Demonstration of a Pilot Integrated Biorefinery for the Economical Conversion of Biomass to Diesel Fuel

The Renewable Energy Institute International, in collaboration with Red Lion Bio-Energy and Pacific Renewable Fuels, is demonstrating a pilot, pre-commercial-scale integrated biorefinery for the production of high-quality, synthetic diesel fuels from agriculture and forest residues using advanced thermochemical and catalytic conversion technologies.

Toledo IBR Plant for Conversion of Carbon-Based Feedstocks to Diesel Fuel.

A next-generation, fully integrated biorefinery (IBR) pilot plant has been designed and built in Toledo, Ohio, for demonstrating the efficient and economical, direct conversion of 25 dry tons per day (dtpd) (ash free) of agriculture and forest biomass residues into high-quality, synthetic diesel fuel.

Information generated from this pilot demonstration plant is being used for the design and deployment of commercial-scale plants.

Project Description

The key project objectives are to accomplish the following:

- Operate the IBR plant for extended periods to collect sufficient technical, operational, and economic data for validation of the IBR technology
- Determine the best plant operating conditions that optimize the production of synthetic diesel fuel
- Demonstrate that the synthetic diesel fuel is suitable as an environmentally friendly, energy-efficient fuel for in-use, current, and future diesel engines.

Potential Impacts

The successful deployment of this IBR technology has the potential to significantly reduce U.S. dependence on foreign oil and mediate greenhouse gases and other pollutants; this will create a new, domestic clean-energy industry that can potentially create thousands of new, high-value jobs. This IBR technology has the potential to produce an estimated 1.5 billion gallons per year of high-quality synthetic diesel fuel by 2030, while reducing greenhouse gas emissions by 89% and tailpipe emissions by up to 50% compared to petroleum fuels.

Other Participants

In addition to Red Lion Bio-Energy and Pacific Renewable Fuels, the team includes experts in biomass sourcing, fuel production, syngas and fuel analysis, engine and vehicle testing, plant construction and operation, project finance, and other disciplines to help ensure the success of this project.

Commercial Deployment

Synterra Energy, Inc. has been established for the deployment of commercial plants with the potential of creating up to 80,700 new U.S. jobs by 2030.

Prime	Renewable Energy Institute International
Location	Toledo, Ohio (IBR site); Sacramento, California, and Maumee, Ohio (IBR Engineering)
Feedstock (s)	25 dry tons per day of agriculture and forest residues
Primary Products	Approximately 54 gallons of drop-in synthetic diesel fuel from one dry ton of biomass
Award Date	January 2010
GHG Reduction	89% compared to petroleum-derived fuels
Anticipated Job Creation	110 jobs during peak construction with an average of 30–35 jobs over the three-year project period
Company Contact	Dr. Dennis Schuetzle, Principal Investigator, www.reiinternational.org

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