of Week	Peak Events	
					Top 10	Top 30
2012-13	16,942	59.0	1/23/2013	Wednesday	0	2
2013-14	17,407	66.7	1/3/2014	Friday	0	3
2014-15	19,193	63.9	2/15/2015	Sunday	1	6
2015-16	19,476	68.0	2/14/2016	Sunday	2	2
2016-17	16,667	54.0	1/9/2017	Monday	0	0
2017-18	19,657	67.1	1/6/2018	Saturday	5	9
2018-19	19,668	63.0	1/21/2019	Monday	2	4
2019-20	16,287	52.5	12/19/2019	Thursday	0	0
2020-21	16,916	56.2	1/29/2021	Friday	0	1
2021-22	17,104	56.5	1/29/2022	Saturday	0	3

Table 3.1: Natural Gas System Peak Demand Events, by winter heating year with observed peak event, HDD and peak day occurrence. Also shows number of peak events per season within Top 10 and Top 30 of historical send-out.

As is typical for Massachusetts, the peak events are directly related to weather with colder days resulting in increased system demand with the day of the week providing some variable load related to industry and business operations. The lack of an extreme peak event since 2019 is likely attributed to weather conditions, the impact of the pandemic, changes in commercial and industrial customer-demand and the established natural gas moratorium.¹

Table 3.2 presents HG&E’s historical design day experience as well as its five-year forecast for system planning demand based upon the application of the design day standard (weather). This table also explains several limited, appropriate adjustments to the peak forecast (i.e., pandemic). Please note that

¹ In 2019, HG&E was forced to self-impose a natural gas moratorium on increases in connected system natural gas load. As a result of the continued system growth without an increase in associated available capacity, HG&E’s gas distribution system operates essentially at capacity on a peak winter under the current system configuration.

the forecasted demand reflects the full interruption of all of HG&E’s interruptible customers secured to maximize the efficiency of the HG&E system and reliability of service to its firm residential customers.

Winter Season	Design Day		Notes
	HDD	Demand	
2018-19	68	20,328	assumes interruptible load curtailed.
2019-20	68	20,304	assumes interruptible load curtailed.
2020-21	68	18,908	assumes interruptible load curtailed and pandemic impact to business load.
2021-22	68	20,041	assumes interruptible load curtailed and post-pandemic impact to business load.
2022-23	68	20,015	assumes interruptible load curtailed and post-pandemic impact to business load.
2023-24	68	19,999	assumes interruptible load curtailed.
2024-25	68	19,981	assumes interruptible load curtailed.
2025-26	68	19,964	assumes interruptible load curtailed.
2026-27	68	19,942	assumes interruptible load curtailed.

Table 3.2 Design Day Forecast, by Winter Heating Season including 5-year outlook, accounting for peak day savings through energy efficiency improvements and anticipated migration to electrification (based on historical performance).

The annual design day forecast standard also accounts for the existing moratorium, a limited number of new firm baseload customers as well as consumption and business turnover within the gas distribution system and, importantly, the continuing demand reductions from HG&E’s aggressive and comprehensive energy efficiency programs.

Another important planning standard that builds off the HG&E peak day forecast is a cold snap. Reliable service in a cold snap is dependent upon the West Holyoke Facility storage tanks being full at the outset of such weather and being regularly replenished with truck deliveries regardless of weather conditions such as snow or ice. In the event of a cold snap (an extended period of design or near design conditions), the West Holyoke Facility is required to supplement system demand on multiple, consecutive days. Consecutive daily operations of the West Holyoke Facility increases the reliance upon LNG trailer transportation to maintain adequate LNG storage volumes and reliable system operations.

HG&E employs a cold snap for planning purposes based upon actual recent experience. Table 3.3 depicts an actual 10-day cold snap model based on locally observed weather and operational data.

Cold Snap	HDD	Demand
Day 1	63.0	18655
Day 2	60.5	17975
Day 3	62.8	18601
Day 4	64.3	19009
Day 5	65.1	19226
Day 6	55.9	16724
Day 7	51.3	15473
Day 8	47.8	14521
Day 9	59.3	17649
Day 10	67.1	19770

Table 3.3 10-Day Cold Snap Planning Standard

Finally, as part of HG&E’s forecasting process, design year LNG needs are also forecasted to ensure sufficient quantities of LNG are procured. In 2015, HG&E dispatched 140,000 Dth of vaporized LNG. This peak historical send-out was considered as an appropriate planning standard for the design winter. HG&E has firm, contract rights to up to five daily deliveries of LNG to maintain storage inventories (which is prudent and appropriate as HG&E accepted an average of three deliveries per day during the 2017/2018 “Polar Vortex” cold snap). HG&E has adequate resources under contract. Moreover, the ability to meet a seasonal peak demand can be satisfied by a range of measures given greater response time. The ability to meet seasonal design requirements was not a critical issue for reliability planning. The primary concerns are the peak day and cold snap.

