

SUSTAINABLE BIOFUELS: AN ANALYSIS OF THE REGULATORY FRAMEWORK OF THE EUROPEAN UNION

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ABSTRACT

Natural resources are finite. In addition, it is necessary to mention the non-sustainability of the exploitation of the same natural resources and the contamination of the environment. We should not continue to overburden the biosphere without considering its limits, reviewing consumption patterns and the use of natural resources. Based on this scenario, ambitious targets for the development of alternative fuels were set. Thus, the European Union (EU) has established the objective of replacing 10% of fossil fuels with renewable sources in the transport sector by 2020. However, some doubts were raised on the sustainability of the demand expansion of the first generation of this energy, since it intensifies the agricultural production, producing potential threat to food security. In the EU, these concerns have resulted in strong opposition to the production of the first generation of biofuels, thus raising the need for focusing on European biofuels policy towards sustainability. In this context, this paper proposes to analyze the evolution of European regulations for sustainable biofuels from 2005 to 2014, a period that coincides with the maturity of the

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production and global consumption of biofuels, in addition to covering the five years before and after the entry into force of the EU Renewable Energy Directive. This study was conducted based on a bibliography review of primary and secondary sources, with emphasis on the European Union's normative texts and reports.

Keywords: biofuels; sustainability; European Union.

LOS BIOCARBURANTES SOSTENIBLES: UN ANÁLISIS DEL MARCO REGULATORIO DE LA UNIÓN EUROPEA

RESUMEN

Los recursos naturales son finitos, y la intensidad de la contaminación establecida en la sociedad moderna es insostenible. No se debe seguir sobrecargando la biosfera sin antes considerar sus límites y replantear los patrones de consumo y utilización de los recursos naturales. Con base en tal escenario, se fijaron metas muy ambiciosas relativas al desarrollo de combustibles alternativos. En particular, en la Unión Europea (UE), se estableció un importante objetivo de sustitución de un 10% de combustibles fósiles por fuentes renovables en el sector de los transportes para 2020. Sin embargo, surgieron dudas sobre la sostenibilidad de la expansión de la demanda de la primera generación de esta energía, que aumenta la presión para intensificar la producción agrícola, generando una potencial amenaza a la seguridad alimentaria. En la UE, estas preocupaciones se tradujeron en una fuerte oposición a la producción de la primera generación de biocarburantes y el incentivo a un desarrollo cauteloso de las generaciones más avanzadas, orientando el enfoque de la política europea de biocarburantes hacia la sostenibilidad. En este contexto, se propone analizar la evolución de las regulaciones europeas para los biocombustibles sostenibles entre 2005-2014, etapa que coincide con la madurez de la producción y el consumo global de los biocarburantes, además de abarcar los cinco años previos y posteriores a la entrada en vigor de la Directiva de Energías Renovables de la UE. Este estudio se realizó con la revisión bibliográfica de fuentes primarias y secundarias, basada en textos normativos de la Unión Europea.

Palabras-clave: *Biocarburantes; Sostenibilidad; Unión Europea.*

FOREWORD

In a world where natural resources are finite and environmental sinks have a limited absorptive capacity, the intensity of exploitation and pollution developed by modern society is unsustainable. When moving towards depleting an indispensable resource such as fossil fuels, or when the ability to absorb pollutants from the atmosphere is overloaded, what is expected sooner or later is a possible collapse. The resulting crisis implies inevitable social and natural calamities, so the biosphere must not be overloaded; we must first consider its limits and rethink patterns of natural resource consumption and use.

Two commonly acknowledged heritages left by modern society to future generations are climate change and energy shortages (GUPTA; TUOHY, 2013). However, it is not yet known which bill will be first due, as they have not manifested themselves anymore, these days. Recognition of this double challenge formally sets the pursuit of goals associated with renewable energy in order to meet the growing energy demand and reduce negative impacts both, internationally and domestically. Precisely along those lines are the UN 2020 Agenda for Sustainable Development, which includes “take urgent action to combat climate change and its impacts” (UN, 2015, objective 13), and the Kyoto Protocol⁴, derived from local energy policies and plans.

