

## Fuel for everyone

In Europe, every kind of petrol can contain up to 5 percent bioethanol. Since 2011, E10 – petrol with 10 volume percent bioethanol – has also been available in Germany. According to the German Association of the Automotive Industry (VDA), 93 percent of all cars in Germany with a petrol engine can handle E10 and even more cars of German manufacturers – 99 percent.

You can find out if your car is also approved for E10 from the manufacturer or in the list of the Deutsche Automobil Treuhand GmbH (German Car Trust Agency): [www.dat.de/e10](http://www.dat.de/e10).

In the US, E10 was introduced in 1972 and today it is the standard petrol. Meanwhile, E15 was introduced in the US, in which 15 volume percent bioethanol are blended to petrol.

## Identical consumption

Results of tests conducted by TÜV Rheinland show that there is no difference in fuel consumption between E10 fuel and E5. This is due to the fact that ethanol has a higher octane rating and better combustion properties than petrol. These balance out the theoretically higher consumption, which should occur because of the lower energy density.

### Results of bench test

VW Golf VI, 90 kW, year of manufacture 11/2009	SuperPlus	Super E5	Super E10
RON	98.3	95.8	97,3
Performance	101.2 KW	100.8 KW	103.4 KW
Consumption per 100 km	5.60 l	5.44 l	5.48 l

Source: Exhaust gas emissions and fuel consumption according to EU Directive 715/2007 – 692/2008A (Euro 5)-NEDC (New European Driving Cycle), carried out in March 2011

## E10 at a glance

- Petrol according to EN 228 with a bioethanol content (E for ethanol) of up to 10 volume percent
- Time-tested and proven fuel
- Approved in Germany since 1 January 2011
- Available at most German petrol stations since end of 2011
- Most inexpensive petrol at German petrol stations
- Successfully established as the second most important type of petrol on the German fuel market
- Approved fuel for over 90 percent of petrol engines in Germany
- Proven reduction of greenhouse gases due to climate friendly bioethanol made from renewable resources

## CropEnergies AG

Ensuring climate friendly mobility – today and in future – is the business of CropEnergies. Founded in 2006 in Mannheim, today the young, dynamically growing member of the Südzucker Group is one of the largest European manufacturers of sustainably produced bioethanol for fuel applications. Every year, around 1.2 million cubic metres of bioethanol, over 1 million tonnes of high-quality protein food and animal feed and 100,000 tonnes of liquefied CO<sub>2</sub> are produced from grain and sugar beets at the modern production plants in Germany, Belgium, France, and the UK. CropEnergies has successfully established itself as a bioethanol pioneer in the growth market of renewable energies; compared to fossil fuels, its bioethanol reduces CO<sub>2</sub> emissions by up to 70 percent. With cutting-edge technology and a high capacity for innovation, CropEnergies is one of the most profitable companies in the renewable energies industry.

## Bioethanol in E10

**Sustainable. Climate friendly. Affordable.**



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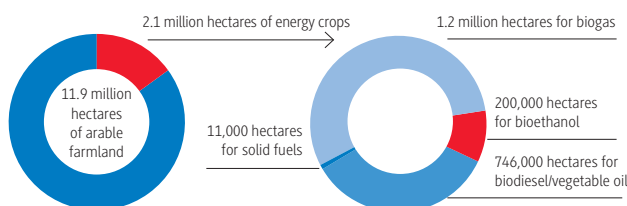
## Bioethanol manufacturers fill plates, tanks and troughs

### EU

In the EU, there is no competition between food products and bioenergy. In Europe, around 3.3 percent of the grain harvest or 9.9 million tonnes of grain are expected to be processed for bioethanol in 2013/14. In contrast, 55 percent of the grain is used for animal feed. In spite of the increased bioenergy production, the EU will also remain a net exporter of grain in the future.