3.3 Summary of Existing Resource Portfolio

HG&E’s natural gas supply portfolio is made up of both firm pipeline capacity from TGP and LNG, which is stored, vaporized and injected into the distribution system at HG&E’s existing West Holyoke Facility.

HG&E is served from the Northampton Lateral off the TGP 200 line interstate pipeline system with its gate station at the same location as the existing West Holyoke Facility. This is the only point of interconnection HG&E maintains on the TGP system. The Northampton Lateral capacity is fully subscribed and there is no ability to secure incremental supply from the pipeline lateral absent expensive and unlikely improvements to the lateral. Recent regional pipeline projects that would have benefitted HG&E’s region, such as the NED project, have been cancelled and there is no expectation of any new interstate pipeline capacity becoming available to HG&E in the foreseeable future.

The existing West Holyoke Facility was commissioned in 1971 with a total site storage capacity of 220,000 gallons (approximately 16,000 Dth, storage). A fifth tank was reflected in planning for the 1974 plant addition; however, such tank was not installed due to financial constraints at the time. The existing

West Holyoke Facility has been operating safely and reliably for over 50 years. During peak periods (typically the coldest days of the year when all natural gas customers are consuming high levels of energy), the existing LNG facility supplies more than 40% of HG&E’s natural gas supply requirements for its customers. The existing facility includes a single vaporizer. HG&E expects to replace its older, single vaporizer with a system that provides redundant capacity in conjunction with the Project to secure cost savings and reduce impacts, while enhancing reliability of service to its customers.

HG&E’s current peak day design forecast for the 2022/2023 winter is 20,015 Dth, which means that vaporized LNG from the West Holyoke Facility must account for 8,222 Dth or 41% of this peak design day demand. The LNG requirement for a single design day accounts for approximately 50% of the currently available storage capacity at the West Holyoke Facility assuming, conservatively, that the existing LNG storage tanks are at full capacity at the commencement of such a design day. HG&E would require the delivery of approximately 10 LNG trailers to replenish this amount of LNG volume required during a design day event. It is extremely challenging to secure this number of deliveries given the duration of a “round trip” from perhaps more distant LNG supply sources, as HG&E maintains “firm” contract rights for only five deliveries per day which is appropriate for the nature of its operations.

The use of LNG facilities to supplement natural gas pipeline deliveries has long been established within the Northeastern region of the United States. There are currently 28 operational LNG storage facilities in this region, with a new facility currently under construction in Charlton, Massachusetts (EFSB 18-04/D.P.U. 18-96) that will provide a new source of LNG supply. See Figure 3-1.

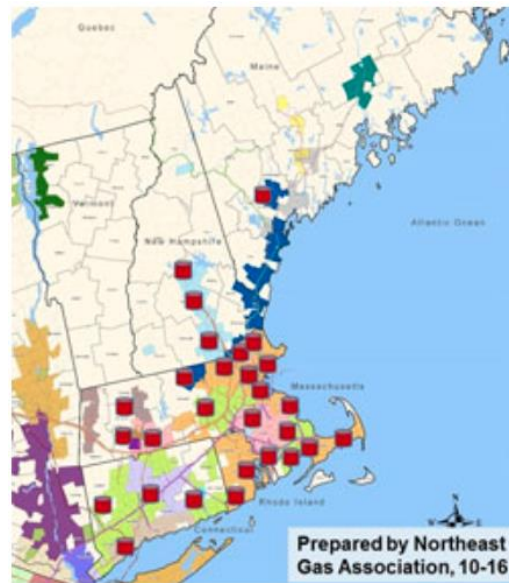


Figure 3-1: LNG storage locations in New England (source Northeast Gas Association)

The industry has relied upon LNG facilities to provide necessary and economical support during periods when pipeline capacity cannot sufficiently meet the energy needs of a connected gas system. According

to the Northeast Gas Association,² in 2021, LNG in New England provided approximately 28% of design day supply for local gas utilities. Notably, HG&E is substantially more dependent upon LNG at peak demand periods than the regional average. Storage capacity among local distribution companies (LDCs) consists of 16 Bcf, not including the Everett, Massachusetts LNG terminal and vaporization capacity for daily send-out was 1.4 Bcf/day.

