

Pilot-Scale Biorefinery

Sustainable Transport Fuels from Biomass and Algal Residues via Integrated Pyrolysis and Catalytic Hydroconversion

This project will leverage two commercially proven core technologies into an integrated platform—pyrolysis of biomass from Ensyn Corporation and hydroconversion from UOP.

Project Description

UOP proposes to conduct a pilot-scale operation of a fully integrated process to convert high-impact biomass to fuels, including gasoline, diesel, and jet range hydrocarbon. Feedstock producers will provide feed and information for detailed life-cycle assessment and growth potential. The feeds will be converted to fuels via integrated pyrolysis and hydroconversion. Refiners and engine manufacturers are also team members, to demonstrate fungibility of the fuels within the refinery, determine fuel properties, and accelerate qualification and acceptance as liquid transportation fuels.

UOP is currently working with the U.S. Department of Energy to develop pyrolysis oil-upgrading technology, which will improve stability of the products and remove highly reactive components that will allow further, more cost-effective processing of the pyrolysis oils. The unit will include RTP™ rapid thermal processing technology developed by Ensyn Corporation to convert the biomass to pyrolysis oil. The RTP technology has been in commercial use since 1989 and is



The UOP integrated biorefinery will convert a variety of biomass feedstocks to fungible liquid transportation fuels.

currently in use in seven units in North America.

The production of pyrolysis oils is envisioned taking place near areas of biomass production in order to transport a higher energy density product to the refinery where upgrading to fuels will take place. The stabilization of pyrolysis products will allow longer-term storage of feedstocks at the refinery. Once at the refinery, the pyrolysis oils will be processed using modified hydroconversion technologies to produce liquid transportation fuels.

Potential Impacts

As a result of this project, UOP anticipates deploying the technology

on a commercial scale. Each commercial application would have four RTP units and one upgrading unit to produce 50 million gallons of fuels annually, with the potential to create approximately 800 construction jobs and 1,000 permanent jobs, including in biomass production.

Other Participants

Other participants in the UOP project include the following: Tesoro; Ensyn; Pacific Northwest National Laboratory; Ambitech; Hawaii BioEnergy; Group70; Michigan Technological University; Ceres; Cargill, Inc.; Grays Harbor Paper LP; Imperium Renewables; Mesa Engineering; Countrymark Petroleum; Kern Oil; Honeywell; Boeing; and General Motors.

Prime	UOP, LLC
Location	Kapolei, Oahu, Hawaii
Feedstock (s)	Agricultural and forestry residue, wood, energy crops, and algae
Size	One ton per day
Primary Products	Gasoline, diesel, and jet fuels
Capacity	Four barrels per day
Award Date	Early 2010
GHG Reduction	60% reduction versus fossil fuel equivalent
Anticipated Job Creation	85 peak construction jobs and an average of 40 sustained per year during the project duration
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