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# Germany

# Bio-Fuels

# Biomass-to-Liquid Biofuel Plant Opens in Germany 2008

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**Report Highlights:**
On April 17, 2008, the world's reportedly first commercial biomass-to-liquid (BtL) plant opened in Freiberg, Saxony in Eastern Germany. The owner company Choren Industries GmbH projects that it will take 8 to 12 months for the plant to reach its full annual capacity of 18 million liters. The plant will run on forest residue wood and waste timber. While BtL can be produced from cellulosic material, it is distinctly different from cellulosic ethanol, another second generation biofuel.

Includes PSD Changes: No
Includes Trade Matrix: No
Annual Report
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[GM]

**BtL Plant Opened in Freiberg**

On April 17, 2008, the company *Choren Industries GmbH*[1] opened the reportedly world's first commercial biomass-to-liquid (BtL) plant in Freiberg, Saxony in Eastern Germany. The company projects that it will take 8 to 12 months for the plant to reach its full annual capacity of 18 million liters (4.75 million gallons) translating into 15,000 MT. The plant will run on forest residue and waste timber. At full capacity it will use 65,000 MT of wood dry matter as feedstock. Investment costs amounted to 100 million Euro, including a 35 million Euro subsidy from the state of Saxony.

**Background on BtL**

BtL is a second generation biofuel that is produced from biomass. For details on the production process please refer to page 20 of report GM4048[2]. While BtL can be produced from cellulosic material, it is distinctly different from cellulosic ethanol, another second generation biofuel.

The specifications of BtL can be fine-tuned to match the requirements of the engines instead of the current practice to adapt the engines to the fuels. Because of this, BTL is also nicknamed "designer fuel". BTL is basically free of sulphur and aromatic components and emits considerably less particles. As a result, BtL is favored by car manufacturers over biodiesel, first generation bioethanol, and cellulosic ethanol.

Unlike first generation biofuels such as bioethanol or biodiesel, BTL production uses the whole plant, while biodiesel and bioethanol currently only use parts of the plant. This results in a smaller area requirement for the same amount of energy compared to biodiesel or bio-ethanol. According to the *German Agency for Renewable Resources* (*FNR*) about 4000 liters of BtL can be produced from 1 ha of energy plants compared to 2560 liters for cereal based bioethanol and 1550 liters for rapeseed oil based biodiesel (RME)[3]. Possible feedstocks for BtL include arable crops, harvest residues such as straw or corn stover, fast growing woods, wood harvest residues, and waste timber.

**BTL in Germany**

The *Choren* project is the most commercially advanced of several research and development activities in Germany for BtL production. *Choren* produces BtL with the *Carbo-V* ® process and calls its fuel "SunDiesel®". For details on the production process please see: http://www.choren.com/en/biomass_to_energy/carbo-v_technology/ . *Choren* cooperates with the car manufacturers *Daimler* and *Volkswagen* which have tested the fuel in their cars.

Other activities exist at the *Forschungszentrum Karlsruhe* (Research Center Karlsruhe, FZK) with the *bioliq* ® process, also in cooperation with *Volkswagen*. A pilot plant is currently being constructed at the FZK.

**Outlook on Future Choren Activities**

*Choren* is contemplating building an industrial scale plant with an annual capacity of 270 million liters/200,000 MT (71 million gallons) in the city of Schwedt in the state of Brandenburg. The final decision is projected for 2009 and subject to the company's

[1] The name "Choren" stands for **C**arbon, **H**ydrogen, **O**xygen **Ren**ewable, for company information please refer to http://www.choren.com/en/, Choren has a subsidiary in the U.S. in Houston, Texas.
[2] http://www.fas.usda.gov/gainfiles/200411/146118126.pdf
[3] Values stated are based on fuel volume. When converted into diesel/gasoline –equivalent, the values are 3910 liters for BtL, 1660 liters for bioethanol and 1410 liters for RME.

assessment of the projected profitability. If build, the plant could start operating in 2012 or 2013. Currently, production costs for BtL are still higher than those for fossil fuels, thus the use of BtL depends on tax incentives. However, the German energy tax law currently provides a tax exemption for second generation fuels only until 2015. As a result, the period for amortization would be rather short. Consequently, the final decision whether to implement the plans will likely depend on amendments in the German energy tax law to prolong support for second generation biofuels.

**Comment**

BtL is very popular among German politicians who hope it will help them achieve their ambitious biofuel goals and alleviate the food versus fuel debate at the same time. However, while the opening of the Freiberg plant is a milestone, BtL is still in its infancy and it is still a long way to go for large scale production of BtL in Germany.

Because of its technical specification BtL is also popular with the car manufacturers and mineral oil companies, which are more likely to support the use of BtL then cellulosic ethanol for example.

Future economic viability of BtL production will depend on feedstock costs, logistic costs to move the biomass to the facility, prices for competing products such as fossil fuels, future technical progress and reduction of conversion costs, and last not least government support, for example in the form of tax incentives or mandate.