

Boston Gas Company
d/b/a National Grid
D.P.U. 20-120
Exhibit NG-GSC-8
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H.O. Tassone

Exhibit NG-GSC-8

LNG Projects

Planned Boston Gas Company d/b/a National Grid LNG Reliability Projects - 2021 through 2026

Descriptions of selected large capital projects:

Project: Vaporizer Replacement

Location: Salem

Incremental Request: \$65.170M

This project will replace the Salem LNG vaporizers and associated vaporization equipment, incorporate vaporization redundancy, and increase the plant's send-out capacity. This capacity will meet the increasing gas demand of Gas Control for years to come. A new redundant vaporization system with increased capacity will provide a more reliable, robust, long term operational solution for the Salem LNG Plant.

The Salem LNG Plant currently utilizes two Trane Thermal Submerged Combustion Vaporizers in a 2 X 50% configuration with one burner per vaporizer to satisfy the gas control send-out requirements. Each vaporizer has a rated vaporization capacity of 15MMSCFD. Installed in 1971, these vaporizers and burners are difficult to service, restrict process safety improvements, and limit send-out capacity. Also, no equipment redundancy exists for these units when operating at the system design maximum capacity of 30MMSCFD.

The vaporizer replacement is currently in development with a construction start date preliminarily set for April 2023. An in-service date for the vaporizers is estimated for October 2024.

Project: Tank Thermal Protection

Locations: Lynn and Salem

Incremental Request: Lynn - \$28.000M; Salem - \$28.000M

This project will add shrouding around the LNG piping in the tank area as well as a thermal shield at the tank pipe duct area to protect the tank from jet fires. It greatly reduces the probability of a jet fire damaging the tank and rendering it out of service.

Project: Seawall Upgrade

Location: Commercial Point

Incremental Request: \$26.250M

The Seawall at the Commercial Point LNG Plant is original to the Plant and has required increasing maintenance over the years. The seawall prevents erosion to land that supports the Tank Dike

Wall. A Seawall Upgrade is needed to guard against the compounding effects of tidal forces and rising sea level.

Project: Boiloff Compressor (BOC) Upgrade
Locations: Commercial Point, Haverhill, and Salem
Incremental Request: \$31.743M

The existing, outdated, Boiloff Compressors (BOCs) at the Commercial Point, Haverhill, and Salem LNG Plants pose an over-pressurization risk to the Tank. The current BOC systems at each site do not provide redundancy in boiloff gas capacity and are undersized. Their operational integrity after 40+ years of service is at risk due to limited available spare parts. Upon a failure of a BOC, there is a potential for the affected Plant to be impacted with a loss of export capacity for between 1-5 days at winter's peak. Without the use of a Boiloff Compressor, the plant would need to continually vent gas until a replacement is installed. Replacing the Reciprocating BOCs at Commercial Point, Haverhill, and Salem with new, redundant, screw compressors will increase each Plant's Reliability and decrease maintenance costs and compressor downtime.

Project: Automatic Emergency Shutdown System (AESD)
Location: Haverhill
Incremental Request: \$6.200M

This project will implement an Automatic Emergency Shutdown (AESD) System and its associated Controls System at the Haverhill LNG plant. The purpose of the AESD system is to protect plant personnel and property by monitoring, alarming and reacting to potentially hazardous situations within the process areas at the LNG plant. It is a hazard detection and mitigation system that includes gas, fire and temperature detection devices, logic solvers, a Human-Machine Interface (HMI) and tie-ins to valves and other equipment that perform mitigation functions in the event of a failure or process upset.

Boston Gas Company d/b/a National Grid LNG Reliability Projects Budget – CY2021-2026

