# BioGTL Overview Updated Feb 22, 2024



### **Executive Summary**

Emerging Fuels Technology (EFT) has updated its BioGas to Liquids (BioGTL) plant designed to produce Drop-In compatible transportation fuels - diesel, iet and naphtha (gasoline blend stock) - from renewable biogas. The key to utilizing biogas as a feedstock lies in our ability to shrink the plant size down to fit available biogas resources. The nominal plant size is now 100 BPD, designed for remote, unmanned operation at landfills, agricultural bio-digesters and wastewater treatment facilities that produce renewable biogas. The resulting transportation fuels qualify for Federal D3 and D7 RINs (Renewable Identification Numbers) under RFS2 (Renewable Fuels Standard). California and Washington's LCFS (Low Carbon Fuel Standard) credits are also possible for product delivered to these states. Carbon Intensity (CI) scores under LCFS can vary widely based on the biogas source and any methane mitigation credits. In North America. these resources are sufficient to support over a thousand BioGTL plants. For applications using RNG (which eleminates the need for biogas cleanup) taken from the pipeline EFT has a 500 BPD system which offers significant economy of scale. EFT's BioGTL design delivers the lowest CAPEX per unit of plant capacity of any known advanced biofuel pathway. Recent pricing of the modules from a qualified engineering/construction fabricator plus an estimated cost of installation of the entire system in a Gulf Coast location indicates the 500 BPD plant can be built and installed (US Gulf Coast) for under \$200,000 per barrel of daily capacity. We believe this is the lowest CAPEX per barrel of capacity for any known cellulosic renewable liquid fuel plant at any size! Current pricing for the 100 BPD case is in the range of \$250,000-\$300,000 per barrel of daily capacity (biogas clean-up not included).

#### **Summary of Features**

- Nominal capacity 1,428,000 Gal/yr (100 BPD) or 7,140,000 Gal/yr (500 BPD)
- Feedstock Biogas with methane content between 48% and 62% for 100BPD, or RNG for 500 BPD
- Plot area required less than 100 ft x 200 ft (for both sizes)
- Can generate most of its own power needs (design option)
- Requires no water source
- Can be equipped for unattended with remote (satellite) monitoring and control as needed
- Built entirely from truckable modules
- Can be disassembled and moved relatively easily
- Product storage is included in cost estimate

EFT's MaxxJet/MaxxDiesel upgrading technology, when combined with our highly selective FT catalyst, produces some of the highest middle distillate yields in the industry.

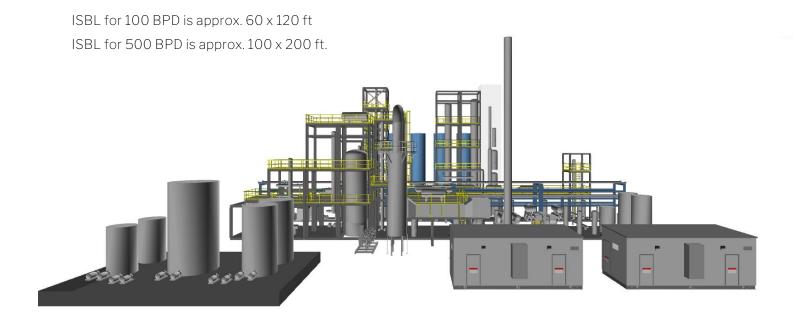
- In "Diesel mode" 85% Diesel, 15% Naphtha
- In "Jet mode" 80% SPK\*, 20% Naphtha (100% Jet option coming soon)
   \* Synthetic Paraffinic Kerosene (SPK) ASTM 7566, Annex 1. Also referred to as Sustainable Aviation Fuel (SAF).

### **Product Specifications**

EFT's MaxxJet/MaxxDiesel upgrading technology can produce diesel to a variety of different specifications including European and Military specs. Yields may vary. Typical product specifications for Diesel, Synthetic Paraffinic Kerosene (SPK) and Paraffinic Naphtha are available on our website.



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#### **Operations & Maintenance**

Both the 100 BPD and 500 BPD BioGTL plants are designed for future autonomous operation. Each Plant will be equipped with a satellite link and multiple cameras to remotely monitor, with the ability to take control as needed. The system will also provide the ability to remotely authorize custody transfer of products.

### Summary

We believe BioGTL is the lowest cost path to cellulosic renewable fuels. It is very low risk to implement with huge potential for mass production and deployment in numerous locations around the world. The much shorter time to complete a project makes the development of multiple BioGTL projects advantageous when compared to a single larger biomass to liquids project as is demonstrated in our white paper "Comparing BioGTL to Larger Renewable Fuels Plants."

Call us anytime to discuss...

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#### About Us:

Emerging Fuels Technology (EFT) is a technology company focused on methods for producing synthetic fuels and specialty products from a variety of feedstocks such as natural gas, biogas, biomass, municipal solid waste (MSW), sources of CO2 and bio-derived oils. EFT is one of the world's foremost authorities on



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Fischer-Tropsch (FT) and related synthesis, licensing the core technologies and upgrade packages for projects from 50 to 10,000 barrels per day. <a href="https://www.emergingfuels.com">www.emergingfuels.com</a>

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