While on the one hand the global energy crisis is attributed to the substantial reduction in fossil fuel deposits and the volatility of world prices, on the other hand, the intensive use of these fuels in power generation results in high carbon dioxide emissions in the atmosphere, with effects associated to global warming. In its most important report, the United Nations Intergovernmental Panel on Climate Change has suggested that fossil fuels should be completely eliminated by 2100 (PACHAURI et al., 2014). The report indicates that renewable energy in 2014 accounted for about 30% of the world’s energy supply, which should be increased to at least 80% by 2050, if they are to achieve the proposed target.

Coal, natural gas and oil were identified as among the major fossil fuels. The latter accounted for 39.9% of global fuel consumption in 2014, with a concentration of 64.5% in the transport sector (IEA, 2016). For this

⁴ Based on the principles of the United Nations Framework Convention on Climate Change, the Kyoto Protocol commits industrialized countries to stabilizing greenhouse gas emissions by setting binding emission reduction targets for 37 industrialized countries and the European Union, acknowledging that they are primarily responsible for the high levels of greenhouse gas emissions currently in the atmosphere, which are the result of the burning of fossil fuels for over 150 years (UN, 2017).

reason, in the early 21st century, biofuels were recognized as the most attractive and practical alternative to replacing oil by-products in transport, as they can use the same logistics distribution network and do not imply very radical changes in transport policies and the technology currently used in motor vehicles.

For Sánchez, López, Pérez and Rincón (2006), biofuels are part of the general category covered by the term biofuel defined as “biofuels that can be used in an internal combustion engine”. Collectively, they are referred to as “first generation biofuels”, also known as “conventional” biofuels, those made from food products such as corn, rapeseed, soybean, beet, cereal, or sugar cane, and are the only ones widely traded internationally. Since they absorb carbon from the atmosphere at the agricultural stage of production, they have the potential to offset carbon dioxide emissions and mitigate climate change.

Based on this scenario, very ambitious targets were set worldwide for the development of these alternative fuels, and as a result their production experienced a 900% increase between 2000 and 2010 (IEA, 2017). Particularly, in the European Union (EU), an important objective of replacing 10% of fossil fuels with renewable sources – essentially biofuels – was set in the transport sector by 2020.

To meet this goal, an increase in domestic biodiesel production was expected, accompanied by an increase in ethanol imports (AL-RIFFAI; DIMARANAN; LABORDE, 2010). However, forecasts have clashed with widespread public, political and scientific controversies about the negative environmental and social impacts of energy crops. The debate casts doubt on the sustainability of the expansion of demand for the first generation of this energy, which increases the pressure to intensify agricultural production, creating a potential threat to food security⁵ and impacts such as soil degradation, unsustainable water use, air pollution, biodiversity reduction, displacement of indigenous and rural populations, and violations of human rights (KOIZUMI, 2015).

In addition, another important concern, related to the negative effects associated with indirect land use changes hangs over this generation of biofuels. According to Eurobserv'er (2015), it has been shown that a global increase in the consumption of agricultural raw materials by the energy sector, offset by cultivation in land plots not originally dedicated

⁵ According to the FAO definition (1996), “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.

to agriculture – forested areas, natural pastures, peat bogs, etc. – has the potential to produce additional greenhouse gas emissions worldwide.

The challenge for States is to balance energy demand and sustainable development with the decrease in fossil fuel energy production and the expansion of biofuel production. A study is proposed to analyze the evolution of European regulation on sustainable biofuels. This research was conducted by reviewing literature from primary and secondary sources, based on European Union normative texts and reports produced by their official departments.

1 EVOLUTION OF THE EUROPEAN BIOFUELS POLICY

In the EU, these concerns have resulted in strong opposition to first-generation biofuel production and in encouraging the cautious development of more advanced generations⁶, leading to a slowdown in the production and consumption of this energy source (BOURGUIGNON, 2015). Directive 2009/28/EC came into effect at the height of this controversy, guiding the focus of European biofuels policy towards sustainability.

Table 1 provides an overview of the normative policy scenario in which the European biofuel policy was developed.

