

NC Biofuel Industry (Feb 2010)

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Biofuel products

- Biomass for heat only
- Biomass for cogeneration
- Biodiesel
- Bioethanol
- Methane
- Pyrolysis (Fischer-Tropsch) products
- Straight Vegetable Oil
- Other R&D

Biomass Combustion

- Biomass for heat (and light and even power)

Some examples of using biomass combustion for heat include burning wood in a campfire (space heating), stove (cooking), or steam engine (power).

Other biomass used for heating include dried dung and straw torches.

- Biomass for cogeneration

- <http://www.wellons.com/cogen.html> provides equipment (High Point).
- <http://www.eea-inc.com/chpdata/States/NC.html> lists 12 of 58 operating cogeneration units in this state using biomass (including wood related).
- www.RenewableTechCorp.com (Florida) lists NC projects including Fort Bragg cogeneration facilities (and a couple others using landfill gas)
- www.chpcenterse.org, run by the DOE, promotes cogeneration units

Biodiesel Producers

- NBB certified (required for sale to public)

The National Biodiesel Board (www.biodiesel.org) lists producers who have demonstrated they can pass the quality tests required for their product:

- Piedmont Biofuels in Pittsboro (www.biofuels.coop)

And other members who are allowed to sell to the public:

- Blue Ridge Biofuels in Asheville (www.blueridgebiofuels.com)
- Foothills Bio-Energies in Lenoir (www.foothillsbio-energies.com)
- Leland Organic Corporation in Leland (no web site)
- Triangle Biofuels in Wilson (www.trianglebiofuels.com)

- Larger co-operatives (sell to co-op partners)
- Individual producers

- **Blue Ridge Biofuels (Asheville)**

Started in May 2006 as 10 MM GPY from multiple feedstocks

Contact: Brian Winslett at 828.253.1034

- **Foothills Bio-Energies, LLC (Lenoir)**

Started September 2006 as 5 MM GPY from multiple feedstocks

Contact: Randy Dellinger at 828.759.7101

- **Leland Organic Corporation (Leland)**

Started in September 2008 as 30 MM GPY from multiple feedstocks

Contact: Rick Pasin at 910.271.3184

- **Piedmont Biofuels Inc. (Pittsboro)**

Industrial design started in 2005 as 1+ MM GPY from multiple feedstocks

Contact: Lyle Estill at 919.321.8260

- **Triangle Biofuels, Inc. (Wilson)**

Started in January 2008 as 3 MM GPY from multiple feedstocks

Contact: Zach Hamm at 252.360.4274

- **Non-NBB member Biodiesel producers**

- Cape Fear Biofuels in Wilmington, www.capefearbiofuels.com, collects WVO and has their own co-operative pump for biodiesel. 910.471.5778
- Evans Environmental Energies, in Wilson, www.evansbiodiesel.com, was a 1 MM GPY producer that may now be closed. 252.237.1898
- Patriot Biodiesel in Greensboro, www.patriotbiodiesel.com, 336.209.0728.

- **Future Biodiesel producers**

- Backwoods Biofuels in Rutherford 828.980.1271 was doing education.
- NC Biofuels plans a 1 MM GPY from soy oil in Seaboard. 252.589.8280
- Oak and Triad Biodiesel are planned plants in Triad area. 336.209.0728
- Smoky Mountain Biofuels, www.smbiofuels.com, in Cullowhee. 828.734.9949

- **Other Biodiesel related**

- Bio Source in Youngsville, www.biosourceinfo.com, collects and purifies waste vegetable oil. 919.562.1199
- Corr Energy outside Charlotte, <http://correnergy.com>, 704.813.0601
- Southeast Biodiesel in Charlotte, www.sebd.biz, distributes biodiesel from their North Carleston, SC plant. 704.957.7126

Bioethanol

- **Industrial producers**

- Clean Burn Fuels (60 MM GPY) in Raeford is the only one operating in this state . The registered agent is located in Raleigh 919.546.9385. Corn to Ethanol.
- Agri-Ethanol officials were just sentenced for bribing a state official.
- Solv-It and Pesco-Beam are raising money for a 5 MM GPY in Southport.
- Green Castle Energy is raising money for a plant to use Statesville's MSW.

