

Decarbonizing the Skies – Sustainable Aviation Fuel from Alder Biocrude Oil

Prime Organization: Alder Fuels

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The goal of Phase One is to complete the engineering design work to establish the first Alder Fuel's demonstration facility in the southeastern U.S., which will be rated to process 120 dry metric tonnes per day (MTD) of forest residuals and produce 3 million gallons per year (MGPY) of liquid hydrocarbon biofuel. Critically, 2 MGPY will be sustainable aviation fuel (SAF). Success at the demonstration scale will enable Alder Fuels to rapidly scale to commercial levels and produce SAF with more than a 70% reduction in the carbon intensity and minimum fuel selling price below \$4/gallon. This project will accelerate the company's core mission to deliver 1 billion gallons of SAF by 2030, in line with the Biden Administration's SAF Grand Challenge, and Alder's offtake commitments to United Airlines and Avfuel for 1-billion gallons each.

The Alder Fuel's approach to scaling SAF integrates commercial fast pyrolysis technology into existing refinery infrastructure. Alder builds upon decades of technical learning within the pyrolysis community to separate highly reactive components in fast pyrolysis oil that plug hydrotreaters into an aqueous phase and convert the remaining organic components into hydrocarbons. This enables downstream distillate hydroprocessing using commercial sulfided, base-metal catalysts as practiced today to process fats, oils, grease (FOG) and petroleum. Alder biocrude can be co-hydroprocessed with esters and fatty acids (HEFA) to deliver SAF with exceptional energy density, reduced sooting tendency, and polymer seal swell.

This project will be executed with the following work plan objectives:

- Complete the integrated design for the Demo Facility, to include engineering for woody biomass pre-processing, fast pyrolysis, biocrude oil production, and hydroprocessing
- Deliver neat and blended fuel properties for Alder biofuel cuts that include properties for 100% SAF, high-octane gasoline, low-sooting diesel, and marine fuel properties
- Update techno-economic, life cycle analysis, and pro-forma cash flow models, as well as commercial-sale projections using the latest project data
- Implement DEI objectives that include site and vendor selection, staff training and organizational policies, and recruiting and hiring across the project team

Investment from the DOE is mission-critical at this stage of the company's scale-up journey and will provide much-needed support for demonstration-level de-risking and technical due diligence. Success will generate the technical data needed to rapidly deploy Alder SAF production in the United States and aid the global race to net zero. If realized to its full potential, this technology can also spur new U.S. jobs and new innovation within a decarbonized energy, support and positively-impact key socioeconomic indicators amongst rural communities, deliver substantial greenhouse gas reductions, and reduce our dependence on crude oil – a goal that is becoming more and more vital as the geopolitical terrain changes around us.