

Built. Operated. Proven.

How Velocys delivered the first commercial FT GTL renewable fuels plant

Client

Envia – A joint venture between Waste Management, NRG Energy, a regional EPC firm, and Velocys



Envia GTL plant during operation

Challenge

Design, build, and operate a first-of-a-kind (FOAK) gas-to-liquids (GTL) plant using landfill gas (LFG) as feedstock to:

- Prove Velocys' Fischer-Tropsch (FT) technology at commercial scale
- Deliver revenue from renewable diesel, wax, and naphtha
- Generate RINs from renewable diesel to support project economics
- Gain real-world operational experience with FT units

Solution

At the East Oak Landfill in Oklahoma City, OK, Envia constructed a commercial GTL facility centered on Velocys' microchannel reactor and Oxford-engineered high-activity FT catalyst. Velocys assumed leadership of commissioning and operational oversight during a critical phase of the project.

The system converted landfill gas into synthetic crude via a steam methane reformer (SMR) and Velocys' FT reactors. This crude was then separated into renewable diesel, wax, and naphtha.

Outcomes and achievements

Technology proven at commercial scale

Velocys became the only FT licensor to successfully operate its system commercially in a GTL plant using renewable feedstock.

Exceptional FT technology performance

FT unit achieved >6,000 hours of on-spec production.

Revenue and environmental credit generation

- Produced and sold 1.6 million liters of renewable diesel, wax, and naphtha
- Generated Renewable Identification Numbers (RINs), validating regulatory and market value

Operational excellence

- Zero recordable safety incidents during the project
- Additional 1,000+ kW/day of renewable electricity generated via steam turbine integration



Overhead shot of the Envia landfill-to-fuels plant after construction

Hands-on expertise for Velocys

Valuable operational experience in catalyst loading, startup, commissioning, and process control that can be leveraged in future designs.

By the numbers



1st and only FT technology

operated at commercial scale to produce renewable fuels in a GTL plant (as of this writing)



>6,000 hours

of commercial FT runtime



200 barrels

per day peak output



1.6 million liters

of renewable products delivered

Key learnings for future deployment

- **Plan for feedstock variability.** LFG quality and flow can fluctuate more than expected.
- **Select robust technologies.** FT reactor and other process technologies must be able to quickly handle varying operating conditions.
- **Unify control systems.** Integrated systems reduce human error, simplify operation, and improve troubleshooting.
- **Design for onsite maintenance.** Include provisions for frequent, low-complexity tasks that can be handled without third-party support.

Project completion

Despite technical success, variability in landfill gas supply, cooling system limitations, and operational economics led Envia to cease operations in 2018. Several components were later repurposed in a renewable natural gas facility.



Envia plant showing the SMR tower on the left with FT island behind it on the right side

Legacy

Envia proved that Velocys FT technology works:

- At scale
- Under real-world conditions
- With renewable feedstock

The project remains a pivotal milestone in the evolution of waste-to-fuel commercialization and demonstrated the viability of compact FT systems in distributed fuel production.

Learn more about licensing proven, cost-cutting FT technology at [Velocys.com](https://www.velocys.com).



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