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BIOENERGY IN THE EU-MERCOSUR AGREEMENT: AN EMPTY SHELL?

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Abstract

This thesis focuses on the EU capacity of coupling its bioenergy domestic expansion with environmental protection, through innovative policies addressing the existing stumbling blocks. The EU pursues liberalisation on different spheres: at multilateral level (WTO), at unilateral level (protectionism) and at bilateral level (free trade agreements). However, the liberalisation of the bioenergy sector is triggering international concern, in view of the debated ratification of a free trade agreement between the EU and Mercosur countries. Despite its chapter on trade and sustainable development having been enhanced to ensure compliance with the Paris agreement, its lack of enforceable measures raised large scepticism across the signatory parties, reaching a deadlock in negotiations.

Beyond representing a thorny issue on the international sphere, bioenergy is also a complicated renewable energy source to manage in a domestic context. The side effects of indirect land use-change contributing to global deforestation, mainly due to biofuel competition with the food sector, played a role in the negative public opinion. At domestic level, the untapped potential of biomass from sectors such as agriculture is mostly hampered by lack of incentives and difficulties in decarbonising segments of the supply chain. Besides, the path dependency embedded in EU bioenergy policies prevented policy makers from overcoming reiterated gaps, in a scenario studded by conflicts and strong interests.

The dimension of conflict in the EU bioenergy sector is paramount to international trade. National interest groups' power often transcends national borders, swaying supranational decision. This could disrupt trade equilibrium, threatening the conclusion of international negotiations. Thus, an EU mobilising policy is required to overcome the existing gaps and stakeholders' cooperation should be enhanced to exploit the untapped potential of bioenergy though innovation. However, enabling technologies must be coupled with clear commitments in the regulation of bioenergy international trade.

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Glossary of Terms

AIEL: Italian Agroforestry Energy Association (Associazione Italiana Energie Agroforestali)

BECCS: Bioenergy Carbon Capture and Storage

CI: Carbon Intensity

CO2: Carbon dioxide

DENA: German Energy Agency (Deutsche Energie-Agentur)

EC: European Commission

EU: European Union

EUBIA: European Biomass Industry Association

FCA: Framework Cooperation Agreement

FQD: Fuel Quality Directive

FTA: Free Trade Agreement

F2F: Farm to Fork

GATT: General Agreement on Tariffs and Trade

GHG: Greenhouse Gas

GMO: Genetically Modified Organisms

GSP: Generalised Scheme of Preferences

hILUC: High-ILUC risk biofuels

IAA: Interregional Association Agreement

IDDRI: Institute for Sustainable Development and International Relations (Institut du développement durable et des relations internationales)

ILUC: Indirect Land Use Change

lILUC: Low-ILUC risk biofuels

LNEG: National Laboratory of Energy and Geology (Laboratório Nacional de Energia e Geologia)

LSE: London School of Economics and Political Science

MERCOSUR: Southern Common Market (Mercado Común del Sur)

MFN: Most Favoured Nation

MHc: Millions Heads of cattle

MS: Member States

Mt: Million tonnes

NCCP: National Climate Change Plan

NGO: Non-Governmental Organisation

R&D: Research and Development

RE: Renewable Energy

RED: Renewable Energy Directive

REDII: Renewable Energy Directive II

SWOT: Strengths, Weaknesses, Opportunities, and Threats

THf: Thousands Hectares of forest loss

TSD: Trade and Sustainable Development

UK: United Kingdom

US: United States of America

WTO: World Trade Organisation

WWF: World-Wide Fund for Nature

Introduction

Bioenergy is associated to the process of production and conversion of biomass feedstock into energy. Despite being the primary renewable energy (RE) source in the European Union (EU), bioenergy has yet to gain public acceptance to fully exploit its untapped potential. Trading bioenergy represents a thorny issue on the international sphere, since it is regulated by clashing regimes: a highly liberal World Trade Organisation (WTO) that leaves loopholes for trade distortions; a protectionist Europe seeking to safeguard its domestic market from cheap imports; a bilateral free trade agreement signed by parties holding an asymmetrical relation; and conflicting national interests within the European Community itself.

This thesis focuses on the EU capacity of mitigating the environmental side effects of its domestic bioenergy expansion through innovative policies, lingering on the impact that the future of the EU-MERCOSUR agreement might have on the international trade of bioenergy. There is interest in digging into such a complex scenario in the light of the change of priorities on the world agenda, spurred by climate concerns, that is spilling into the trade dynamics of world superpowers. The call for international climate cooperation and the adaptation of existing frameworks, including trade agreements, to reach *net zero* may create unprecedented opportunities, especially in the bioenergy field. However, three key questions must be kept in mind: will the possible ratification of the free trade agreement between the EU and the Mercosur countries overturn the *soft imperialist* position of the EU? Will the introduction of a chapter on trade and sustainable development ensure better environmental conditions and remove negative externalities that hamper regional development in Latin America? And lastly, will the EU innovative policy succeed in tackling the path dependency that permeates its bioenergy domestic expansion, unlocking new sustainable opportunities?

The hypothesis advanced is that the path dependency embedded in EU bioenergy policies prevented policy makers from overcoming reiterated gaps, in a scenario studded by conflicts and strong interests. It is worth noting that the world is facing a new kind of energy transition, dictated by climate imperatives rather than economic ones. If, at domestic level, the EU "soft" approach based on voluntary requirements to decarbonise its economy has slightly strengthened through innovative bioenergy policies, on the international sphere dialogue-based mechanisms are still in

place. Lacking effective enforcement and clear guidelines, the green pledge of the EU-MERCOSUR agreement risks being meaningless, whilst increasing global deforestation and undermining fair trade across the EU Member States (MS).

The first chapter retraces the history of the EU-MERCOSUR agreement, shedding light on the asymmetrical relationship between the two regional blocs that prevented them from reaching a consensus after more than 20 years of negotiations. It will be argued whether the revised agreement could change the dynamics of their uneven relation, based on protectionism and the compliance with the "driving" bloc's sustainability standards.

The second chapter analyses the policies that underpin the innovative political dimension of the EU green strategy in the bioenergy sector, assessing its capacity to use legal opportunities to change existing paradigms. With regard to international bioenergy trade, the exposed arguments of different MS in view of the possible ratification of the trade agreement are developed to explain the deadlocks behind its fulfilment.

The third chapter oversteps the institutional dimension of bioenergy policy to address the local dimension of conflictual relations between stakeholders, studded with different opposed interest groups whose powerful voice can influence national and supranational deliberations about international trade. The chapter further elaborates the stumbling blocks hampering the bioenergy sector, considering whether those barriers are reflected into the EU-MERCOSUR agreement and to what extent its ratification might contribute to tackle the exposed gaps. A final analysis on selected stakeholders' influences and interests provides an insight into cooperation opportunities that might pave the way to overcome the existing barriers to a domestic bioenergy expansion.

Methodology

This thesis is the outcome of a literature review, shedding light on the path-dependency embedded in EU bioenergy policies and their relative trade distorting mechanisms within international trade, with a special focus on the EU-MERCOSUR agreement. The main sources implemented are journals, such as Energy Policy, academic papers, such as IDDRI, and study reports, such as LSE Consulting, dealing with bioenergy policies, international bioenergy trade and global

sustainability. Considering that the future of the EU-MERCOSUR agreement is at stake, as well as the revision of significant policies for the bioenergy sector, such as the REDII (Renewable Energy Directive II), this work considers analytical reviews of news and magazine articles dealing with EU policies, such as Euractiv.

Qualitative interviews with experts provide empirical evidence to support the questions raised and future prospects hypothesised. The scenarios outlined will be backed by the interviews' main findings, by analysing stumbling blocks in bioenergy expansion, interests, and conflicts. The interviews' valuable contribution goes beyond analytical research, highlighting further room for cooperation and best practices. The experts interviewed where identified on LinkedIn through a research of bioenergy organisations/companies. After checking their willingness to be anonymously interviewed through a personalised note, they were sent a question sample prior to the scheduled interview day. The interviews took place online between April 9th and May 27th, 2021, for an average duration of 45 minutes. The experts were sent a link through Google Meets to join the interview and they were asked their permission before recording the conversation. The interviews carried out were qualitative, collecting personal opinions and allowing follow-up questions from the interviewee's side in order to make the conversation engaging. At the end of every interview, a summary of the conversation's content was revised, refined, and sent back to the experts, to make sure that the information delivered was accurate. The outcome of the interviews is disclosed either through direct quotes or paraphrasing of statements. The main findings are summarised in the Appendix (*Annexes F-G-H*).

CHAPTER 1

1.1 EU-MERCOSUR: an asymmetrical relation?

The history of EU-MERCOSUR agreement entails a complex negotiation process that has being carried out for over twenty years. Although the EU has always strived to export its own trading "standards" abroad, becoming the world's largest trading bloc, the dynamics of power intrinsic to the EU-MERCOSUR transcends the dimension of trade. In a scenario of world superpowers committing to decarbonise their economies to meet carbon-neutral targets, the relationship between the EU and MERCOSUR countries is entering a new phase. The EU has signed 36 preferential trade agreements so far, with the purpose of protecting its industry by creating a system of tariffs and regulations.

Figure 1: Overview on EU trade agreements

Source: The European Commission

In spite of the MERCOSUR region being a key-partner for the EU, **Figure 1** shows that the ratification of an agreement between the two regional blocs has not been concluded yet. MERCOSUR was founded in 1991 to foster economic and political integration among the

countries' members of the bloc. Although MERCOSUR took inspiration from the EU integration framework, it differs significantly in its decision-making authority since member states retain full sovereignty on their national territories.[1] It was in 1995 that the EU signed a bilateral trade agreement with the Mercosur region, namely Brazil, Paraguay, Argentina, and Uruguay, in order to facilitate the trade in goods and services between the two regional blocs. The dialogue between the two blocs is guided by the Framework Cooperation Agreement (FCA), signed on 15 December 1995 and entered into force as of 1 July 1999.[2] The treaty is composed of 24 founding articles addressing a fair trade of goods in compliance with safety standards and non-discriminatory practices. Additionally, some Mercosur countries set off bilateral FCAs with the EU, encompassing a system for coping with trade-related matters. Ultimately, the final goal of these agreements was to lay the foundations for establishing an Interregional Association Agreement (IAA). *Annex A* provides an overview of bilateral trade agreements' type.