Table 1 Evolution of European biofuels policy

Date	Document	Directive/policy document
13/Oct/1998	98/70/EC	Directive relating to the amount of gasoline and diesel
7/Nov/2001	COM(2001) 547 final	Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions on alternative fuels for road transport and on a set of measures to promote the use of biofuels.
3/Mar/2003	2003/17/EC	Directive altering Directive 98/70/CE relating to the amount of gasoline and diesel
8/May/2003	2003/30/EC	Directive relating to the promotion of the use of biofuels or other renewable fuels in transport
7/Dec/2005	COM(2005) 628 final	Action Plan for Biomass
8/Feb/2006	COM(2006) 34 final	EU strategy for biofuels
April July/2006	–	Review of public inquiry by Directive 2003/30/EC

6 “Les biocarburants des première génération sont représentés notamment par le biodiesel et le bioéthanol” [...] Les biocarburants dits “avancés” appartient généralement à la deuxième generation. Ils sont produits a partir des matières ligno-cellulosique des plantes et des déchets, comme par exemple, huile usagée” (ANDRADE, 2018. p. 23-24).

10/Jan/2007	COM(2006) 848	Work Program on Renewable Energies – Renewable Energy in the 21st Century: Building a More Sustainable Future
16/May/2007 to 18/ Jun/2007		Public inquiry on biofuels within the scope of the new legislation on the promotion of renewable energies
10/Jan/2007	COM(2006) 845 final	Progress report on the use of biofuels and other renewable fuels in EU MS
31/Jan/2007	COM(2007) 18 final	Proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC as regards the specifications of gasoline, gas oil and diesel; a mechanism is introduced to control and reduce greenhouse gas emissions from the use of road transport fuels
23/Jan/2008	COM(2008) 19 final	Proposal for a European Parliament and Council directive on the promotion of the use of energy from renewable sources
17/Sep/2008	2009/C 77/12	Opinion of the European Economic and Social Committee on the “Proposal for a European Parliament and Council directive on the promotion of the use of energy from renewable sources”
17/Dec/2008		European Parliament votes the directive relating to the promotion of the use of energy from renewable sources
6/Apr/2009	52nd year, L140	Publication of the Directive on the promotion of the use of energy from renewable sources in the Official Journal of the EU
23/Apr/2009	2009/28/EC	Directive relating to the promotion of the use of energy from renewable sources
23/Apr/2009	2009/30/EC	Amending of Directive 98/70/EC on the quality of gasoline and gas oil by introducing regulation on the sustainability of biofuels
9/Sep/2015	(UE) 2015/1513	Amending Directive 98/70/EC on the quality of gasoline and gas oil and Directive 2009/28/EC on the promotion of the use of energy from renewable sources

Source: Grinsven (2009).

The promotion of biofuels in the EU is based on the “Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the Regions on alternative fuels for road transport and on a set of measures to promote the use of biofuels” (COM 2001), from which biofuels were recognized as an alternative source to the use of fossil fuels in road transport.

Two years later, Directive 2003/17/EC revised Directive 98/70/EC on the quality of gasoline and gas oil, setting the blending of biofuels with oil by-products at 5% by volume of fuel. However, this mix was not mandatory and no implementation period was set down. It was Directive 2003/30/EC that promoted the use of biofuels or other renewable fuels in transport when targets were initially set for Member States. These targets

were based on both energy security and greenhouse gas reduction.

To this end, as a general objective, it was determined “contributing to objectives such as meeting climate change commitments, environmentally friendly security of supply and promoting renewable energy sources” (Article 1, Directive 2003/30/EC). Non-binding reference values were established for the percentage of substitution of fossil fuel by-products in the EU between 2 and 5.75%, calculated on the basis of the energy content of all diesel and gasoline intended for transport, with deadlines for compliance with each percentage.

