

Emerging Municipal Waste Feedstock Biofuel Companies

Jim Lane [Biofuels Digest](#) [1] — November 20, 2009

In a recent poll, Biofuels Digest readers identified “waste biomass” as the hottest feedstock — and with 5–6 pounds of garbage being produced per person, per day in the U.S., there’s a lot of feedstock, and no “food vs fuel” issues. The companies are new in many cases and not as well known or financed as some others, but here is the latest from a few that are on the road toward commercializing this biofuel path.

Fulcrum Bioenergy Fulcrum utilizes new emerging technologies [to convert post-recycled municipal solid waste \(MSW\) feedstock to cellulosic ethanol](#) [2]. Fulcrum is deploying new technologies in a two-step thermochemical process. In the first step, MSW received from feedstock suppliers under long-term contracts, will be processed through a down-draft partial oxidation gasifier followed by a plasma arc. In the second step, syngas will be converted to ethanol through an alcohol synthesis process developed by Fulcrum using a new, proprietary catalyst technology. By recycling heat and energy within the MSW-to-ethanol plant, Fulcrum is able to reduce its cost of production to less than \$1.00 per gallon. This represents a dramatic reduction in the cost of production when compared to both conventional ethanol production as well as other cellulosic ethanol production models using agricultural and wood-waste feedstocks.

Reclaim Resources UK-based Reclaim Resources [recently announced the launch of a financial package for UK councils allowing them to install and operate a Vantage Waste Processor](#) [3] without raising funds for project financing. The VWP uses thermal hydration to convert municipal solid waste into ethanol. In the project financing package, Reclaim keeps all profits for five years, after which the project is turned over to the council. According to Reclaim, Operating a VWP will eliminate landfill tax levies as waste removal is no longer necessary. As landfill tax is set to reach \$78 in 2010/2011, local councils will make annual savings of \$13 million per year. Additionally, local authorities can augment profits by charging for MSW accepted from external sources.

Enerkem Enerkem GreenField Alberta Biofuels [was recently granted North America’s first unconditional commercial permit ever awarded to produce 10 Mgy of advanced biofuels](#) [4] from sorted municipal solid waste. The Enerkem technology utilizes diverse feedstocks, including sorted municipal solid waste, construction and demolition wood, treated wood and forest residues. The Enerkem technology is currently in operation and new plants are under construction. Since 2003, the company’s technology has been tested at a pilot-scale facility in Sherbrooke, Quebec. Enerkem’s CEO, Vincent Chornet, confirmed that Edmonton gave a 25-year commitment for 100,000 tons of presorted material. The project is slated

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to commence construction at the end of 2009, and it will take about 18 months to build. **INEOS Bio** The INEOS Bio process [is a combined thermochemical and biochemical technology for ethanol and power production](#) [5]. It is comprised of four main steps: (1) feedstock gasification, (2) synthesis gas fermentation (3) ethanol recovery and (4) power generation. The process utilizes a patented fermentation process, where cleaned, cooled synthesis gas is converted selectively into ethanol by a naturally occurring anaerobic bacteria. The pilot plant has been in operation for 6 years (2003-2009), and feedstocks successfully tested include: wood waste, MSW, sugar cane bagasse, corn stover, and auto shredder residue.

Terrabon Terrabon's process is [anaerobic mixed culture fermentation followed by chemical conversion of fermentation products into biofuels and bio-chemicals](#) [6]. Depending on chemical pathway chosen, Terrabon can produce mixed primary alcohols (a mix of ethanol, propanol, butanol, pentanol, hexanol and heptanol), mixed secondary alcohols (a mix of isopropanol, 2-butanol, 3-pentanol, 2-pentanol, etc), green gasoline, green diesel and green jet fuel. The company has joint venture arrangements with Valero/Waste Management, and licensing arrangements for larger facilities (300 to 500-ton per day) using agricultural and forest residue, food scraps and non-food energy crops as feedstock, with a target production cost of \$2 per gallon or less. **Masada Resource Group** Last month, [Masada announced a partnership with California-based entrepreneur Robert Lee in a proposal to build "hundreds" of municipal solid waste-to-ethanol production facilities](#) [7]. The company said that it would target facilities in China, Vietnam, Hong Kong, Singapore, Taiwan, Japan, Ghana, South Korea, Denmark and France. The company said that its patented CES OxyNol process, converts municipal solid waste (MSW) and sewer sludge to ethanol and other commercial byproducts. More than 90% of the waste process in a CES OxyNol facility is recycled or converted to beneficial use, according to the company. Masada's first waste-to-ethanol facility in development in the United States is located in Orange County, New York. Masada has international projects in development in the Dominican Republic and Switzerland. The company produces yields of 85 gallons of ethanol per dry ton of MSW.