In contrast to a free trade agreement, an IAA entails full liberalisation of trade in goods and services in compliance with WTO regulations and strengthens cooperation and political dialogue between the two signing parties. This deal is trying to be achieved through two negotiation phases, namely the foundation of an Interregional Framework Agreement on trade and economic cooperation to fulfil the ultimate goal of the EU-MERCOSUR agreement, the creation of an interregional association between the EU and MERCOSUR countries.[3] Whilst translating the second phase into reality is ambitious, the first phase is currently underway. In June 2019, the EU and MERCOSUR countries reached an *in-principle* trade and sustainable development (TSD) agreement, within an FTA, which for the first time in the negotiation process included environmental considerations.[4] The latter and its relative implications will be further analysed in section 1.3. Overall, the negotiations of the agreement had gone through periods of sluggish deliberations and prolonged stagnation, also due to the economic recession and political instability that some MERCOSUR countries were coping with on a domestic level.[5] A remarkable moment of the negotiation process

[1] Isabella Querci,"EU and Mercosur vis-à-vis the Trade Agreement. Remarks from the Institutional Perspective", Oasis no. 26 2017 (July-December 2017)
[2] European Parliament, "The trade pillar of the EU-Mercosur Association Agreement", by Gisela Grieger, PE 640.138 (August 2019)
[3] Council Decision 1999/279/EC, OJ (L 112), 29/04/1999
[4] EC, "Trade part of the EU-Mercosur Association Agreement", 28 June 2019
[5] European Parliament, "The trade pillar of the EU-Mercosur Association Agreement"

was the removal of all MERCOSUR countries from the EU's Generalized Scheme of Preferences (GSP). The GSP scheme concedes a favourable treatment towards developing countries, paying reduced tariffs or no duties on their exports to the EU, in order to foster mutual economic growth. All Mercosur countries were classified as high middle-income countries (Paraguay was the last country to upgrade to an upper-middle income country in 2018), and thus no longer able to apply to the scheme. However, they won't lose their eligibility until a Free Trade Agreement (FTA), or IAA is concluded, since such agreements are incompatible with the application of the GSP scheme, and this would greatly impact members of Mercosur individual gains.[6]

For a comprehensive analysis of the hurdles that have been facing during the negotiations of the agreements, it is essential to define the dynamics of power characterising the relationship between the two regional blocs. The first element of divergence is that, despite the EU-Mercosur agreement being treated as a single entity in terms of decision-making, at regional bloc level different executive procedures apply.[7] The EU, as a representative of the whole "community" of MS, is entitled to implement provisional agreements under the treaty before MS consensus. Contrarily, the MERCOSUR region, treated as separate legislative powers, could ratify agreements with the EU, that would provisionally enter into force, as single countries. In other words, Argentina could deliberate to ratify an agreement under the treaty, even without reaching a consensus with the other MERCOSUR countries. Thus, the different consideration of the two regional blocs may create a misalignment of decision-making procedures, failing to express the will of all the signatory parties. The asymmetrical relationship of EU-MERCOSUR countries is embedded into the EU strategy of multilateralism, or inter-regionalism. According to *Afionis et al.*, under its flagship of founding alliances to pursue common goals, the EU has been acting either as a "normative" or a "soft imperial" power with regards to MERCOSUR countries.[8] Hinging on the interests at stake, sometimes the EU has opted for advancing its values and ideas through an ethical policy of debate and dialogue. On the other hand, it is worth noting that the pursuit of common interests has not always been attained through ethical power, but rather through non-physical coercion or economic

[6]Querci,"EU and Mercosur vis-à-vis the Trade Agreement"
[7] Querci,"EU and Mercosur vis-à-vis the Trade Agreement"
[8] Stavros Afionis and Lindsay Stringer, "The environment as a strategic priority in the European Union-Brazil partnership: Is the EU behaving as a normative power or soft imperialist?", International Environmental Agreements, no. 14 (March 2014)

deterrents. In this sense, the EU is criticised by *Afionis et. al* for behaving as a "soft imperial" power in the attempt to safeguard its self-economic interests. It can be inferred that the EU tends to open up its internal market only to those countries that are willing to accept its conditions. An example of "soft imperialist" behaviour is depicted by the policy of *green protectionism* that the EU has been enacting since the signature of the EU-MERCOSUR treaty. Under the treaty, certain traded goods are protected by deterrent measures, such as tariffs and quotas. To a certain extent, the fact of being Brazil's main trading partner allowed the EU to impose its own rules. With regard to that, environmental pledges have often been used as a justification for placing protectionist measures in favour of the European industry.[9] As argued by Erixon:

> "It is difficult to escape the picture of a policy driven by industrial ambitions rather than environment concerns"[10]

The following chapter will provide an overview over bi-regional trade in goods and services, shedding light on existing tariff barriers to trade.

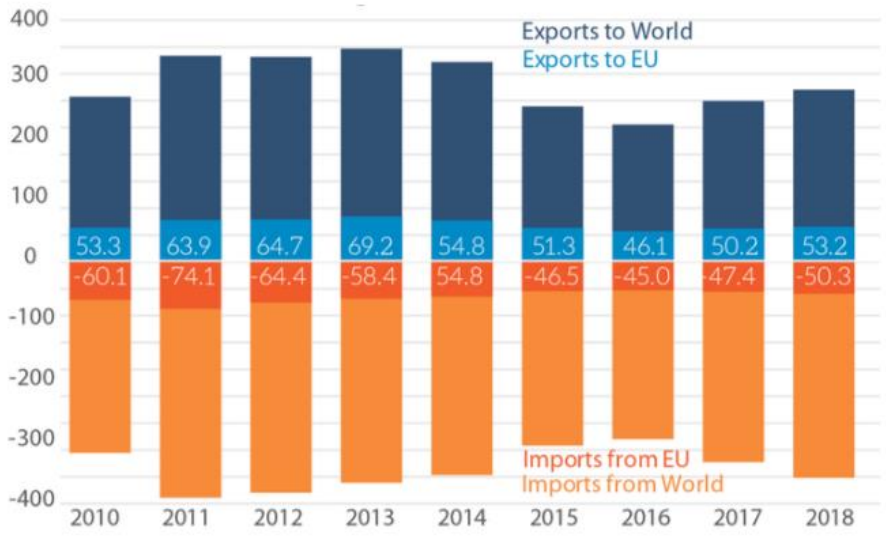
1.2 Trading bioenergy: distorting effects under the WTO

Although the trade between EU and Mercosur is relatively small, the two blocs have always been strategic partners. Mercosur holds a comparative advantage in the agricultural sector compared to the EU, which has always strived to offset through a highly protected market. Contrarily, the EU boasts a competitive manufacturing industry. As of 2018, total EU-Mercosur trade in goods amounted to €87.6 billion. EU exports to Mercosur accounted for €45 billion and EU imports from Mercosur at €42.5 billion, with Brazil being the main trading partner at regional level.[11] The fluctuation in the trade value of Mercosur exports can be partially explained by the volatility of global commodity prices, greater for Mercosur exports to the world than to the EU (Figure 2). It is worth noting that bioenergy covers a significant part of EU imports, such as foodstuffs (20.5%)

[9]Alan Beattie, "Is the EU's green policy protecting the planet or European industry?", Financial Times, December 11, 2017
[10]Fredrik Erixon,"Green Protectionism in the European Union: How Europe's biofuels policy and the Renewable Energy Directive violate WTO commitments", Ecipe Occasional Paper, no. 1 (2009): 30
[11] European Parliament, "The trade pillar of the EU-Mercosur Association Agreement"

and vegetable products, such as soy and coffee (16.3%). Beyond that, a smaller percentage of exports to the EU is dedicated to minerals and meat or other animal products. On the other hand, the EU mainly exports machinery, chemical producers, pharmaceutical and transport equipment to Mercosur countries.[12]

Figure 2: MERCOSUR trade in goods (billion US$)



Source: IMF

Figure 2 demonstrates that, from 2014 to 2016, the demand for EU goods from MERCOSUR significantly dwindled. Brazil's economic recession, the market entry of new competitors, namely China, and protectionist measures, such as tariff and non-tariff barriers, played a role in slowing down trade from the EU to Latin America.[13] Although the EU-MERCOSUR's trade-off is based on the most favoured nation (MFN) tariffs under the WTO, Mercosur countries have been wishing to upgrade their relation in order to attain a more preferential treatment.[14] However, the GPS upturned Mercosur countries expectations by delisting them from their preferential status. This is

[12] "Sustainability Impact Assessment in Support of the Association Agreement Negotiations between the European Union and Mercosur", London: LSE Consulting, Draft Final Report (July 2020)
[13] Querci,"EU and Mercosur vis-à-vis the Trade Agreement"
[14] According to WTO Principles of the Trading System: "Each member treats all the other members equally as "most-favoured" trading partners. If a country improves the benefits that it gives to one trading partner, it has to give the same "best" treatment to all the other WTO members so that they all remain "most-favoured"."

one of the factors, coupled with the decreasing goods' demand from China, that boosted Mercosur bloc's interest in establishing an FTA with the EU.[15]

As mentioned in the previous section, protectionism has always been a cornerstone of EU trade strategy with regards to Mercosur region. It is worth noting that different types of sugar crops (mainly sugarcane and sugar beet) can be used as feedstocks for producing both conventional and advanced biofuels. First generation or conventional biofuels often derive from edible biomass and include ethanol, typically obtained by fermenting the sugars of plants and biodiesel, a biodegradable fuel manufactured from vegetable oils, animal fats or recycled cooking oil. Advanced biofuels can derive either from non-food feedstocks such as wood chips, agricultural and forest residues, municipal solid waste (second-generation biofuels) or from niche products such as algae biomass (third-generation biofuels).[16]

