

EXPERIENCE OF BIOFUEL INTRODUCTION IN LATVIA

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Abstract. The paper presents the short survey of production and use of motor biofuels in Latvia. Latvia is rich in agricultural lands, but a very large part of agricultural lands nowadays still remains uncultivated. Under these circumstances the biofuel production resource potential of Latvia is very good. Small quantities of biodiesel – 2.5 thousand tons annually, have been started to produce since the end of 2001, but the development of production and use of biofuels goes very slowly due to different economical, legislative and psychological barriers.

This paper summarizes the main results of our study on the introduction of biofuels in motor vehicles and the identification of policy measures in support of the promotion of biofuels and other renewable fuels in accordance with the Directive 2003/30/EC and the further policy measures for developing biofuels in Latvia.

Key words: biodiesel, bio-ethanol, bio-energy policy.

Introduction

Agriculture, industry and transport in Latvia are fully dependent on imported fuels. That is why a successful development of biofuels is vital for Latvia.

At the moment there still exists a variety of different economical, legislative and psychological barriers, which prohibit enforcement of biofuels in transport. There is also insufficient information on biofuel technologies and advantages, which seriously influence biofuel use in transport. Some experimental research on biofuels and motor testing with biofuels in the laboratory of the Latvia University of Agriculture (LUA) started in the middle of 90-s.

With the support of the Ministry of Agriculture a group of experts was established to work out the national biofuel program. Research work in universities started to investigate possible biomass and feedstocks for production of biofuels, to work out small scale experimental units for obtaining bioethanol and biodiesel.

The chemical and physical properties of the obtained examples of biofuels were investigated in laboratories of RTU (Riga Technical University) and LU (Latvia University), but technical and economical parameters with operating engines were investigated in the Motor testing and Biofuels laboratory of LUA.

The Directive 2003/30/EC of the European Parliament and of the Council of 8 May, 2003 “On the promotion of the use of biofuels or other renewable fuels for transport” was an important stimulus to promote the Biofuels program of Latvia. The Cabinet of Ministers of the Republic of Latvia adopted the national program “Production and use of biofuel in Latvia (2003-2010)” (further in the text – Program) on December 19th of the same year (2003).

Legislation

As a result of the implementation of the program, a new production sector in agriculture has been created. With the program there will be preconditions established for the use of its main products – biodiesel and bioethanol – in different types of motor vehicles as well as for the use of by-products for local needs and export. The approximate control figures for production of biofuel in Latvia and the prognoses for the coming years (2004-2010) were set in the program (see Table 1).

As it is seen from the Program to ensure biofuels not less than 2% of the total share of fuel for transportation by December 31, 2005, twenty thousand tons of biofuels are needed, including 9 thousand tons of bioethanol and 11 thousand tons of biodiesel. To produce these quantities of biofuel in 2005, it was necessary to produce 33 thousand tons of grain and 32 thousand tons of rapeseed [2].

The future development of biofuel production and utilization requires a substantial support from the government to each player in the chain from the raw materials to the biofuel. Production and use of biofuels can be developed only if it gives each player the profit. In this field of activities the government has exceeded the time and the market situation is insufficient. Only in the middle of 2005

some financial and legal regulations in the field of taxation, excise and subsidation were accepted by the Cabinet of Ministers. During the March 1, 2005 session, the Cabinet of Ministers discussed the promotion of the use of biofuels, the competencies of ministries, and appointed the Ministry of Economy as the coordinating ministry for the implementation of the Law on Biofuels. On April 1, 2005, the Law on Biofuels was accepted by the Saeima [3]. In cooperation with non government organizations a strategy on the implementation of the Law of Biofuels was developed and accepted by the Cabinet of Ministers on June 21 (2005). The Law outlines measures necessary to ensure that by December 31 (2005) biofuels will constitute not less than 2% of the total share of fuel for transport in the national economy, and not less than 5.75% by December 31 (2010).

