



# BioMotion Beacon

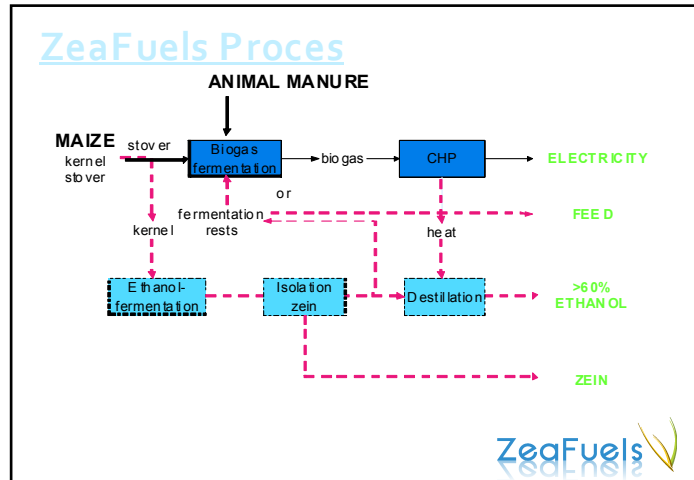
## DLG- Bio Energie Noord Beacon

### SUSTAINABLE, DECENTRALLY PRODUCED BIOFUELS

In the ZeaFuels process ethanol and proteins are being produced. This is graphically depicted as:

Advantages:

- Low investment costs, less operating risks compared to large scale production
- Production of ethanol and 'green' electricity at very competitive prices
- 70% savings of greenhouse gases compared to gasoline
- Closing local loops by re-using carbon and minerals
- Zein for food and non-food applications at very competitive prices
- Pure CO<sub>2</sub> to be used as fertilizer in greenhouses
- Easy to expand to make ethanol from miscellaneous (agricultural ) waste materials



We team up with:



and

ACRRES offers companies at the facilities of Wageningen University in Lelystad the infrastructure and research environment to test prototypes for production of renewable energy or biobased materials. The ZeaFuels prototype is being built and tested here.



*The development of the ZeaFuels process is made possible by:*



*The various expertmeetings of the BioMotion project, jointly organised by Dienst Landelijk Gebied and the Zentrum für nachwachsende Rohstoffe in 'Haus Düsse' and also the contacts/excursions to the E85 Regional project in Warendorf, were very helpful to start this thanol pilot project in Lelystad. This year Zeafuels became member of E85 Regional."*

'Project Energierijk': bioethanol as sustainable fuel

### Background

The demand for biofuels is growing due to inclining prices of fossil fuels and the European guidelines for reducing greenhouse gases. Bioethanol is a fuel that can be blended (up to 10%) with gasoline to be used in a regular gas fueled motor or with small adaptations of the motor in higher blends (up to 85%).



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The background behind this project is to examine a new and alternative way to produce bioethanol that can both compete with production cost prices levels and meet the latest sustainability requirements.

## Goals

In the ZeaFuels process waste heat of the gas motor from the (anaerobic) biogas process is used to produce bioethanol. Combining the production of ethanol with biogas has several advantages, a.o.:

1. Higher energy yields
2. Less transportation kilometers
3. Closing loops (local cycles)

Maize is split into kernel and stover during the harvesting process. The kernels are fed to the bioethanol production unit, that uses waste heat to produce a product containing ethanol and water (> 60% ethanol). The stover is fed together with the animal manure to the biogas process. The waste stream from the ethanol process can be used as cattle feed or as feedstock for the biogas process. This way the net energy production per hectare land increases enormously compared to both ethanol production or biogas production.

Through the local production way, the transportation of feedstock is limited to transport over small distances. Only the intermediate ethanol product is transported to be upgraded to an ethanol suitable to be blended with gasoline. The process saves expensive and energy intensive drying facilities for the distillers grains since the waste is either digested or used as cattle feed without a drying step (as DWG = Distillers Wet Grains). Since feedstock and DWG require limited transportation distances, this results in less transportation kilometers are made thus saving CO<sub>2</sub> emissions.