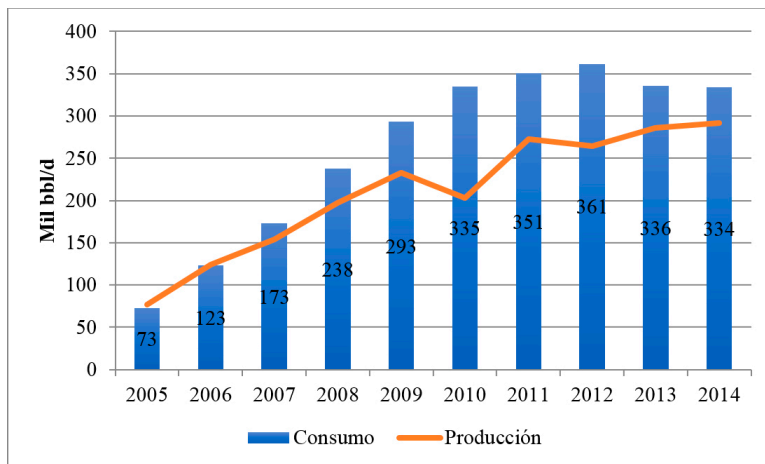
In addition, the choice between blending or full use of biofuels has been left to the Member States, so blends greater than 5% should be indicated on the product by a seal. However, despite all established national initiatives, the Dutch government was the only one to implement these objectives in their national legislation in 2005 (GRINSVEN, 2009, p. 34). This was because in most EU countries, it was necessary to create the biofuel production and supply chain from scratch.

Based on this result, the Commission has developed the “European Union Strategy for Biofuels” (COM 2006), based on the previous “Biomass Action Plan” (COM 2005). Key elements of this plan included the need to reduce energy demand, increase confidence in renewable energy sources, diversify energy sources and promote international cooperation.

During this period, as shown in Figure 1, the EU was self-sufficient in biofuel production and consumption. National policies focused on local production, and their objective was to eliminate technical, economic and social barriers to market expansion for these fuels. According to Di Lucia (2013, p. 83),

By linking biofuels policies to rural development and energy self-sufficiency, governments have attracted political support from farmers’ organizations and industrial lobby groups, leading to an increase in biofuel production in the EU.

This first stage of European policy development, which can be placed between 2005 and 2007, was led by national governments, the biofuel and automotive industry, farmers and environmental NGOs. While some NGOs have begun to question the benefits of earmarking agricultural crops for energy use, all these players have agreed on the importance of expanding production of this alternative source in the transport industry (LOND, DEURWAARDER; VAN THUIJL, 2006).

Chart 1 Consumption and production of biofuels in the EU (2005-2014).

Source: EIA (2017).

In the scenario mentioned, the scale of production and consumption was local, that is, it was concentrated in the European territory. The EU was preparing to allocate more biofuels to transport, driving oil substitution and rural development, but concern about sustainability was still very incipient. In this respect, the revision of Directive 2003/30/EC initiated in 2007 pointed to a new period in European policy for this renewable energy source.

Between 2007 and 2009, with the industry consolidated and production on the rise, a wider range of stakeholders shaped the landscape of this energy source in the EU, which includes both players directly involved in the production chain and supplying, to those indirectly affected by it (DI LUCIA, 2013). It must be pointed out that, at this stage, most stakeholders had well-defined but very divergent positions on biofuels, especially regarding the benefits and risks of intensive production (BOURGUIGNON, 2015).

In addition, the players were distributed throughout the world, even in areas geographically disconnected from the physical production of renewable fuel. For this reason, special emphasis has been given to the impacts associated with production expansion, which have resulted in the establishment of a European policy to control and mitigate the negative effects of biofuel production and consumption (DI LUCIA, 2013), consolidated in Directive 2009/28/EC.

To this end, the 2009 Directive, which is part of the “2020 Climate and Energy Package” (COM 2008a), was presented as a pioneering initiative in the development of a Sustainability Meta-Standard and the introduction of a target of using 10% renewable energy – essentially biofuels – to replace oil in the transport sector before 2020. In addition to the preceding Directive 2003/30/EC, the major breakthrough of this new regulatory instrument was to establish an explicit link between biofuel consumption and sustainable production (LYDGATE, 2013, p. 159).⁷

2 EUROPEAN UNION RENEWABLE ENERGY DIRECTIVE

Directive 2009/28/EC of the European Parliament and the Council entered into effect on 25 June 2009, with its transposition into national legislation scheduled for 5 December 2010. It is the “2020 EU Renewable Energy Policy” Directive, and is the first in the world to provide binding sustainability criteria for biofuel production. Adopted at the initiative of the EU Directorate-General for Mobility and Transport, its main objective is the development of energy from renewable sources, linked to an improvement in energy efficiency to reduce GHG emissions.