Table 1. **The prognosis of biofuel production in Latvia (2005-2010) [6]**

	2005	2007	2010
Percentage of biofuels	2.0%	3.5%	5.75%
Petrol consumption, thous. t	465	495	540
Bioethanol, thous. t	9	17	32
Amount of corn, thous. t [*]	33	62	116
Sown area of corn, thous. ha ^{**}	10	16	26
Diesel consumption, thous. t	540	620	740
Biodiesel, thous. t	11	22	43
Amount of rapeseed, thous. t ^{***}	32	63	123
Sown area of rape, thous. ha ^{****}	15	26	46
Biofuels in total, thous. t	20	39	75

For calculations engaged: ^{*} – 1 t corn gives 275 kg of bioethanol; ^{**} – corn yield 3.2-4.5 t/ha; ^{***} – 1 t rapeseed gives 350 kg of biodiesel; ^{****} – rape yield 2.1-2.7 t/ha.

According to these regulations biodiesel and bioethanol are set free from excise tax in the volume in which the corresponding biofuel is added to the fossil fuel (diesel or gasoline). In order to promote in Latvia the use of biodiesel fuels acquired entirely from rapeseed oil, and the production and use of biofuel blends with fossil diesel, a reduced excise rate has been enforced in the Law “On Excise Duties”. If the fossil diesel is blended with biodiesel made from rapeseeds, than the excise tax is decreased:

- for blends containing 5-30% vol. of rape biodiesel;
- for blends containing 30% vol. and more of rape biodiesel;
- for biodiesel produced in full volume from rapeseeds the excise tax is zero.

The excise tax is decreased also for petrol, containing 4.5-5.0% bioethanol, if the bioethanol is obtained from agricultural raw materials, is dehydrated and denaturated.

There is given also a direct subsidation to the biofuel producers in the limits which are determined by the production quotas. In the 2005 the direct support to producers was as follows:

- 170 LVL (243 Euro) for 1000 liters of biodiesel for quotas 12.5 million liters;
- 140 LVL (200 Euro) for 1000 liters of bioethanol for quotas 11.4 million liters.

In the second half of 2006 direct support to biofuel producers was as follows:

- 210 LVL (300 Euro) for 1000 litres of biodiesel for quotas 18.18 million litres;
- 160 LVL (228 Euro) for 1000 litres of bioethanol for quotas 16.45 million litres.

To ensure compliance with the requirements of the Directive 2003/30/EC, the necessary normative acts were adopted, defending the quality requirements, the procedure for granting support, as well as compliance assessment, consumer notification and market monitoring conditions for biofuels and blends of biofuels with fossil fuels.

Present situation

Resources of agricultural lands in Latvia fully allow to fulfill and overfulfill the targets prescribed by the EU directive for the year 2010 and further. The total number of agricultural land in Latvia is

2 458 thousand ha. From this area according to statistical data the arable land in 2006 was 1762 thous. ha, from which 363 thousand ha were left unused.

Rapeseed sown areas can engage 7-12% from all agricultural land. Due to this provision and taking heed of crop sown areas, rapeseed sown areas can reach 180 000 ha. It is possible to increase the sown areas significantly if all arable land will be recultivated and included into turnover with the support of the government.

Rapeseed in Latvia is a new corn culture and the farmers are still learning its cultivating technology. Due to this reason the yields of rapeseed are not stable. It is influenced also by the weather conditions and by the lack of corn drying kilns. Latvia is located in the temperate climate zone and in general the climatic and soil conditions are suitable for rapeseed cultivation. The average yield is not high: 1.78 t (2002), 1.44 t (2003) and 1.9 t (2004) per ha.

With the improving of the rapeseed cultivating technology and with building the drying kilns in the needed amount, helping to reduce the lost of rapeseed, by the opinion of experts the average yields of rape will stabilize in the level approximately 2.5 tons per ha and production of rape will exceed 450 thousand tons per year.

