

# Commercial-Scale Biorefineries

*Fuel Product: Ethanol*

Performer	Location	DOE Award*	Feedstock Type	Conversion Technology	Fuel / Capacity**	Status
<b>Abengoa</b>	Hugoton, KS	\$100M	Corn Cobs	Biochemical Process	25 M gals Ethanol/yr and 15 MW Power	Phase 1 Award for engineering design and environmental permitting NEPA EIS process completed. Record of Decision imminent.
<b>Poet</b>	Emmetsburg, IA	\$100M	Corn Cobs	Biochemical Process	25M gals of Ethanol/yr	Phase 2 TIA Award issued, engineering and construction in progress.
<b>BlueFire Ethanol, Inc.</b>	Fulton, MS	\$87.6M	Woody Biomass	Biochemical-Concentrated Acid Hydrolysis	19M gals Ethanol/yr	Phase 1 Award for engineering design and environmental permitting. Site preparation underway.
<b>Range Fuels, Inc.</b>	Soperton, GA	\$76.2M	Woody Biomass	Gasification + Mixed Alcohol Synthesis	5 M gals Methanol/yr	Phase 2 TIA Award issued, construction complete, in start-up and commissioning.
<b>Mascoma Corporation</b>	Kinross, MI	\$75M	Woody Biomass	Biochemical Process	40M gals of Ethanol/yr	Phase 1 Award for engineering design (pilot in Rome, NY), NEPA EA, and securing financing. Phase 2 Award likely in Spring 2011.

\*Award amounts still under negotiation.

\*\*Fuel capacities are based on performers estimates.

# Demonstration-Scale Biorefineries

*Fuel Product: Ethanol*

Performer	Location	DOE Award*	Feedstock Type	Conversion Technology	Fuel / Capacity**	Status
<b>RSA</b>	Old Town, ME	\$33.9M	Hemicellulose from Wood	Biochemical-Acetic Acid & Formic Acid Extraction	1.5M gals Butanol/yr 2.1 Mgy Acetic .7 Mgy Formic	Phase 1 Award Environmental and Engineering in Progress.
<b>Lignol Innovations</b>	TBD	Up to \$50M	Woody Biomass	Biochemical - based on original 'Alcell' technology	2.5M gals Ethanol/yr	Phase 1 Award. Pilot facility in Vancouver, BC.
<b>Verenium Biofuels Corporation</b>	Jennings, LA	\$14.9M	Bagasse, Energy Cane, Energy Sorghum	Biochemical-Enzymatic Hydrolysis	1.4M gals Ethanol/yr	Project completed.
<b>Pacific Ethanol</b>	Boardman, OR	\$30M	Wheat Straw, Stover, Poplar Residuals	Biochemical-Biogasol	2.7M gals Ethanol/yr	Phase 1 Award. Pilot facility in Denmark.
<b>INEOS New Planet BioEnergy, LLC</b>	Vero Beach, FL	\$50M	Agricultural Residues & Segregated MSW	Biochemical-Thermochemical Process	50M gals Ethanol/yr & 2 MW Power	Phase 1 Award, Engineering Complete Phase 2 Award Imminent.
<b>Enerkem Corporation</b>	Pontotoc, MS	\$50M	Woody Biomass & MSW	Thermochemical + Gasification	10M gal Ethanol/yr	Phase 1 Award, Engineering Complete Phase 2 Award Imminent.

\*Award amounts still under negotiation.

\*\*Fuel capacities are based on performers estimates.

# Pilot-Scale Biorefineries

*Fuel Product: Ethanol*

Performer	Location	DOE Award*	Feedstock Type	Conversion Technology	Fuel / Capacity**	Status
<b>American Process Inc.</b>	Alpena, MI	\$17.9M	Woody Biomass	Biochemical Process	890,000 gals Ethanol/yr and 690,000 gals Potassium Acetate/yr	Phase 1 award. Engineering Complete Phase 2 award info sent to GO.
<b>Zechem, Inc.</b>	Boardman, OR	\$25M	Woody Biomass	Biochemical + Gasification	250,000 gal Ethanol/yr	Phase 1 award.
<b>ICM, Inc.</b>	St. Joseph, MO	\$25M	Corn Fiber, Switchgrass, and Energy Sorghum	Biochemical Process + Enzymatic Hydrolysis	100,000 gals Ethanol/yr	Phase 1 award Engineering Complete, construction in progress.
<b>Archer Daniels Midland</b>	Decatur, IL	\$24.8M	Agricultural Residues	Enzymatic Hydrolysis + Catalytic Conversion	23M gals Ethanol/yr and 250M lbs of Ethyl Acrylate/yr	Phase 1 award Engineering Complete, some additional details needed.
<b>Logos Technologies</b>	Visalia, CA	\$20.4 M	Corn Stover, Switchgrass, & Woodchips	Biochemical Process + Enzymatic Hydrolysis	50,000 gals Ethanol/yr	Phase 1 award NEPA delayed due to site move, bid packages sent out.
<b>Algenol Biofuels, Inc.</b>	Moved to FL	\$25M	CO <sub>2</sub> and Algae	Closed Bioreactor	100,000 gals Ethanol/year	Phase 1 award EA in progress

