

RENEWABLE ENERGY FROM WASTE, MAY/JUNE 2016

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Not stopping at first

Being the first landfill-gas-to-energy project in the state was not enough for one Louisiana solid waste district who has tripled production with its base-satellite renewable natural gas fueling system.

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St. Landry Parish, Louisiana, has been in the forefront of developing a biogas resource from its municipal solid waste (MSW) landfill. The parish's solid waste district has generated renewable natural gas (RNG) vehicle fuel from landfill gas (LFG), using it to fuel municipal vehicles. Commissioned by the district in 2012, the system is the first biogas to RNG vehicle fueling system in the state of Louisiana. The project garnered the district the prestigious Environmental Protection Agency's (EPA's) 2012 LMOP Project of the Year Award.

Not being one to rest on its laurels, the district expanded that original RNG production system in 2015, tripling its capacity and adding an off-site fueling station in the city of Opelousas, approximately 17 miles from the landfill's RNG production station. A unique aspect of this system is that the satellite fueling station is supplied by RNG transported in a compressed natural gas (CNG) tube trailer that is filled at the base, RNG production station. This base-satellite configuration is the first of its kind for an RNG fueling system.

The planning and project development activities that made both the original RNG fueling system and the expansion a reality are complex and worth discussing as a potential model for others.

LAYING THE GROUNDWORK

The district laid the groundwork for this project even before there was technology available to economically produce RNG from biogas at such a small scale. In 2009, the district voluntarily installed a LFG collection and control system (GCCS) to efficiently collect and combust the generated biogas. That voluntary installation meant that carbon reduction credits, generated from the combustion of methane in the biogas, could be sold on the open market.

The district's foresight generated sufficient revenue from the sale of those credits to pay for the GCCS. This set them up to be able to evaluate options for beneficial use of the energy from that biogas, since they did not have to factor in the cost of biogas collection into a beneficial use financial analysis.

The district initiated the original biogas to vehicle fueling system after conducting an evaluation of available biogas beneficial use options. They conducted the evaluation after the patent-pending BioCNG biogas conditioning system had proven it could economically produce RNG from even small biogas sources. The district determined that this option made the most sense economically.



With a viable biogas utilization technology, the district now had one leg of the three-legged project development stool covered, but they needed additional funding and a fuel purchaser. It secured funding through a U.S. Department of Energy (DOE) grant administered by the Louisiana Department of Natural Resources.

The district then developed an agreement with the parish's sheriff department to convert a portion of its fleet to use CNG and purchase fuel from the biogas-based RNG system. The district now had all three legs of the stool in place.

BioCNG LLC, Madison, Wisconsin, entered into a design/build contract to supply, construct and commission the RNG vehicle fueling system. That initial project utilized 50 standard cubic feet per minute (SCFM) of biogas to produce approximately 230 gallons of gas equivalent (GGE) per day of RNG. The sheriff's vehicles, along with an expanding fleet of landfill maintenance vehicles, continued to successfully utilize the fuel.

Due to the project's success and the wholehearted manner in which the parish residents bought in to the project, district officials began exploring options for expanding the BioCNG system. The most obvious fuel user frequenting the landfill was Progressive Waste Solutions, the contracted waste hauler that serviced the parish residents and hauled collected solid waste to the landfill.

INCREASING PRODUCTION

The district solid waste director initiated discussions with Progressive to determine if they could agree on a win-win strategy to produce and utilize more RNG vehicle fuel. The solid waste services contract was due to be bid out again in approximately two years, and the district agreed to extend Progressive's contract for an additional five years if they would bring in CNG-powered refuse hauling trucks and purchase RNG from the district.

Both parties agreed that this path was worth pursuing, but they both also acknowledged that they needed an uninterrupted CNG fuel source. The district then began discussions with BioCNG LLC to evaluate options for developing this system expansion concept.

BioCNG began concept development, which included the on-site expansion, as well as plans for an uninterrupted fuel supply. The distance to a natural gas pipeline was too great to consider bringing a natural gas source to the landfill base station. In addition, the district was also interested in expanding opportunities for parish residents to use the RNG fuel.

