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Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania 29, 135-149

2012

STUDIA I PRACE WYDZIAŁU NAUK EKONOMICZNYCH I ZARZĄDZANIA NR 29

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REDUCTION OF EXCISE TAXES ON BIOFUELS AND THE CLIMATE CHANGE POLICY

Abstract

The article discusses the definition and classification of biofuels. The author also presents policy targets regarding biofuels in the European Union. This policy is currently based on so called sustainability criteria which biofuels are required to meet. The rest of the article contains the analysis of tax exemptions and reductions introduced in the EU countries in order to promote the use of fuels obtained from biomass. In recent years such tax provisions have been abolished in many member states, however some of EU countries still provide tax relief for biofuels. Particular attention has been paid to issues such as the loss of tax revenues due to tax exemptions on biofuels and costs of abating CO_2 emissions with special tax provisions.

Keywords: biofuels, climate change, excise tax.

Introduction

Substituting conventional transport fuels with fuels derived from biomass (biofuels) can be considered as an option to decrease greenhouse gas (GHG) emissions from road transport and tackle climate change. There are also other potential benefits of using biofuels, such as new markets for agricultural products or increased energy security.

The governments may use different instruments to promote the use of biofuels in the road transport sector. One of these instruments are partial or total tax exemptions on biofuels. Such tax provisions combined with higher excise taxes on petroleum-based fuels are used to compensate for the additional production costs of biofuels compared to fossil fuels. By reducing the price of biofuels such tax exemptions provide incentives to consumers to prefer biofuels over traditional fuels.[1] Tax incentives are demand-side mechanisms for promoting biofuels. Supply-side mechanisms include feedstock support or capital grants.[2]

The aim of the article is the analysis of the development of tax provisions related to biofuels in the European Union countries. The paper also discusses on effectiveness of tax exemptions in promoting the use of biofuels and the efficiency of those instruments to reduce GHG emissions.

1. Types of biofuels and their potential to reduce greenhouse gas emissions

Biofuels are defined (in a broad sense) as *any fuels derived from biomass*,[3] *fuel products obtained from biological carbon sources*[4] or *solid, liquid, or gas fuel derived from recently dead biological material*.[5] Biofuels are alternatives for conventional fuels, however they can be considered as transitional step until more advanced technologies in road transport become practical.[6]

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[1] C. Bessou, F. Ferchaud, B. Gabrielle, B. Mary, *Biofuels, greenhouse gases and climate change. A review*, in: eds. E. Lichtfouse, M. Hamelin, M. Navarrete, P. Debaeke, *Sustainable agriculture, Volume 2*, Springer, Dordrecht 2011, p. 396.

[2] T. Wiesenthal, B. Schade, P. Christidis, G. Leduc, L. Pelkmans, L. Govaerts, *Analysis of biofuel support policies, Available* at: www.globalbioenergy.org/bioenergyinfo/sort-by-date/detail/en/news/7551/icode/31/.

[3] S. Stec, B. Baraj, *Energy and environmental challenges to security*, Springer, Dordrecht 2009, p. 24.

[4] *Novel technologies in food science: their impacts on products, consumer trends and the environment*, eds. A. McElhatton, P. Sobral,Springer 2011, p. 97.

[5] Fossil fuels are derived from long dead biological material. F. Sobrino, C. Monroy, *Critical analysis of the European Union directive which regulates the use of biofuels: An approach to the Spanish case*, "Renewable and Sustainable Energy Reviews" 2009, Vol. 13, p. 2677.

[6] L. Ryan, F. Convery, S. Ferreira, *Stimulating the use of biofuels in the European Union: Implications for climate change policy*, "Energy Policy" 2006, Vol. 34, p. 3185.