The waste stream from the biogas process, the digestate, can be used as fertilizer for the crops, thus re-using carbon and minerals, so local loops can be closed. This also implies that no artificial fertilizers are necessary in the cultivation process.

In the near future there are 2 optimization routes:

1. Isolation of zein from the ethanol fermentation rests: zein is a very interesting maize protein for both food and non food applications because of its excellent film forming properties.
2. Using agricultural waste to produce ethanol: beet & potato leave, grasses, contaminated products (not suitable for food/feed due to fungal diseases, pesticides e.g.).

## Results

The results of the project is a process that:

- Produces ethanol and 'green' electricity (biogas) at very competitive cost prices
- Creates an ethanol with more than 70% of the greenhouses gas emission savings over the complete chain compared to fossil fuel (gasoline)
- Improves the economics (both from a financial and a risk perspective) of the production process by valorization of the (all) side streams

## Follow-up

After the proof-of principle with the pilot scale unit, the ZeaFuels process can be engineered to be added used in combination with existing or new biogas installations. Integration of these relatively small units with the process of upgrading of the ethanol on a regional scale, can prove to be an alternative route to produce ethanol at competitive costs in a very sustainable manner.

## Distillery in Zuidvelde



In Zuidvelde a farmer has a big biogasplant (2003) and now also is building a distillery with a capacity of 10,000 litres a day. The distillery should work in combination with the biogas plant but the farmer is still waiting for his licence for producing ethanol. Bio Energie Noord / DLG is helping him now to get his permission from the municipality, so he can start soon his production.



The biogas is produced from manure and agricultural waste streams and that's the reason it has a high CO<sub>2</sub>-reduction.

To stimulate producers and potential producers of biogas to start also the production of ethanol, a meeting was organised in February 2009 in Leeuwarden. Two examples of ethanol production were shown, one of North Rhine Westphalia and one of the University of Wageningen.

Input: Biomass of 21,000 tons (only potato) biogas yield 350 400 m<sup>3</sup> per hour bio-methane, bio-ethanol yield 4600 tons per yea, r investment € 2 million net

Involved are:

Henk Bosma, Zuidvelde (farmer)  
Frans Debets, Bio Energie Noord  
MR Warendorf: Benedikt Sprenger (distiller)

## First E85 filling station in Groningen



In Groningen they worked hard to refit an Euro98 filling station to



E85. The opening was on 6th March 2009. The city of Groningen took this initiative and consultancy 'Duinn' is doing the project management of rebuilding this filling station. Thanks to the good cooperation in the BioMotion project and especially to the German partner (Landwirtschaftskammer NRW), the firma Sasol in North Rhine



Westphalia delivered the E85 Regional to Groningen. The ethanol will be produced in agricultural distilleries who are members of the beacon project "E85 Regional" and of the "Association of Regional Distilleries".

The big advantage is the high eco-efficiency of biofuels from decentralised production.

The decentralised production of Bioethanol could be combined with the production of biogas in ideal manner. The transports which are of subordinate meaning in ecological





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Lifecycle analyses (LSA) would be minimized by this way. Beside the CO<sub>2</sub> neutrality the circulations of the nutrients are also closed with this concept. Moreover it would bring an added value for rural regions. This concept leads to the excellent LCA and the saving potential of CO<sub>2</sub> per ha is 5 to 10 times better in comparison with the industrial production of ethanol.

De-hydrogenation and blending with gasoline is carried out as a service of the Sasol company in Herne. Bennedikt Sprenger of the machinery ring Warendorf, is organising the distribution.

