Below are nineteen projects relevant to the development of biorefinery technologies that have been awarded under the American Recovery and Reinvestment Act (ARRA) of 2009 by the U.S. Department of Energy.

Section: BIOREFINERIES
Active ARRA U.S. Department of Energy Biorefinery Projects as of September 2011

Project name	Lead Partner/ Project Period	Project cost	Project Description and Status
Integrated Pilot Plant to Convert Corn Stover to Fuel and Chemicals	Archer Daniels Midland	N/A	A process has been developed to pretreat and pelletize corn stover, increasing its density by a factor of three. A higher density allows use of ADM's existing agricultural transportation infrastructure for long term storage and reduced transportation costs. Current Status; Award Date: TBD
Integrated Pilot-Scale Biorefinery for Producing Ethanol from Hybrid Algae	Algenol Biofuels, Inc.	N/A	An integrated pilot-scale biorefinery will be constructed that will convert carbon dioxide into ethanol. Algenol is targeting the development of hybrid algae that produce 6,000 galls of ethanol per acre, per year.The biorefinery will consume 2 dry tons of carbon dioxide per day and will produce more than 100,000 gallons of fuel ethanol per year.
Conversion of sweet sorghum biomass to hydrocarbon diesel and chemicals	Amyris Integrated Biorefinery	N/a	Process uses low-risk, yeast-based fermentation of traditional or lignocellulosic-derived sugar feedstocks. The fermentation intermediate is readily recovered as water-immiscible oil. Fermentation waste is treated by anaerobic digestion to reduce effluent and utilize residual sugars for biogas production. Biogas is then converted to hydrogen via steam-methane reformation for use in finishing reactions for a variety of products. Current Status: Award Date: November 2009. Commercial Production: Targeted for 2013.
Alpena Prototype Biorefinery	Alpena Prototype Biorefinery	N/A	Alpena Prototype Biorefinery will be used to demonstrate a modular, technically successful, and financially viable process of making cellulosic ethanol from woody biomass extract in wood processing facilities. It will produce 894,200 USG per year of cellulosic ethanol and 696,000 gallons per year of aqueous potassium acetate. Current Status: Awarded April 2010.
BlueFire Fulton Renewable Energy Project	BlueFire Renewables	$320 Million	The Project would produce in excess of 18 million gallons per year of denatured ethanol from approximately 700 metric dry tons per day of cellulosic materials consisting primarily of wood wastes. Current Status: Award dates: September 2007 and December 2009. Engineering, procurement and construction contract has been awarded to Mastec North America. A front-end level 3 engineering design effort has been completed.
Integrated Pilot Project for Fuel Production by Thermochemical Conversion of Woodwaste	ClearFuels-Rentech	N/A	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. Current Status: Awarded January 2011. Anticipated operational date: late 2015
Elevance Integrated Biorefinery	Elevance Renewable Sciences	N/A	Process uses novel catalyst developed in the US to convert renewable natural oils into fuels and chemicals. Data will be generated specific for high potential U.S. feedstocks to assist in the design of key sections of a biorefinery which will convert natural oils into fuels and chemicals using the Grubbs olefin metathesis catalyst, develop a non site-specific process design and detailed angeineering, and perform an analysis of the sensitivity of the economics of the process using algae oil. Current Status: Award Date: December, 2009
Enerkem to Use Sorted Waste as Feedstock in Biorefinery	Enerkem	N/A	Biorefinery will convert heterogeneous (mixed) sorted municipal solid waste into ethanol. By converting waste into transportation fuels, the project will increase U.S. energy security, create jobs, reduce greenhouse emissions, and extend the life of the landfill by diverting incoming volume. Current Status: Award Date: March 2010
Gasoline and Diesel from Wood, Agricultural Waste, and Algae R&D	Gas Technology Institute	N/A	GTI will conduct R&D on integrated hydropyrolysis and hydroconversion for the economic conversion of wood, agricultural waste, and algae biomass into fungible gasoline and diesel. Current Status: Award Date: Early 2010
Green Gasoline from Wood Pilot Biorefinery Demonstration Project	Haldor Topsoe, Inc.	N/A	A new economical thermochemical process for the converstion of wood waste and woody biomass to gasoline will be demonstrated. Wood waste and non-merchantable wood product will be sourced from UPM-Kymmene, a pulp and paper company. Current Status: Award Date: Early 2010. Beginning operations by mid-year 2012.
Pilot Integrated Cellulosic Biorefinery Operations to Fuel Ethanol	ICM, Inc.	N/A	Operate the pilot cellulosic integrated biorefinery ujsing 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. Proposed process addresses pretreatment, hydroloysis, fermentation, and feed production which represent key technologies needed for the cost effective production of ethanol from cellulosic biomass. Current Status: Awarded January 2010.
INEOS Bio Commercializes bioenergy technolgy in Florida	INEOS New Plant BioEnergy	N/A	Utilizing a unique combination of gasification and fermentation processes, the facility will demonstrate key equipment at full commercial scale using vegetative, yard, and municipal solid waste as feedstock which will be heated to produce a synthesis gas that is cooled and cleaned before being fed to naturally occurring bacteria. These bacteria convert the synthesis gas into ethanol, which is purified for use as fuel in the transportation market. Current Status: Award Date: September 2010
Logos Technologies, Inc. Pilot CCM Biorefinery	Logos Technolgies, Inc., & EdiniQ, Inc.	N/A	Demonstrate advanced technologies and methods to convert non-food, cellulosic feedstocks into ethanol in an economically and environmentally compelling way. Current Status: Award Date: TBD
Myriant Succinic Acid Biorefinery (MySAB) Demonstration Facility	Myriant Technologies, Inc.	N/A	Facility will validate the production of succinic acid using proprietary, integrated, biocatalytic processes to displace petroleum based production of this plantform chemical. Produce succinic acid, an industrial organic chemical building block that can be used in the production of plymers, solvents and pigments. Current Status: Award Date: March, 2010
Demonstration of a Pilot, Fully Integrated Biorefinery for the Efficient Production of Clean, Synthetic Diesel Fuel from Biomass	Renewable Energy Institute International, Red Lion Bio-Energy, & Pacific Renewable Fuels	N/A	Demonstrate a pilot, pre-commercial integrated biorefinery for the production of high-quality synthetic diesel fuels from agriculture and forest residues using advanced thermochemical and catalytic conversion technologies. Current Status: Award Date: TBD
Sapphire Energy Integrated Algal Biorefinery (IABR)	Sapphire Energy Inc.	N/A	IABR will be built in Luna Country that will benefically reuse carbon dioxide to produce green crude oil from algae. The oil will be refined to produce jet fuel and diesel. Current Status: Award Date: TBD