The most popular biorenewable liquid transport fuels are bioethanol and biodiesel.[7] Bioethanol is an ethanol produced from biomass and is an alternative fuel for petrol engines. Biodiesel is an alternative fuel for diesel engines. Both bioethanol and biodiesel can be used in neat or blended form.[8]

Biofuels can be generally classified into different generations according to the feedstock used for production and technologies used to convert feedstock into fossil fuels substitutes.[9] First-generation biofuels are produced using conventional technologies from sugar, starch or vegetable oil.[10] Examples include sugarcane ethanol, starch-based or corn ethanol and biodiesel. Biofuels of the generation affect world food prices, increase food insecurity, have limited potential to reduce greenhouse gas emissions (except for sugarcane ethanol) and have relatively high costs of avoiding CO_2 emissions.[11] Second-generation biofuels are made from non-food feedstock and waste biomass (agricultural or forest residues). Examples include cellulosic ethanol and Fischer-Tropsch diesel. There is less concern about the use of these fuels leading to famine in developing countries. They can also produce less GHG emissions than biofuels of the first generation.[12] One can also distinguish third-generation biofuels which refer to biofuels derived from algae.[13]

Greenhouse gas emissions associated with the use and production of biofuels can be estimated using a life cycle assessment (LCA) which also allows one to compare those emissions from biofuels with emissions from fossil-based fuel substitutes. A majority of studies confirm that the use of biofuels can reduce GHG emissions.[14] How-

[7] M. Demirbas, *Biofuels from algae for sustainable development*, "Applied Energy" 2011, Vol. 88, p. 3474.

[8] J. Peters, S. Thielmann, *Promoting biofuels: Implications for developing countries*, "Energy Policy" 2008, Vol. 36, p. 1538.

[9] G. Timilsina, A. Shrestha, *How much hope should we have for biofuels?*, "Energy" 2011, Vol. 36, p. 2056.

[10] A. Demirbas, *Biofuels: securing the planet's future energy needs*, Springer, 2008, p. 88.

[11] *From 1st- to 2nd-generation biofuel technologies. An overview of current industry and RD&D activities*, OECD/IEA, Paris 2008, p. 6.

[12] M. Charles, R. Ryan, N. Ryan, R. Oloruntoba, *Public policy and biofuels: The way forward?*, "Energy Policy" 2007, Vol. 35, Issue 11, p. 5738.

[13] G. Sorda, M. Banse, C. Kemfert, *An overview of biofuel policies across the world*, "Energy Policy" 2010, Vol. 38, p. 6978.

[14] R. Gupta, A. Demirba, *Gasoline, diesel and ethanol biofuels from grasses and plants*, Cambridge University Press, New York 2010, p. 190.

ever, some authors suggest that the potential of specific types of biofuels to reduce net GHG emissions is limited. This is mainly due to so called land use changes.

Direct and indirect land use changes are one of the most important and undesirable consequences of biofuels production.[15] Direct changes occur when a land (e.g. grassland) is converted into energy crops production.[16] Indirect land-use change refers to effects of planting new grain and corn crops on other lands in order to replace lands progressively being devoted to biofuel production and maintain previous level of food production.[17] Conversion of previously uncultivated land may release carbon accumulated in vegetation and soil.[18] Indirect changes may occur in the country where biomass is produced or in other parts of the world.[19] It should be noted that such indirect effects are difficult to identify and quantify.[20] Hence, the real greenhouse gas emission savings achieved by substituting conventional fuels with biofuels are uncertain.[21]

2. Targets for biofuels in the European Union

In 2003, the European Union adopted the Directive 2003/30/EC which aimed at promoting the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes, with a view to contributing to objectives such as meeting climate

[15] F. Stappen, I. Brose, Y. Schenkel, *Direct and indirect land use changes issues in European sustainability initiatives: State-of-the-art, open issues and future developments*, "Biomass and Bioenergy" 2011, Vol. 35, p. 4824.

[16] P. Borjesson, L. Tufvesson, *Agricultural crop-based biofuels – resource efficiency and environmental performance including direct land use changes*, "Journal of Cleaner Production" 2011, Vol. 19, p. 108–109.

[17] J. Mathews, H. Tan, M. Moore, G. Bell, *A conceptual lignocellulosic 'feed+fuel' biorefinery and its application to the linked biofuels and cattle raising industries in Brazil*, Energy Policy" 2011, Vol. 39, pp. 4932–4938; F. Stappen, I. Brose, Y. Schenkel, *op.cit.*, p. 4829.