Involved are:

Boerema, Klaas Boerema (fillingstation owner)  
Duyn, Agre van der Meij en Marcel Brouwer (consultancy)  
Machinerijring Warendorf: Benedikt Sprenger (distiller)  
Joel BV, Lukas Joel (Saab dealer)  
City of Groningen; Jeroen Westendorp (Government)

### Biogas

In the Netherlands, the government and trade and industry are focusing more and more on biogas for sustainable transport. During the symposium Mobility and Sustainability on 16 January, the main conclusion was that Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) are fuels for a transition to biogas. A few important aspects for biogas (also called 'green gas') are:

- at the moment biogas is the cleanest and most sustainable fuel for transport
- in 2009 there will be about 50 filling stations in the Netherlands for CNG
- the emissions of dust particles and NO<sub>x</sub> is very low and that will be good for the local
- air quality and it will reduce the CO<sub>2</sub> emission more than 70% compared to gasoline
- in the northern Provinces Groningen Fryslan, Drenthe and Noord-.Holland have the
- ambition for 2015 to have 100,000 vehicles on renewable fuels
- biogas is suitable for every engine which is powered by natural gas
- more and more cars and buses are using CNG and in future they can switch over to biogas.



During the symposium the Volkswagen Passat TSI EcoFuel (CNG) (148 hp) was shown and introduced. This is the first car on natural gas with turbo engine (22 kg of gas stored in 3 tanks under the vehicle floor). In combination with gasoline this car will have a range of about 900 km. The gasoline tank (31 liter for 400km) serves as a fuel reserve. Volkswagen also have an EcoFuel version of the Touran and the Caddy.

Gasunie is working on a certification system for using biogas (similar to green electricity certificates). This cars will also get a prominent role in the BioMotion tour.

Involved are:

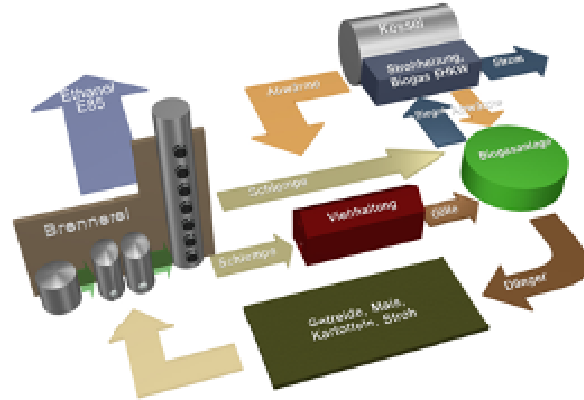
VW Century, Mario Sabel, Gasunie: Menno Groeneveld, TT-circuit, Peter Oosterbaan, Provincie Friesland: Jitske Stavenga, Provincie Groningen: W.J. van der Berg, Milieufederatie Drenthe, mw. H. Heemstra, Energy Valley, Owen Huisman, Reeuwijk advies, Bas van Reeuwijk

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## LWK-NRW Beacon

For public promotion purposes, the ZNR NRW has leased three Flexi-Fuel-Vehicles, of the type Ford Focus, and a 1000 l volume company fuel station. This station is leased from the producer "Rietbergwerke GmbH & Co.KG" and costs 220 € per month plus the costs for the installation (purchase price: ~ 10,000 €).

The fuel for the vehicles is supplied by an initiative of distillery owners who decentrally produce ethanol in their agricultural distilleries and then regionally market it as E85 Regional (regionally produced Bioethanol). Mr. Benedikt Sprenger is the manager of this initiative which is aiming for the advancement of the production of bioethanol by agricultural distilleries. The initiative implemented a project called „Bioethanol produced by decentralized distilleries“ from April



2006 to April 2009 which was supported by the state of North Rhine-Westphalia. Within this project an association of some farmers called "Association of Regional Distilleries" was founded.

In the regionally structured production system, an alcohol concentration of 86 Vol.% is achieved and the ethanol is then purified at the chemical producer Sasol Solvents Germany GmbH in Herne/Germany. There, it is then mixed to E85 Regional and is finally marketed by the Grünes Zentrum Agrar Service GmbH.

