

ANALYSIS OF BIODIESEL FUEL AND BIOETHANOL PRODUCTION AND CONSUMPTION IN LATVIA

Summary

The article provides an analysis of the biofuel production and consumption development in Latvia. The biofuel production developed due to the state subsidies which were paid for the produced amount till the year 2010. The present capacities can ensure fulfilment of the norms set by the EU Directive for the consumption of biofuel; there is a competitive production unit with a modern technology and a great production output. However, in the field of consumption, the state considerably lags behind the norms mentioned. Therefore measures should be continued to promote biofuel consumption.

Key words: biodiesel fuel, bioethanol production, bioethanol consumption, Latvia

1. Introduction

In 2009, the EU adopted the Renewable Energy Directive [1]. The Directive mandates that all Member States shall have 10% (on energy basis) biofuels in the transport sector by 2020. Biofuel must meet a number of sustainability criteria as described in the Directive, which must also meet, in order to be eligible for financial support, such as tax exemptions. The Fuel Quality Directive [2] sets requirements on fuel specifications, but also obliges fuel suppliers to reduce greenhouse gas (GHG) emissions. Research in this field of the biofuel production and consumption at the end of the last century and the beginning of this century have become a constituent part of the energy policy in Latvia. Experimental production of biofuel in Latvia started in 2001. Already in 2002 a bus Ikarus of the Riga Bus Fleet was prepared for its use. Serious development of the branch began after the government adopted a "Programme for the production and consumption of biofuel in Latvia (2003 – 2010)" 19.12.2003. During the ten-year period certain experience has been accumulated in Latvia: on a scientific plane – approximately 10 theses have been written in the field of biofuel production and consumption; on an administrative plane – normative documents have been prepared for the use of biodiesel fuel, bioethanol and canola oil as an officially allowed fuel; in production – in the year 2012 there were produced more than 90 tons of biodiesel, and in 2012 more than 3 % of the total fuel consumed in transport constituted biofuel. It should be remarked that this is considerably less than it was set by the EU Directive [1], which requires a 5.75% use in 2010, and 10% in 2020.

However, there are also negative moments mentioned during scientific discussions and the development of new normative documents – the raw material for the production of the biodiesel fuel should meet the sustainability criteria. Discussions are arising recently about the emissions level of the hot house gases; wide production of biofuel may reduce the supply of food provisions [3].

Therefore the aim of this study is an analysis of the situation in the production and consumption of biofuel in comparison with other EU countries, particularly, Lithuania and Estonia, as well as an assessment of the perspectives for its production and consumption.

2. Methods of research

The principal materials used for the studies are as follows: different sources of literature, e.g. scholars' articles, research papers and the reports of institutions, including the European Commission (EC) and governments; published and unpublished data from the Central Statistical Bureau of Latvia (CSB), data from the Eurostat databases. Suitable qualitative and quantitative research methods have been used for various solutions in the process of the study: a systematic review; analysis and synthesis; data grouping; comparative analysis; critical appraisal, correlation-regression, etc.

3. Results of research

The results of the biofuel consumption in Estonia, Latvia, Lithuania, and the EU 28 are shown in Figure 1. As it is evident, the biofuel consumption sharply increased in Lithuania in 2007, in Latvia in 2010 – by obligatory addition of 5% biofuel to the traditional fuel. Estonia does not develop the biofuel production and did not introduce the obligatory additive. The use of biodiesel fuel per se is not popular in Latvia – it is sold only at individual fuel filling stations in rural areas. In 2012 there were sold about 700 t but in 2013 only 380 t (the data provided by the Association of the Fuel Trading Organisations), though the prices are by a couple of Euro cents are lower.

As we already said, the biofuel production evolved since the year 2006 when, within the framework of the already mentioned government programme, subsidising of production started. The production rate was subsidised. i.e. subsidies were paid for the produced tons of biofuel. In order to calculate the value of subsidies, a special methodology was created [5]; it depended basically on the prices of the raw material and the production costs, constituting 350-500 EUR/t for the biodiesel fuel. On the whole, there were paid ~ 96 million EUR, or approximately 390 EUR/t of biofuel (the biodiesel fuel + bioethanol) during the period.

As a consequence of financially profitable production, 9 enterprises producing biofuel were put in operation during the period till 2009 with the total capacity of about 200 thousand tons a year, including BIO Venta in 2008 with a capacity of 100 thousand tons, using a modern production

technology, and with a possibility to produce not only biodiesel, but also pharmaceutical glycerine, as a by-product and a raw material for the production of mineral fertilisers. The total investments into the creation of the branch are approximately 140 million EUR.