GeoSynFuels GSF's technology is [simultaneous saccharification and solid-state fermentation for ethanol and potential for other advanced biofuels such as biobutanol](#) [8]. GeoSynFuels is currently a development company focused on the construction of a continuous pilot plant. The company has several processing routes that range from treating beetle killed pine for both hemicellulose and cellulose conversion and fermentation to treating waste fiber (MSW, waste paper, etc) which requires no pretreatment. The beetle kill process has a projected price of \$1.25 per gallon while the waste fiber process will be less than \$1.

BlueFire Ethanol Last month, [cellulosic ethanol pioneer BlueFire Ethanol Fuels announced strategic relocation of its second planned biorefinery to Fulton, Mississippi](#) [9]. BlueFire has completed a 20-month licensing process and is currently awaiting the final financing needed to break ground on its ethanol biorefinery in Lancaster, CA. The Lancaster facility will use post-sorted cellulosic wastes diverted from Southern California's landfills to produce approximately 3.9 million gallons of fuel-grade ethanol per year.

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Range Fuels Range Fuels is focused on [commercially producing low-carbon biofuels, including cellulosic ethanol, and clean renewable power](#) [10] using renewable and sustainable supplies of biomass that cannot be used for food. The company uses an innovative, two-step thermo-chemical process to convert non-food biomass, such as wood chips, switchgrass, corn stover, sugarcane bagasse and olive pits to clean renewable power and cellulosic biofuels.

Powers Energy of America Power announced in August [that it will apply for a state waste handling permit in the next 45 days, based on one of up to three locations in Lake County](#) [11], IN. The \$285 million waste-to-ethanol project in Lake County will be the first to generate ethanol from municipal solid waste, if it stays on its current timeline, with a construction period of 18 months. Following application for the waste permit, a 90-day comment period will follow before the plant can move to secure up to 15 permits and thence officially commence construction by spring 2010. The company is focused on locations in the towns of Lowell, Crown Point and Schneider, and will handle up to 10,000 tons of waste per day. Opening of the facility is slated for fall 2011.

Agresti Biofuels Also in August, [Agresti Biofuels said that it was seeking to replace \\$5 million lost for its Pike County waste-to-ethanol project](#) [12], when an earmark placed by Senator Jim Bunning was removed in a congressional budget review. Agresti is seeking \$5 million in private capital towards its \$13 million phase one expense. Total cost of the project is \$200 million, which will produce up to 20 Mgy of ethanol from municipal solid waste using a gravity pressure vessel technology that produces a net gain in potable water.

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- [5] <http://www.biofuelsdigest.com/blog2/2009/08/28/ineos-bio-50-hottest-companies-in-bioenergy-candidate-profile/>
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[8] <http://www.biofuelsdigest.com/blog2/2009/10/09/geosynfuels-50-hottest-companies-in-bioenergy-candidate-profile/>

[9] <http://www.biofuelsdigest.com/blog2/2009/10/19/bluefire-shifts-second-cellulosic-ethanol-project-to-mississippi-taxes-timing-issues-in-move-from-california/>

[10] <http://www.biofuelsdigest.com/blog2/2009/10/16/range-fuels-50-hottest-companies-in-bioenergy-candidate-profile/>

[11] <http://www.biofuelsdigest.com/blog2/2009/08/26/powers-energy-of-america-readies-for-permitting-process-for-285-million-waste-to-ethanol-project/>

[12] <http://www.biofuelsdigest.com/blog2/2009/08/12/agresti-seeks-5-million-for-kentucky-waste-to-energy-project-after-government-earmark-disappears/>