It is the long-term goal of the Regional initiative to produce alcohol in closed, agricultural cycles and this, in conjunction with high energy- and CO<sub>2</sub>-efficiency, is already possible today. A farmer from this



initiative, who produces the ethanol for our fuel station, currently connects his biogas plant with the distillery. The wet distillers grain (residue of the grain by distillation) is utilized for anaerobic digestion in the



biogas plant and the heat produced by the combustion of biogas could be used for processing the distillation. Thus higher energy efficiency and a reduction of greenhouse gases would be reached in comparison to the distillation with fossil fuels.

The initiative delivers ethanol to several public filling stations in the region. In the last year the quantity of sales rises very strong (quadruplicated) up to 100,000 l per month. But the collapse of the oil price has lead to a strong fall in demand down to an amount of 30,000 l per month since autumn 2008. Because of the rising price of fossil fuels for a few weeks the selling rose again. But the political framework and direction of development concerning biofuels is very unsure in Germany at the moment. There is no noticeable progress in the regulation on sustainability. But this regulation would be very important to sanitize the public image of biofuels and to stop the trade with non-sustainable biofuels.



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At the moment these kinds of high efficient systems still receive little consideration in the ongoing political discussions about the sustainability of biofuels. However, the greenhouse gas saving potential was actually calculated in cooperation with the University of Hohenheim/Germany. This calculation is currently being audited. Now the goal is that this highly efficient and decentralized production path will be taken into account in the EU directive and the German regulation of sustainability, respectively. Mr. Sprenker and Dr. Block, as representatives of the projects, work on it. At the moment the next step is to present the result of the audit to the members of the “Association of Regional Distilleries” and to discuss the following steps. This event will take place in the Agricultural Centre Haus Düsse in cooperation with the BioMotion project on the 1<sup>st</sup> July.



Now Mr. Sprenker particularly works on the progress of the calculated and audited greenhouse gas balance for sustainable, decentralized produced ethanol. Dr. Block and Martina Abel make public relations to inform the broad public about an available, sustainable, GHG- and energy-efficient fuel which is produced in the region. So the “Regionol”-initiative and the BioMotion project enhance each other.

When the audit could be published LWK-NRW will organize an event together with the “Regionol”-initiative with filling station operators, car dealers, converters and potential customers (owner of small fleets) to stimulate the acceptance, interest and the market for ethanol in the region.



# BioMotion Beacon

## NYME Beacon

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The NYME beacon project is a joint project of Seed-Imex Kft and BIO-MA Magyarország Zrt. The companies' activities cover the full range of plant oil and biofuel production, raw material production, technology research and development, and consulting.

BIO-MA established one of the most modern biofuel plants in Hungary in Sarkad, which produces pure plant oil for biofuel production. The capacity of the plant is 60 000 tons/year rapeseed (180 t/day). The plant started its work in 2007. Beside of plant oil production they construct machinery for biofuel production and elaborate and sell technologies for plant oil mills.



Seed-Imex's main profile is oil plant growing, integration of oil plant growers, agricultural and technological consulting, project management and construction of oil mills and biofuel plants.



Experts of the companies involved in Beacon project are members of the Hungarian BioMotion cluster. The project was identified on the basis of the profile of both companies, expertise of the owners and common activities in the frame of BioMotion e.g. study tours, Dr. Farkas participated on the project meeting in Haus Düsse, Germany.

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### Plant oil mill in Sarkad

The NYME BioMotion consortium supported the project provided information about the Beacon. A brochure introducing the beacon project has been made in 500 printed copies and distributed for the target groups on events (printed version) and by e-mail. The beacon will be introduced on the Hungarian BioMotion web site.

The NYME BioMotion consortium visited the possible locations for beacon and met the leader of the chosen project Sarkad.



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# BioMotion Beacon

## 3N Beacon

The beacon of the project is the first biogas filling station in Germany, operated by the rural cooperative Jameln it was initiated by the association region Active-Elbetal Wendland, a voluntary association of regional companies and municipalities for realizing future projects.

