Northeast GAS ASSOCIATION
NYSEARCH

Technology Brief

Living Lab for Biomethane (RNG) Assessment

Description: **A five-year controlled study to assess impact of processed biomethane on gas distribution infrastructure.**

Status: **Test material has been installed for the Living Lab at Newton Creek and alternate site. Commissioning of the biomethane recovery system pending.**

BENEFITS

The planned Newtown Creek wastewater treatment biomethane recovery system offers National Grid and the industry at large a unique opportunity to monitor the immediate and long-term impacts of direct injection of biomethane into a local distribution network via a "living laboratory" environment. The relationship of gas processing technology, monitoring instrumentation and downstream piping system impacts will be explored to help fill long standing industry wide knowledge gaps. This integrated practical operations approach to assessing potential infrastructure impacts, coupled with the bench scale laboratory bench scale testing will help develop a long-term strategy to embrace this valuable renewable energy resource.

The comprehensive five-year research initiative will identify the levels and nature of trace constituents (such as siloxanes, sulfur, CO_2 etc.) of interest in processed biomethane. Also, a duplicate test system operating on traditional pipeline quality gas is being constructed from the ground up based on input from subject matter experts. This will help create an exclusive data set to evaluate specific pipeline components at the material level.

BACKGROUND

NYSEARCH has been considering not only existing projects that support RNG and what is now referred to by some as 'decarbonization' but looking to address Technology Gaps specifically in terms of impacts to the gas infrastructure and gas customers. Of the technologies and processes that are possible for conversion and use as RNG, the most advanced and used approach is through the same process selected in the Newtown facility, that of anaerobic digestion of waste.

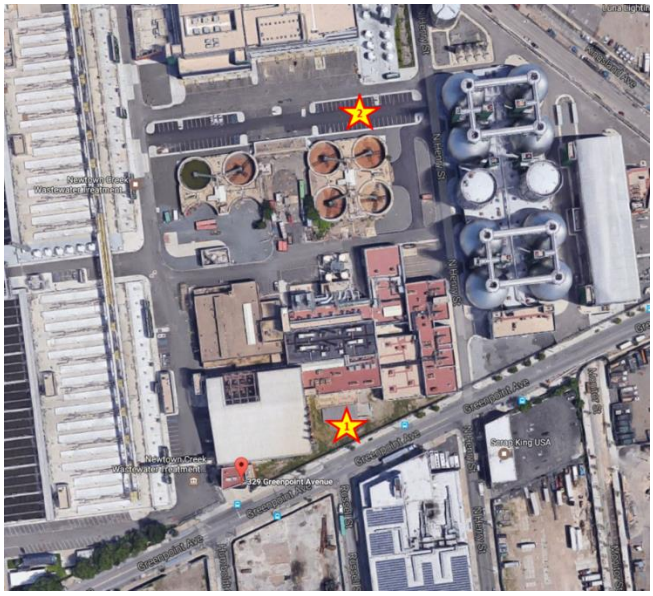

Figure 1: Newton Creek Waste water treatment facility and Bio gas Digesters

The commercial digester (see Figure 1) in this project is owned by the NY Department of Environmental Protection (DEP)/City of New York. There is a tight collaboration between DEP and National Grid on the design of this pressure swing

adsorption clean-up system that is intended to process between 550 MMCF – 800 MMCF of raw biogas per year. This processing will amount to 277,500 – 377,500 MMBtu of pipeline quality gas per year that will be directly injected and blended into National Grid's distribution system.

TECHNICAL APPROACH

The objectives of the project are to: a) study the impact to gas infrastructure of processed biogas from the Newtown Creek waste water treatment facility, and, b) compare information from this system to a pipeline system specifically designed to be equivalent but with utilization of traditional pipeline quality natural gas. The study is design to evaluate and compare immediate impacts and impacts over time from first startup through five years of operation.

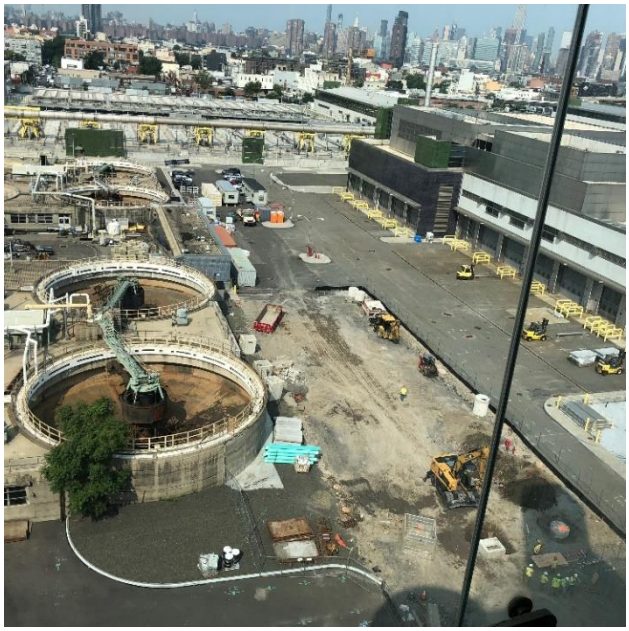

Figure 2: Aerial view of Living Lab test site

The sampling plan will identify the levels and nature of trace constituents within the RNG (or biomethane) in both real time and based on agreed periodic sampling and lab analysis. These include hydrocarbons, VOCs/SVOCs, O_2, CO_2 and other inerts, and general H_2S levels. Also, various pipe materials will be included in the piping system so that they can be extracted and analyzed. The same analysis will be performed at the parallel site at a National Grid property in Long Island (operating with the traditional pipeline quality gas) that will be constructed with the same materials and lots so that a direct comparison can be made based on the project's test plan. Analyzers for moisture and trace constituents, metering and other instruments are included. Materials to test will be located at the outlet of the meter but prior to the flow into the 60-psi distribution system. Planned system materials include PE pipe segments, steel pipe segments, common gaskets and couplings, and fittings.

PROGRAM STATUS

Newtown Creek is the largest of its kind in North America and located in the City of New York. Some of the activities to date included multiple reviews by various NYC agencies (NYC, FDNY, EPA, etc.) of the design. The setup for Living Lab has been installed at Newton Creek and the alternate site that would see typical natural gas. Construction of the clean-up facility (See Figure 2) is near complete.

Highlights

- Assess RNG impacts on the gas infrastructure over a long period of continuous operation
- Ability to Compare two systems – flowing RNG and traditional gas designed with material from same batch

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