The Everett LNG terminal, a principal resource for LNG in New England, will be closing in the near term. HG&E has not contracted for supply from the Everett terminal in recent years and has purchased its LNG supply from sources in Pennsylvania and Quebec, Canada to provide its customers with the most competitive pricing. With truck delivery round trips requiring up to 10 hours, there is an increased risk of unanticipated obstacles impacting timely arrival of scheduled LNG tanker trucks for inventory management. The Everett terminal closure is expected to impact Massachusetts LNG deliveries and increase competition for current and future suppliers of LNG.

3.4 Need Analysis

Section 69J provides that the Siting Board should approve a petition to construct if the Board determines that the petition meets certain requirements, including that the plans for the construction of the applicant's projects are consistent with the policies stated in G.L. c. 164, § 69H to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. In carrying out its statutory mandate with respect to proposals to construct natural gas facilities, the Siting Board evaluates whether there is a need for additional natural gas facilities in the Commonwealth to meet reliability, economic efficiency, or environmental objectives. Accordingly, the need for a particular facility can be demonstrated by showing need on any (or all) of those three bases.

HG&E experienced a new natural gas peak or design day demand during the 2014-15 winter heating season. This new peak demand day raised concerns with the reliance placed upon the existing West Holyoke Facility. HG&E recognized the need for an additional resource at that time to maintain reliable services and conducted a comprehensive resource analysis. These efforts resulted in HG&E identifying a tentative solution that would address reliability concerns for itself and a neighboring utility's natural gas distribution system. Following extensive analysis and review, HG&E and CMA, now Eversource, executed an MOU in 2017 with respect to a plan that would have provided benefits to meet the energy demands of each respective operator's system.

The MOU obligated HG&E to release its Northampton Lateral capacity to CMA, in exchange for new, incremental pipeline volume to be delivered over an alternative system "back feed" which would have been sourced from a CMA gate station off of the main TGP pipeline. The project would have consisted of approximately six miles of pipe installation by CMA through two cities and a one-mile upgrade of existing infrastructure in Holyoke. Following proposed upgrades to a TGP compressor station on the

²https://www.northeastgas.org/about_lng.php#:~:text=There%20are%20three%20import%20facilities,facility%20offshore%20Cape%20Ann%2C%20MA.

main line, HG&E would also be able to secure new pipeline rights for an additional 5,000 Dth/day of firm daily delivery. This incremental capacity would have resulted in HG&E's pipeline capacity increasing by 42% to 16,800 Dth per day. Based on a new system peak observed in 2016, HG&E's reliance upon the LNG from the West Holyoke Facility would have been reduced considerably. This contractual structure would have reduced the frequency of LNG vaporization operations from an average of 42 times per year to three times per year. The exchange structure would have allowed CMA to lift a natural gas moratorium in its Northampton, Massachusetts and Easthampton, Massachusetts service areas and would have allowed CMA to work with the communities on economic development opportunities including the transition of existing systems from higher emitting fossil fuel sources to cleaner natural gas.

HG&E worked aggressively to advance this alternative; however, the unfortunate incident that occurred in the Merrimack Valley on September 13, 2018, resulted in CMA shifting operational focus away from expansion projects and more towards system reliability projects. This shift in operational strategy led to the eventual cancellation of the MOU in 2019. CMA's Greater Springfield Reliability Project is now under review in docket EFSB 22-05/D.P.U. 22-69 which addresses some of the CMA requirements covered by the MOU. That project, however, does not address HG&E's concerns and requirements. Without this available alternative, HG&E was forced to implement its natural gas moratorium, revisit its reliability analyses and continue to adapt to changing market conditions. The difficulty of advancing pipeline infrastructure projects in the region limits the ability to proceed with projects of this nature in a timely manner. This concept was, however, considered in the evaluation of Project alternatives. See Section 4.0.

HG&E's most recent analysis confirmed the continuing high reliance upon LNG, the continuing and increasing challenges of securing LNG and delivery service during peak conditions and HG&E's very profound operational challenges during cold snaps. HG&E's existing West Holyoke Facility storage capacity is capable of providing less than two days of forecasted supplemental supply for existing customers under typical peak operations (i.e., full pipeline deliveries) without the need for refill; however, in the event of a pipeline interruption, the existing send-out capacity is 20% below total system peak demand for a single day. The analysis of send-out and LNG supply deliveries at the West Holyoke Facility demonstrates that the current reliance upon LNG during peak events and increasing concerns with the ability to restore LNG inventory during cold snaps presents challenge to HG&E's ability to maintain reliable service.