### From the field to the tank: driving with biogas

That environmentally-friendly electricity and heat can be produced from biogas is known. But biogas can also be used as a fuel to power cars. For more than three years, it has been possible to fill up with fuel from the land in Jameln in the Wendland, on the B 248 between Lüchnow and Dannenberg. All vehicles capable of using natural gas, of which there are more than 70,000 in Germany, can also be driven on biogas.

The operator of the filling station is the Raiffeisen Waren-genossenschaft (RWG) Jameln, an agricultural cooperative. The biogas plant in which the raw gas is produced is about 800 metres from the fuel pumps. Maize, forage rye and clover grass is cultivated on 40 farms around Jameln and supplied to the biogas plant. Before the gas can be pumped into the car tanks, it has to be processed. This brings the methane content to more than 95%, at which level it equals the quality of natural gas. The processing operation can deal with up to 150 cubic metres an hour.



The people who live in Wendland can identify with 'their' biogas filling station. The value creation remains in the locality, incomes and jobs are assured and even new employment opportunities are created. In as short a time as one year, the turnover from Germany's first biogas filling station had increased in leaps and bounds. In this time, a distance of about 900,000 km have been driven on the biogas supplied from this filling station, a distance equalling more than twenty circuits around the Earth. In comparison to the equivalent distance covered by petrol-powered vehicles, the environment and the climate has been saved 200 tonnes of carbon dioxide. The advantage of biogas as a transport fuel is the great area efficiency, that is, the amount of energy obtained from the raw materials cultivated on the required amount of agricultural land. Biogas is well ahead of the other biofuels by this measure. Drivers who fill up with biogas are not only helping the environment, they are also helping their finances: biogas as a transport fuel enjoys tax concessions up to 2015, making fuel costs significantly lower than for petrol.



More than 100 natural gas cars are on the road in the rural district alone. With a share of 12% of all registrations, that is the highest level anywhere in Germany. Car manufacturers are increasingly turning out vehicles which are able to run on biogas without modification, with Volkswagen leading the way by supporting the marketing of this fuel under the brand name SunGas. It is to be hoped that the involvement of the company will lead to a growth of the network of filling stations. In the meantime, Wendland is gearing up for its second biogas filling station. The planned date for the opening is spring 2010, in the Autohof in



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Dannenburg. The raw gas will be supplied from a biogas plant which has operated successfully since 1998. The cost of installing the processing plant is 1.5 million euros. New jobs are also being created.

The prospects for the Wendland biogas production are good. In the medium term, increasing prices for fossil fuels such as oil and gas and a growing awareness of climate change mean that biogas is a real alternative, also in the car.

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The biogas plant and the gas filling station were already realized by the beginning of BioMotion project. This plant and installation shows the possibilities that farmers, small businesses and interested individuals and



organizations from the general public with respect to using other paths for the future supply of energy in the field of biofuels. The project BioMotion uses this beacon as an outstanding example. 3N and BioMotion presented this positive example on different workshops and events. In BioMotion networks, bilateral contacts between the Beacon and manufacturers of various components for biogas production, preparation and manufactures of pressure tanks could be initiated. Since the beginning of 2009, Volkswagen has been using "Sungas" and is a Partner of the RWG Jameln.

Currently there are 2 more biogas tank filling station being planned.

With this beacon, 3N got other very interesting contacts with a manufacturer of truck filling stations, this company is operating a truck with 50% diesel and 50% biogas. The technique is currently being tested.

### Chicken fat in truck tanks

Can a biofuel confer a set of wings? Probably not quite, but it is possible to obtain a fuel from the by-products of food manufacturing. This has been proved by a company in Diepholz. With 'refined' fresh poultry fat, it is possible to power trucks which have engines capable of running on vegetable oil. The manufacturer will also offer advice with regard to the issue of engine conversion. According to the company, the following measures are necessary here: the poultry fat must be preheated and the fuel lines must have a greater internal diameter than usual, as well as additional fuel filters. On top of this, the electronic control system and the fuel injectors may also need to be modified. The warm poultry fat must not be allowed to cool, therefore the fuel tank is heated. The technology is undergoing continuous improvement and is now considered fully developed. The engine is first of all started with traditional diesel and after a warming up phase, is switched over during operation. The manufacturer has quoted a conversion price of 7000 euros. However, calculations have shown that a conversion quickly pays for itself.