EU sugar policy was characterised by the following cornerstones: beet sugar production was incentivised with a minimum support price and sugar was subject both to production/import quotas and import tariffs.[17] In 2017, a turning point was reached in sugar trade: quotas for sugar production were abolished, allowing the EU to export unlimited amount of sugar and adjust its production to the market demand. Tariffs, however, weren't removed from sugar imports. The EU imposes an MFN import tariff of €339 per tonne of sugar, with some exceptions for sugar imported under multilateral or bilateral Tariff-Rate Quotas, and sugar from Least Developed Countries, which is imported duty-free.[18]

[15] European Parliament, "The trade pillar of the EU-Mercosur Association Agreement"
[16] Roland Arthur Lee and Jean-Michel Lavoie, "From first- to third-generation biofuels: Challenges of producing a commodity from a biomass of increasing complexity", Animal Frontiers 3, no 2 (April 2013)
[17] "Sustainability Impact Assessment", London: LSE Consulting
[18] Ibid

Figure 3: EU Sugar balance (Million Tonnes)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sugar beet production	105.2	125.0	114.1	109.0	131.0	101.9	112.4	142.8	126.2
Sugar production*	16.1	18.9	17.5	16.7	19.5	14.9	16.8	21.1	18.6
Consumption	18.9	19.0	19.0	19.1	19.4	18.5	17.7	18.6	18.5
Imports	3.4	3.3	3.6	3.1	2.7	2.9	2.4	1.3	1.3
Exports	1.0	2.1	1.3	1.4	1.4	1.4	1.3	3.3	2.1
Beginning stocks**	1.6	1.2	2.4	3.2	2.6	4.0	1.9	2.2	2.7
Ending stocks**	1.2	2.4	3.2	2.6	4.0	1.9	2.2	2.7	1.9

Source: LSE report, 2020

Figure 3 provides data on the EU's sugar production in the period 2010-2018. It can be noticed that there has been a drop in sugar imports after 2016, whilst exports had almost tripled.

Ethanol from sugarcane is claimed to be the most traded first-generation biofuel at world level, due to its suitability for transport fuels. The regulatory framework for biofuels is grounded on targeted policies that will be discussed in the following chapter. As **Figure 4** shows, the EU is a major producer of ethanol based on cereals and sugar beet.[19] However, in the timeline 2010-2018, only its supply of ethanol based on cereals and advanced biofuels has been relatively increasing. On the other hand, the table demonstrates that ethanol imports have been decreasing during the same time span, whereas the percentage of exports has been slightly rising. In other words, the EU is becoming more self-sufficient, which goal seems to be in line with the raising concerns over the exportations of biofuels from developing countries. Additionally, the blending rate of ethanol in gasoline has been scaling up, as required by the biding targets imposed by mobilising policies.[20]

[19] "Sustainability Impact Assessment", London: LSE Consulting
[20] EU Directive 2018/2001, OJ (L 328), 11/12/2018

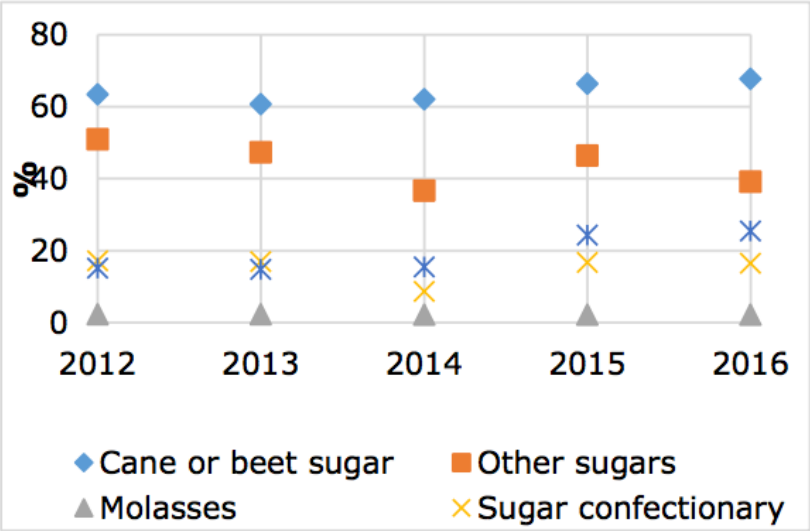
Figure 4: EU Ethanol balance (Million Tonnes)

	2010	2011	2012	2013	2014	2015	2016	2017	2018
Production	4.4	4.8	4.8	4.8	5.5	5.1	4.9	5.2	5.2
of which based on cereals	66%	66%	65%	67%	66%	61%	72%	71%	73%
of which based on sugar beet and molasses	27%	28%	30%	29%	29%	33%	23%	23%	21%
of which based on other agricultural crops	6%	4%	4%	3%	4%	4%	3%	3%	2%
of which advanced	1%	1%	2%	1%	2%	2%	3%	4%	4%
Consumption	4.5	4.8	5.0	5.1	5.7	5.2	5.2	5.3	5.8
of which for fuel use	3.1	3.4	3.6	3.6	3.8	3.6	3.5	3.9	4.1
of which for other uses	1.4	1.4	1.4	1.5	1.9	1.6	1.7	1.5	1.7
Ethanol imports	0.3	0.3	0.4	0.6	0.4	0.4	0.3	0.3	0.2
Ethanol exports	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
Ethanol blending in gasoline %	3.1	3.6	4.0	4.3	4.4	4.2	4.2	4.5	4.8

Source: LSE report, 2020

The EU has been protecting its domestic market from cheap imports of biofuels from Mercosur countries through tariffs and countervailing duties.

Figure 5: EU MFN ad valorem equivalent tariffs for sugar and ethanol products



Source: LSE report, 2020

Figure 5 depicts the MFN *ad valorem equivalent* tariffs that the EU had imposed on sugar and ethanol products between 2012 and 2016. It can be noticed that tariffs on raw cane or beet sugar were the highest compared to other goods. Contrarily, sugar confectionary was charged with much lower tariffs. In order to better grasp the hurdles intrinsic to bioenergy trade, a comprehensive outlook on the classification of bioenergy products is provided in the following paragraph.

The WTO distinguishes three main categories of commodities: agricultural, industrial, or environmental. One of the main issues with biofuels is that their classification is not unique but overlaps those labels. In fact, while ethanol is classified as an agricultural good, biodiesel is considered an industrial one. This is explained by the fact that, under the WTO, products are classified according to their chemical composition rather than their potential use.[21] Additionally, WTO regulations tend to be more flexible with respect to the size of subsidies approved for agricultural products. Consequently, they receive different treatments in terms of taxation. Referring to different definitions, they are charged with distinct trade-distorting domestic subsidies. Overall, tariffs on ethanol are higher than those on biodiesel. Tariffs' classifications are broad and encompass several multi-purposes products. The EU lacks product codes, namely *tariff lines*, either for ethanol or biodiesel. As shown in the table below, both goods fall out of a taxonomy classification. Ethanol is classified as "undenatured and denatured alcohol", whilst biodiesel is labelled as "other chemicals".[22]

[21] Afionis and Stringer, "The environment as a strategic priority in the European Union-Brazil partnership"
[22] Erixon, "Green Protectionism in the European Union"

Table 1*:* MFN and applied tariffs on biofuels

CATEGORY	MFN BOUND TARIFF	AD VALOREM EQUIVALENT
Ethanol		
Undenatured alcohol	EUR 19.2/hl	63%
Denatured alcohol	EUR 10.2/hl	39%
Biodiesel		
Other chemicals	6.50%	
Vegetable oil for biodiesel production		
Crude soy oil for industrial use	3.20%	
Crude palm oil for industrial use	0	
Crude sunflower oil for industrial use	3.20%	
Crude rape oil for industrial use	3.20%	

Source: TARIC and COMTRADE

Table 1 lists the tariff rates for import of biofuels. With regards to ethanol imports, the EU does not use a fixed tariff expressed in percentage, even though it is estimated that the *ad valorem* equivalents of these tariffs are 63% for undenatured alcohol and 39% for denatured alcohol. Currently, the tariff per hectolitre on imported undenatured ethanol is of €19.20, whilst denatured ethanol is charged with an import duty of around €10.20 per hectolitre. Comparing those tariffs with the ones placed on biodiesel and vegetable oil, we can see that they are much higher. If, on the one hand, palm oil is imported duty free, other vegetable oils are subject to a tariff of 3.20%. If a country makes part of a trade-preference scheme, exporting to Europe can be allowed at a lower tariff. However, it is worth noting that most imports of biofuels stem from countries that are not eligible for trade preferential duty rates.

The following section analyses the capacity of the revised agreement to overcome trade distortions.

