Project Title: Cellulosic-Derived Advantage Jet Fuel
Name of Applicant: University of Colorado - Boulder
FOA Area of Interest: AOI 5 Optimization of Bio-Derived Jet Fuel Blends
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Project Team: University of Colorado – Boulder
National Renewable Energy Laboratory
Virent Inc.
Shell

Objectives: This project will produce a jet fuel from cellulosic-derived sugars using a novel catalytic processing technology. The produced liquid fuel will have high combined content of cyclo-paraffins and dicyclo-paraffins, compounds that have high energy density, thermal stability, and low freeze point, all of which are desirable and advantage properties for jet fuel. With improved yields and process efficiencies it is expected that the proposed integrated process will generate a biomass-derived advantaged jet fuel that meets BETO requirements for MFSP and is competitive with conventional jet fuel derived from fossil fuels.

Description: The proposed project will be led by the University of Colorado-Boulder (CU) in partnership with the National Renewable Energy Laboratory (NREL), Shell, and Virent. This project combines the DMR deconstruction technology developed by NREL with a novel catalytic conversion technology first discovered by Virent. Virent is supporting this project by providing a research license, equipment and knowhow to allow the effective catalytic conversion of biomass-derived sugars to generate a jet fuel that contains high concentration of the cyclo-paraffins and dicyclo-paraffins. Shell, one of the leading providers of jet fuel to the aviation industry, will provide analytical support by conducting analysis for ASTM approval as well as conduct blending studies of the generated jet fuel. The University of Colorado will lead the project, upgrade facilities to house the catalytic conversion processing unit, and conduct fundamental studies of the catalytic chemistry to guide improvements of the catalytic process.

Impact: The proposed process of generating jet fuel from cellulosic feedstocks provides a route with the potential of generating a large volume of product (7 to 14 billion gallons) from corn stover at a price point competitive with conventional jet fuel, but with superior properties to conventional jet fuel. This project will leverage previous EERE funding to develop a similar concept to generate the advantage jet fuel from corn stover. This proposed project would provide the necessary evidence for improved yields and operability of the proposed system to allow this technology to move toward commercialization. Additionally, EERE funding will allow the development of capabilities at NREL to demonstrate end-to-end processing of biomass-derived sugars to jet fuel and generate gallon quantities of fuel. Once in place these capabilities can be applied to other catalyst processes necessary to convert biomass feedstocks to either high purity chemicals or fuels with specific property requirements.