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The reason for this is the favourable cost of the fuel. The current price is 70 cents per litre. Compared to traditional diesel fuel, this represents a saving of 34 cents per litre. The manufacturer has pledged to keep the price always 20 cents under the price of fossil diesel. However, it is not just for financial reasons that refined poultry fat offers an alternative to conventional fuels: because of the clean fatty acid spectrum, the combustion process releases fewer emissions. In addition, fears that the exhaust emissions would smell like a greasy spoon cafe are unfounded.

The biofuel is made from clean and unobjectionable poultry fats. The manufacturer is a subsidiary company of the PHW group, one of the largest producers of poultry products in Europe. The first experiments with the new type of biofuel were carried out on their own vehicles. The positive test results have encouraged the conversion of several fleets of commercial vehicles for a comprehensive practical trial. Currently, there are 650 trucks which are powered by poultry fat. For the distribution system, a network of filling stations has been set up across Germany, currently totaling twenty-five. In addition, mobile filling stations are available.

The use of the biofuel saves the dwindling fossil fuel resources. On top of this, it is a resource-conserving measure: the use of waste materials means that no agricultural land is needed.

GePro

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## Presentation of the IBMER Beacon

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### Oil mill Bastik Ltd.

Bastik Ltd. – modern oil Mill Company from Kozmin, experimental farm of IBMER Poznan, Biogora – private producer of esterification equipment from Poznan.

As active “beacons” IBMER recognize the entities that support our workshops organized for pupils. The IBMER BioMotion team cooperate with Bastik Ltd., PPO producer identified by trade websites. The next plan is an experimental farm at IBMER, where modern tractor propelled with raw rapeseed oil is used. As much as 85% of produced rape oil is contracted for energetic purposes.

The production potential is up to 3.75 tons/hr. BASTIK Ltd. owns the storage space for 10 thousand tonnes of rape. The annual maximum production potential is around 10 thousand tonnes of plant oil. The company has 3 press sets consisted of 2 presses with the processing of 1.25 ton of rape/hr and extruder. The oil pressing is in two stages. In the first one the seeds go on the first press, then the oilseed cake goes to the extruder and is pressed again on the second press. The efficiency of this set is 40%.

IBMER organized visits at Bastik Ltd. for Opatowek School Complex group. Cooperation with Bastik Ltd. has been developed. IBMER biofuel laboratory and Bastik Ltd. are working together on the methods of raw oil cleaning. In April they organized the workshop for School Complex in Poznan Golecin with lecture and PPO tractor presentation. Next workshops are in progress in accordance to school field trip programs.

Filling stations where you can buy biodiesel in Poland in general belong to national refineries. These are commercial initiatives and there is no possibility for further bilateral cooperation. Cooperation concerning distilleries does not exist because there are no bioethanol filling stations owned by private and national entities. In the reaction to the latest information from the government side, national refineries announced to start B85 production if law conditions change.

IBMER has planned visits at Bastik Ltd. for agricultural schools after holiday season and PPO tractor presentations.

### Biodiesel laboratory at ITP institute

Institute of Technology and Live Sciences, Poznan Branch carries out the research and application works in the field of environmental and technical sciences, also about innovative and technologies concerning farm production and renewable energy. Biodiesel laboratory with an oil press line and experimental esterificator equipment are located on institute’s premises. Many research concerning production of biodiesel from different types of oil, animal fats and used cooking oil are conducted there.

If any private or institutional person is interested biodiesel production, it is possible to visit institute’s experimental installation. After implementation of biodiesel act in 2006 some Polish farmers were interested how such installation works, because changed law allowed them to produce biodiesel in restricted amount for farm activity. Nowadays we don’t recognize any further significant interest – lack of visits.