During the last six years sown areas of rapeseed have increased almost 12 times (see Figure 1). This is connected with the developing biofuel industry and also with the possibility to export rapeseed to other European countries.

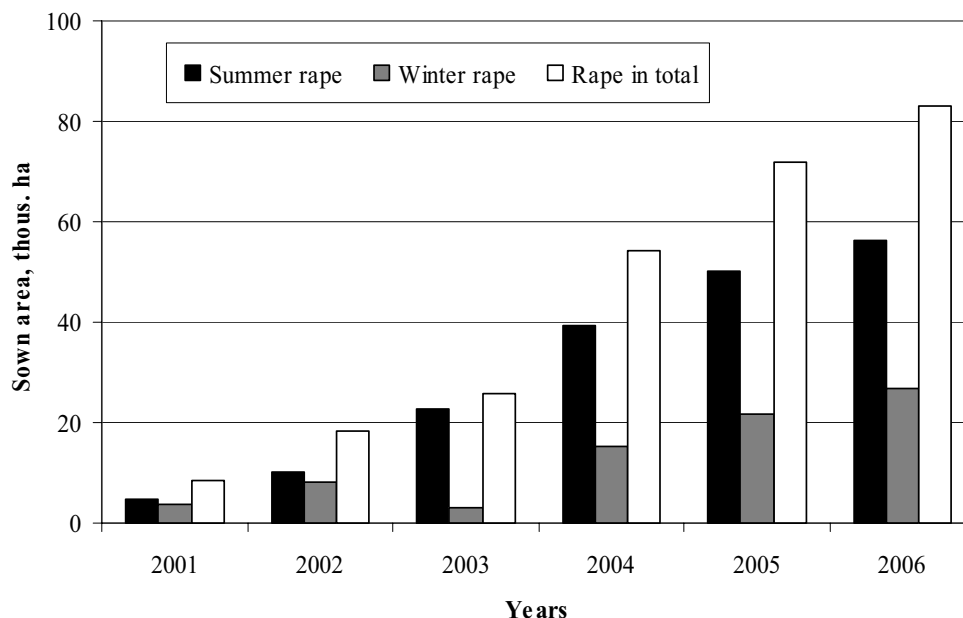


Fig. 1. Sown areas of rape for last six years

At present in Latvia there are a few small scale (with capacity 2.5-3.0 thousand tons annually) biodiesel plants in operation, and some large plants are planned to build in the nearest years (see Table 2). The first biodiesel plant in Latvia and in all the Baltic States was built by private resources by the Company "DELTA RIGA" in Naukseni (Valmiera district) with capacity 2.5 thousand tons of biodiesel annually. It is in operation since November 2001 and has produced during the last three years about 7.5 thousand tons of biodiesel. In the years 2005-2006 the plant in Naukseni does not work on full capacity according to the reconstruction. After the reconstruction the production capacity of the plant will rise up to 5 thousand tons annually.

In 2004 another biodiesel plant was built by the company "Mezrozite" (Jelgava district) with the similar capacity and started to operate in 2005, but the production capacity was not exceeded thanks to the bureaucratic and institutional barriers. At the beginning of 2006 company "Mamas-D" started to operate with the capacity 3.5 thousand tons annually.

A large biodiesel plant “BioVenta” in Ventspils is under construction with the planned capacity 100 thousand tons of biodiesel annually. Starting of the plant is planned at the end of the this year. A private company “EcoDiesel” with participation of the farmers cooperative “LatRaps” is planning to build another large biodiesel plant (capacity 100 000 t/a) in Eleja near Jelgava, the center of Zemgale, the main corn growing region in Latvia. This plant is planned to start at the end of 2007. Operation of these plants will be a large stimulus to cultivate the neglected arable lands and to rise the production of rapeseed as the raw material for biodiesel production.