<u>Boston Gas LNG Reliability Projects</u>	<u>Budget Status</u>	<u>CY20</u>	<u>CY21</u>	<u>CY22</u>	<u>CY23</u>	<u>CY24</u>	<u>CY25</u>	<u>CY26</u>	<u>CY21-CY26 Total</u>
LNG - Boston Gas Blanket	Approved	\$ 1,277,000	\$ 1,312,000	\$ 1,341,000	\$ 1,367,000	\$ 1,394,000	\$ 1,422,000	\$1,450,000	\$8,286,000
LNG - Commercial Point BOC Upgrade	Approved	\$ 4,507,000	\$ 8,070,000	\$ 4,300,000	\$ 500,000	\$ -	\$ -	\$ -	\$12,870,000
LNG - Commercial Point Control Room	Preliminary	\$ 50,000	\$ 500,000	\$ 2,500,000	\$ 6,500,000	\$ -	\$ -	\$ -	\$9,500,000
LNG - Commercial Point Modernization	Approved	\$ 50,000	\$ 200,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$200,000
LNG - Commercial Point MCC Upgrade	Approved	\$ 1,135,000	\$ 1,550,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$1,550,000
LNG - Commercial Point Sea Wall	Preliminary	\$ -	\$ -	\$ -	\$ 250,000	\$ 1,000,000	\$ 15,000,000	\$ 10,000,000	\$26,250,000
LNG - Commercial Point Steam Boilers	Approved	\$ 1,417,000	\$ 1,800,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$1,800,000
LNG - Commercial Point Tank Foundation Heating System	Near Final	\$ 70,000	\$ 1,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$1,000,000
LNG - Haverhill AESD System	Near Final	\$ 610,000	\$ 2,000,000	\$ 4,500,000	\$ 500,000	\$ -	\$ -	\$ -	\$7,000,000
LNG - Haverhill BOC Upgrade	Preliminary	\$ -	\$ -	\$ 100,000	\$ 1,000,000	\$ 6,000,000	\$ 500,000	\$ -	\$7,600,000
LNG - Haverhill Facilities Modernization	Near Final	\$ 200,000	\$ 1,500,000	\$ 9,000,000	\$ 500,000	\$ -	\$ -	\$ -	\$11,000,000
LNG - Haverhill Hi Ex Foam System	Approved	\$ 2,141,000	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$500,000
LNG - Haverhill MCC Upgrade	Preliminary	\$ -	\$ -	\$ -	\$ -	\$ 250,000	\$ 2,500,000	\$ 100,000	\$2,850,000
LNG - Lynn Control Building Upgrade	Near Final	\$ 500,000	\$ 4,523,000	\$ 6,785,000	\$ 1,181,000	\$ -	\$ -	\$ -	\$12,489,000
LNG - Lynn Sea Wall Modification	Preliminary	\$ -	\$ -	\$ -	\$ -	\$ 2,040,000	\$ 5,000,000	\$ 18,000,000	\$25,040,000
LNG - Lynn Tank Seismic Upgrade	Preliminary	\$ -	\$ 3,705,000	\$ 5,558,000	\$ -	\$ -	\$ -	\$ -	\$9,263,000
LNG - Lynn Tank Thermal Protection	Preliminary	\$ 500,000	\$ 2,500,000	\$ 25,500,000	\$ -	\$ -	\$ -	\$ -	\$28,000,000
LNG - Lynn Transmission Piping Refurbishment	Near Final	\$ 948,000	\$ 3,300,000	\$ 500,000	\$ -	\$ -	\$ -	\$ -	\$3,800,000
LNG - Salem Boiloff Compressor Upgrade	Near Final	\$ 1,249,000	\$ 8,000,000	\$ 2,000,000	\$ -	\$ -	\$ -	\$ -	\$10,000,000
LNG - Salem Sea Wall Modification	Preliminary	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,040,000	\$ 5,000,000	\$7,040,000
LNG - Salem Tank Seismic Upgrade	Preliminary	\$ -	\$ 3,705,000	\$ 5,558,000	\$ -	\$ -	\$ -	\$ -	\$9,263,000
LNG - Salem Tank Thermal Protection	Preliminary	\$ 500,000	\$ 2,500,000	\$ 25,500,000	\$ -	\$ -	\$ -	\$ -	\$28,000,000
LNG - Salem Vaporizer Replacement	Preliminary	\$ 600,000	\$ 2,670,000	\$ 15,000,000	\$ 30,000,000	\$ 15,000,000	\$ 2,500,000	\$ -	\$65,170,000
Total:		\$15,754,000	\$49,335,000	\$108,142,000	\$41,798,000	\$25,684,000	\$28,962,000	\$34,550,000	\$288,471,000

Planned Former Colonial Gas Company d/b/a National Grid LNG Reliability Projects – CY 2021 through 2026

Descriptions of selected large capital projects:

Project: LNG Tank Upgrade

Location: South Yarmouth

Incremental Request: \$172.350M

The South Yarmouth LNG Plant essential equipment and infrastructure are in urgent need of an upgrade. The LNG facility was originally commissioned in 1975. The LNG tank is a pre-stressed concrete outer with stainless steel inner tank and suspended deck. The Tank is at risk of failure due to its age. This project will evaluate the LNG tank and balance of plants to determine whether to upgrade or replace the facility systems. The systems include LNG Storage Tank, Vaporization System, Control Room Building, Truck Station, Pumps, Piping, and Security System.