1.3 International race to net-zero: new sustainability criteria in free trade agreements

In the latest years, the irreversible countdown to prevent the catastrophic effects of climate change spurred world powers to review environmental policies and regulations to achieve carbon neutrality in the shortest period. These concerns were reflected in the EU-MERCOSUR agreement, provided with revised sustainable imperatives. In 2019, the two trading partners reached a FTA after a negotiation phase which has lasted over than 20 years, as part of an IAA, facilitated by political dialogue. The agreement is grounded on 17 chapters dealing with the liberalisation of tariffs and removal of non-tariff barriers in several sectors. The *in-principle* agreement, or FTAs, which has been signed but is yet to be ratified, is regarded as "win-win" for the two parties.[23] FTAs are grounded on three main pillars: the parties' commitment to achieve mutual interests, the involvement of civil society to monitor progresses about the implementation of the alleged goals, and a dispute settlement mechanism to be appealed when commitments are not respected by the signatory parties.[24] On the EU side, it would entail a simpler market access for its exported products and the opportunity to auction public contracts, priorly out of reach for foreign companies. On the other hand, the countries of Mercosur would claim a cheaper access to some EU's key products and the removal of barriers that hamper the operational activities of Mercosur companies in Europe. In this section, the chapter on TSD, namely chapter 14, will be analysed. The introduction of a chapter on TSD is not a novelty *per se*, in fact, since 2011 trade agreements with the EU must contain a section asserting that:

> *[…] trade should not come at the expense of the environment […]. On the contrary, it should promote sustainable development.*[25]

The aim of these chapters is to improve environmental and labour conditions, by leveraging on enhanced trade and investments' opportunities. It must be kept in mind that each TDS chapter differs in structure and functioning, depending on the FTA they belong to.[26]

[23] Tancrède Voituriez and Yann Laurans,"Greening trade agreements: A roadmap to narrow the expectations gap", IDDRI, no. 4 (September 2020)
[24] Ibid
[25] EC, "Trade part of the EU-Mercosur Association Agreement"
[26] European Parliament, "The trade pillar of the EU-Mercosur Association Agreement"

However, over the last three years the TSD clause contained in the EU-MERCOSUR agreement was revised to ensure its compliance with the green targets set by the Paris Agreement. Ultimately, this implies that the parties also commit to *effectively implement the Paris Agreement and to cooperate on the trade- climate change interface.*[27] In the following section, it will be argued that the ambition to "green" bilateral FTAs doesn't necessarily translate into environmental benefits, but rather lead to deadlocks. In fact, increase in trade has been proven to trigger negative outcomes for the environment, especially with regards to global forests.[28] There are two main factors to be taken into consideration in assessing whether a TSD agreement is likely to be successful or not. The first factor touches on the implementation of the multilateral environmental agreement. If this has not been fully achieved, trade is unlikely to bring positive outcomes to the environment. Another obstacle is the risk of slack implementation due to the vague terms established by the TSD chapter. For instance, measures to tackle forests' preservation deal with illegal logging but no mentioning is reserved to illegally grown feedstocks on deforested lands.[29] It has been claimed that unclarity leaves loopholes for the "driving" party of the agreement, in this case the EU, to impose its own rules on the other party, swaying production where it retains a competitive advantage. In the case of EU-MERCOSUR agreement, both factors have prevented the EU from delivering a sustainable trade.

Whilst FTAs agreements are subject to "grievance mechanisms" to regulate obligations breaches, the TSD chapter adopts another tool to settle disputes, namely the *precautionary principle*. The difference between the two mechanisms is embedded in the condition for acting lawfully. Under a FTA, the offensive party cannot file a legal complaint until a conclusive irrefutable proof of harm is acknowledged, whereas in the TSD clause the parties are allowed to take legal precautionary actions against potential damage.[30] Ultimately, except for the TSD chapter, all the other chapters of the FTA can turn to dispute settlement mechanisms if the agreement is violated. Therefore, it has been objected that TSD clauses are "essentially soft law, and not enforceable"[31].

[27] EC, "Trade part of the EU-Mercosur Association Agreement, chap. 14
[28] Voituriez and Laurans,"Greening trade agreements"
[29] Ibid
[30] "The EU-MERCOSUR trade agreement: What is it, and what could it mean for forests and human rights?" Fern, Brussels (May 2020)
[31] Voituriez and Laurans,"Greening trade agreements"

Additionally, the precautionary principle contained in the TSD chapter differs from those established by similar EU agreements. As **Table 2** demonstrates, the EU-MERCOSUR agreement lingers over the scientific assessments on which offensive measures should be based on. However, it is difficult to understand to which extent "scientific evidence" can be deemed *insufficient* or *inconclusive*, and thus eligible to appeal to the precautionary principle.

Table 2: Comparison of the precautionary principle clause in different FTAs

	EU-Mercosur (text prior to legal scrubbing)	EU-Mexico (prior to legal scrubbing)	EU-Chile (text proposal)
Precautionary principle	In cases when scientific evidence or information is insufficient or inconclusive and there is a risk of serious environmental degradation or to occupational health and safety in its territory, a Party may adopt measures based on the precautionary principle. Such measures shall be based upon available pertinent information and subject to periodic review. The Party adopting the measure shall seek to obtain new or additional scientific information necessary for a more conclusive assessment and shall review the measure as appropriate.	Where there is a lack of full scientific certainty and there are threats of serious or irreversible damage to the environment or to occupational safety and health, a Party may adopt cost-effective measures based on the precautionary principle.	Where there is a lack of full scientific certainty and there are threats of serious or irreversible damage to the environment or to occupational safety and health, a Party may adopt measures based on the precautionary principle.

Source: EU-MERCOSUR and EU-Mexico FTAs and EU-Chile text proposal

The following paragraph provides a SWOT analysis of the TSD chapter of the EU-MERCOSUR FTA, focusing on internal strengths and weaknesses, coupled with external opportunities and threats (*Annex B*).

Among the main strengths of the trade deal, it can be stated that it encourages the signatory parties to achieve mutual interests, emphasising their commitment to achieve the target (in this case sustainable trade goals). Besides, the agreement fosters trade and investment opportunities through enhanced market liberalisation in relation to certain goods. Another upside is the involvement of civil society to monitor progresses on the implementation of the agreement, and the immediate enforcement of precautionary actions whenever the agreement is deemed to be far from meeting its goals, creating potential damage to trade relations.

On the other hand, the opposite positions of different MS and Mercosur representatives undermine the ratification of the FTA, expected to be concluded by the end of this year (2021). Overall, the FTA seems to fall short of meeting the environmental and social concerns addressed in its TSD chapter, due to the absence of enforcement mechanisms and incapability of outlining clear commitments. The unbalanced relation of power between the two regional blocs might be another downside, especially for the least developed industries of Mercosur countries, who will likely need to adopt EU standards to keep up with global competition.[32] Besides, especially with regards to the Mercosur bloc, the lack of funding might hamper the implementation of sustainable trade relations, further aggravated by the absence of performance indicators to monitor advances.

In terms of opportunities, the TSD chapter is expected to contribute to the development of a global green consciousnesses, pooling together best practices and shared knowledge to achieve climate goals. The agreement also lays the foundations for managing the deployment of natural resources in a more sustainable manner and for harmonising sustainability criteria's requirements in both blocs, facilitating trade in goods.

Apart from the difficulties embedded in finding a consensus within the signatory parties of the agreements, the TSD clause risks triggering negative reactions on the international sphere, mainly due to the uncertainties about its alleged sustainable ambitions. The market liberalisation enabled by the trade deal would cause indirect effects on deforestation, through a possible increase of land use change to meet the demand of soy and cattle ranching. Additionally, the free-rider advantages which non-signatory countries may benefit from is likely to hinder the trade deal success. Last but not least, hurdles in meeting the ambitions set by international treaties might emerge throughout the negotiation process, questioning the actual feasibility of climate pledges.

The analysis of opportunities and challenges stemming from the TSD chapter of the EU-MERCOSUR casts some doubts on the achievement of TSD ambitions. Although the listed strengths shed light on the unique occasion created by the trade deal, the weaknesses embedded in the future of the agreement emphasise the need for enhanced coordination and clarity. Furthermore, although the opportunities unlocked by the possible ratification of the agreement are

[32] Afionis and Stringer, "The environment as a strategic priority in the European Union-Brazil partnership"

expected to create global "green" awareness and pave the way to harmonise sustainability criteria, the existing threats cannot be underestimated. Both side effects derived from the liberalisation of goods and generous climate goals set by international treaties urged to be tackled.

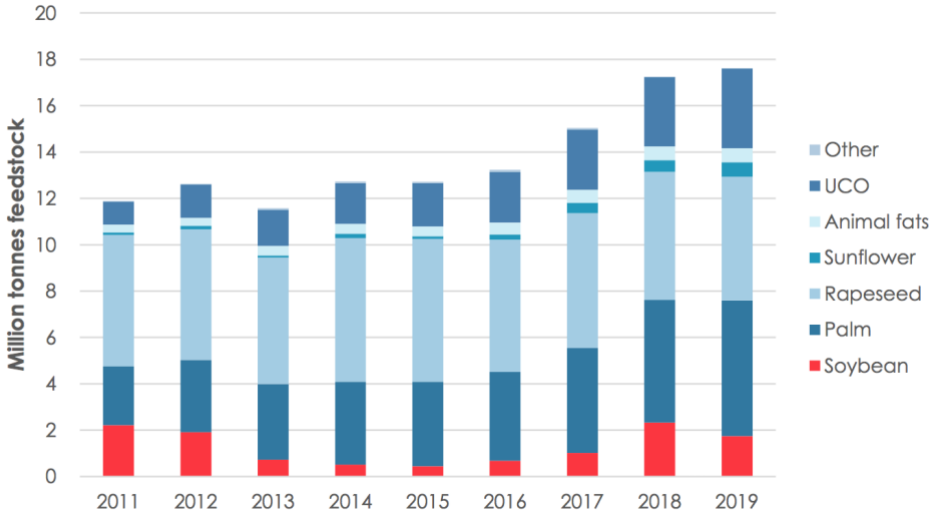
1.4 Possible ratification of the *in-principle* agreement: the end of "green protectionism"?

This section analyses the expected outcomes of the FTA, in relations to bioenergy good traded. It also shed light on the change of trade dynamics among the two regional blocs, arguing that the FTA might mark the end of "green protectionism".