It provides, on the one hand, for a 20% share of energy from renewable sources to be achieved in total EU energy consumption and, on the other, for a mandatory minimum share of 10% for each Member State in relation to the percentage of Biofuels consumed in transport by 2020 (Article 3.4). This specific incentive for the use of energy from renewable sources in transport aims to “reduce the EU dependence on oil imports in the sector, an area where the problem of energy supply security is particularly severe and influences the fuel transport market” (Recital 2).

The Directive sets the same objective for all Member States in order to ensure consistency of specifications applicable to biofuels and their availability. In addition, it highlights the need to promote energy efficiency in the transport sector, given that “a mandatory percentage target for energy from renewable sources is likely to become increasingly difficult to achieve sustainably if overall demand for energy for transport continues to rise” (Recital 1, Directive (EU) 2015/1513).

⁷ At the same time, an amendment to Directive 98/70/EC – Fuel Quality Directive – by means of Directive 2009/30/EC, introduced the mandatory objective of reducing GHG intensity by 6% for road transport fuels. This Directive amended a number of elements of the diesel and gasoline specifications, and also introduced the requirements to supply vendors in order to reduce the intensity of GHG emissions in the road transport sector, in its Article 7a. Its Article 7 also laid down the same sustainability criteria for biofuels as set out in the Directive, which must be met to contribute to the goal of reducing GHG emissions during the fuel life cycle by up to 10% per unit of fuel energy or power supplied.

Concerning international trade, Recital 16 states that:

[...] While it is technically possible for the Community to achieve the objective of using energy from renewable sources for transport only from its domestic production, it is likely and desirable to achieve this objective by combining domestic production and imports.

The Directive therefore stipulates that the Commission oversees the supply of the European biofuels market and proposes relevant measures to strike a balance between domestic production and imports, taking into account “the development of multilateral and bilateral trade negotiations as well as environmental, social, economic and energy supply security considerations, among others.” The Directive explicitly provides for some environmental issues related to biofuels, identifying them as an impact on climate change and biodiversity conservation. However, it does not mention others, such as soil erosion, water pollution or use of pesticides (ANDRADE, 2018, p. 158).

In this context, a meta-standard of binding sustainability criteria related to the production of this energy source is established in Article 17, sections 2-6, the observance of which is binding to assess compliance with national objectives, such as obligations to use renewable energy and be able to opt for financial assistance for consumption. The directive encourages the consumption of biofuels that contribute to the reduction of greenhouse gas emissions, ensuring the fulfillment of the objectives of reducing the effect of the production of these pollutants on climate change. Table 2 summarizes the environmental sustainability criteria⁸ covered by the Directive.

Regarding the mechanisms available to verify these sustainability requirements, third country producers have three tools: bilateral or multilateral agreements; national systems established by Member States; voluntary certification schemes or schemes recognized by the European Commission. Among these options, certification is the most widely used mechanism, as it ensures producers that their crops will meet the requirements of all Member States, regardless of the source of the raw material (COM, 2015).

⁸ It is important to note that Directive 2009/28/EC also establishes social sustainability criteria in its Article 17.7 (table 4), but to this end, it lays down a weak verification framework, with the Commission sending reports to the European Parliament every two years and to the Council in relation to third countries and Member States which are a major source of raw materials or biofuels consumed in the EU. Unlike environmental criteria, social criteria have no binding force, are inaccurate and lack verification mechanisms (PORTOCARRERO; RIBEIRO, 2012).

