



# Fuel for the Fleet

A COLORADO COMMUNITY TURNS BIOGAS INTO COMPRESSED NATURAL GAS FOR VEHICLES AND GENERATES SIGNIFICANT SAVINGS ON GASOLINE AND DIESEL FUEL

By Doug Day

**M**any municipal vehicles in the Colorado City of Grand Junction now run on fuel that costs the city just \$1.50 a gallon.

The city no longer has to worry about oil markets now that the fuel price is locked in with a system at the Persigo Wastewater Treatment Plant that converts biogas into compressed natural gas (CNG) fuel.

The CNG system will pay for itself in eight years by providing 400 gallons of fuel per day for city vehicles.

## NO MORE FLARING

Built in 1984, the 12.5 mgd (design) plant used to flare much of its biogas. “We produce about 128,000 cubic feet of gas per day and were using about 16 percent of that to heat the anaerobic digesters,” says Dan Tonello, wastewater services manager. Jointly owned by Grand Junction and Mesa County, the plant treats wastewater for about 80,000 people.

The city chose the CNG project after a 2006 engineering study. “We looked at fuel cells, which had an 81-year payback,” says Tonello. “We looked at microturbines, which had about a 10-year payback, but there wasn’t that much bang for the buck. It was a \$750,000 project with \$75,000 a year in positive revenue.”

The plant already had cheap electricity at 6.5 cents per kWh, so those two alternatives didn’t offer much margin. While more expensive, the \$2.8 million BioCNG system (Unison Solutions) offered a better payback financially and environmentally. The project was funded in part by a \$500,000 state grant from the Colorado Department of Local Affairs.

## LITTLE PLANT IMPACT

The CNG system went online April 16, 2015, and required only the addition of the BioCNG conversion equipment. “We tied into our existing anaerobic digesters and just diverted the gas from the existing flare to the new scrubbing equipment, where it is compressed and put into the pipeline to the fueling station,” says Tonello.

The CNG equipment doesn’t affect plant operations other than minor tweaks to the system during startup. “In the beginning it was a little scary,” says Tonello. “Would we be able to run it or did we need a contractor? The

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ABOVE: Producing 128,000 cubic feet of biogas daily, the digesters are heated with some of that gas, while the rest is now used to produce compressed natural gas for fueling the community’s growing fleet of CNG vehicles.

little upsets at startup gave our operators such a familiarity with it. We have so many other things here that are much more complicated than that gas treatment skid. It’s been a good thing.”

The cleanup and compression equipment accounted for \$1.5 million of the cost. The rest was for the 6-mile pipeline to the fueling station near the lot where the CNG-fueled vehicles are parked overnight. A cost-benefit analysis showed that it was cheaper to build the pipeline than to drive vehicles to the plant for refueling. The fueling station is also on an existing natural

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DAN TONELLO

gas line, so fuel is available even if the CNG supply from the treatment plant is interrupted.

The new system includes a flare for excess gas, but Tonello doesn’t expect it to be used. “If we need gas storage, we’ll certainly go with that. Our demand is probably going to exceed our production.”

## FINANCIAL ARRANGEMENTS

The production cost of the biofuel system is about \$1.04 per gallon. Renewable energy credits will greatly speed up the time to recover the investment. “For every gallon of biofuel we put into a vehicle, we get about 83 cents from renewable energy credits,” Tonello says. “That means we’ll be making gas for about 21 cents a gallon.”

The utility will charge \$1.50 per gallon to the city and county until the project is paid off. At that point, the price will be renegotiated and likely go down, providing long-term savings and a stable price.

Before going into the project, the city had no CNG vehicles and no fueling facility. The \$1 million fueling station was completed in 2011 with help from

\$850,000 in grants. In the meantime, 10 city-owned refuse trucks due for retirement were replaced with CNG vehicles, and Grand Valley Transit began converting its fleet of 28 buses to CNG as buses reached their end of life.

## GROWING FLEET

“There were so many moving parts,” says Tonello. “I’m grateful that the city council had the foresight to see the value in this. Going from diesel fuel to natural gas has saved hundreds of thousands of dollars per year in fuel expenses.”

The savings continue to grow now that the CNG system is online and more CNG vehicles are added. They do cost more, but Tonello says the extra



After biogas is cleaned and compressed, it is piped to a CNG fueling station so employees don’t waste fuel and time driving 6 miles to the wastewater treatment plant.



The Persigo plant also uses renewable energy with a 98 kW Sunsense solar photovoltaic system installed in 2011.

expense is worth it. “When you have vehicles with high fuel use, they pay back very quickly. Currently, we have one car, one street sweeper, 10 refuse trucks that get about 2 miles to the gallon, 10 pickup trucks, six dump trucks, and four transit buses.” More are being added; at the end of 2015, the city was expected to have 38 CNG-fueled vehicles.

Converting to CNG also has environmental benefits. “We were burning gasoline in the vehicles and flaring the biogas at the wastewater facility,” says Tonello. “We’ll offset the gasoline use by about 35 percent, or 146,000 gallons a year.” Carbon emission will be cut by about 88 percent, or 3 million pounds per year.

“We started looking at this internally more than 10 years ago,” says Tonello. “The technology in this field has come so far. What was available then and what’s available now, it’s just a huge difference. If someone looked at CNG several years ago, they need to look at it again because the technology is just amazing.” **tpo**



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