Pilot Integrated Cellulosic Biorefinery Operations to Fuel Ethanol

ICM, Inc. has modified its existing pilot plant and begun operations to use its biochemical conversion technology to produce fuel-grade ethanol from corn fiber, switchgrass, and energy sorghum.

35,000-gallon hydrolysis reactors

10 T/D pre-treatment skid

ICM, Inc. is leveraging its existing dry fractionation grain-to-ethanol pilot plant, located at LifeLine Foods, LLC in St. Joseph, Missouri. Co-locating the cellulosic biorefinery with the existing grain-to-ethanol pilot facility is accelerating pilot operations and improving the economics of the process. Each day, the integrated biorefinery processes 10 bone-dry tons of feedstock into ethanol.

Project Description

ICM, Inc. is operating the pilot cellulosic integrated biorefinery using a biochemical platform pretreatment and enzymatic hydrolysis technology coupled with a robust C5/C6 co-fermenting organism to refine cellulosic biomass into fuel ethanol and co-products. ICM's process addresses pretreatment, hydrolysis, fermentation, and feed production, which represent key technology advances needed for the cost-effective production of ethanol from cellulosic biomass. ICM, Inc. plans to use energy sorghum and switchgrass to evaluate the advantages of a co-located cellulosic/starch biorefinery against a standalone cellulosic biorefinery. In addition, ICM, Inc. has formulated an "integrated fiber" concept that is expected to allow existing corn/milo ethanol plants the ability to convert corn/milo fiber cellulose with a bolt-on addition to their existing facility at a much reduced cost. ICM, Inc. is proving its fermentation strategies that co-ferment both C5 and C6 sugars that result from lignocellulose hydrolysis. Applying these strategies has produced high-titer cellulosic ethanol and reduced capital and operating costs, as well as producing significant volumes of animal feed.

Potential Impacts

In addition to creating an economically efficient model for future biorefineries, the bio-based substitutes generated by this facility have the potential to reduce greenhouse gases (GHGs) by 55% when compared to petroleum-based products, as well as displace imported oil that is currently used to make commercial fibers, solvents, and fuel additives. The intent is to help move the United States closer to petroleum independence and reduce GHG emissions. In addition, more than 70 permanent and temporary jobs have been created as a result of this project.

Other Participants

ICM, Inc. has collaborated with Novozymes and others to make this scope of work possible.

Prime	ICM, Inc.
Location	Colwich, Kansas (Headquarters), St. Joseph, Missouri (Project)
Feedstock(s)	Corn Fiber, switchgrass, and energy sorghum
Size	10 tons of cellulosic feedstock per day
Primary Products	Cellulosic ethanol
Capacity	245,000 GY fuel or product
Award Date	January 2010
GHG Reduction	55% reduction versus fossil product
Anticipated Job Creation	21 sustained jobs created by this project; 50 temporary jobs created during peak construction
Company Point of Contact	Douglas B. Rivers, Ph.D., Director of Research & Development, 316-977-8502; Monique Pope, Government Affairs, 316-977-6508

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