The ratification of the agreement won't change the almost total absence of protectionist mechanisms already in place. The EU, in fact, does not place any charge for most soy imports. If the FTA is ratified, it would remove the duties for soy destined to the EU.[33] This will make soy, a crop largely linked to deforestation, cheaper and more competitive on the market. Despite the EU campaign against deforestation, it has been demonstrated that importing soybeans from Mercosur is paramount to the EU agri-food model competitiveness. The EU already allows a large share of soybean to access its biodiesel market.[34] As **Figure 6** demonstrates, EU producers consume nearly a million tonnes (Mt) of soybean oil per year. The deployment of soy as feedstock has almost tripled since 2013. Imports from Mercosur countries, mainly from Argentina, scaled up the soy oil demand for the EU biofuel market to 1.7 Mt as of 2019. Provided that the EU major's partner for soy import is currently the United States (US), scrapping the charge on Argentinean exports, recently raised to 30%, might cause a paradigm shift in biofuel trade.[35]

[33] " The EU-MERCOSUR trade agreement", Fern
[34] Chris Malins, "Soy, land use change and ILUC-risk", Cerulogy, chap.1 (November 2020)
[35] Hugh Bronstein and Maximilian Heath, "Argentina cuts soy export tax rate in bid to boost FX reserves", Reuters, October 2, 2020

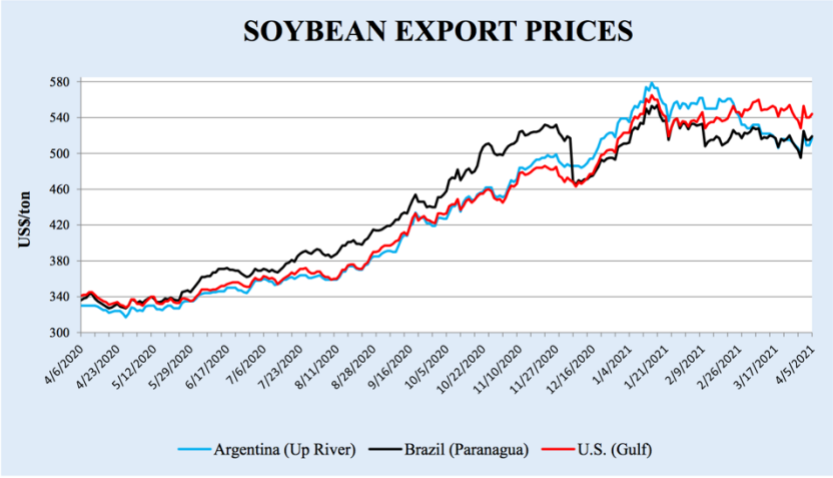
Figure 6: Feedstocks for EU biodiesel and renewable diesel consumption, 2011-2019



Source: OilWorld

A possible consequence of that would be a mitigation of EU dependence on US soybean imports and roll back to Latin America[36]. Since February 2021, in fact, it is cheaper to export soybean either from Brazil or Argentina than the US (**Figure 7**).

Figure 7*:* Soybean export prices



Source: USDA

[36] United States Department of Agriculture, Brazil Soybean Exports Record Large in March, Oilseeds: World Markets and Trade (April 2021)

The EU imposes a 83% MNF tariff on sugar, considered a highly protected product. Out of Mercosur's total sugar exports, only 2% are destined to the EU market, despite the favourable existing quota of 412,054 tonnes for Brazilian sugar exports to the EU (**Table 3**). This can be explained by the fact that the current specific tariff rate is set at €98 per tonne for a quota of 334,000 tonnes and €11 per tonne for a quota of 78,000 tonnes.[37] The FTA would allow an additional quota of 10,000 tonnes for sugar produced in Paraguay. Such a quota is expected to raise sugar quotas to 90 percent compared to the current export flows from Mercosur to the EU, triggering an almost imperceptible change.

Table 3: Current and new EU tariff rate quotas on agricultural products under EU-Mercosur agreement

A	B	C	D	E	F	G	H	J
	Mercosur exports		Existing EU quotas in 2018 for		New additional quotas under the FTA	F/B	(D+F)/B	Phase-in period for new quotas
Product	to EU	to world	Mercosur	*Erga omnes**				
Beef fresh	118,065	480,923	46,076	45,000	55,000	47%	86%	0 / 6 years
Beef frozen	75,619	2,142,545	0	109,578	44,000	58%	58%	6 years
Poultry meat	391,927	5,345,730	331,084	36,684	180,000	46%	130%	6 years
Honey	33,926	107,533	0	0	45,000	133%	133%	6 years
Sugar	468,914	26,722,917	412,054	295,734	10,000	2%	90%	immediate
Ethanol	46,467	1,333,885	0	0	650,000	>1000%	>1000%	6 years
Rice	117,247	2,914,373	0	77,185	60,000	51%	51%	6 years
Sweetcorn	2	97	0	0	1,000	>1000%	>1000%	immediate
Pork meat	35	691,166	0	74,628	25,000	>1000%	>1000%	6 years
Cheese	37	84,502	0	59,897	30,000	>1000%	>1000%	10 years
Milk powder	0	273,231	0	68,537	15,000	>1000%	>1000%	10 years

Source: Bruegel based on UN Comtrade, WTO and EC documents

[37] Michael Baltensperger and Uri Dadush, "The European Union-Mercosur Free Trade Agreement: prospects and risks", Policy Contribution, no.11 (Bruegel: September 2019)

Contrarily, ethanol is expected to be largely affected by the possible ratification of the agreement. [38] Ethanol imports to the EU are protected with a 21 percent MFN tariff. Under the FTA, a quota of 650,000 tonnes per year will be granted. It is worth noting that, beyond providing sugar for the food sector, Brazil also processes large amounts of sugar cane to produce bioethanol.[39] Bioethanol imports to the EU are currently charged with a tariff of between €10 and €19 per hectolitre. 450,000 tonnes of the 650,000 tonnes quota granted by the trade deal are indeed allocated for chemical purposes, that is bioethanol production. In other words, 450,000 tonnes of bioethanol will access the EU duty free. Further 200,000 tonnes will be subject to an in-quota duty established at a third of the current MFN rate of 21 per cent. Although this remaining amount is deemed to be applicable to multiple uses, it can be inferred that fuel use will be prioritised. The expected quotas are significantly larger than the existing ones. Therefore, the FTA ratification would trigger a considerable increase in ethanol exports from Mercosur to the EU, to the benefit of European bioplastic and biochemical industries, in view of cheaper prices in the EU. This would also entail a scaling up of Brazilian production and a readjustment of existing ethanol exports from other parties. Last but not least, ethanol producers in Brazil might deliberate to import ethanol from other market competitors, such as the US.

This spike in quotas is dread of changing the dynamics of some Mercosur countries' monocultures of Genetically Modified Organisms (GMO) crops (especially in Brazil, Paraguay, and Argentina), largely dependent on the use of pesticides and fertilisers.[40] May this happen, not only a rise in deforestation levels in these countries must be expected, but health issues might also affect local population living next to the plantations, due to the chemical's substances released in the air. Thus, the ratification of the agreement would drive the agribusiness industry to embrace this model of agricultural production, with detrimental consequences both for the people and for the environment.

It must be added that Brazil and US are currently the biggest producers of pesticides worldwide. Out of the 500 pesticides considered legal in Brazil, 150 are banned from the European agricultural

[38] Baltensperger and Dadush, "The European Union-Mercosur Free Trade Agreement"
[39] Ibid
[40] Bettina Müller and Lucile Falgueyrac , summary of "The analysis of the agreement between the European Union and the Mercosur", ed. Luciana Ghiotto and Javier Echaide (Berlin, Buenos Aires, Brussels: Anna Cavazzini MEP, The Greens/EFA, 2019)

sector. Since Jair Bolsonaro came to power, he is pushing for further scaling up the number of pesticides allowed. It has been argued that 70% of the pesticides deployed in Brazil, which are implemented for treating genetically modified agricultural products (such as soy and sugar), will gain greater access into the EU market in case the agreement is approved.[41]

Throughout this chapter, the trade relations between the EU and MERCOSUR Countries have been analysed. It has been argued that not only the potential achievement of a FTA is crucial to the future trade dynamics of the two blocs, but also to the environment. In fact, if concluded, this agreement would go far beyond trade. The removal of protectionist mechanisms is expected to reverse the trade dynamics between the two blocs. The strengthening of the European industrial sector may negatively affect the least developed industries of Mercosur countries, which are expected to increase their reliance on agricultural frameworks prone to the disruption of the environment.[42]Additionally, the EU is likely to enhance its position as "soft imperial" power, since Mercosur countries are expected to become more dependent on EU "standards" established for its exported manufactured products. Ultimately, the EU market imperatives have the potential to sway production in Mercosur countries. Although the trade agreement is unlikely to deprive the EU of its position as "soft power" towards the Mercosur market, it could mark the dawn of green protectionism. The full liberalisation of certain commodities is expected to create significant paradigm shifts in the worldwide dynamics of importing and exporting countries, re-directing trade flows, and adjusting the market demand accordingly.

The next chapter will investigate whether the EU have the capacity to overcome the limits of the TDS clause by mitigating the environmental side effects of its local bioenergy expansion through an innovative policy.

[41] Müller and Falgueyrac, "The analysis of the agreement between the European Union and the Mercosur"
[42] Ibid

CHAPTER 2

2.1 Coupling local bioenergy expansion with environmental protection before the Paris Agreement: too little too late?

This section analyses the main policies aimed at incentivising the expansion of bioenergy in the EU and sheds light on their limitations in coupling bioenergy expansion with environmental protection. Different factors have driven the EU to boost its domestic bioenergy production in time. At the end of the XX century, biofuels production was largely adopted with the purpose of ensuring energy security and regional development. However, lately policymakers' attention has shifted to the decarbonisation of the transport sector, reflecting an increasing international awareness about climate change. A special emphasis was put on passengers' vehicles, identified as the main culprits of GHG emissions by the International Council of Clean Transportation. Whilst in certain world regions, government policies are implementing successful tools to break the carbon *lock-in* from fossil-fuelled vehicles, the EU is still lagging behind, especially when the alternative is biofuels.[43] Across MS, *market-pull policies* such as blending mandates are the most adopted incentives to foster the penetration of biofuels in the transport sector.[44]

Prior to the Paris agreement, three main policies have supported the integration of bioenergy in the EU energy mix, namely the Fuel Quality Directive (FQD), the Renewable Energy Directive (RED) and the Indirect Land Use Change Directive (ILUC), analysed in *Annex C.* All these policies have been further revised and amended in order to adjust their content to the gradual energy transition from a fuel-dependent economy to a mostly renewable-based one.