During a 10-day stretch from December 2017 to January 2018 (which weather reflects HG&E's cold snap planning standard), HG&E experienced a total of 597.1 HDDs. Applying this weather data to the current forecast demand model, the risk of the substantial reliance upon HG&E's LNG suppliers to deliver trucked LNG as scheduled during a 10-day cold snap event is clearly evident. This extended event required extensive coordination with regional LNG suppliers beyond HG&E's contract suppliers to secure additional LNG, in part, due to difficulties in securing necessary drivers. HG&E was only able to maintain reliable service by employing strategic "overtakes" from TGP of approximately 500-1000 Dth/day, as

was available and allowed by TGP. Slightly colder weather on Day 6 or Day 7 could have resulted in the loss of service for customers. Reliance on such an approach is not consistent with best operating practices.

Table 3.4 shows the actual daily send-out during this actual 10-day cycle in 2017-18, inclusive of LNG inventory refills to manage reliable system operations. Given the modest change to HG&E’s forecast and continuing resource portfolio, this actual experience is essentially identical to how HG&E would be forced to operate under similar conditions in the future.

Cold Snap	HDD	Actual Demand	LNG Vaporized	LNG Trucks	Starting LNG Inventory	Ending LNG Inventory	Notes
Day 1	63.0	18247	5954	5	12,250	10,546	Tanks not full at start of cold snap due to extended period of use prior to peak 10-day cold snap. Employed strategic 500 dth/d TGP overtake.
Day 2	60.5	17620	5330	5	10,546	9,466	Employed strategic 500 dth/d TGP overtake.
Day 3	62.8	17086	4787	6	9,466	9,779	Employed strategic 500 dth/d TGP overtake.
Day 4	64.3	18683	6252	4	9,779	6,926	Employed strategic 500 dth/d TGP overtake.
Day 5	65.1	18623	5829	0	6,926	1,097	Employed strategic emergency 1000 dth/d TGP overtake. Received late authorization from TGP for overtake.
Day 6	55.9	17258	3937	5	1,097	1,410	Employed strategic emergency 1000 dth/d TGP overtake.
Day 7	51.3	15985	2663	10	1,410	7,247	Employed strategic emergency 1000 dth/d TGP overtake. Coordinated receipt of LNG for regional facilities beyond existing contracts.
Day 8	47.8	16191	2873	4	7,247	7,775	Employed strategic emergency 1000 dth/d TGP overtake. Coordinated receipt of LNG for regional facilities beyond existing contracts.
Day 9	59.3	18315	5005	7	7,775	8,720	Employed strategic emergency 1000 dth/d TGP overtake. Coordinated receipt of LNG for regional facilities beyond existing contracts.
Day 10	67.1	19657	6332	5	8,720	6,637	Employed strategic emergency 1000 dth/d TGP overtake.

Table 3.4 10-day Cold Snap System Performance from December 28, 2017 through January 6, 2018.

The strategic TGP “overtakes” were beneficial during this event to maintaining reliable service. However, “overtakes” are dependent upon TGP system operations and availability and cannot be considered a readily available resource. When a similar request to TGP was made in 2019, it was denied due to TGP system constraints. If LNG supply was insufficient and “overtakes” unavailable, the next step would be to curtail customer load beyond the normal interruptible customers and based on criticality of customer need in accordance with HG&E’s Emergency Plan. While extended peak events such as this do not occur every year, they occur with enough frequency that HG&E must maintain system preparedness for the occurrence of comparable weather events in order to meet the energy demand of its customers.

An additional planning concern related to the 27-day Northeast “Polar Vortex” from December 2017 to January 2018, HG&E required 89 LNG trailer deliveries to maintain sufficient LNG storage inventory during this period, including one day in which an unprecedented 10 deliveries were offloaded into HG&E’s storage tanks. The addition of incremental storage capacity would provide a greater margin and ensure continuing reliable service.