Because of institute assignment it is always possible to organize thematic workshop for schools, farmers and advisory centres. We are open for any inquires.



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## Experimental farm

John Deere tractor is used on the farm and is engaged in international project 2nd Vegoil. It is propelled with PPO, and has modified fuel system, changed operating software and many modifications. Tractor is used for everyday tasks, like transport, field tillage, ploughing. At this moment a person operating tractor has many exploitation observations.

Within Biomotion project we have managed two tractor presentations at farm technology exhibition, organized



by regional agriculture advisory centre, and agricultural secondary school near Poznań, where pupils had a possibility to become acquainted with BioMotion project aims and to exchange opinions with tractor operator. We recognize raised awareness of school and farm visitors concerning tractors propelled with biofuels.

Because of the running European project “2nd Vegoil” it is not allowed to reveal technical details concerning engine modifications, but smooth engine work and smell of kitchen cooked oil are very impressive for visitors.

Next to agricultural production experimental farm also support some research conducted by ITP institute research teams. Practice exchange and partnership

working seem to be natural effect of that cooperation.



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## USAVM Beacon

The Beacon is in the university. The university invested in a biogas plant situated at one of the university's farms. The investment was started during the development of the Biomotion project proposal and the dean of the horticulture faculty professor Victor Popescu (head of the Romanian team for the BIOMOTION project) was one of the members of the university board who supported and approved the investment.

In 2008 was discussed the opportunity of developing a biogas plant by the University of Agronomical Sciences and Veterinary Medicine Bucharest at Moara Domneasca university's farm. The discussions were started during the development of the Biomotion project proposal and the dean of the horticulture faculty professor Victor Popescu was one of the members of the university board who supported and approved the investment.  
INTERAGRO bioetanol plant

In 2006-2007 very little information was available in Romania about biofuels, although Romania has a long history in producing biogas from farm manure. Several investments had a difficult start in 2008 but were finally successful in 2009 such as the Bioetanol factory from Zimnicea were one of the students who visited the BIOMOTION Info The Center from Bucharest ( Interdisciplinary laboratory) is now working ( Pena Dragos).



This unit is the largest unit for bioetanol production in the S-E Europe and it has 300 employees. Its capacity is about 100 000t/year . The company Bio Fuell Energy ( Romania) invested 90 000 euros . No European funding was used for the development of this factory. The investment was made using 95% of the technology and equipments from China. The Chinese equipments were chose because they were 30-40% cheaper than the EU offer.

The ¾ of the biomass used for the bioetanol production is corn produced by INTERAGRO . The bioetanol plant from Zimnicea will cover the Romanian need for bioetanol ( 4% bioetanol will be added to the petrol soled by the Romanian filling stations )



The costs of the investment will be recovered in 4 years.  
BIODIL – Romanian biodiesel at Tandarei in Ialomita county

ULTEX Romania is producing 4500t/month Biodil. The total investment was of were over 4,5 milion euros for the modernization of facilities in order to produce biodiesel



Staff: 200 input: sunflower 90% (175,000 t) RAPS 10%.

REM PETROL TRADE - MARACINENI BIODIESEL PLANT – Argeselu village

REM PETROL TRADE has a production capacity of 30.000 l/24h and a storing capacity of 1.300 t .





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## CAO2 Beacon

To promote the use of biofuels in the transports, the Chamber of agriculture of Aisne get three F-F-V (Ford Focus) using E85 fuel. We find several filling stations in the region.

We organize many meetings and exhibitions to promote the use of biofuels in the Region. To illustrate the action, three beacons are presented below.

### Pure Plant Oil exhibition

The use of Pure Plant Oil (PPO) as a fuel is only authorized in France for farmers, fishers and experimental captive fleets, mixing with 5 percents of domestic fuel.

Farmers can use PPO in their tractors if they produce it by themselves.

So far in Picardy, less than 1 percent of the farmers are still using PPO in their tractors.

