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## Renewable Jet Fuel from Woody Biomass

By [Marina Bowie](#) | February 22, 2019



Gevo aviation fuel used to power first commercial flight using wood-based fuel  
(Photo Credit: Giving Trax)

According to the [Inventory of U.S. Greenhouse Gas Emissions and Sinks \(1990-2016\)](#), the transportation sector is one of the largest contributors to U.S anthropogenic greenhouse gas emissions, at 28%. Of the 28%, aircraft transportation contributes 9% of emissions. Luckily, biobased technology companies have found ways to convert post-harvest forest residuals, or left over woody biomass, into renewable jet fuel. In fact, researchers in Maine are working on technology to make renewable diesel and jet fuel from woody biomass. Nationally, companies have perfected and proven their technology at commercial scale, and their fuel has been deployed on commercial flights.

Researchers at the University of Maine's Forest Bioproducts Research Institute (FBRI) are turning woody biomass, including fallen tree limbs and other wood harvest residuals, into "green" chemical intermediates. From there, the University uses their patented conversion technology to produce small amounts of hydrocarbon fuel oil. [In 2017, the University demonstrated the technology in 100 hours of continuous operation.](#)

Leaders in the manufacture of renewable jet fuels from wood include Gevo and Velocys. [Gevo](#) is a low carbon chemicals and fuels company which uses the greenhouse gas emissions stored in plants in the form of carbohydrates, to produce renewable jet fuel, gasoline, and other products traditionally made using petroleum and natural gas. [To make Gevo's renewable jet fuel](#), carbohydrates (which store CO<sub>2</sub>)

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from woody biomass are separated from protein and fermented using specially designed yeast to make ethanol, isobutanol, and higher alcohols. The isobutanol is then converted using catalytic processes to produce hydrocarbons, and ultimately the Gevo bio-jet fuel.



Fueling the first commercial flight to use wood-based aviation fuel  
(Photo Credit: Alaska Airlines)

In Lakeview, Oregon, [Velocys](#) is licensing technology for the Red Rocks Biofuels (LLC) biorefinery, which will produce 15 million gallons per year of renewable fuels. The RRB biorefinery is currently under construction. When operational, Velocys reports that RRB will produce enough jet fuel to power 1,800 round trips per year from Portland, Oregon to San Francisco. Crucial to the success of this project are RRB's big-brand commercial off-take agreements. [Biofuels Digest reported](#) that FedEx and Southwest Airlines joined in an offtake agreement to purchase the total volume of Red Rock's jet fuel from its first commercial plant.

[Velocys](#) uses gasification and Fischer-Tropsch technology to create renewable fuels from forest industry residues and municipal solid waste. And according to Velocys, their fuels yield net greenhouse gas emission reductions of 60% compared to their petroleum derived counterparts.

[In Maine, annual harvests of nearly 12 million green tons per year produce forest residues and low-grade pulpwood that seeks new markets.](#) Much of our forest residue that lacks markets could be used to produce renewable jet fuel. In fact, Velocys has indicated that it prefers the type of wood that Maine has available (e.g., softwood) for use in its technology.

So why aren't we seeing any facilities in Maine to manufacture renewable jet fuel from woody biomass? Part of the reason is because it is still unclear whether Maine's woody biomass qualifies as "renewable biomass" under the U.S. Environmental Protection Agency-administered national [Renewable Fuel Standard as amended by the Energy Independence and Security Act of 2007 \(RFS2\)](#).

So why aren't we seeing any facilities in Maine to manufacture renewable jet fuel from woody biomass? Part of the reason is because Maine's woody biomass does not meet the requirements to receive RIN credits under the U.S. Environmental Protection Agency-administered national [Renewable Fuel Standard as amended by the Energy Independence and Security Act of 2007 \(RFS2\)](#).



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Under the Renewable Fuel Standard (RFS), transportation fuels sold in the U.S. are required to contain a minimum volume of renewable fuels. When a refinery complies with the RFS, they receive [RINs](#) (proof of compliance under the RFS) for each batch of biofuel produced. When a refinery blends more ethanol than required by the RFS, this results in excess RINs, which the company can then sell on the market to other refiners who may not be able to meet their blending requirements. Therefore, this market-based compliance tool allows biorefineries to compete in the market for fuels.

Unfortunately, because biofuel made from sustainably harvested Maine wood doesn't currently qualify for RINs, Maine does not benefit from the positive economic impacts of the RFS that is currently being enjoyed by plantation-grown trees and corn. It's unfortunate that Maine's naturally-regenerating forests, [which are considered by some to be a more sustainable feedstock than corn](#), do not qualify for RIN credits.

Biobased Maine has learned that some forest industry stakeholders in Maine are working on revising the way EPA interprets the RFS2, and we hope this issue gets resolved quickly so that Maine can help speed the transition from fossil-fuel derived aviation fuel to renewable aviation fuel made from sustainably grown and harvested second-generation feedstock.

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