HG&E has recently experienced increasing difficulty in securing firm LNG transportation during the peak winter season. While HG&E’s LNG suppliers have been successful, to date, in managing scheduled deliveries around ever-shifting regional weather impacts, the difficulty in transportation scheduling and driver shortages raises concerns over the ability to strategically refill during extended peak events to maintain system reliability. The planned closure of the Everett terminal will increase all parties’ dependence upon and competition with respect to, more remote sources of LNG outside of New

England (HG&E has been able to secure cost savings from other, more distant LNG sources). Driver availability is an increasing concern. With the risk of snow or ice delaying deliveries and longer “round trips” between these LNG sources and the West Holyoke Facility, additional storage capacity is needed to be certain to maintain reliable service to HG&E’s customers. In a previous Siting Board case, EFSB 99-2/D.T.E. 99-17, a reliability standard for potential capacity additions at a proposed LNG facility in the nearby Town of Whately (also served off of the constrained Northampton Lateral) was set at up to three peak days of storage capacity. Thus, HG&E’s less than two-day design day storage capacity is not adequate for the long-term provision of reliable service or consistent with precedent and an increase in on-site storage capacity (or some other resource) is needed to maintain reliable service to existing customers.

Again, if HG&E had not been authorized to exceed its daily firm supply from TGP (notably, a similar and subsequent request was denied by TGP), additional challenges in LNG delivery had been encountered or slightly colder weather had been experienced, then the curtailment of service to customers would have been required.

As noted in Section 3.2, HG&E expects to schedule necessary maintenance and improvements to its existing LNG vaporization equipment in parallel with the proposed Project but given that most of the necessary contractors would be on-site to install the proposed additional storage tank. This opportunistic enhancement is the planned replacement of the existing single vaporization and heating system, which now operates without any redundancy. HG&E recognizes the risk associated with a single-point-of-failure through a system without operational redundancy as it raises concerns over reliability during peak demand events. The planned complementary installation of a redundant vaporization system will minimize construction-related impact and further enhance system and service reliability.

While the primary focus of HG&E’s planning efforts are related to maintaining reliable service to existing customers, HG&E has experienced customer frustration as it seeks to implement its planned move to a net zero future in an efficient, orderly and economic manner. HG&E has been forced to decline customer requests seeking cleaner natural gas service leaving them with fuel oil or propane as their only other viable fuel alternative. HG&E believes that it can achieve meaningful, albeit limited, environmental benefits through strategic, incremental natural gas service. Thus, any resource (project) that can also provide some supply relief (in addition to securing the needed reliability enhancement for existing customers) would be preferred.

In sum, HG&E has identified the following resource needs in order for it to provide a necessary and reliable energy supply:

- The need to address concerns relating to its single pipeline supply source and limited LNG storage capacity that affect its ability to meet existing peak day demand or cold snap requirements, particularly in the context of the increasing difficulty in securing timely LNG transportation service.
- Promoting strategic and cost-effective natural gas customer additions to facilitate the transition toward net zero by reducing consumption of higher emitting fuel sources.

3.5 Demand-Side Management Does Not Address Identified Need

HG&E offers a variety of aggressive and effective energy efficiency programs aimed to help customers conserve energy and GHG emissions. HG&E's Green Team reviews potential opportunities on a monthly basis to ensure the programs are balancing current customer needs with the clean energy goals of HG&E. In addition, the team is charged with ensuring each incentive is cost justifiable, comparable to regional utility programs (i.e., MassSave) and do not negatively impact rates for the whole customer base. The Green Team is made up of key employees from throughout the organization and welcomes feedback from customers and local contractors in an effort to continuously improve programs and incentives. The Green Team also promotes a variety of incentives from partner organizations such as the Massachusetts Clean Energy Center's (MassCEC) Decarbonization Pathways program, Springfield Partners for Community Action's Low Income Weatherization Assistance Program, OneHolyoke's Rental Neighborhood Improvement Program, Valley Opportunity Council's Fuel Assistance, MassDevelopment's Pace Program and more. HG&E remains committed to developing innovative, cost justifiable, customer-oriented efficiency programs that will reduce overall energy consumption and reduce its carbon footprint.

These energy efficiency programs have proven successful and result in widespread participation from HG&E's customer base. Since the institution of HG&E's natural gas moratorium, the energy efficiency programs have result in an annual savings of over 4,000 Dth but only a peak gas day reduction of 43 Dth (or less than one percent of LNG send-out on a peak day). While these programs help save energy throughout the year and reduce annual emissions, adoption of these programs is largely driven by customer behavior and individual circumstances (social and economic). To date, the overall impact during a peak natural gas event has been minimal with annual peak day savings only averaging 10 to 15 Dth. Given the limited impact on peak day demand reduction the energy efficiency programs are not seen as a viable alternative to the Project's objective of addressing system reliability for existing customers. To achieve the transition to the Commonwealth's goal of net zero emissions by 2050, HG&E will continue to explore and expand energy efficiency and electrification program offerings in the residential, commercial and industrial sectors. See Appendix G.