

Biogas Treatment & Renewable Natural Gas

City of Longmont Takes the Lead in Sustainable Fuel Production

by Tamara Moon

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Fueling a fleet is one of the largest costs associated with managing vehicles in a Public Works department. From the environmental standpoint, fueling vehicles also contributes significantly to environmental pollution, and environmental degradation. A fleet of municipally owned vehicles is essential for city operations, and is often one function that doesn't get much press. But what if there was a way to fuel a fleet of vehicles, decrease environmental impacts with a renewable resource, AND create a fiscally and operationally sustainable option instead?

Sounds too good to be true, but the future has arrived, and the City of Longmont has taken the lead. In late 2018, Longmont began construction on its Biogas treatment system and Renewable Natural Gas (RNG) fueling center. A first of its kind in the Front Range, this process leads the way in what the future holds for municipal fleet operations in Colorado.

Sustainability – A Plan for the Future

In 2016, the City of Longmont published its first Sustainability Plan. This document, created under the vision of multiple city departments, provided direction for the city in sustainable operations and future decision making. The goal of the sustainability plan was to create a Longmont that was a vibrant and community where every resident could thrive.

The sustainability plan not only focused on environmental sustainability, but also looked at sustainability from the fiscal, planning and operational functions of the city. Ten areas were addressed in the City's sustainability plan including Air Quality, Economic Vitality, Energy, the Natural Environment and Transportation.

The RNG project impacts all of these factors within the plan for sustainability, by providing a fuel source that is renewable, cost effective and better for the environment. In one small step, Longmont is already creating a better place to live for its residents.

What is Biogas and Renewable Natural Gas and Why it's Great!

Biogas is a natural byproduct of the decomposition of natural materials. Biogas has, for many years, been harnessed in livestock operations as a fuel source for heating barns and fueling equipment. So long as there are operations that have an organic, natural waste source, the production of biogas is possible.

Renewable natural gas, is a treated form of biogas. Identical in chemical composition to fossil natural gas (the same natural gas used in your home), RNG is a man-made product with unlimited production potential. When combined with existing processes and infrastructure, RNG and biogas treatment are a great option for helping municipal fleet services save money and be better stewards to the environment.

RNG Production at Longmont's WWTP

In 2018, following the City's first greenhouse gas inventory, it became clear that there were ways that Longmont could take steps to reduce greenhouse gas emissions, and start the process of creating environmentally sustainable processes within the city. The greenhouse gas inventory gave the city an opportunity to evaluate strategies for reducing greenhouse gasses. RNG was one of a number of strategies identified.

Anaerobic digestion is a typical process in waste water treatment. The process uses bacteria to decompose the solids and sludge produced during treatment. This process creates a significant amount of biogas. In many waste water plants including Longmont's, this biogas is used to heat the plant and the rest is "flared" or wasted by burning off. Because of the abundance of biogas produced in anaerobic digestion, it is an ideal source for generating RNG.

Longmont contracted with the team of CGRS and Carollo Engineers to design and construct the project. CGRS, based in Fort Collins, is the project lead and responsible for design of the RNG fueling system and construction of the entire project. Carollo Engineers, with offices in Broomfield and Littleton, designed the RGN system. Both firms have broad portfolios of work relating to waste water treatment and RNG treatment systems.

Construction of the biogas treatment system and RNG fueling infrastructure began in late 2018. The Longmont biogas treatment and RNG delivery project, has three components:

- Biogas treatment
- RNG Pipeline and Fueling Center
- Administration Building

The Biogas treatment system will remove impurities from the biogas such as water, hydrogen sulfide, and other organic compounds, resulting in a product that is a minimum of 90 percent methane, and will be chemically identical to the natural gas that is used to heat homes and businesses. The end product is Renewable Natural Gas. The biogas treatment process will also pressurize the RNG to 4,000 psi, allowing it to be stored and distributed to vehicles.

Longmont will be constructing a 17,000 square-foot fueling center with four to 10 bays that will allow the city to fuel the new trash trucks indoors. The fueling facility will be connected to the treatment system via the newly constructed pipeline. Finishing out the project will be a 5,000 square-foot administrative building to support RNG treatment and distribution operations.

The City will also be replacing 11 of 16 trash trucks. Currently the sanitation fleet runs on diesel fuel. Existing trucks cannot run RNG, so the fleet will be replaced with new, natural gas trucks. These trucks will be highly efficient, quieter and run cleaner.

The RNG facilities are expected to be completed and in service later in 2019. Trucks will be replaced according to the city's vehicle replacement program. The first of the new trash trucks will be in service beginning in late 2019. The remaining five diesel trucks are anticipated to be replaced in 2021.

When completed, Longmont will be the first municipality on the Front Range to use treated biogas, from their own treatment processes, to fuel vehicles. For many other Colorado municipalities, Longmont will serve as an example of how innovation can provide economic value to the community, while also being a good steward to the environment.

Funding

The cost of projects of this scope can be taxing on a municipal budget. Off-setting the costs of projects through grants, loans and in-house work can make funding substantial projects more manageable for cash limited municipal budgets.

To fund this project as well as the purchase of new trash trucks, the City of Longmont has received grants from state agencies to offset a portion of the costs associated with construction and equipment purchases. The Colorado Department of Local Affairs (DOLA) awarded Longmont a \$1,000,000 grant to help with the capital costs of the project. Additionally, the Colorado Regional Air Quality Council has awarded Longmont a grant that will provide \$35,000 per truck to replace the first 11 trucks. This funding covers 80% of the cost difference between diesel trucks and RNG trucks. Trucks will be replaced on their normal replacement schedule, to allow for full use of existing equipment.

Benefits

The benefits from this project will impact not only Longmont as a municipal agency, but provide a host of benefits to the community as a whole.

From a cost savings perspective, the city will benefit from reduced fuel costs. It is anticipated that the biogas treatment system and RNG fuel will reduce the city's diesel fuel demand by nearly 90,000 gallons per year. Because fuel costs can vary significantly even from month to month, the RNG system will allow the city to reduce impacts to the budget and have a reliable and cost effective source of fuel for a portion of the city's fleet. Additionally, because the sanitation fleet will only be utilizing a portion of the biogas available, the system can easily be expanded to fuel other vehicles in the city's fleet, as they are replaced with new, RNG vehicles.

Environmental benefits to the city and the community include a nearly 1,000 metric ton per year elimination of carbon dioxide gas. This reduction in greenhouse gas production, for the near future, will be achieved only by the sanitation fleet. However, these reductions will increase as the city converts more and more of its fleet to RNG. For residents of Longmont, this means a cleaner city, with less air pollution.

The RNG process is also a sustainable, long-term solution for fueling the city's fleet. Anaerobic digestion and the creation of biogas in the waste water treatment process isn't going away anytime soon. So long as the city continues to treat its waste water, there will be a source of biogas. As the city grows, the quantity of biogas available may increase as well. A sustainable fuel supply means reduced impacts to city budgets and continued improvements to the environment in and around Longmont.

The Future

When Longmont set out to develop a sustainable fuel supply for its fleet, it wasn't looking to be a leader in sustainable operations for municipal sanitation departments. However, their innovative approach to creating a process that was both fiscally responsible and environmentally responsible, has set a new standard for fleet operations.

With more and more cities developing plans for sustainability, communities like Longmont will be the leaders in innovation and inspire a new way of thinking about public works operations and what is possible for creating an environmentally sustainable community.