Table 2 Environmental sustainability criteria

GHG emission reduction (Article 17.2)	The Directive on GHG emission saving from the use of biofuels shall be at least 60 % for biofuels produced in installations in which production started on or after 5 October 2015. An installation shall be considered as operational when it physically produces biofuels or bioliquids. In the case of installations operational on 5 October 2015 or before that date, GHG emission saving shall be at least of 35% by 31 December 2017 and at least of 50% as of 1 January 2018.
Land with high biodiversity value (Article 17.3)	Agricultural raw materials grown in the EU and used for biofuels shall not be made from raw material obtained from land with high biodiversity value, namely land that had one of the following statuses in or after January 2008, whether or not the land continues to have that status: a) primary forest and other wooded land, namely forest and other wooded land of native species, where there is no clearly visible indication of human activity and the ecological processes are not significantly disturbed; b) areas designated: i) by law or by the relevant competent authority for nature protection purposes; or ii) for the protection of rare, threatened or endangered ecosystems or species recognised by international agreements or included in lists drawn up by intergovernmental organisations or the International Union for the Conservation of Nature, subject to their recognition in accordance with the second subparagraph of Article 18(4); unless evidence is provided that the production of that raw material did not interfere with those nature protection purposes; c) highly biodiverse grassland that is: i) natural, namely grassland that would remain grassland in the absence of human intervention and which maintains the natural species composition and ecological characteristics and processes; or ii) non-natural, namely grassland that would cease to be grassland in the absence of human intervention and which is species-rich and not degraded, unless evidence is provided that the harvesting of the raw material is necessary to preserve its grassland status.
Land with high carbon stock (Article 17.4)	Biofuels shall not be made from raw material obtained from land with high carbon stock, namely land that had one of the following statuses in January 2008 and no longer has that status: a) wetlands, namely land that is covered with or saturated by water permanently or for a significant part of the year; b) continuously forested areas, namely land spanning more than one hectare with trees higher than five metres and a canopy cover of more than 30 %, or trees able to reach those thresholds in situ; c) land spanning more than one hectare with trees higher than five metres and a canopy cover of between 10 % and 30 %, or trees able to reach those thresholds in situ, unless evidence is provided that the carbon stock of the area before and after conversion is such that, when the methodology laid down in part C of Annex V is applied, the conditions laid down in paragraph 2 of Article 17, paragraph 2 of the Directive would be fulfilled.
Peatland (Article 17.5)	Biofuels shall not be made from raw material obtained from land that was peatland in January 2008, unless evidence is provided that the cultivation and harvesting of that raw material does not involve drainage of previously undrained soil.
Regulation (EC) n. 73/2009 (Article 17.6)	Agricultural raw materials cultivated in the Community and used for the production of biofuels shall be obtained in accordance with the requirements and standards under the provisions referred to under the heading “Environment” in part A and in point 9 of Annex II to Council Regulation (EC) No 73/2009 of 19 January 2009 establishing common rules for direct support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers and in accordance with the minimum requirements for good agricultural and environmental condition defined pursuant to Article 6(1) of that Regulation.

Source: Directive 2009/28/EC.

In addition, Article 4 states that Member States shall “adopt a national renewable energy action plan, which shall determine their national targets for the share of energy from renewable sources consumed in transport by 2020”. Finally, they should take into account the measures adopted to achieve these national overall objectives, which include

[...] cooperation between local, regional and national authorities, planned statistical transfers or joint projects, national policies to develop existing biomass resources and mobilise new biomass resources for different uses, and the measures to be taken to fulfil the requirements of Articles 13 to 19 (Directive 2009/28/EC).

The European Commission offers a model of national action plans reflecting the minimum requirements set out in the Directive. These plans are released every two years on the EU Transparency Platform, accompanied by a report on the progress of renewable energy in the Member States⁹. The latest report was presented in February 2017 (COM, 2017).

According to the report mentioned above, 25 of the 28 Member States incorporated the sustainability criteria of the directive into their national legislation in 2014. However, only 19 of these countries have managed to replace up to 5% of fossil fuels with transport biofuels. In particular, Austria, Sweden and Finland are listed as the only Member States to achieve the target with a share of 10.9%, 21.1% and 22% respectively. Of this total, biodiesel stands out as the most used renewable energy in transportation, with 12.7 Mtoe, followed by ethanol, with 3.5 Mtoe (EUROSTAT, 2017).

3 CONDITIONING FACTORS OF THE BIOFUEL INDUSTRY IN THE EUROPEAN UNION

When Directive 2009/28/EC was adopted, the European Parliament and the Council asked the European Commission to examine the indirect impact of greenhouse gas emissions from the expansion of agricultural crops for first generation biofuels, and if necessary, put forward a legislative proposal. This highly controversial issue has been the subject of a lengthy normative debate that culminated in the adoption of Directive (EU) 2015/1513, which would change the European policy path for this renewable source.

The draft of this new directive, which aims to limit the participation of the first generation of biofuels in European energy consumption by 5%, was

⁹ EC action plans and reports are available at <http://ec.europa.eu/energy/en/topics/renewable-energy/progress-reports>, as of 13 June 2017.

presented in October 2012 by the European Commission to the European Parliament. The new threshold established meant stopping production of the first generation of these fuels in Europe (EUROSERV'ER, 2015, p. 5). For this reason, the proposal aroused the dissatisfaction of the biofuel sector by disregarding the high investments already made to implement the objectives of the previous directives.

