

High-Yield Hybrid Cellulosic Ethanol Process Using High-Impact Feedstock for Commercialization

ZeaChem will deploy their hybrid biochemical and thermochemical technology to produce fuel-grade ethanol from poplar and other feedstocks.

ZeaChem is constructing a 250,000 gallon per year cellulosic biorefinery in Boardman, OR. The biorefinery will convert 10 bone-dry tons per day of cellulosic feedstock into ethanol. ZeaChem anticipates a 95% reduction in life cycle greenhouse gas emissions for fuel production in its commercial biorefineries compared to conventional gasoline. This project will create approximately 19 direct jobs. Once the ZeaChem process has been demonstrated and deployed, it has the potential to create many more jobs throughout the United States.

www.zeachem.com

Project Description

The technology uses chemical fractionation to separate the feedstock into a sugar-rich stream and a lignin-rich stream. The sugar stream is converted into acetic acid using naturally occurring bacteria, or acetogens, which produce no carbon dioxide during the fermentation process and enabling 100% carbon conversion. The acetic acid is processed into an acetate ester; an intermediate bio-based chemical which can be marketed and sold. The



(Left) Coppiced hybrid poplar tree harvesting at Greenwood Resources' Boardman, Ore. plantation. (Right) ZeaChem's 250,000 gpy integrated biorefinery under construction in Summer 2011.



ester is then converted into ethanol via hydrogenolysis.

Funds from this grant will be used to construct and operate an addition to ZeaChem's existing ethyl acetate production facility, resulting in a fully integrated cellulosic ethanol facility. The operations plan includes a step-wise start-up of the facility beginning by the end of 2011, followed by fully integrated operations. ZeaChem will begin running the integrated pilot plant on hybrid poplar trees supplied by Greenwood Resources, as the feedstock is readily available in the vicinity of the plant. After completing the trials on poplar trees, ZeaChem will also run trials on alternative cellulosic feedstocks including corn stover and wheat straw to ensure that their technology can be duplicated in other locations around the United States.

Potential Impacts

This project will create jobs, reduce greenhouse gases, and reduce the United States' dependence on foreign oil.

Other Participants

Valero Energy Corporation, Burns & McDonnell, Greenwood Resources, Andritz, Continental Technologies.

Prime	ZeaChem, Inc.
Location	Boardman, OR
Feedstock (s)	Hybrid poplar and other cellulosic feedstocks
Size	10 Tons per day
Primary Products	Ethanol and intermediate chemicals
Capacity	250,000 GPY
Award Date	January 2010
GHG Reduction	95 % reduction versus conventional gasoline
Anticipated Job Creation	19
Company Point of Contact	Tim Eggeman, Ph.D., P.E., Chief Technology Officer, Founder, time@zeachem.com