Project name	Lead Partner/ Project Period	Project cost	Project Description and Status
Solazyme Integrated Biorefinery: Diesel Fuels from Heterotrophic Algae	Solazyme, Inc.	NA	Demonstrate integrated scale-up of heterotrophic algal oil biomanufacturing process, validate the projected commecial-scale economics of producing multiple advanced biofuels, and collect the data necessary to complete design of the first commercial-scale facility. Demonstrate production of algal oil derived entirely from lignocellulosic feedstocks, as well as other feedstocks. Biofuels derived from these feedstocks will reduce lifecycle greenhouse gas emissions by over 90%. Current Status: Award Date: TBD
Sustainable Transport Fuels from Biomass and Algal Residues via Integrated Pyrolysis and Catalytic Hydroconversion	UOP, LLC	NA	A fully integrated process to convert high impact gasoline, diesel and jet range hydrocarbon. Feeds will be converted to fuels via integrated pyrolysis and hydro-conversion. Team members will demonstrate fungibility of the fuels within the refinery, determine fuel properties and accelerate qualification and acceptance as liquid transportation fuels. Current Status: ward Date: Early 2010
High-Yield Hybrid Cellulosic Ethanol Process Using High-Impact Feedstock for Commercialization by 2013	ZeaChem, Inc.	N/A	Biorefinery will convert 10 bone-dry tons per day of cellulosic feedstock into ethanol. A 95% reduction in life cycle greenhouse gas emissions for fuel production is anticipated in the commercial biorefineries as compared to conventional gasoline. Facility will use a hybrid of biochemical and thermochemical 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 fermentation process and enabling 100% carbon conversion. Current Status: Award Date: TBD

Source:

U. S. Department of Energy, Energy Efficiency and Renewable Energy, Biomass Program, September 2011, http://www1.eere.energy.gov/biomass/factsheets.html

Websites of all companies serving as project leaders or key partners on the DOE funded projects.