In response to this dissatisfaction, in 2014 the European Council of Energy Ministers reached a political agreement with the sector, the main features of which were reflected in the modifications made by Directive (EU) 2015/1513 to Directive 2009/28/EC (PRESSE 138, 2014). The main effect of these modifications was to limit the participation of first generation biofuels to 7% in the Member States. The overall target of 10% renewable energy in transport has been maintained, so that the remaining 3% should be obtained through electric mobility or advanced biofuels, whose contribution to achieving the overall target would be considered to be twice its energy content.

However, the insecurity generated by this lengthy regulatory review process negatively affected the EU biofuel market. As can be seen from Table 3, even though, between 2005 and 2014, there was a global increase in the use of renewable energy in urban heating, cooling and electricity systems, in the transport sector progress towards achieving the objective of Directive 2009/28/EC has been slow. The latest report on the progress of renewable energies presented by the Commission in 2017 (COM 2017, p. 8) shows that, in 2014, a share of 6.5% was reached as regards the goal of replacing 10% of fossil fuels with biofuels.

Table 3 Percentage share of energy from renewable sources by sector (2005-2014)

Public	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Transport	1.8	2.5	3.1	3.9	4.6	5.2	4.0	5.6	5.9	6.5
Electricity	14.8	15.4	16.1	17.0	19.0	19.7	21.7	23.5	25.4	27.5
Heating and cooling	10.9	11.4	12.8	13.1	14.7	14.9	15.6	16.4	16.9	18.1

Source: Eurostat, 2017

The Commission (COM 2015, p. 3) expressly associates these findings with the uncertainty caused by delays in completing the strategy to limit the risks of indirect land use change and insufficient progress in the implementation of second generation alternative biofuels. In this

context, Directive (EU) 2015/1513 converged towards a reorientation of the European transport policy strategy for the most advanced generations of this alternative energy source, as well as for the electrification of the light vehicle fleet (COM 2014, p. 9).

Another turning point in the EU biofuels market took place in 2011, the year in which consumption of this energy source was linked to the implementation of the binding sustainability criteria of Directive 2009/28/EC. Euroserv'er data (2013; 2015) suggest that the share of certified fuels increased from 2011-2014, from 11.7 Mtoe in 2012 to 12.5 Mtoe in 2014, to account for 92% of biofuels consumed in the EU.

However, between 2009 and 2014, average growth in biofuel consumption began to significantly decrease. In that period, it was only 3%, compared with 48% experienced in the 2003-2008 period (EUROSTAT, 2017). Euroserv'er indicates as the main reason for this slowdown that, with the adoption of Directive 2009/28/EC, the priority of Member States, rather than increased consumption, has been linked to sustainability.

Table 4 indicates that biofuel production in the EU followed the same trend in consumption. A significant increase was registered between 2005 and 2009, averaging 25%. However, over the next period, it gradually refused to suffer a historic fall of 10.7% in 2011, which coincides with the transposition of Directive 2009/2 EC to Member States.

Table 3 Overview of biofuels in the EU in Mtep (2005-2014)

		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Consumption	Biodiesel	2,529	4,046	6,030	7,969	9,562	10,546	10,923	11,869	10,625	11,721
	Ethanol	607	894	1,166	1,795	2,267	2,790	2,898	2,867	2,686	2,652
	Total	3,136	4,940	7,196	9,764	11,829	13,336	13,821	14,736	13,311	14,373
Production	Biodiesel	2,499	3,674	5,199	6,401	7,876	8,931	8,504	9,111	9,787	11,361
	Ethanol	480	741	1,036	1,492	1,688	1,972	1,763	2,046	2,564	2,274
	Total	3,373	5,486	7,362	8,716	10,510	11,725	10,594	11,482	12,743	13,982
Importation	Biodiesel	425	1,230	1,863	2,927	3,093	4,191	5,412	5,783	5,041	5,968
	Ethanol	128	179	347	699	1,056	1,387	1,629	1,418	1,096	1,292
	Total	828	1,727	2,248	3,732	4,402	6,152	7,557	7,760	6,770	8,016
Exportation	Biodiesel	383	861	925	1,296	1,430	2,599	2,890	3,049	4,004	5,507
	Ethanol	28	30	144	360	488	556	498	639	956	936
	Total	412	892	1,069	1,655	1,918	3,155	3,390	3,687	4,959	6,443

Source: EUROSTAT (2017).