After the completion of the programme in 2011 subsidising was terminated, the credit for the previous years was paid back, and, as evident from Table 1, the bioethanol production was sharply cut down. In its turn, the production of the biodiesel fuel in 2012 even increased. This can be explained by the expansion of production at the contemporary enterprise BIO Venta, but the small producers, after subsidising was stopped, gradually curtailed production. According to the data provided by the Association of the Biofuel Producers, in 2013 the production of bioethanol was interrupted, but ~70 thousand tons of the biodiesel fuel was produced, mainly by the big producer BIO Venta. Only one of eight small producers was operating.

On the whole, the analysis of the development of the biofuel branch shows that, in spite of the great subsidies and investments (about 236 million EUR), it turned out that, after direct subsidising was terminated, only one en-

terprise BIO Venta with an annual output of 100 thousand tons and modern technology remained competitive on the international market. The production in the other enterprises was practically stopped. No protectionism in the form of a lowered excise tax on the home-produced biofuel was allowed by the business rivals and the EU institutions. One can say that here, too, the advantage of large-scale production manifested itself with contemporary technologies. A negative fact is that the development of the biofuel production has not ensured its consumption to the extent required by the EU Directive. In 2012 it constituted more than 3% while the norm in the year 2010 was 5.75%, and 10% in 2020.

Figure 2 shows the production, export, import and consumption of the biodiesel fuel. It is evident that its actual consumption started only in 2010 because obligatory 5% addition of biodiesel was fixed starting from October 1, 2009. However, this measure is applied only from April 1 till October 1 because the additive is not introduced into the winter fuel. Bioethanol is added to petrol (gasoline) all year round. As it was said, biodiesel per se is consumed in a trace amount.

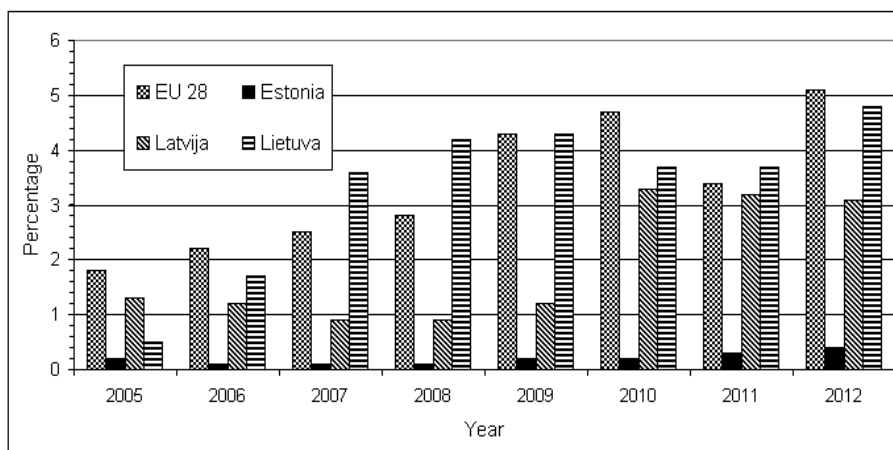


Fig. 1. The trends of the share of biofuels in the total fuel consumption in the Baltic States and EU28, on average, 2005-2012 [4]

Table 1. Biofuel production and support indicators in Latvia in 2005-2012 [MoE, 2013, Eurostat CSB]

Indicator	2005	2006	2007	2008	2009	2010	2011	2012
Produced amount, thsd. t	2.1	11.7	20.7	39.7	58.5	58.3	55.9	92.1
- bioethanol	-	5.0	11.6	11.6	13.5	14.8	2.0	1.6
- biodiesel	2.1	6.7	9.1	28.1	45.0	43.4	53.9	90.5
Support quota, thsd. t	20.0	29.0	39.0	50.0	62.0	63.2	n/a	n/a
Supported amount, thsd. t	2.3	14.3	25.4	38.9	45.4	49.3	n/a	n/a

