

“Clean water, sustainable aviation fuel and renewable diesel production from wastewater”

Applicant: **MicroBio Engineering Inc.**
 Principal Investigator: **Mr. Braden Crowe.**
 Topic: Topic 1 Scale-up of Biotechnologies
 Subtopic 1a. Pre-Pilot for Biofuels and Bioproducts
 Major Participants: University of Illinois Urbana-Champaign (Champaign, Illinois)
 Pacific Northwest National Laboratory (Richland, Washington)
 California Polytechnic State University (San Luis Obispo, California)

Project Description:

Conversion of wastewater sludges to finished fuels for the aviation, heavy-duty trucking, and marine fuels markets by hydrothermal liquefaction (HTL) has a 1.1 billion gallon/yr national potential, with highly favorable technical, economic (<\$2.50/gge), environmental (80% reduction in greenhouse gas emissions relative to fossil fuels), and community social benefits (see TEA, LCA, Market Transformation sections). However, the leading organization in this field, PNNL, has only conducted 30 runs in small-scale (0.02 DT/day throughput) trials using sludges from only four wastewater treatment plants (WWTPs, 3 activated sludge and 1 raceway algae WWTP). Additionally, unit operations to treat toxins in the aqueous phase (AP) byproduct have not yet been validated. Limited, although encouraging, HTL trials have been conducted at a 0.08 DT/day throughput. In this project, we aim to advance the state of technology with an additional 6-fold HTL scale-up (to 0.5 DT/day feed throughput), operated for 750 hrs cumulative time on stream in a series of continuous trials (>100 hrs each). The biocrude oil will be upgraded and separated into finished products for ASTM testing, both by project participants and downstream oil refineries. HTL AP Treatment and nutrient recovery strategies will be identified and validated by continued testing of pre-pilot byproducts. Combined, this project will de-risk the HTL technology to justify the next phase, a fully-integrated pilot.