> […] policies that try to foster mitigation of climate change, such as reducing the carbon intensity of transportation, have become an increasing focus in biofuels-related policy development.[45]

[43] Max Ahman and Lars J. Nilsson, "Path dependency and the future of advanced vehicles and biofuels", Utilities Policy 16 (November 2017)
[44] Mahmood Ebadian *et al.*, "Biofuels policies that have encouraged their production and use: An international perspective", Energy Policy 147 (September 2020)
[45] Ibid, 3

The first policy to boost the use of biofuels in the attempt to decarbonise the transport sector was the FQD, which introduced *strongly recommended* blending national targets for biofuels, 2% by 2005 and 5.75% by 2010.[46] However, by analysing the reasons behind the implementation of such a policy, it can be inferred that sustainability of production was a meaningless concern. The main driver of the FQD was mitigating the EU commodities' dependence after an unexpected increase of global oil prices at the end of the XX century, that startled its energy security of supply. The main drawbacks of the FQD include the lack of sustainability requirement considerations and its weak level of enforcement. In fact, the directive felt short of addressing air transport fuel consumption, biofuel feedstock originated from carbon-rich or biodiverse lands and fuel's life cycle Greenhouse Gas (GHG) emission savings. Additionally, provided that the nature of the recommendation was voluntary, very little impact was recorded at MS level.

However, those targets became mandatory a few years later with the issuance of the RED, which set up the share of RE coming from biofuels to 10%. Additionally, it established that biofuels were required to ensure 35% GHG savings compared to fossil fuels. The directive also tackled the issue of crop-based biofuels grown in high-biodiversity lands, by banning raw products with such an origin. The purpose of the RED was the actual first endeavour to break the carbon lock-in in the EU transport sector, by shifting to a new paradigm of energy generation. Although the RED required MS to implement the RE targets into their National Climate Plans, no sanctions were envisaged in case of non-compliance, leaving room both for violations and sluggish transposition procedures. Thus, except for minimal improvements in terms of sustainability, not only does the RED reiterate the gaps of the FQD, such as the lack of incentives for non-ground transport, but it also introduces a new challenge to tackle.[47] Through the RED, the EU has created a sort of "hybrid biofuel governance" based on *meta-standards* of compliance for private and public authorities, namely certification schemes.[48] This system triggered two main side effects, one caused by the voluntary nature of these certification schemes, and a second one relative to exclusionary criteria.

[46] Martin Banse, *et al.*,"Will EU biofuel policies affect global agricultural markets?", European Review of Agricultural Economics 35, no. 2 (June 2008)
[47] J. Popp *et. al.*, "The effect of bioenergy expansion: Food, energy, and environment", Renewable and Sustainable Energy Reviews 32 (February 2014)
[48] Sarah L. Stattman *et. al*, "Toward Sustainable Biofuels in the European Union? Lessons from a Decade of Hybrid Biofuel Governance", Sustainability 2018, no. 10 (October 2018)

Certifications schemes are non-binding requirements on social sustainability criteria applicable to both biofuels and biomass. These schemes are supposed to ensure the sustainability of the whole production process. By 2016, 19 schemes for biofuels were accepted by the EU, divided into 3 categories: roundtable or multi-stakeholders initiatives, industry schemes and government-supported schemes.[49] After 5 years the schemes' criteria are reviewed and subject to renewal eligibility. Provided that producers are not encouraged to enable sustainable practices that exceed *meta-standards*, the industry has proliferated with certification schemes including minimum sustainability requirements. Thus, companies driven by profit-seeking goals have seldom chosen to be certified by strict standards.

> As there is no economic incentive to commit to more ambitious sustainability standards, there currently is a race to the bottom[50]

Furthermore, schemes' requirements indirectly exclude certain world regions from accessing the EU domestic market.[51] Although "unsustainable" biofuels, mainly exported by developing countries, are not explicitly banned form the RED, their lack of sustainable labelling plays against their trade, breaching WTO law. Despite the WTO condemns discriminatory trade, the RED is objected to violate several General Agreement on Tariffs and Trade (GATT) articles in trading bioenergy, namely Articles I, III and XI.[52] First, the directive is argued to violate Article I, which regulates "like products" treatment, by discriminating equal products hinging on the environmental footprint of their value chains. Further non-compliance is observed with Article III, since the RED should ensure that imported products are subject to the same regulations as national ones. Contrarily, it has a negative impact on foreign producers' trade transactions. Lastly, although Article XI limits the implementation of restrictive mechanisms in trade, the RED itself further curbs a sector already studded with different types of taxation. In other words, the RED sheds light

[49] Mariarosa Lombardi *et. al,* "Sustainability criteria and certification schemes of biofuels in the European Union" in *Commodity Science in Research and Practice - Towards sustainable development*, ed. Wacław Adamczyk (Cracow: Foundation of the Cracow University of Economics, 2014)
[50] Stattman *et. al,* "Toward Sustainable Biofuels in the European Union?", 13
[51] Ibid
[52] Erixon, "Green Protectionism in the European Union"

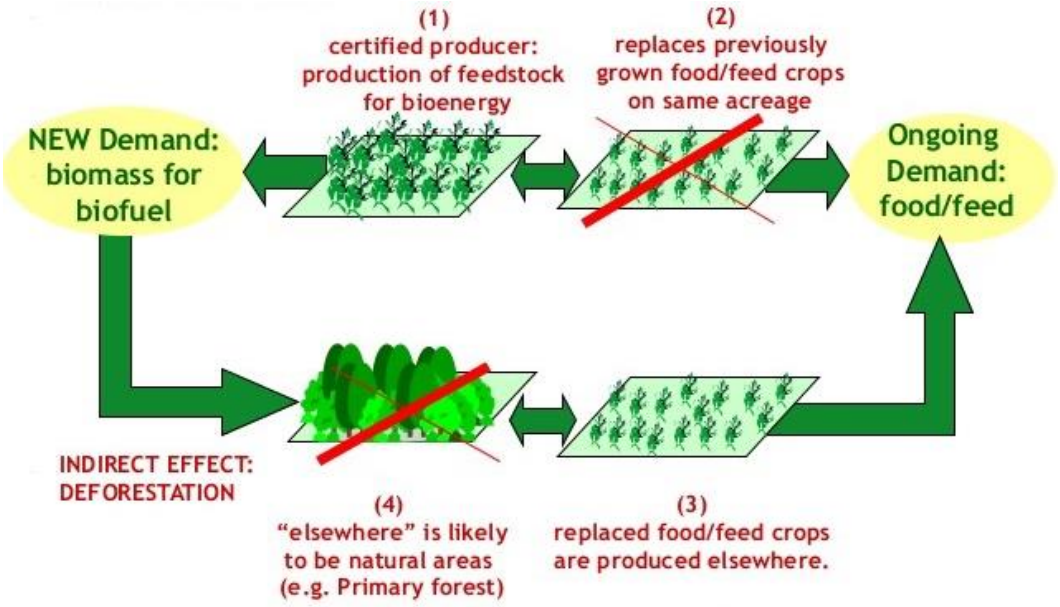
on the failure of private governance schemes in assuring either sustainability for imported bioenergy or enforcement of sustainable requirements.

The FQD was revised in 2009, in the attempt to address the decarbonisation of both road transport and non-road vehicles.[53] Its amendment introduces technical parameters for fuel quality assessment and mandatory targets to reduce gasoline and diesel's life cycle GHG emissions. A special emphasis is placed on the incentives to develop new low-carbon technologies. As the RED, the FDQ directive relies on the system of *meta-standards* that entrusts fuel suppliers with the responsibility of mitigating life cycle GHG emissions of fuels, underlying the same challenges. Contrarily, its level of enforcement was strengthened. In fact, the amendment of the FDQ demands a 2010 benchmark value to allow the calculation of GHG savings from biofuels and alternative fuels in comparison with life cycle GHG emissions per unit of energy produced from fossil fuels. Additionally, fuel providers must report on the life cycle GHG emissions per unit of fuel supplied to MS every year.

Biofuels' energy stems from plants.[54] However, the interplay between energy and agricultural sector triggers several pitfalls. The most outstanding issue derives from land-use change, triggered by energy crops grown on lands that would otherwise be used to produce food crops. This compels dispossessed farmers to move their production elsewhere, to the detriment of areas with high biodiversity. Besides, "stealing" food feedstocks lands and undermining their availability causes spikes in global food prices. This phenomenon of land-use change is known as ILUC (**Figure 8**). In the next section, it is argued that Brazilian Amazon forests were largely destroyed by the clearing of pastureland for cattle breeding and soy production. The first policy to address the side effects of biofuels expansion was the ILUC directive (2015).

[53] Laura Lonza *et al.*, "EU renewable energy targets in 2020: 2015 Legislative update", JRC Technical Reports, Luxembourg, 2016
[54] Bill Gates, How to avoid a climate Disaster: the solutions we have and the breakthroughs we need (UK: Penguin Press, 2021)

Figure 8*:* What is ILUC?



Source: IFEU

The EU addressed the aforementioned gap by introducing a 7% cap on first generation biofuels in the road and rail transport sectors. The novelty of ILUC is the unprecedented level of enforcement that urged MS to transpose the legislation into national law by 2017. Besides, more incentives were created to foster the production of advanced biofuels from waste feedstock and certify the emission risk impact on biofuels, distinguishing between *low-ILUC risk biofuels (*lILUC*),* namely with little or zero ILUC impact, and *high-ILUC risk biofuels (*hILUC*),* namely biofuels whose expansion of production undermines land with high carbon stock. However, certifications scope is limited to direct effects of land use change and barely cope with leakage effects. This is mostly due to the difficulties in either classifying "marginal" lands or sourcing productive relinquished areas suitable to dodge the competition of food-crops with fuel-crops.

In conclusion, there are many factors that prevented the EU from coupling bioenergy expansion with environmental protection between 2003 and 2015. Among the main obstacles, the lack of comprehensive biofuels laws felt short from meeting sustainable targets in the biofuel industry. It is also worth noting that the biofuel industry is a highly volatile energy market whose fluctuations are aggravated by the interplay between multiple sectors. Food security is perceived as one of the main threats, causing backlashes especially from small scale producers since fuels competition

with food is blamed for reducing food acreage.[55] Provided that "sustainability" hinges on conflicting definitions across world regions, voluntary certifications have been objected to create "loopholes" to shift unsustainable production practices to developing countries. The following section will compare the *hybrid-governance* system issued by the EU to the system of effective land use planning policies created by Brazil to ensure the sustainability of biofuels production.