[18] S. Soimakallio, K. Koponen, *How to ensure greenhouse gas emission reductions by increasing the use of biofuels? – Suitability of the European Union sustainability criteria*, "Biomass and Bioenergy" 2011, Vol. 35, p. 3508.

[19] E. Gawela, G. Ludwig, *The iLUC dilemma: How to deal with indirect land use changes when governing energy crops?*, "Land Use Policy" 2011, Vol. 28, pp. 846–856.

[20] S. Soimakallio, K. Koponen, *op.cit.*, p. 3508.

[21] *Ibidem*, p. 3504.

change commitments or promoting renewable energy sources.[22] Under this directive, EU member states were asked to aim at an indicative consumption targets for share of biofuels and other renewable fuels in the transport sector. The non-binding targets were 2% by the end of 2005 and 5,75% by the end of 2010 (percentages calculated on the basis of energy content). According to the Article 4(1) of the 2003 Directive member states had to report to the European Commission on measures taken to promote the use of biofuels.

Provisions relating to biofuel promotion are included in the Directive 2003/96/EC restructuring the Community framework for the taxation of energy products and electricity.[23] The directive was adopted, inter alia, to help EU member states comply with the targets defined in the 2003 Directive on the promotion of the use of biofuels or other renewable fuels for transport.[24] The Directive 2003/96/EC (so called energy taxation directive) allows member states to reduce excise taxes on biofuels for up to six consecutive years (however this period may be renewed). Exemptions and reduced tax rates on biofuels are limited to the part of the fuel that actually derives from biomass.[25] According to the Article 16(3) of the Directive exemption or reduction in taxation shall be adjusted to take account of changes in raw material prices to avoid over-compensating for the extra costs of biofuel production.

In 2009 a new directive was adopted on the promotion of the use of energy from renewable sources.[26] According to the Directive 2009/28/EC each member state shall ensure that the share of energy from renewable sources in all forms of transport in 2020 is at least 10% of the final consumption of energy in transport in that member state.

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[22] 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.

[23] Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity.

[24] G. Kutas, C. Lindberg, R. Steenblik, *Biofuels: at what cost? Government support for ethanol and biodiesel in the European Union*, International Institute for Sustainable Development, Winnipeg 2007, p. 2.

[25] Commission Decision of 23 October 2007 on the State aid C 30/2006 (ex N 367/05 and N 623/05) which Italy is planning to implement as an amendment to an existing scheme for excise duty reduction for biofuels.

[26] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

The Directive 2009/28/EC sets out so called sustainability criteria for biofuels. Biofuels should meet those criteria in order to be counted towards the biofuel targets and to be eligible for financial support.

The first criterion is related to greenhouse gas savings from the use of biofuels and bioliquids. According to the article 17(2) of the Directive 2009/28/EC the GHG savings shall be at least 35% in 2010, 50% in 2017 and 60% in 2018.[27] Further two criteria stipulate that biofuels and bioliquids shall not be made from raw material obtained from land with high biodiversity value (eg primary forest or areas designated for nature protection purposes) and from land with high carbon stock (eg wetlands or continuously forested areas).

3. Trends in using reductions of excise taxes on biofuels in the EU Member States

Fuel excise tax exemptions for biofuels have been very popular instruments to promote biofuels. In 2005–2006 special tax provisions related to biofuels were applied in all European Union member states, except Finland.[28] In some countries the introduction of tax reductions and exemptions was partly motivated by the Directive 2003/30/EC.[29]

Particularly high tax exemptions on biofuels were applied in Germany. Pure biodiesel has been totally exempted from the excise duty (the mineral oil tax) in Germany since 1993. The level of tax exemptions increased during the period when the environmental tax reform was introduced (1999–2003). The reform included gradual increases of the mineral oil tax rates. Between 1999 and 2003 the rate for diesel increased by 48% (up to 0.47 euro per litre).[30] The full exemption on biodiesel

[27] The 35% target applies from 1 April 2013 in the case of biofuels and bioliquids produced by installations that were in operation on 23 January 2008. The 60% target only applies to installations in which production starts on or after 1 January 2017.

