Control Number: 2638-1516
Applicant: LanzaTech, Inc.
PI: Dr. Rick Rosin
Title: RESTORE: Replenishing EcoSystems by Transforming Residues to Energy
Partners: LanzaJet Inc., PNNL, USDA ARS, RSB

Objectives

Bringing zero-discharge, small biorefineries to remote forests, grasslands, and other biomass and MSW resources too small to support large biorefineries will create a sustainable manufacturing network that strengthens rural economies and contributes to the multi-agency Sustainable Aviation Fuel (SAF) Grand Challenge. RESTORE addresses a critical need for systems to operate at or near waste sources, with minimal infrastructure and environmental impact. RESTORE will quantify long-term impacts of forest thinning management on forest fire frequency/magnitude, sustainable forest biomass/residue supply, and air/water quality for rural/tribal land watersheds.

Project Summary

LanzaTech proposes to pilot an integrated field-deployable, zero-discharge, biorefinery concept for distributed production of ethanol – as feedstock for larger LanzaJet™ alcohol-to-jet SAF facilities – and biochar for soil amendment. One target application is processing residues and small-bore trees removed by the US Forest Service (USFS) to reduce wildfire risk. Pacific Northwest National Laboratory (PNNL) will assess ecosystem services impacts at the watershed level and Roundtable on Sustainable Biomaterials (RSB) will advise on requirements for sustainability certification.

The pilot will consist of a low cost, easy to operate, air blown gasifier coupled with LanzaTech's second generation bioreactor (2GBR). The ethanol will be converted to sustainable aviation fuel at LanzaJet's Freedom Pines Fuels facility, in Soperton, Georgia. USDA's Agricultural Research Laboratory (ARS) in Corvallis, Oregon will assess biochar quality for soil uses, including returning carbon to forest.

Project Impact

The applications of low cost and simple distributed conversion systems extend to agricultural waste and municipal solid waste at medium and small landfills. This project will provide the engineering underpinnings of such a system and provide pilot data needed to move the technology forward. The DEI work in this program will extend outreach into local schools working with teachers to develop curriculum content that provides students with the skills to be competitive for future clean, safe, good-paying job opportunities.