

## Integrated Pilot Project for Fuel Production by Thermochemical Conversion of Woodwaste

ClearFuels-Rentech will integrate High Efficiency Hydrothermal Reformer (HEHTR) technology with Fischer-Tropsch synthetic gas-to-liquids technology for conversion of woodwaste and bagasse to diesel and jet fuel.

A major challenge of utilizing biomass for conversion to fuel and chemicals is the flexibility of a process to accept a variety of feedstocks and produce fuels that can directly replace existing petroleum derived fuels. ClearFuels has developed a process to thermochemically convert a variety of feedstock types that, when combined with Rentech's technology, are anticipated to provide direct replacements for diesel and jet fuel. For more information, visit: [www.clearfuels.com](http://www.clearfuels.com) [www.rentechinc.com](http://www.rentechinc.com)

### Project Description

An integrated pilot facility processing 20 dry tons per day will provide the necessary data for the completion of the first commercial facility using the joint technologies, with an anticipated operational date of late 2015.

Additional commercial facilities are also planned to start construction in Hawaii and the mainland United States before the end of 2015.

This project will demonstrate a flexible, cost-efficient, green, non-food source, integrated technology to transform woodwaste, bagasse, and mixtures of both into clean, renewable diesel and jet fuel using a single facility



*The ClearFuels-Rentech integrated biorefinery will be located in Commerce City, Colorado.*

design. The project will demonstrate the flexibility of the HEHTR technology to produce a wide range of low tar syngas with controllable H<sub>2</sub>:CO ratios from 1:1 up to 3.5 :1 to exactly match the needs of downstream processes. The project will also demonstrate the economical renewable syngas production combined with Fischer-Tropsch conversion and upgrading to diesel and jet fuel. The results of the integrated pilot will be the basis for design of commercial facilities.

### Potential Impacts

ClearFuels and its project partners will deliver an integrated biorefinery pilot demonstration project that proves the flexibility, efficiency, and versatility of the novel technology, leading to direct scale up for development of commercial ClearFuels-Rentech biorefineries, while creating immediate jobs and a pathway to direct substitution of petroleum products for U.S. energy independence. The diesel and jet fuel

produced will meet ASTM certifications for these fuels.

### Other Participants

ClearFuels is providing the HEHTR technology and has partnered with Rentech for its Fischer-Tropsch synthetic gas-to-liquids technology. Other participants include URS, Linde/Hydro-Chem, Hawaiian Electric, National Renewable Energy Lab, and Hawaii Natural Energy Institute.

On April 19, 2011 Rentech, Inc. exercised its option to acquire additional equity in ClearFuels Technology Inc. (ClearFuels). Rentech now owns a substantial majority of the equity of ClearFuels, with existing ClearFuels investors retaining a minority interest. The transaction was accomplished through the merger of a subsidiary of Rentech into ClearFuels, with ClearFuels continuing as the surviving company in the merger.

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| <b>Prime</b>                    | ClearFuels Technology   |
| <b>Location</b>                 | Commerce City, Colorado   |
| <b>Feedstock (s)</b>            | Woodwaste, Bagasse  |
| <b>Size</b>                     | 20 tons per day   |
| <b>Primary Products</b>         | Renewable F-T Diesel and F-T Jet Fuel   |
| <b>Capacity</b>                 | 420 gallons per day   |
| <b>Award Date</b>               | January 2011  |
| <b>GHG Reduction</b>            | 80% reduction versus fossil product   |
| <b>Anticipated Job Creation</b> | 12 sustained & 50 peak construction   |
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