[28] The Renewable Energy Progress Report: Commission Report in accordance with Article 3 of Directive 2001/77/EC, Article 4(2) of Directive 2003/30/EC and on the implementation of the EU Biomass Action Plan, Communication from the Commission to the Council and the European Parliament, COM (2009) 192 final.

[29] *Cutting transport CO_2 emissions. What progress?*, European Conference of Ministers of Transport, OECD, Paris 2007, pp. 85–86.

[30] S. Bach, *Belastungswirkungen der ökologischen Steuerreform in den Produktionsbereichen: Steuervergünstigungen reduzieren ökologische Anreize*, "Zeitschrift für Umweltpolitik und Umweltrecht" 2007, No. 1, p. 53.

(of 0.47 euro per litre) was one of the highest in the European Union. From 2004 a tax exemption has been also granted on blends.

The concern over the loss of tax revenue from the petroleum diesel was one of the rationale to change energy taxation for biofuels in Germany in 2006 and 2007 (another rationale was the development of second-generation biofuels).[31] The key changes in the tax system consisted of abolishing the tax exemption for added biofuel and introducing a modest tax on pure biodiesel and pure vegetable oil. Tax exemptions for low-level blends has been replaced with mandatory quotas which require fuel suppliers to provide a given share of biofuels. The obligation can be implemented by blending or marketing pure biofuels. Tax rates on B100 and vegetable oil were scheduled to rise over the next years. It should be noted that second-generation biofuels, biogas and the bioethanol component of E85 fuel enjoy tax exemptions until the end of 2015. Tax relief for biofuels only applies to fuels not used for quota purposes.

Not only Germany but also other European Union countries shift from the use of tax reductions to obligation schemes (blending mandates).[32] For example, in Hungary and the United Kingdom tax incentives for biofuels were removed respectively in 2009 and 2010.[33] Both countries use biofuel obligations on fuel distributors or suppliers. Poland agreed to limit the aid scheme for biofuels in the form of tax reduction until 30 April 2011. The scheme included tax reductions for fuels containing more than 2% biocomponents made by blending fuels biocomponents and modest tax rate for biocomponents used as pure fuels. In 2010 the value of tax reductions on biocomponents in fuels was euro 289 million, and the value of reductions on bio-

[31] G. Schwartz, E. Noe, V. Saggau, *Comparison of bioenergy policies in Denmark and Germany*, in: *Rethinking agricultural policy regimes: food security, climate change and the future resilience of global agriculture*, eds. R. Almís, H. Campbell, Emerald Group Publishing, Bingley 2012, pp. 238–239; G. Pahl, *Biodiesel: growing a new energy economy*, Chelsea Green Publishing, 2008, p. 97.

[32] *Renewable energy sources and climate change mitigation: special report of the Intergovernmental Panel on Climate Change*, eds. O. Edenhofer, R. Pichs-Madruga, Y. Sokona, K. Seyboth, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schlömer, C. von Stechow, P. Matschoss, Cambridge University Press, Cambridge 2012, p. 911.

[33] Biofuels – Progress reports of EU member states (available at: http://ec.europa.eu/energy/renewables/biofuels/ms_reports_dir_2003_30_en.htm).

components as pure fuels – euro 64 million.[34] The total fuel excise revenue in 2010 was euro 5.342 billion.[35]

Some European countries use a combination of quota system and tax incentives.[36] In such schemes, biofuels are generally subject to absolute mandates and tax exemptions only are offered only to certain biofuels. Alternatively, mandates can limit the quantity of biofuels that enjoy tax exemptions.[37]

One can question whether a simple and transparent biofuels policy requires the use of tax exemptions as a complement to well designed biofuels mandates.[38] Obligations to blend allow governments to decide the quantity of biofuels that has to be supplied in a given year.[39] Additionally, they are not financed by the budget.[40] Some authors suggest that excise duty exemptions are rather suitable in the early stages of a biofuel market development.[41]

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[34] Obwieszczenie Ministra Gospodarki z dnia 29 marca 2012 r. w sprawie ogłoszenia raportu dla Komisji Europejskiej dotyczącego wspierania użycia w transporcie biopaliw lub innych paliw odnawialnych za 2010 r. (M.P. 2012, poz. 224).

