

# NATURAL GAS WEEK®

Vol. XXXI, No. 18



May 4, 2015

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## GTL Project in Oklahoma Helping Push Trend Toward Smaller Scale

Dirt has been turned on a gas-to-liquids (GTL) project in Oklahoma City that could become the standard bearer of a wave of projects across the US — all using the abundant supplies of natural gas the shale revolution has produced.

This project, though, goes a step further and has added landfill gas as another feedstock stream. When completed, it will take the landfill gas or natural gas and convert it into ultra-clean diesel, naphtha or paraffin wax. A joint venture between NRG Energy, Velocys, Ventech and Waste Management, the facility will not be gigantic — in fact it fits on about 20 acres. But for the developers, that's the point.

"It's a small plant but a big, really big market for us," Velocys Chief Executive Roy Lipski told *Natural Gas Week*. He said the facility at Waste Management's East Oak Landfill will be one of the first to use landfill gas as a feedstock.

The technology is not exotic, Lipski said. It uses the Fischer-Tropsch (F-T) process dating from the 1920s. What is new, he told NGW, is shrinking giant reactors down in size.

Velocys has pioneered the development of the microchannel F-T reactor that was originally invented in US national labs in the 1990s for the space program. Microchannel technology utilizes a new type of reactor and catalyst system that enables the entire plant to be scaled down while maintaining the same production economies of mega-projects.

Lipski said that since microchannel reactors are small, they can be prefabricated rather than custom built. This standardization and modularization enables Velocys to pursue a much greater variety of projects in locations that are not feasible using conventional reactors.

"And that translates into savings," Lipski said. "And savings is what companies want. They want to take that unused gas — landfill or natural gas here — and turn it into a revenue stream."

According to Velocys, conventional GTL technology is only economic for plants producing 30,000 barrels per day or more.

The smaller scale GTL plants such as the one being built in Oklahoma City are designed to be economic at 1,500 b/d to 15,000 b/d, requiring only 15 million to 150 million cubic feet of gas per day as feedstock.

The Oklahoma City project isn't the first to deploy micro- or small-scale GTL technology. Sacramento, California-based Greyrock Energy is working on one near Houston, but it does not use F-T technology (NGW Apr.27'15). Also, Primus Green Energy is also going small with a GTL solution for flared gas in North Dakota by turning it into gasoline, again using a technology other than the F-T process employed by Velocys (NGW Aug.25'14).

Velocys' business model is fairly straightforward: develop small-scale production sites close to natural gas resources.

With stranded or wasted gas in mind, he said, Waste Management seemed like the perfect partner for a joint venture to develop biogas, taking a gas that was bleeding off into the atmosphere and turning it into fuel that the companies can either use or sell in a regional market.

Oklahoma City is just the beginning, though, for Velocys. A second plant is planned in Ashtabula, Ohio, near Lake Erie using natural gas from the Marcellus Shale. This plant was acquired by Velocys when they purchased small-scale GTL project developer Pinto Energy in June.

Lipski told NGW that initial engineering is complete and permits have been issued adding that the plant boiler plate capacity will have an initial production of 2,800 b/d with expansion potential up to 10,000 b/d.

Both projects are central to Velocys' mission, Lipski said.

"And that is bring small-scale GTL to the mainstream of the industry," he said. "We are preparing for this 'new age of gas' we find ourselves in ... [when] we will have to make more and more things from natural gas. We can take this natural gas and, on a small scale, turn it into ultra-clean diesel."

**John A. Sullivan, Houston**