### Germany

In 2013, around 16.7 million hectares of land were used for agriculture. Of these, 11.9 million hectares were arable farmland. In total, 200,000 hectares were used for cultivation of crops for the production of bioethanol. That represents 1.7 percent of arable farmland in Germany.



Source: FNR

When bioethanol is manufactured from feed grain or industrial sugar beets, not only bioethanol is produced but at the same time valuable food and animal feed products as well. The land use balance is positive: For example, in addition to bioethanol, one hectare of wheat yields more protein than one hectare of soy, e.g. from South America.

### Calculation of area released

	Wheat	Soy
Yield per year and hectare (in tonnes)	7.5	2.7
Yield of DDGS (as co-product of bioethanol production)/soybean meal (in tonnes)	2.639	2.192
Useable raw protein per tonne DDGS/soybean meal (in kilogram)	269	253
Useable raw protein per hectare (in kilogram)	709.86	554.58

Source: Klenk/Kunz (2008): Sugar industry.

In order to obtain 710 kilograms of useable raw protein for soybean meal, 1.3 hectares would be needed to grow soy, however only one hectare is needed for wheat.

## Bioethanol provides solutions for the challenges of the future

In addition to climate protection due to the reduction of CO<sub>2</sub> emissions, the European production of bioethanol provides the solution to several of the current challenges in Europe and the world:

### 1. Ensures energy supply

The EU imports 85 percent of the required crude oil. By manufacturing its own bioethanol, the EU becomes less dependent on these imports some of which come from countries that are politically unstable. With the ever-increasing price of oil, bioethanol represents a cost-effective alternative to petrol.

### 2. Creates jobs in rural regions

Establishing a new industry branch also means the creation of jobs. In the bioethanol industry, these are predominantly found in rural regions which are lacking in infrastructure.

### 3. Closes the protein gap

Europe needs large quantities of vegetable protein and imports around 70 percent of it; this is mainly soy. Protein products from the bioethanol production – DDGS, CDS and gluten – replace a part of these imports and improve the protein supply of the EU.



### 4. Sets the standard for technical progress

Researchers are already working on developing the next generation of biofuels, such as bioethanol made from wood or straw. However, this kind of development needs an established production of biofuels made from agrarian raw materials.

## Climate protection with E10

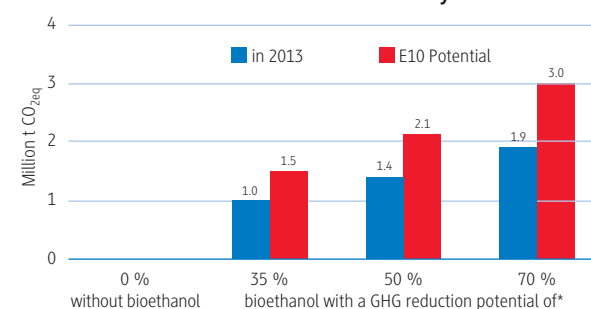
### Bioethanol

- is currently the only way to reduce the greenhouse emissions of petrol engines without placing a greater burden on the consumer
- is available
- can be distributed with the existing infrastructure
- is sustainable

Since the beginning of 2011, the required sustainability certification in the EU has guaranteed that all biofuels used in the EU reduce at least 35 percent of the greenhouse gases (GHG) compared to fossil fuels. This includes the emissions of the entire value added chain – from cultivation of the crops, transportation and production of the bioethanol to combustion of the fuel in the engine.

From 2017 on, biofuels will have to reduce greenhouse gases by 50 percent; new plants will even have to reduce them by 60 percent starting in 2018.

### GHG reduction with bioethanol in Germany



\* Own calculations based on domestic sales of petrol in 2013

For E10 this means that when the minimum requirement of a 35 percent reduction in greenhouse gases is met, 1.5 million tonnes of CO<sub>2eq</sub> per year can be saved with the bioethanol in E10. With a reduction of 70 percent, which modern plants already achieve today, CO<sub>2eq</sub> emissions are reduced by 3 million tonnes per year.