[35] *Analiza wykonania budżetu państwa i założeń polityki pieniężnej w 2010 roku*, Najwyższa Izba Kontroli, Warszawa 2011.

[36] In 2008 there were 16 EU member states which used biofuel obligations; 14 of them used a combination of quota system and tax incentives. Commission Staff Working Document 'Recent progress in developing renewable energy sources and technical evaluation of the use of biofuels and other renewable fuels in transport in accordance with Article 3 of Directive 2001/77/EC and Article 4(2) of Directive 2003/30/EC' Accompanying document to the Communication from the Commission to the European Parliament and the Council 'Renewable Energy: Progressing towards the 2020 target', COM (2011) 31 final. See also: C. Klessmann, A. Held, M. Rathmann, M. Ragwitz, *Status and perspectives of renewable energy policy and deployment in the European Union – What is needed to reach the 2020 targets?*, "Energy Policy" 2011, Vol. 39, pp. 7646, 7649.

[37] T. Wiesenthal, L. Guillaume, P. Christidis, B. Schade, L. Pelkmans, L. Govaerts, P. Georgopoulos, *Biofuel support policies in Europe: Lessons learnt for the long way ahead*, "Renewable and Sustainable Energy Reviews" 2009, Vol. 13, p. 796.

[38] C. Klessmann, A. Held, M. Rathmann, M. Ragwitz, *op.cit.*, p. 7648.

[39] The Renewable Energy Progress Report: Commission Report in accordance with Article 3 of Directive 2001/77/EC, Article 4(2) of Directive 2003/30/EC and on the implementation of the EU Biomass Action Plan, Communication from the Commission to the Council and the European Parliament, COM(2009) 192 final.

[40] C. Klessmann, A. Held, M. Rathmann, M. Ragwitz, *op.cit.*, p. 7648.

[41] *Renewable energy sources and climate change mitigation...*, p. 911; A. Ninni, *Policies to support biofuels in Europe: the changing landscape of instruments*, Available at: www.agbioforum.org/v13n2/v13n2a05-ninni.htm.

As shown in Table 1 some level of relief from energy taxes for biofuels is still provided in some European Union countries. In some member states there are also total exemptions for biofuels. For example, in Latvia rapeseed oil used for fuel and biodiesel which is totally obtained from rapeseed oil were totally exempted from the excise duty. In Ireland biofuel or the biofuel proportion of a blend is exempted from the CO_2 tax.

Table 1. Tax reductions for biofuels in chosen EU countries in 2011

Country	Fuel	Biofuel content	Standard tax rate for the fuel	Tax rate for a fuel with biofuel content	Tax reduction	
			Euro per 1000 l			%
Austria	Petrol	Minimum 46 l per 1000 l	515.00	482.00	33.00	6.41
	Diesel	Minimum 66 l per 1000 l	425.00	397.00	28.00	6.59
Bulgaria[a)]	Petrol	4–5%	363.02	351.77	11.25	3.10
	Diesel	4–5%	314.45	304.73	9.72	3.09
Latvia	Petrol	5%	379.30	360.97	18.33	4.83
	Petrol	70–95%	379.30	113.79	265.51	70.00
	Diesel	5–30% (of rapeseed oil)	329.95	314.44	15.51	4.70
	Diesel	Minimum 30% (of rapeseed oil)	329.95	231.25	98.70	29.91
Lithuania	Petrol	Minimum 30%[b)]	434.43	x	x	x
Malta	Diesel	–[b)]	382.40	x	x	x
Romania	Petrol	Minimum 4%[b)]	359.59	x	x	x
	Diesel	Minimum 4%[b)]	302.51	x	x	x
Slovakia	Petrol	Minimum 3.1%	550.52	514.50	36.02	6.54
	Diesel	Minimum 5.2%	386.40	368.00	18.40	4.76

[a)] The reductions were valid until 23.11.2011.

