

ABSTRACT

Project Title: TRIFTS Biogas to Renewable Fuel Technology Evaluation

Project Applicant: Yolo County

Project Director/Principal Investigator: Ramin Yazdani

Project Investigators: Mr. Devin Walker (T2C-Energy), Dr. Troy Hawkins (Argonne National Lab), Professor Anthony Wexler (UC Davis-Air Quality Research Center)

The Yolo County Department of Community Services, Division of Integrated Waste Management is applying to evaluate the Tri-reforming and Fischer Tropsch Synthesis (trademarked TRIFTS®) Biogas to Renewable Fuel Technology. This project seeks to perform feasibility and technical demonstration testing to determine the best strategy to convert waste gas to energy at the Yolo County Central Landfill (YCCL). The main objective of this project is to complete a TRIFTS® pilot test and feasibility study of various technologies utilizing sources of biogas readily available at the YCCL and converting this to liquid transportation fuels.

This project will begin by establishing a baseline of performance and costs associated with the YCCL's current waste-to-energy operations. T2C-Energy, a leading energy infrastructure company, will verify the County's data and complete an initial business-as-usual feasibility report. Stakeholders, including the County's Waste Advisory Committee and representatives from local cities and counties, regulatory agencies, educational institutions, and a newly formed technical advisory committee will have an opportunity to discuss a buy-in and reach agreement to move forward with the Pilot phase. The Pilot phase will consist of pre-site evaluations, permitting, and implementation of an operational and safety plan before moving forward with the mobilization of an onsite TRIFTS® pilot unit. T2C-Energy will complete more than 500 hours of continuous pilot testing at the YCCL. At the end of pilot studies. Key inputs/outputs will be monitored, and fuel samples will be sent to a third-party lab for analyses. Other parameters monitored will include contaminant removal efficiency, individual reactor efficiency, fuel quality/quantity, liquid waste, solids waste, air emissions, and outside utility usage.

Yolo County, UC Davis-Air Quality Research Center, and an independent consultant will review the TRIFTS pilot data and preliminary report before reviewing with stakeholders for comments and recommendations. T2C-Energy will then collaborate with Argonne National Lab to complete a full feasibility study. T2C-Energy will also complete a Life-Cycle Assessment (LCA) and Techno-Economic Assessment (TEA) to compare against current commercially ready technologies. After review with stakeholders the County will determine the best path forward for near- and long-term waste management.

This project will aim to inspire Yolo Community and other jurisdictions and the private sectors to implement similar project at other landfills or anaerobic digester facilities. Preliminary LCA models give a carbon intensity score of -37 gCO₂e/MJ for TRIFTS fuel for landfill gas and show that the project does not require government assistance (RIN, LCFS) to be cost effective.