- **Some related R&D companies:**

- American Distillation, www.AmericanDistillation.net, is a Wilmington area production facility for hire with an interest in ethanol production. 910.371.0993
- Grass Roots Biotechnology, base in Durham, is the company attempting to commercialize Duke University's Dr. Philip Benfey's switchgrass to ethanol process. www.grasrootsbio.com 919.747.7400
- Mycosynthetix is based in Hillsboro doing fungus research. One of their lines of interest is to create biofuels from cellulosic biomass. www.MycoSynthetix.com 919.245.0600

Methane

- **The Energy Exchange**

www.energyxchange.org is a Burnsville renewable energy center using landfill gas for cogeneration of electricity and heat (to their facility and their aquaculture greenhouse). 828.675.5541

- **White Street Landfill**

www.epa.gov/lmop/projects-candidates/profiles/conemillsifgenergyboilerp.html

Identifies this project as 2083 SCFM of landfill gas used for Cone Mills boilers.

The landfill still operates for construction and compostable wastes.

- **Swine Waste Digesters**

<http://www.epa.gov/agstar/operational.html#nc> identifies four operating digesters in NC at this time. Barham Farms in Zebulon describes theirs at:

<http://www.barhamstomatones.com/methanerecovery.php>

Pyrolysis and Fischer-Tropsch

- **Pyrolysis is the partial combustion of biomass**

The typically useful products are Hydrogen and Carbon Monoxide.

Hydrogen is the gas that held up, and burned down, the Hindenburg.

Carbon Monoxide is a poisonous gas produced from ALL smoldering fires, such as cigarettes and sofas (and requires special fire detectors to find).

In 1800's England, street lamps were fueled by "coal gas" from this process.

- **Fischer-Tropsch is the catalytic combining together of partial combustion products**

Using "high" pressures and temperatures touching catalysts (Iron and Cobalt for example), small gases (methane, hydrogen, and monoxide) combine to make larger fuels. Process conditions are proven for diesel and crude oil.

Pyrolysis and F-T in Durham area

- **Facilities**

- Southern Research, www.SouthernResearch.com, has two facilities in Durham that assist in biomass to fuel R&D. The C2L facility north of Durham, www.CarbonToLiquids.com, partners with promising companies in the scale-up stage. 919.282.1051

- **Companies at C2L**

- Thermo Chem Recovery International, www.TRI-Inc.net, specializes in biomass gasification and has a pilot plant (1 MWth) at the C2L site.
- Another company is testing a five tons per day gasification of municipal solid waste pilot plant, according to the C2L web site.
- Another pilot facility there is a pilot scale FT-Liquids conversion system.

Straight Vegetable Oil

- Conversion kits (for Diesel Engine Vehicles)
 - <http://www.gasfreeearth.com/> in Raleigh Terry Hershner 919.740.0866 sells www.LovecraftBiofuels.com conversion kits.
 - www.rebornco.com in Shelby, 704.480.5544, is the NC installer of www.PlantDrive.com conversion kits.
- R&D Notes
 - www.journeytoforever.org/biodiesel_svo.html is a discussion on using straight vegetable oil in a diesel engine from a site with many other references about biofuels.
 - [www.4cleanfuels.com/biofuels/NC Biodiesel factsheet%20\(6-27-07\).pdf](http://www.4cleanfuels.com/biofuels/NC_Biodiesel_factsheet%20(6-27-07).pdf) is a fact sheet about biodiesel and using SVO or WVO instead...don't.
 - http://www.biodiesel.org/resources/reportsdatabase/reports/gen/20011101_gen-346.pdf sites the 1900 world fair diesel engine using neanut oil and the Japanese battleship Yamato using refined

Biodiesel related R&D in NC

- Biodiesel R&D – Algae related

- Alganomics, <http://algaeresource.com>, is based in Southport investigating growing and harvesting algae for various purposes. 910.471.0803
- Organo Fuels is an Asheville area company. 828.300.0874
- Innovatech, www.novafilter.com, is an RTP company with innovative algae harvesting technology. 919.881.2197.

- Biodiesel R&D – Jet Fuel

- Elix Biofuels is pursuing the development of lower cloud point biodiesel to allow its use as jet fuel. 919.461.8391

- Biodiesel R&D – Trap Grease

- NC Future Fuels, www.ncfuturefuels.com, is scaling up to a 30 gallon reactor to convert Brown, aka trap, grease to biodiesel in the Raleigh area.

Other Biofuel related R&D in NC

- Biofuels like diesel and gasoline

- BGT Biogasoline, [www.bgtbiogasoline](http://www.bgtbiogasoline.com), is a spinoff to convert sugar to components of gasoline. The parent company, www.cpsbiofuels.com, has various processes to convert waste products to fuels.
860.655.5253

- Cellulosic Ethanol Enzymes

- Novozymes, www.novozymes.com, in Franklinton is the NC recipient of a large Department of Energy contract to research less expensive enzymes for converting biomass cellulose into ethanol feedstock.