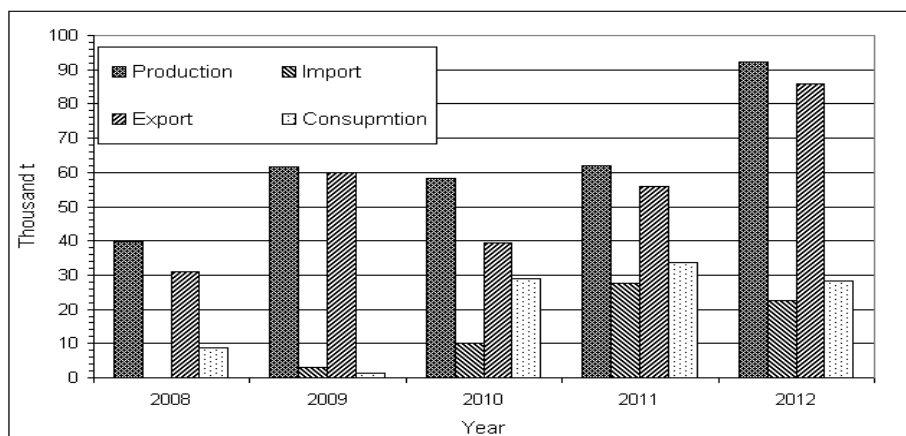


Fig. 2. The balance of biofuel in Latvia, 2008-2012 [6]

Since the consumption of the diesel fuel in Latvia constitutes ~1 million t/ha, 50 thousand tons are required in order to reach 5% of the volume but, to reach 10%, 100 thousand tons of biofuel are necessary [6]. The production capacities can ensure this, yet the competitive ability is the question that matters, i.e. the ability to produce biofuel at a price acceptable for the European market. It is also evident from Figure 2 that most of the fuel is exported alongside with its import. The question – why its import? Apparently this is determined by the price. One should also take into consideration that, according to the data of the Association of Organisations which are marketing fuel, ~ 50% of the diesel fuel is imported from Lithuania (Order Lietuva) with a 5% addition of biodiesel, the remaining ~ 50% come from Belarus and Finland with no additive, the fuel being mixed with the additive in Latvia. This is obviously where the imported biodiesel is consumed.

It follows from what was said above that a real way how to approach the goal of 10% biofuel in the transport of the year 2020 would be increasing the obligatory additive from 5% to 7%. Such a draft of normative documents was prepared by the Ministry of Economics with April 1, 2014 as the date of their commencement. However this draft was not coordinated with a public agricultural organisation. The official version was that 7% addition is harmful for modern tractors, the unofficial one – the diesel fuel with an additive may stratify when stored for a long time. As it is known, in Latvia the farmers use the diesel fuel exempt from an excise tax at a rate of 100 l per hectare of agricultural land. As the obligatory 7% addition was not introduced, the Ministry of Economics was obliged to work out other measures how to promote wider application of biofuel. No concrete suggestions have been discussed as yet.

But there is another side of the issue – because of the shortcomings of the first-generation biodiesel mentioned at the beginning of this article and elsewhere the European Council supported a proposal to change the Directive [1] which regulates the use of biofuel. The proposal provides to lower the consumption of the first-generation biofuel to 7% in transport in the year 2020 [7]. The final discussion of the changes in the Directive will take place at the European Parliament, and a part of experts consider that the Directive will be changed. Reduced requirements of the Directive may appease us, that is, Latvia, to a certain degree, because ~ 3% have been reached. However measures in order to reach 7% will be necessary.

Evidently there are two variants possible – either to consume a fuel with a comparatively high percentage of the additive in the public transport, a measure which can hardly be influenced by the government, or comparatively wide introduction of electric transport, which may appear a rather expensive measure.

As far it is known, the latter way how to reach the goal of the Directive was chosen by Estonia, the electric energy used in transport and produced from renewable sources being counted in with a coefficient 2.5.

A part of authors consider it perspective to develop the production of the second-generation biofuel [8], [9]. However, investments into the production are greater but the price is not competitive for the time being. Besides, the use of the second-generation biofuel needs preparation of the normative documentation and acquisition of the equipment

for the quality control of this fuel. It is positive that biofuel produced not from food sources is counted in with a coefficient 2.

In our opinion, it will be possible for the time being to achieve corresponding norms of exhaust emissions from the engine – at present EURO – 5 or EURO – 6 by improving the exhaust system. For economic reasons advanced kinds of biofuel will not find wide application.

4. Conclusions

1. A branch of the biofuel production has been created in Latvia – an enterprise with a modern technology, which is competitive on the international market, but the target of the Directive concerning the consumption of biofuel has not been achieved as yet.
2. The first-generation biofuel has both – advantages and shortcomings. Yet during the next years its consumption will continue.
3. Latvia must choose a direction towards increased application of the sources of the renewable energy in transport since increasing obligatory addition biodiesel to the traditional fuel to 7% is not envisaged.

5. References

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