

Summary/Abstract**Project Title: Demonstration Scale-up: TRIFTS Biogas to Renewable Fuel****Lead Organization: T2C-Energy, LLC****Principal Investigator: Devin Walker**

T2C-Energy developed and patented a proprietary process, we have trademarked TRIFTS[®], by which to convert biogas (or landfill gas) to liquid transportation fuels. This project seeks to scale the TRIFTS technology to enable the design and construction of a demonstration plant achieving a TRL of 7 by the end of the project. The TRIFTS process has been thoroughly tested at the pilot scale (over the past two years) processing a 9-24 scfm slipstream of raw biogas into drop-in renewable transport fuel. The process is capable of utilizing both the carbon dioxide and methane portions of biogas and incorporates the biogenic carbon from them into the hydrocarbon backbone of the final fuel product of the process. In doing so the technology essential uses 100% of the biogas as a feedstock. The use of carbon dioxide (CO₂) is a critical cost reduction step as it represents 40-50% of the total makeup of biogas effectively doubling the utilizable carbon compared to technologies that remove CO₂ utilizing expensive pretreatment processes. We have previously identified a candidate landfill with our project partners to implement a 1,300 scfm biogas capacity plant and produce over 1,000,000 gal/yr of renewable cellulosic diesel. This renewable source of diesel resembles its petroleum counterpart both physically and chemically, passing ASTM D975 specifications, and can be used in current day engines with no engine modifications. The demonstration plant final fuel product is tunable with the ability to produce renewable fuels for heavy trucking, aviation, and marine industries by varying process conditions within the FTS reactor with no equipment modifications required. By avoiding wax formation, we eliminate the necessity for expensive hydrotreatment, hydrocracking, and high temperature distillation post treatments of the FTS product. Proven performance at the demonstration scale makes future projects more financeable as technology risk is removed. Many of the inherent restrictions of waste to energy facilities in the US will be solved by this project; including, high capital costs, subsidy reliance, additional infrastructure costs, vehicle modifications, carbon capture, substandard financial performance, limited or specific feedstock, low fuel output, and scalability.