2.2 Complying with sustainability requirements: is Brazil doing better?

The analysis will compare the framework established by the EU to assess biofuels sustainability criteria with the one established by the Brazilian government. Several policies enacted to improve the sustainability of sugarcane production in Brazil will be discussed. There are several international initiatives that aim at disseminating knowledge sharing to improve the sustainability of sugarcane production. However, the EU and Brazil have different reasons for taking part into those initiatives. The purpose of the EU is to increase the acceptance of biofuels, soothing the negative stigma attached to their reputation. Contrarily, Brazil strives to mitigate the negative environmental and social impact leveraging on the long-term benefits of biofuels' expansion. This explains why a pioneer in biofuels production such as Brazil has an interest in complying with EU imperatives on sustainable trade. A special emphasis will be given to RenovaBio, a recent Biofuel National Policy regarded as the way forward to transport decarbonisation in Brazil.

Brazil has a long history of biofuel production enabled by favourable incentives, and its sugarcane is regarded as the most efficient and environmentally friendly crop worldwide. In the Southern Cone, biofuels have always played a significant role for economic development.[56] The first reason is the inheritance of a tradition based on the integration of small producers in the supply chain.[57] The second reason is the different approach used in ensuring the sustainability of production. The

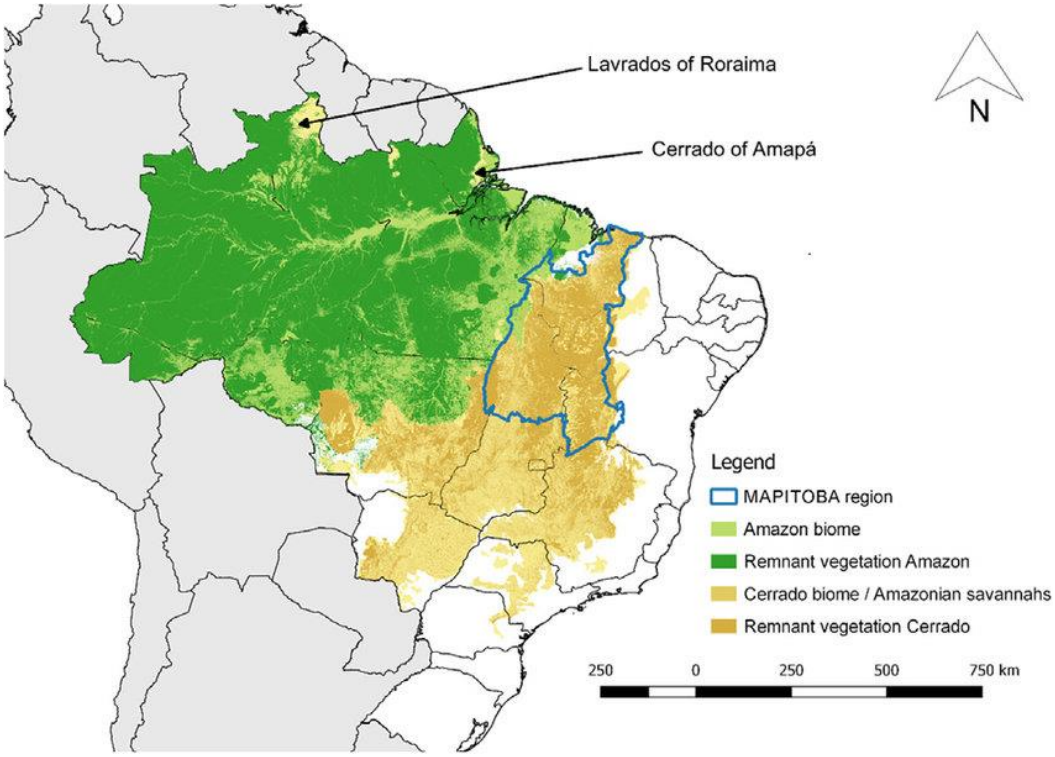
[55] Ariane Goetz, *et al.*, "Do no harm? Risk perceptions in national bioenergy policies and actual mitigation performance", Energy Policy 108 (March 2017)
[56] Córdoba et. al,"Fuelling Social Inclusion?"
[57] Theresa Selfa *et al.*, "Interrogating Social Sustainability in the Biofuels Sector in Latin America: Tensions Between Global Standards and Local Experiences in Mexico, Brazil, and Colombia", Environmental Management 56 (December 2015)

EU created a system of voluntary certification schemes to address those requirements, whilst Brazil enacted effective land use planning policies to achieve the same goal.[58]

It is worth noting that biofuels are not the main driver of deforestation and land grabbing in Brazil, since their effects are minimal compared to those triggered by soy crops expansion and cattle ranching. About 60% of the world rain forests belong to Brazil, making part of the Amazon biome.[59] During the latest years, the clearing of pasturelands for cattle have had the greatest impact on Amazon deforestation in Brazil, whilst soy production connected to deforestation has represented a bigger issue in the tropical savannah region of Cerrado (**Figure 9**). Despite being less acknowledged than the Amazon, this region has been destroyed by sugarcane land farm increase in the last 50 years, due to cheaper prices and favourable incentives to small-scale farming.[60]Today, Cerrado biome is threatened by large-scale monocultures of soybeans, which have compelled farmers to displace their production elsewhere, often identifying "suitable" lands in the Amazon forests.[61] This is the outcome of globalisation, which often implies that commodities consumed in a developed country trigger land-use changes in developing ones.[62]

[58] Stefan Renckens *et al.*,"When Normative and Market Power Interact: The European Union and Global Biofuels Governance", JCMS Journal of Common Market Studies 55, no. 6 (August 2017)
[59]Rainer Janssen and Dominik Damian Rutz, "Sustainability of biofuels in Latin America: Risks and opportunities", Energy policy 39 (February 2011)
[60] Eva Cudlínová, *et al.*,"New Forms of Land Grabbing Due to the Bioeconomy: The Case of Brazil", Sustainability, vol. 12, no. 3395 (April 2020)
[61]Janssen and Rutz,"Sustainability of biofuels in Latin America"
[62] Gates, How to avoid a climate disaster

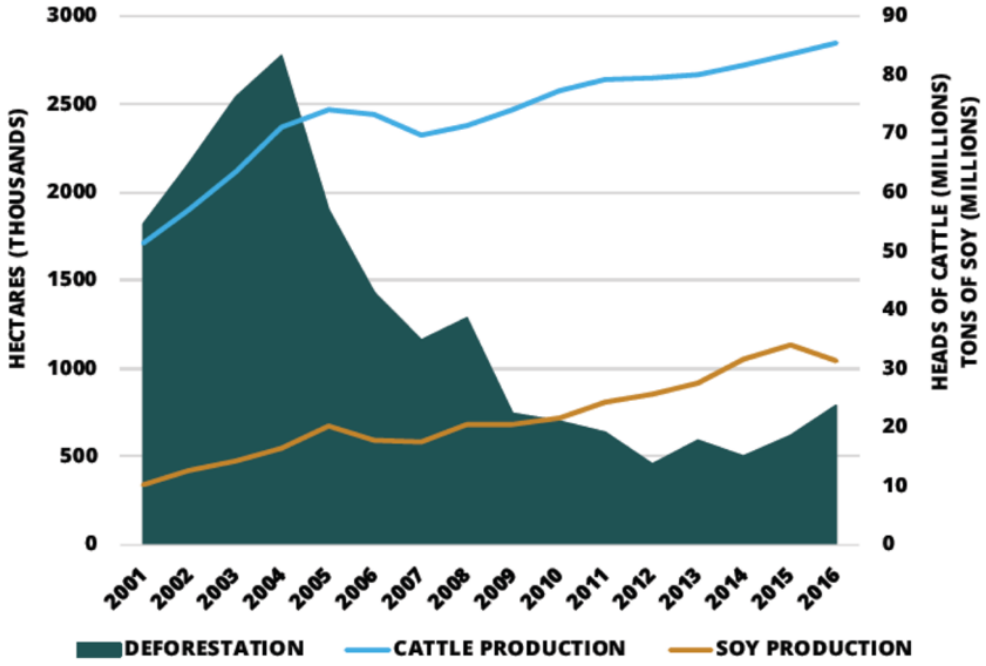
Figure 9: The Amazon forest and Cerrado biomes



Source: ABEC

Figure 10 shows that up to 2005, high level of cattle production matched alarming deforestation levels, registering about 73 millions heads of cattle (MHc) per 2400 thousands hectares of forest loss (THf). However, since 2005 the correlation of these two factors decreased its magnitude. In 2016, about 85 MHc corresponded to about 800 THf. On the other hand, it can be noticed that soy production has exceeded deforestation levels only after 2010. In 2016 the gap between soy production and deforestation rate curbed (about 31 Mt of soy corresponded to about 800 THf), which means that soy is resulting into an increasing threat to deforestation.