Project: Vaporizer Replacement

Locations: Tewksbury

Incremental Request: \$64.200M

The Tewksbury LNG Plant currently utilizes four Falling Film Vaporizers in a 4 X 25% configuration with four glycol heaters to satisfy the gas control send-out requirements. These obsolete vaporizers are difficult to service, restrict process safety improvements, and limit send-out capacity. Also, no equipment redundancy exists for these units when operating at the system design maximum capacity of 80MMSCFD.

This project will replace the four aging vaporizers with three new Shell and Tube Vaporizers in a 3 X 50% configuration with an in-service spare. This will incorporate vaporization redundancy and increase the send-out capacity to 100MMSCFD. This capacity utilizes full capability of the LNG pumps and will meet the increasing gas demand of the three local townships in the area for years to come. A new redundant vaporization system with increased capacity will provide a more reliable, robust, long term solution for the Tewksbury LNG Plant.

Project: Boiloff Compressor (BOC) Upgrade
Location: Tewksbury
Incremental Request: \$7.010M

The existing, outdated, Boiloff Compressors (BOCs) at the Tewksbury LNG Plant pose an over-pressurization risk to the Tank. Its operational integrity is at risk due to years of use and limited available spare parts. Without the use of a Boiloff Compressor, the Plant would need to continually vent gas until a replacement is installed. Replacing the BOCs at Tewksbury will increase the Plant’s reliability, and decrease maintenance costs and compressor downtime.

Former Colonial Gas Company d/b/a National Grid LNG Reliability Projects Budget – 2021-2026

<u>Colonial Gas LNG Reliability Projects</u>	<u>Budget Status</u>	<u>CY20</u>	<u>CY21</u>	<u>CY22</u>	<u>CY23</u>	<u>CY24</u>	<u>CY25</u>	<u>CY26</u>	<u>CY21-CY26 Total</u>
LNG - Colonial Gas Blanket	Approved	\$ 1,538,000	\$ 1,588,000	\$ 1,623,000	\$ 1,654,000	\$ 1,687,000	\$ 1,721,000	\$ 1,755,000	\$10,028,000
LNG - South Yarmouth Boiloff Compressor	Approved	\$ 6,634,987	\$ 2,000,000	\$ 3,000,000	\$ -	\$ -	\$ -	\$ -	\$5,000,000
LNG - South Yarmouth Tank Upgrade	Preliminary	\$ -	\$ 250,000	\$ 500,000	\$ 2,000,000	\$ 60,000,000	\$ 60,000,000	\$ 49,600,000	\$172,350,000
LNG - Tewksbury Boiloff Compressor Engine Upgrade	Preliminary	\$ -	\$ -	\$ -	\$ -	\$ 10,000	\$ 2,000,000	\$ 5,000,000	\$7,010,000
LNG - Tewksbury Generator Switchgear Replacement	Preliminary	\$ -	\$ -	\$ -	\$ -	\$ 10,000	\$ 500,000	\$ 1,000,000	\$1,510,000
LNG - Tewksbury Generators Replacement (3 Units)	Preliminary	\$ -	\$ -	\$ -	\$ 10,000	\$ 500,000	\$ 2,000,000	\$ 2,000,000	\$4,510,000
LNG - Tewksbury Raw Gas Makeup System	Preliminary	\$ -	\$ 50,000	\$ 500,000	\$ 2,000,000				\$2,550,000
LNG - Tewksbury Sewer Connection	Preliminary	\$ -	\$ 50,000	\$ 500,000	\$ 1,000,000	\$ -	\$ -	\$ -	\$1,550,000
LNG - Tewksbury Vaporizer System Upgrade	Preliminary	\$ 1,425,000	\$ 1,000,000	\$ 15,000,000	\$ 30,000,000	\$ 15,714,000	\$ 2,500,000	\$ -	\$64,214,000
Total:		\$9,597,987	\$4,938,000	\$21,123,000	\$36,664,000	\$77,921,000	\$68,721,000	\$59,355,000	\$268,722,000