Two manufacturing procedures are available for the production of rapeseed oil: decentralised cold pressing which take place on individual farms or cooperative enterprises, and centralised production in large industrial refineries. In our Region, only the decentralised units take place at farm level. The processing of the rapeseed is classical with pressing first and purification and filtering then.



may



The water content of the seed should not exceed 8% and pressing takes place at a seed temperature lower than 30°C (cold pressure). The press cake can be used on farms as a valuable protein feed (dairy cows, pigs, and poultry).

In Picardy, the Chambers of agriculture work improve the oil quality at farm level (norm 51605). The price of the rapeseed oil stays higher than fossil oil.



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This exhibition took place in Château-Thierry, a city with captive fleet using electricity. During the meeting, local politicians and mayors of the communities were very interested using PPO for their trucks, oil mixing with normal diesel. Producers hold a stand with a rapeseed screw press demonstration and a tractor running with PPO.

### Biogas biofuel

Biogas is used compressed in natural gas powered vehicles in the form of biomethane. It is a requirement that the biogas is refined to meet natural gas standards. Biogas-powered vehicles are characterized by lower pollution emissions compared to petrol or diesel vehicles. With regard to the yield per hectare of cultivated land, the energy content and range of biogas fuel are particularly favorable.

We find in France only 10 biogas plants at farm level and less than 25 biogas plants based on the waste industries. The use of biogas as a fuel only exists in one site, in Lille town. Hundred buses are



running there with biogas with a great success.

Some smaller cities are interested in using Natural Gas for Vehicles (GNV) for their captive fleets, but we don't have filling stations for the public in France yet.





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GNV is stored compressed in special pressure tanks at a pressure of 200 bars. With a tank full of gas, the vehicle can cover a distance between 300 - 500 km, depending on the type of vehicle.

The Chamber of agriculture organized meetings with regional collectivities in charge of GNV projects during the Biomotion project.

For example, the city of Villers-Cotterêts tested a new filling station, based on natural gas delivered by pipe. Few cars of the fleet were transformed to use the GNV.

We organize a meeting with peoples in charge of the fleets in the main towns of the Region (from 10,000 to 100,000 inhabitants), showing them the advantages using GNV (reduction of CO2 emissions, positive combustion qualities, good energy balance, lower price, simple to use...).

This beacon was successful and now, at the end of the project, others cities use GNV for their fleet and all the cars of the city of Villers-Cotterêts are running with GNV.

We expects for the future to build new biogas plant in the region (only one actually with CHP process), and to use this biogas as a fuel too.



## Ethanol distillery and vehicles

Ethanol fuel is the most common biofuel worldwide. In France, it is produced from crops like corn or wheat or any sugar that alcoholic beverages can also be made from. Most existing petrol engines can run on regular petrol blended with Bioethanol. In fact, today petrol is regularly blended with Bioethanol. Common cars can run on blends of up to 15% Bioethanol, Flexifuel engines run on blends of up to 85% (E85).

Direct incorporation is already commonplace in France for bioethanol or ETBE (Ethyl Tertiary Butyl Ether), which is produced from a combination of bioethanol (49%) and isobutylene (51%). This is supported by French regulations.

E85 super-ethanol, which can be used in Flex-Fuel vehicles (which run just as well on bioethanol, petrol or a mix of the two), is a fuel which is 85% bioethanol and 15% petrol. More than 300 French service stations supply this fuel (18 in the Region).



SP95 – E10 is a fuel containing up to 10% of bioethanol. In France, 2,200 service stations distribute this fuel, launched in April 2009.

Most of the beacons organised during the BioMotion project are based on the promotion of bioethanol, with the development of E85 and E10 fuels in France.

One of the biggest plant producing ethanol in the World is in our Region, Picardie: 300,000 m3 per year of bioethanol.



The Chamber of agriculture organizes 'from field to tank' meetings in this place (Tereos Plant), on-place meeting in cooperation with car dealers and filling stations (Volvo, Renault, Ford, Saab), regular press point (newspapers, regional TV).