[b)] In proportion to the percentage of biofuel additives.

Source: Biofuels – Progress reports of EU member states (available at: http://ec.europa.eu/energy/renewables/biofuels/ms_reports_dir_2003_30_en.htm); *Excise Duty Tables. Part II – Energy products and Electricity (January 2011)*, European Commission, 2011; J.M. Cansino, M. del P Pablo-Romero, R. Román, R. Yńiguez, *Promotion of biofuel consumption in the transport sector: An EU-27 perspective*, "Renewable and Sustainable Energy Reviews" 2012, Vol. 16, p. 6020.

In recent years some EU countries introduced tax exemptions for biofuels meeting sustainability criteria. For example, in April 2010 the Netherlands introduced a lower tax rate for sustainably produced E85 (produced in accordance with

the Directive 2009/28/EC). The tax is reduced by 27% (inter alia due to lower energy content of E85 compared with unleaded petrol).[42] In Germany, since 2011 biofuels counted towards the quota obligation or receiving tax relief have to meet sustainability criteria.[43]

4. Reduction of excise taxes on biofuels and the use of biofuels and GHG emissions

According to some authors, tax exemptions and reduced tax rates played a crucial role in promoting biofuels. These policy instruments were particularly effective in countries where rates of conventional fuel taxes were high enough to compensate for the extra costs of biofuels production compared to petroleum fuels.[44]

The analysis of measures used to encourage the introduction and development of biofuels in chosen EU countries indicated that there was some relationship between biofuels consumption and the level of tax reduction on biofuels.[45] For example, significant tax exemption applied in Germany for biofuels and rising diesel fuel prices (due to increasing oil crude prices and increases in excise tax on fuel) encouraged transport companies (and to lesser extent private car owners) to buy pure biodiesel instead of traditional diesel fuel.[46] In 2005 Germany had the highest share of biodiesel in total diesel consumption (6.05%). Somewhat similar situation occurred in Sweden where the high level of ethanol consumption (3.52% of petrol consumption) was accompanied by a relatively high tax exemption (of 0.52 euro per litre). However, in some cases high tax breaks were not sufficient conditions to increase the market share of biofuels. For example, in Germany popularity of ethanol was limited despite a significant tax rate reduction.[47]

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[42] Biofuels – Progress reports of EU member states (available at: http://ec.europa.eu/energy/renewables/biofuels/ms_reports_dir_2003_30_en.htm).

[43] *Ibidem.*

[44] T. Wiesenthal, L. Guillaume, P. Christidis, B. Schade, L. Pelkmans, L. Govaerts, P. Georgopoulos, *op.cit.*, p. 794; *Renewable energy sources and climate change mitigation...*, p. 911.

[45] L. Pelkmans, E. Portouli, A. Papageorgiou, P. Georgopoulos, *Impact assessment of measures towards the introduction of biofuels in the European Union*, PREMIA WP4 report, 2006, p. 100.

[46] *Ibidem*, pp. 34–35.

[47] T. Wiesenthal, B. Schade, P. Christidis, G. Leduc, L. Pelkmans, L. Govaerts, *op.cit.*

It is worth noting that withdrawal of tax provisions for biofuels in Germany have contributed to the decrease of biodiesel (particularly pure vegetable oil) consumption.[48] In 2010 the share of biofuels in total fuel consumption was only 5.8% compared to 7.2% in 2007. Many large fleets has shifted from biodiesel to fossil diesel.[49]

There are some estimations of costs of abating carbon dioxide emissions with biofuels. In Germany the cost of eliminating one tonne of carbon dioxide by special tax provisions for biofuels in Germany was around 180 euro. In Sweden, the efficiency of reducing CO_2 emissions was reviewed by the Swedish National Audit Office in 2011. The aim of the analysis also was to examine the role of the tax exemption in reaching the climate objectives. According to the study in 2007–2009 the use of biofuels have reduced emissions in Sweden by 0.4–1.1 million tonnes of CO_2 equivalent per year. In recent years covered by the analysis tax exemption involved a loss of tax revenues of about euro 206 million per annum. The estimated cost of reducing a tonne of carbon dioxide was about 308 euro. For comparison, the rate of carbon tax in Sweden is 108 euro per tonne of CO_2. It can therefore be assumed that tax exemption for biofuels reduces greenhouse gas emissions at relatively high cost.[50]

Conclusions

Biofuels can contribute to GHG emissions however the emission reduction depends on the type of feedstock crops and production process. There also some negative effects of biofuel production such as land-use changes which contribute to carbon dioxide emissions. However, it is difficult to quantify those effects.