\*Award amounts still under negotiation.

\*\*Fuel capacities are based on performers estimates.

# Pilot, Demonstration and Commercial-Scale Biorefineries

*Fuel Product: Diesel Replacement*

Performer	Location	DOE Award*	Feedstock Type	Conversion Technology	Fuel / Capacity**	Status
<b>Flambeau River Biofuels LLC</b>	Park Falls, WI	up to \$80M	Woody Biomass	Thermochemical to Fischer-Tropsch	9M gals FT Liquids/yr & Wax	Commercial Phase 1 Award for engineering design and environmental permitting.
<b>NewPage</b>	Wisconsin Rapids, WI	Up to \$50M	Woody Biomass	Thermochemical to Fischer-Tropsch	8M gals FT Liquids/yr	Demonstration Phase 1 Award for engineering design and environmental permitting. Phase 2 Award Imminent (finalizing EA).
<b>Sapphire Energy, Inc.</b>	Columbus, NM	\$50M	CO <sub>2</sub> and Algae	Dynamic Fuels, LLC refining process	1M gals/yr Jet & Diesel	Demonstration Phase 1 Award for engineering design and environmental permitting.
<b>Amyris Biotechnologies, Inc.</b>	Emeryville, CA	\$25M	Sweet Sorghum	Biochemical Process	1,000 gal/yr Diesel	Pilot Phase 2 Award for construction and operation.
<b>REII</b>	Toledo, OH	\$19.9	Agricultural and Forest Residues	Thermochemical and Catalytic Conversion	44,000 gal/yr Diesel	Pilot Phase 1 Award for engineering design and environmental permitting.

\*Award amounts still under negotiation.

\*\*Fuel capacities are based on performers estimates

# Pilot-Scale Biorefineries

*Fuel Product: Gasoline, Jet, Diesel*

Performer	Location	DOE Award*	Feedstock Type	Conversion Technology	Fuel / Capacity**	Status
<b>Haldor Topsoe, Inc.</b>	Des Plaines, IL	\$25M	Woody Biomass	Thermochemical	345,000 gals/yr Gasoline	Phase 1 Award for engineering design and environmental permitting.
<b>Clearfuels Technology, Inc.</b>	Commerce City, CO	\$23M	Woody Biomass and Bagasse	High Efficiency Hydrothermal Reformer + Fischer-Tropsch Synthetic Gas-to-Liquids	37,000 gals/yr FT liquids	Phase 2 Award for construction and operations.
<b>Solazyme, Inc.</b>	Riverside, PA	\$21.7	Sugar Fed Algae, Municipal Green Waste, Switchgrass	Biochemical Conversion	100 gals/yr of Diesel	Phase 1 Award for engineering design and environmental permitting, delay waiting on Merck.
<b>UOP, LLC</b>	Kapolei, HI	\$25M	Agricultural Residues, Woody Biomass, Algae	Integrated Pyrolysis + Hydro-conversion	55,000 gal/yr Gasoline, Diesel & Jet	Phase 1 Award for engineering design and environmental permitting.

\*Award amounts still under negotiation.

\*\*Fuel capacities are based on performers estimates.

# Demonstration-Scale Biorefineries

## *BioProducts: Succinic Acid*

Performers	Location	DOE Award*	Feedstock Type	Conversion Technology	Fuel / Amount	Status
<b>Myriant Technologies, Inc.</b> <sup>^</sup>	Lake Providence, LA	\$50M	Sorghum and Lignocellulosic biomass	Biochemical-Integrated Biocatalytic Processes	30M lb/year of Succinic Acid and Ammonium Sulfate Fertilizer	Phase 1 Award for engineering design and environmental permitting, FONSI signed, finalizing Phase 2.

\*Award amounts still under negotiation.

\*\*Fuel capacities are based on performers estimates.

<sup>^</sup> Formerly BioEnergy International, LLC.