- Genetic Modifications

- Athenix, www.AthenixCorp.com, is a Research Triangle Park company developing organisms for production of ethanol from cellulosic feedstocks and production of biofuel similar to diesel. 919.328.4100
- Monsanto, www.monsanto.com, has partnered with Grass Roots Biotechnology to pursue switchgrass to ethanol. 314.694.1000

Other NC Links of Interest

- NC Biodiesel Association

This is an optional industry association for biodiesel producers and marketers. www.biodieselNC.org is based in Candler (near Asheville) 828.254.1921

- NC Biofuel Center

This Oxford based state organization, www.BioFuelsCenter.org, has links to funding sources and companies involved in biomass based energy sources in this state.

- NC Biotechnology Center

www.NCBiotech.org has links to funding sources and companies active in various aspects of biotechnology in this state. The local contact is in Winston-Salem.

- NC Depart of Revenue – motor vehicle (and fuel) taxes

www.dor.state.nc.us/taxes/motor lists the taxes required per gallon of motor fuel (for this year that is 30.3 cents). Collection and filing appear to not be required if the distributor owes under \$ 2000 per year. That translates to 6600 gallons.

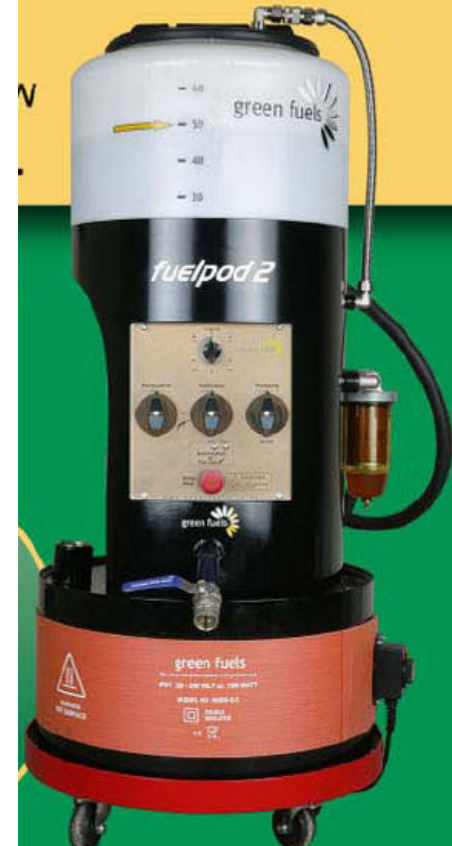
Biodiesel Links of Interest

- Unusual Equipment Suppliers

- Kredio Biofuels, www.kreido.com, is noted here because of their high shear biodiesel reactor; Evans Environmental Energies references them.
- Woodleaf Biodiesel, resells small biodiesel plants including a 14 gallon per day system called “Fuel Pod” pictured to the right. www.woodleafbiodiesel.com, 704.278.2256
- Thermaco, www.big-dipper.com, an Asheboro company makes an auto-cleaning grease trap which will make trap grease for biodiesel much more comfortable (and profitable?) to collect. 800.633.4204

- Waste Vegetable Oil re-sellers

- <http://TheForestFoundation.org> has a business model of providing tax credits to waste oil suppliers (restaurants) and selling the collected oil as feedstock to (non-profit, co-op and individual?) biodiesel producers. 919.957.1500
- www.ValleyProteins.com, which purchase Carolina Byproducts, is the largest local rendering company and already collects much of the restaurant WVO but also offers for sale biodiesel feedstock.



Government Incentives for Biofuels

- DSIRE (www.dsireusa.org)

The Database of State Incentives for Renewables & Efficiency (run by the NC Solar Center <http://www.ncsc.ncsu.edu/>) updates links to most programs, but currently shows mostly incentives for electricity and/or heating.

- US DOE summary

http://www.afdc.energy.gov/afdc/progs/view_all.php/NC/0 is part of the Alternative Fuels & Advanced Vehicles Data Center. Examples:

- Through the end of 2010, there is a 25% NC tax credit for construction of a new biodiesel or ethanol “processing” plant. Or 15% for dispensing.
- Through the end of 2010, there is a additional 10 cents per gallon federal credit for “small” (under 60 MM GPY) ethanol producers.

- NC State Energy Office summary

- <http://www.energync.net/funding/other.html> lists tax incentives and funding opportunities