Bioethanol production in Latvia is under development. The spirit producing company “Jaunpagasts Plus” in 2004 opened a new production unit especially for bioethanol production in Iecava (Bauska district) with a projected output 10 thousand tons of bioethanol annually. In the 2006 9.0 thousand tons of bioethanol were produced in this production unit. Most of them were exported, but some amount of bioethanol was used for oxygenated gasoline production, mixing 4.5-5% bioethanol with gasoline.

About 13 thousand tons of gasoline containing 4.5-5% vol. of dehydrated and denaturated bioethanol were sold in internal market. Another bioethanol plant with the planned capacity 4 thousand tons annually is under construction in Kalsnava (Madona district).

Data of the existing and planned biofuel plants in Latvia are presented in the Table 2 and showed in Figure 2. From these data it is seen that the years 2007-2008 will be extremely for rising up the biodiesel production from rapeseed oil in Latvia. With the starting to work of the two large biodiesel plants “BioVenta” and “EcoDiesel” in 2008 the total amount of produced biodiesel will be 229 thous. tons, but the summary output of biofuels including bioethanol exceeds 246.5 thous. tons annually.

Table 2. The existing and planned biofuel plants in Latvia (March 2007)

	The title of company, location	Type of biofuel	The year of starting	Projected output, thous. t/a	Produced, thous. t			
					2005	2006	2007	2008
1.	Delta Riga Ltd. (Naukseni, Valmiera distr.)	BioD	2001	2.5	2.5	2.5	5.0	5.0
2.	Mezrozite Ltd. (Jelgava distr.)	BioD	2006	5.0	0	2.5	5.0	5.0
3.	Mamas-D Ltd. (Daugavpils)	BioD	2006	3.0	0	2.5	3.5	3.5
4.	Eco Diesel Ltd. (Eleja, Jelgava distr.)	BioD	2008	80.0	0	0	0	100.0
5.	BioVenta Ltd. (Ventspils)	BioD	2007	100.0	0	0	0	100.0
6.	Jaunpagasts Plus Ltd. (Iecava, Bauska)	BioE	2004	10.0	0	9.0	9.0	9.0
7.	Lako Ltd. (Kalsnava, Madona distr.)	BioE	2006	4.0	0	0	0	9.0
8.	Sauka Ltd. (Preilu distr.)	BioD	2008	10.0	0	0	0	10.0
9.	Kurzemes sekla (Talsu distr.)	BioD	2008	5.0	0	0	5.0	5.0

To compare the data given in Table 1 with the data in Table 2, we can find out that the biofuel production capacity already in 2006 was enough to achieve the target to provide the percentage 2.75% of biofuels from the total amount of used transport fuels. The target was not achieved because the biofuel producers about 80% produced biofuels exported, as the internal market was not ready for marketing biofuels.

The biofuel producers in this year are planned to produce not little as 37.5 thous. tons of biofuels, including 28.5 thous. t. of bioiesel and 9.0 thous. t. of bioethanol. With such amount of biofuel it is possible to achieve the percentage of biofuel 3.75%.

