

Europe's largest bioethanol facility

Mannheim-based CropEnergies AG operates Europe's largest bioethanol facility, located in the town of Zeitz. The company is also erecting a large-scale facility for liquefying, purifying and recycling biogenic carbon dioxide at the same site.



Bioethanol facility in Zeitz.
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On 26th March 2010, the Saxony Anhalt Minister for Employment and Economic Affairs, Reiner Haseloff, laid the foundation stone for the largest German biogenic CO₂ liquefaction facility, which is to be erected in Zeitz. Haseloff, along with Prof. Dr. Markwart Kunz (Deputy Supervisory Board Chairman of CropEnergies AG and Executive Board member of its parent company Südzucker AG (Mannheim/Ochsenfurt)) and Hans-Wolfgang Tyczka, majority shareholder of the Tyczka Group dug out the first symbolic spade of earth to start the construction of a plant designed to liquefy CO₂ from the production of bioethanol. The new plant will have an annual capacity of 100,000 t of food-grade liquefied CO₂ and is scheduled to become operational as soon as the end of 2010. The estimated investment costs of around 10 million euros will be jointly covered by CropEnergies AG, Mannheim, which operates Europe's largest bioethanol plant, and Tyczka Energie GmbH, based in Geretsried, on the same site as the new plant in Zeitz. Tyczka Energie GmbH plans to use the CO₂ in the drinks industry in the form of carbonic acid, in the food industry as a refrigerant and frosting agent as well as for manufacturing dry ice as a cleansing agent.

CropEnergies, which also operates large plants in Belgium and France, is a member of the Südzucker

Group, the largest sugar producer in Europe. As one of the leading European producers of bioethanol, CropEnergies also considers itself a pioneer in the German market for fuels produced from renewable resources. The name CropEnergies of course brings to mind the production of energy from crops; however, the company points out that “crop” stands for “creative regeneration of power”, i.e. an innovative way of generating energy. In the 2008/2009 business year, the company produced a total of 436,000 m³ ethanol from crops and sugar beets. The plant in Zeitz has been specially designed to cope with the growing ethanol demand that is a result of the world’s growing demand for energy.

The CropEnergies’ bioethanol plant in Zeitz has an annual capacity of 360,000m³ bio-ethanol and can process up to 700,000 t of corn and sugar syrup from up to 1 million t of sugar beet, which becomes bioethanol for the fuel sector and protein feed. Bioethanol production also generates a waste product with high protein and fat content, known as mash. The mash is carefully dried and pellettised into DDGS (distillers’ dried grains with solubles), a feedstuff that is easy to store and transport. DDGS is marketed as ProtiGrain® by CropEnergies. In this way, the CO₂ liquefaction plant helps to dispose of or put to effective use another “waste product” generated during the fermentation of raw materials that is potentially harmful for the climate.

Research for new applications



Prof. Dr. Markwart Kunz, Head of Research/Development/Services of Südzucker AG and Vice-Chairman of the CropEnergies AG Supervisory Board
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The plant in Zeitz has both ecological and economic advantages. It can accept a broad range of different raw materials, and the company's own modern energy centres produce the thermal and electrical energy required for the production process. The thermal and electrical energy can be produced inexpensively and highly efficiently by employing power-heat coupling processes. A considerable proportion of the electricity produced is also fed into the public power network. CropEnergies not only focuses on optimising existing production methods, but also on developing strategies for alternative bioethanol applications outside of the fuel sector. The company works with the Südzucker AG research and development departments, as well as with institutes of the Fraunhofer Society, with the aim of further developing ethanol as the energy source in fuel cells used for electrical power supply. Prognoses envisage huge growth rates for the fuel cell market in their role as a key technology for the future energy supply of electrical devices.

The Zeitz location

Zeitz has been home to a sugar factory since 1858 and the cultivation of sugar beet has a long tradition in this area. The sugar factory was acquired and completely rebuilt by Südzucker AG in 1993. Sugar beets are delivered to the company from an area of around 20,000 ha comprising

Thuringia and the southern and western parts of Saxony-Anhalt. During the sugar beet harvest from mid-September to the end of December, this amounts to 12,400 t of sugar beet per day. Zeitz is also located in the middle of one of the largest German wheat cultivation areas with excellent road and rail connections. These were decisive factors in Südzucker AG's decision to invest 200 million euros in the construction of CropEnergies' bioethanol plant, which became operational in April 2005. The plant mainly processes wheat due to the fact that in Europe it is cheaper to produce biofuels from corn than from sugar beet.

A change in energy policy?

In contrast to Brazil, which is the world's largest bioethanol producer from sugar cane, European bioethanol, whether it is produced from corn starch or sugar syrup, can only be produced with massive government support. Reducing dependency on oil and reducing the discharge of carbon dioxide are the major arguments that convince the EU to provide funding of 90 million euros per year for the cultivation of energy crops and Germany to support the production of biofuel through mineral oil tax exemptions. However, in early 2008, the American and European subsidy programmes for the production of fuels from food plants were largely held responsible for the dramatic worldwide increase in food prices. Following the food crises that occurred in many countries, including Haiti, a number of African states, the Philippines and Indonesia, the EU Commission decided to abandon their policy of subsidising energy crops. The mineral exemption tax in Germany was, in any case, scheduled to come to an end on 31st December 2009. These moves can be seen as the countries' (half-hearted) withdrawal from their previous subsidy policy: on the one hand, binding national targets for renewable energy to increase the renewable share to 10 per cent by 2020 were put in place. On the other hand, only sustainably produced biofuels associated with reduced CO₂ emissions were to be included in the mandatory 10 per cent target. In addition, further measures were put in place (EU Directive on the Promotion of Renewable Energy, 1st August 2009) to promote the production of second-generation biofuels produced from cellulose or other organic agricultural and forestry waste rather than from food plants.



Ethanol molecule
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CropEnergies AG has clearly focused on this development. The future liquefaction plant in Zeitz is in line with EU sustainability criteria, i.e. the use of biofuels needs to generate a saving of at least 35 per cent in CO₂ emission (from 2017, this figure rises to 50 per cent for existing plants and 60 per cent for new plants). The company is also focusing on the development of technical concepts for new bioethanol plants that enable the cost-effective processing of ligno-cellular raw materials from the wood industry.

Further information:

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