With regard to imports and exports, it is interesting to note that Eurostat data do not confirm the forecasts made when Directive 2009/28/EC came into force, which provided for a greater importation of ethanol into the EU. To meet this directive goal, it was estimated that the expected increase

in biodiesel production would be predominantly domestic, while ethanol would be imported from other countries (AL-RIFFAI; DIMARANAN; LABORDE, 2010).

However, while between 2005 and 2010 there was a significant importation of biofuels into the EU, from 2010 on, the block of 28 Member States became an exporter of this energy source, mainly biodiesel. Likewise, it can be seen that consumption was higher than production between 2005 and 2010, but a trend indicators coming closer together began to show up in the final period of the analysis, 2010-2014, which points to the achievement of an autonomy of the biofuels industry.

CONCLUSION

In early 2014, the Commission published a proposal to establish a strategic climate and energy framework for the period 2020-2030, which started negotiations on the implementation of the next energy and climate change package. On this occasion, an overall target of 27% renewable energy was suggested, which could vary for each Member State, based on energy policy and national interests. However, the Commission chose not to set a specific transport target.

This decision was strongly criticized by representatives of the biofuels industry, as the lack of an outlook mainly affected the development of new generations. As a result, the new Renewable Energy Directive, proposed by the European Commission in February 2017, raises two objectives for the transport sector: to ensure the economic implementation of electricity from renewable sources and their integration into the market; and to develop the decarbonization potential of advanced biofuels by clarifying the role of biofuels produced from food crops after 2020.

To achieve these objectives, the Commission held an online public inquiry on sustainability, held from 10 February to 10 May 2016. This consultation was concluded with a telematic stakeholder conference held on 12 May 2016. The responses highlighted that the main obstacles to increasing renewable energy in the transport sector include the lack of a stable post-2020 policy framework; the long debate on the sustainability of biofuels; and the high price of electric vehicles.

In addition, the vast majority of respondents noted that an effective measure to promote renewable fuels would be to maintain a specific obligation to incorporate their consumption. In this case, several public

sector authorities and companies, biofuel producers, and forestry companies have opposed the imposition of new sustainability requirements for biofuels in view of the risk of administrative burdens.

In this regard, stakeholders have asked for consistency in imposing social and environmental criteria on renewable energy sources, which means that the requirements for advanced biofuels should be the same as those for biogas used for heat and electricity generation, for example.

Among the options for increasing renewable energy in the transport sector envisaged in the proposal, the best value was the obligation to incorporate advanced renewable transport fuels with a biofuels reduction. This alternative supports the gradual return on investments already made in the Member States over the first generation and offers greater security for future investments and large-scale innovation in the sector.

Therefore, the main action point of the new directive is to take measures to encourage the further deployment of advanced fuels. That is, the central focus is no longer on first-generation biofuels, but on promoting future generations and accelerating the electrification of road vehicles.

Progress can be seen in European regulations for the use of sustainable biofuels. If, in principle, European legislation was based on the substitution of fossil fuels for biofuels without promoting sustainable development, at a second stage this requirement is no longer indirect, but rather implicitly and explicitly stated in Directive 2009/28/EC, together with latter ones, which set down limits on the use of first generation biofuels and encouraged second generation or advanced biofuels. These advances aim to promote sustainable development as set out in the European Union Fundamental Treaty.

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Article received on: 1-Aug-2019.

Article accepted on: 18-Oct-2019.

How to quote this article (ABNT):

PORTOCARRERO, I. R.; FERRAZ, D. A; OLIVEIRA, L. P. S. Sustainable Biofuels: an analysis of the regulatory framework of the European Union. *Veredas do Direito*, Belo Horizonte, v. 16, n. 36, p. 63-83, sep./dec. 2019. Available at: <http://www.domhelder.edu.br/revista/index.php/veredas/article/view/1614>. Access on: day month. year.