The district owned and operated a recycling center in Opelousas, approximately 17 miles from the landfill, which had sufficient land available to develop a CNG fueling station. Piping RNG 17 miles to that location was not an option, so it began considering another alternative, a "virtual pipeline," which would use a CNG tube trailer to transport RNG to their Opelousas location.

The district and Progressive agreed to move forward and Progressive purchased 10 new CNG refuse hauling trucks. In the original system installation, the district had the biogas source but needed funding and the vehicle fuel demand to complete the three legs of the project development stool. The district elected to self-finance the expansion project, so it had two of the legs, and it developed the fuel demand through the innovative contract with Progressive.

The district proceeded with the expansion and purchased a CNG tube trailer. BioCNG designed, permitted, constructed and commissioned the base BioCNG expansion system and the off-site, satellite RNG/CNG fueling station in Opelousas.

The base station is the primary fueling location for Progressive's refuse hauling trucks and the various parish vehicles. The base station also includes a CNG tube trailer filling terminal that is typically filled at night when the vehicle fuel demand is low.



The trailer can be left in place to provide additional RNG filling capacity, or transported to the satellite station to be used as the primary fuel source at that location. When the trailer is connected to the satellite station, and the fuel demand is greater than it can supply, the system can seamlessly switch to natural gas as the CNG source, or natural gas can be the sole CNG source if the trailer is not connected.

The combined base-satellite system was completed in ten months. Progressive took delivery of three of the new CNG powered trucks four months before system construction was complete, but system decommissioning and commissioning was staged to enable the district to fuel those trucks with the original BioCNG 50 system until the expansion was complete.

The new fueling stations have been operating continuously for more than five months. The Parish is routinely using up to 640 GGE of fuel per day during the week, and less than that on Saturday, when Progressive completes partial refuse hauling routes.

Katry Martin, St. Landry Parish Solid Waste director, was especially happy about the latest expansion, saying, “The fact that the hauler that delivers waste to the district landfill will fuel its trucks with the biogas generated from the landfill is a true example of the power of renewable energy sources and a preview of the future of biogas.”

The project also continues Progressive Waste’s aggressive embrace of CNG. Progressive has added nearly 250 natural gas vehicles to its waste and recycling fleet since it announced a corporate plan in May 2013 to convert to CNG. It expects to have as much as 55 percent of its fleet replaced by CNG vehicles annually in the U.S. and Canada. By 2019, it plans on having 18 to 20 percent of its fleet powered by natural gas.

Fleet managers are typically slow to embrace new, unproven technology that could have the potential to have a detrimental effect on their fleet. To date, Progressive’s drivers have commented that they see no difference in the CNG fueling time and truck performance between the RNG and CNG derived from natural gas.

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According to Progressive’s site manager who requested not to be named, purchasing RNG from the St. Landry Parish BioCNG project has been a positive experience for the drivers and the fleet as a whole. He says, “The RNG being produced has to meet or exceed all natural gas engine specifications. As a fleet manager, my top priority is to protect the investment Progressive Waste Solutions has made in natural gas vehicles.

He adds, “We are pleased to fuel our trucks on BioCNG produced from the refuse we collect for the Parish in this truly closed-loop system. Not only is it the right thing to do for our company and our customer but also the right thing to do for the environment.”

A FINANCIAL SUCCESS

The BioCNG expansion project has also been a financial success for the district. Its contract with Progressive pays for a large part of system expenses, and the district has been able to defray much of its own vehicle fuel expenses.

The district has also been able to take advantage of the Renewable Identification Number (RIN) market for qualifying renewable vehicle fuel, which was defined in the Renewable Fuel Standard (RFS). The RFS requires that specified volumes of renewable fuel be used as transportation fuel, home heating oil, and/or jet fuel each year.

RNG is a qualified renewable fuel and suppliers who sell this fuel can generate the RINs, which are traded in an open marketplace. When the project was first envisioned, the RIN credits were trading around \$1.00/GGE of RNG. Recently, that value has increased to about \$2.50/GGE.

With the success of the BioCNG expansion system, the District is eyeing how to develop additional fuel demand to allow it to continue to expand the system and make use of additional LFG that is currently being flared.

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