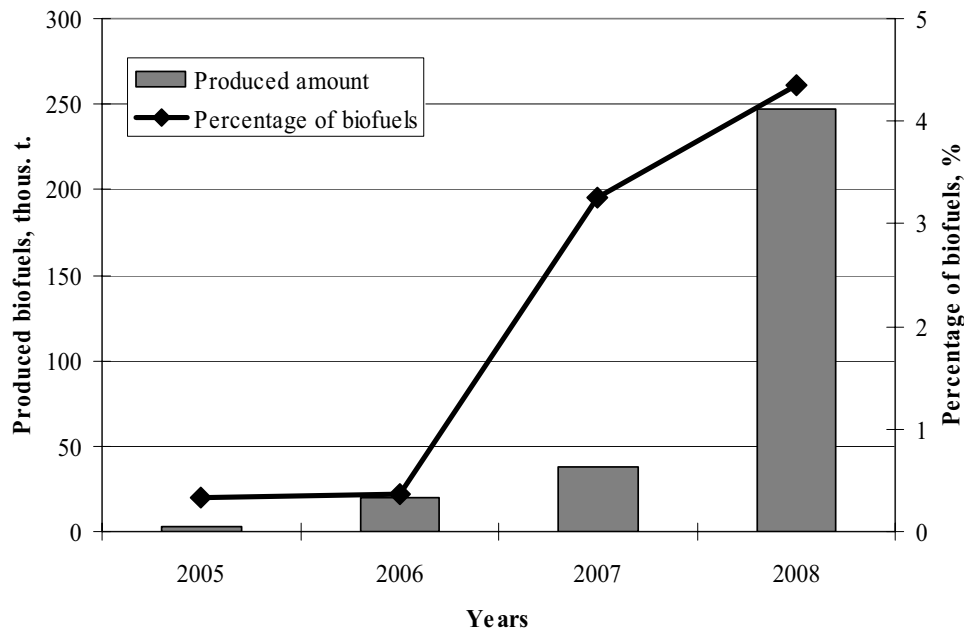


Fig. 2. Produced amount of biofuels and percentage of biofuels from the total amount of used transport fuels

Future targets

For the future development it would be very positive, if would be prevented different bureaucratic and institutional barriers. It is necessary also to simplify administrative procedures for biofuel producers.

For better biofuel introduction some important things could be done:

- find possibilities to increase the number of fuel stations, marketing biodiesel and/or biofuel blends with fossil fuel;
- work on biofuel recognition sign, which would show not only the filling stations, where it is possible to get biofuel, but also ensure the quality of biofuel;
- inform customers about the biofuel advantages and disadvantages to overcome informational barrier;
- inform potential biofuel sellers about biofuel storage problems.

Biofuel introduction could be related with different scenarios. There could be such versions:

- introduction of pure biofuels (biodiesel) in public or municipal transport.
- introduction of biofuels blended in small quantities (till 5% vol. for biodiesel and till 4.5-5.0% vol. for bioethanol) in the general market.

The use of pure biofuels in public transport or municipal transport could be a very good example for public, and also it would help to improve air quality in the largest cities. The last one variant could be relatively cheap and could help achieve the country target connected with the Directive 2003/30/EC. Besides that, it could help relatively to increase the public awareness of the biofuel use.

Conclusions

Latvia has a rather big potential of arable lands for cultivation of cereals needed for the biofuels production. To succeed the implementation of the program "Production and use of biofuels in Latvia" further measures are necessary to suggest in order to promote the production and use of biofuel in Latvia.

Production of biodiesel from rapeseed and bioethanol from grain has already started in Latvia as an agricultural production branch. At present three biodiesel plants with the capacity in total of 10.5

thousand tons of biodiesel annually and a plant producing 10 thousand tons of bioethanol annually are in operation. Two large biodiesel plants with capacity 100 thousand t/a each are planned to start in 2008.

To facilitate the expansion of the new biofuels in the transport sector, one important measure will be wide public information on biofuel quality, sustainability, impact on engines and the environment.

One of such measures will be a necessity to create a biofuel quality control system, which would inform customers in fueling stations that the fuel which they will use will not damage their cars.

Information could not only confine on articles in newspapers or journals, but also it is necessary to make public test trials with different cars. The Biofuel Producer Association was organized in 2006, which could give consultations to potential biofuel users, coordinate biofuel development and promote biofuel use.

To avoid from different mistakes and to learn how to build legislation system, Latvia needs to cooperate with other European countries, which has a large experience of successfully used biofuel. The introduction of biofuels is a very complicated process, where are involved many institutions in Latvia and therefore there is a necessity for a better cooperation between the government, biofuel producers, oil companies, researchers, etc. Only good work would help to get the best quality, environmentally friendly and economically viable biofuel accepted by the society on the Latvia fuel market in the nearest future.

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