The use of biofuels in transport is encouraged by targets set in the European Union directives. In the first decade of the 21st century most of the EU countries have applied tax exemptions inter alia in order to reach the targets set out in the 2003 Directive on the promotion of the use of biofuels. In recent year special tax exemptions in some member states have been abolished. A shift towards the biofuel obligations can be driven by the loss of tax revenue. The losses can be particularly high on developed biofuel markets (that's why tax reductions are rather regarded as suitable

[48] *Renewable energy sources and climate change mitigation...*, p. 911.

[49] G. Pahl, *op.cit.*, p. 97.

[50] *Biofuels for a Better Climate – How does the tax relief work? (Summary)*, Riksrevisionen 2011.

in the early stages of a biofuel market development).[51] Of course, losses of budget revenues can be avoided if tax exemptions are accompanied by adequate increases in excise duties on fuel.

One can say that foregone tax revenue may be justified by the reduction of external effects of transport, particularly greenhouse gas emissions.[52] However, it seems that the use of tax exemptions for biofuels is relatively expensive way of reducing emissions.

In recent years the policy measures are focused on biofuels that require sustainable criteria. Some countries have already applied tax exemptions or reliefs for biofuels that are based on those criteria.

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Bessou C., Ferchaud F., Gabrielle B., Mary B., *Biofuels, greenhouse gases and climate change. A review*, in: eds. E. Lichtfouse, M. Hamelin, M. Navarrete, P. Debaeke, *Sustainable agriculture, Volume 2*, Springer, Dordrecht 2011.

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[51] *Renewable energy sources and climate change mitigation...*, p. 911; A. Ninni, *op.cit.*; T. Wiesenthal, L. Guillaume, P. Christidis, B. Schade, L. Pelkmans, L. Govaerts, P. Georgopoulos, *op.cit.*, p. 798.

[52] See M. Frondel, J. Peters, *Biodiesel: A new Oildorado?*, "Energy Policy" 2007, Vol. 35, p. 1683.

Charles M., Ryan R., Ryan N., Oloruntoba R., *Public policy and biofuels: The way forward?*, "Energy Policy" 2007, Vol. 35, Issue 11.

Commission Decision of 23 October 2007 on the State aid C 30/2006 (ex N 367/05 and N 623/05) which Italy is planning to implement as an amendment to an existing scheme for excise duty reduction for biofuels.

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ULGI PODATKOWE NA BIOPALIWA A POLITYKA OCHRONY KLIMATU

Streszczenie

W artykule omówiono definicję, klasyfikację biopaliw, a także cele Unii Europejskiej odnoszące się do wykorzystania tych paliw w transporcie drogowym. Istotną rolę w polityce UE dotyczącej biopaliw odgrywają tzw. kryteria zrównoważonego rozwoju. Dalsza część artykułu zawiera analizę zwolnień i ulg podatkowych wprowadzonych w krajach Unii Europejskiej w celu promowania paliw otrzymywanych z biomasy. W ostatnich latach takie preferencje podatkowe zostały zniesione w wielu krajach członkowskich, niemniej jednak niektóre z krajów Unii w dalszym ciągu obejmują biopaliwa ulgami podatkowymi. Szczególną uwagę zwrócono na takie kwestie, jak utrata dochodów podatkowych w wyniku stosowania preferencji podatkowych czy też koszty redukcji emisji CO_2 za pomocą ulg podatkowych.

Słowa kluczowe: biopaliwa, zmiany klimatu, podatek akcyzowy.