Figure 10: Soy and cattle production as main drivers of deforestation in Brazil, 2001-2016



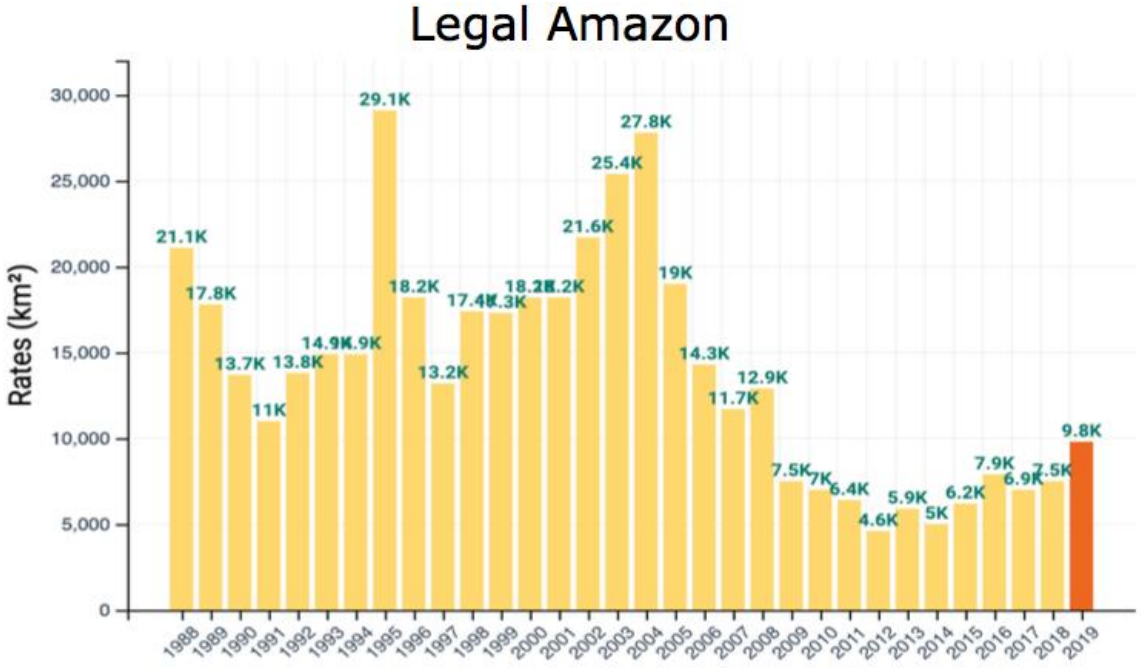
Source: INPE

In 2009, Brazil further enhanced its system of land use monitoring through the so-called Agroecological Zoning of sugarcane Programme (ZAE Cana).[63] The aim of this programme was to ensure technical support to the creation of policies designed to regulate the sustainable expansion of sugarcane in Brazil. One of the measures taken under the programme was setting a threshold to areas suitable to sugarcane production by increasing cattle density, avoiding land change use to pasture. Uncomplying stakeholders were denied the access to lands. One of the primary distinctions of production between the EU and Brazil is the acceptance of GMOs, legalised in 2005 in Brazil.[64] Some regional initiatives were put in place to upscale existing practices in sugarcane expansion, encompassing the use of agrochemicals, environmental education, and sugarcane zoning.[65]

[63] J. Popp *et. al.*, "The effect of bioenergy expansion"
[64] Janssen and Rutz,"Sustainability of biofuels in Latin America"
[65] Protocolo Etanol Mais Verde by the State of São Paolo

Figure 11 demonstrates that the implementation of successful policies coupled with public property registries and deforestation monitoring had succeeded in ensuring the sustainability of biofuels production in the period between 2004 and 2012, halving deforestation levels.[66] One of the most impacting policies was the so-called *Amazon Soy Moratorium*, an agreement which forbade the purchase of soy grown on recently deforested land.[67] However, deforestation in the Legal Amazon has resumed since 2017, aggravated by Bolsonaro administration, who rolled back policies aimed at safeguarding biodiversity.

Figure 11: Deforestation in the Legal Amazon States



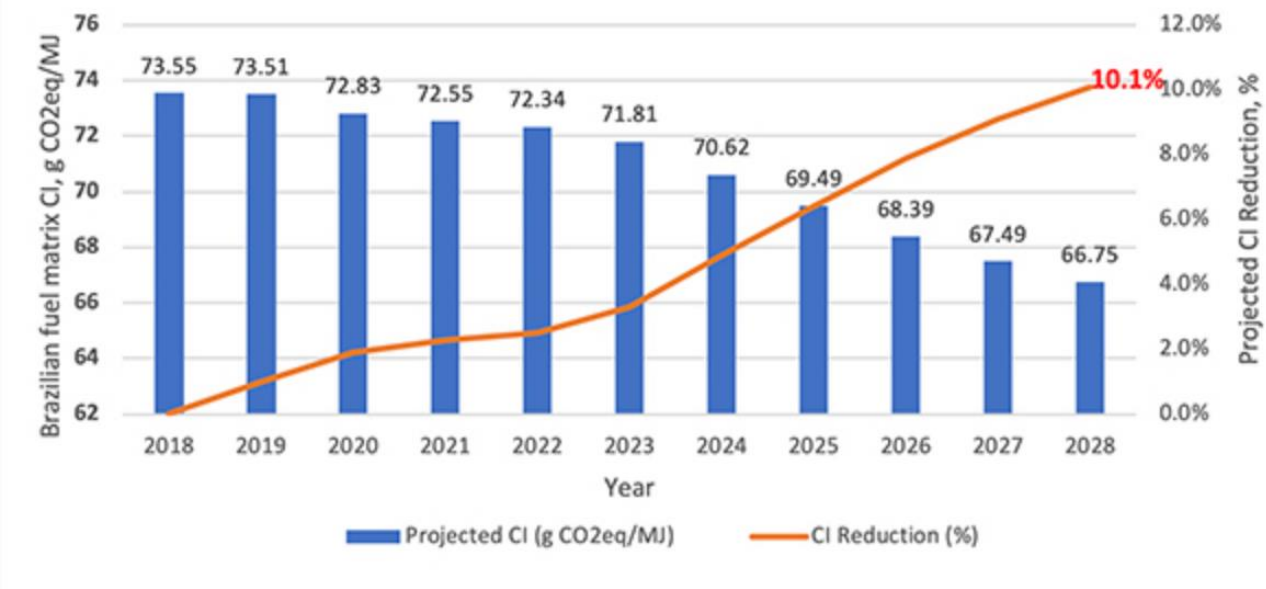
Source: LSE

The role of biofuels in Brazil's energy mix is expected to have a huge impact in the following years, since the Biofuel National Policy, regulated by *Lei 13.576/2017*, has finally been enforced in 2019.[68] It is a state policy of transport decarbonisation, in line with the objectives established by the Paris Agreement, which aims at expanding the share of biofuels in the country's energy

[66] Claudio Angelo and Carlos Rittl, "Is Brazil on the way to meet its climate targets?", Observatório do Clima (September 2019)
[67] Érica Geraldes Castanheira *et al*., "Environmental sustainability of biodiesel in Brazil", Energy Policy 65 (November 2013)
[68]Gabriel Miranda, "RenovaBio takes off", Ethanol Producer Magazine, January 14, 2020

matrix and mitigating carbon emissions through a sustainable action plan. It is grounded on three main pillars: a. annual decarbonisation targets, b. certification of biofuel production through life cycle assessments, c. issuance of GHG emissions reduction certificates, CBio, namely Decarbonisation Credits. In a nutshell, RenovaBio sets up a carbon credit market with straightforward goals and tools to achieve them. GHG emissions are mitigated through decarbonisation certificates (CBio), which each distributor is compelled to purchase to offset its volume of fossil fuels' carbon emissions. As **Figure 12** shows, Brazil is expected to decrease 10.1 percent of the carbon intensity (CI) from its fuel matrix by 2028. Provided that the lower the CI, the more carbon can be mitigated from the corresponding replaced fossil fuel, and more CBio are created. Thus, efficiency is met when a producer is able to generate more CBio than others with less efficiency but a higher level of volumetric production capacity.

Figure 12: Prospect over the Brazilian fuel matrix with RenovaBio



Source: Ethanol Producer Magazine

Alongside the increase in biofuel production, the asset of this program is the mechanism that urges companies to comply with anti-deforestation practices triggered by agricultural expansion. Leveraging on life-cycle assessments, the policy goes to the detriment of biofuel producers that source feedstocks from deforested areas.

In conclusion, not only has Brazil enacted an effective land use planning policies to address biofuels sustainability of supply chain, but it also converted sustainability requirements into a national policy to decarbonise its transport system. The following chapter discusses whether after the ratification of the Paris agreement, the policies enacted to tackle bioenergy expansion have succeeded in tackling its environmental side effects.

2.3 The way forward: RED II and Farm-to-Fork

This section sheds light on the main bioenergy policies enacted after the ratification of the Paris Agreement: the recast of the RED, REDII, and Farm-to-Fork strategy (F2F), analysed in *Annex D*. A comparative analysis of *hILUC and lILUC* is provided to reveal the extent to which recent bioenergy policies have succeeded in phasing out harmful bioenergy crops. Furthermore, the adaptation strategy of Mercosur countries is discussed, in the light of the EU change of policy towards a greener pathway.

The recast of the RED aims at accelerating the energy transition by fostering the use of RE in all sectors: electricity, heating and cooling, and transport.[69] This is meant to be achieved by an overall target of 32% for RE in the energy mix, where only transport should account for 14%. Within the transport target, a special emphasis is placed on advanced biofuels, expected to meet 3.5% in 2030, whilst waste and residues are constrained at 1.7%, even though MS are allowed to raise the target in conformity to their availability of supply.[70] The REDII also established a cap of 7% on crop-based biofuels in 2020 to 3.8% in 2030. Not only does the REDII applies the title of *hILUC* to further biofuels, such as palm oil, but they won't be longer tolerated by 2030.[71]

The transposition of the RED II into MS' national law is expected to be concluded by the end of 2021, delayed with respect to the initial deadline (established for June 2021) due to the Covid-19 pandemic. Although the REDII was expected to ban the unsustainable feedstocks contested in the ILUC Directive, the new policy simply leaves their impact assessment to further reviews, carried

[69] EU directive 2018/2001, OJ (L 328), 21/12/2018
[70] "RED II and advanced biofuels: Recommendations about Annex IX of the Renewable Energy Directive and its implementation at national level", Transport and Environment briefing (May 2020)
[71] Philippe Dusser ,"The European Energy Policy for 2020–2030 RED II: what future for vegetable oil as a source of bioenergy?", OCL 26, no. 51 (October 2019)

out every two years. None of them will be completely eliminated from the list of accepted crops, namely *Annex IX*, until 2030. In other words, the acknowledgment of *hILUC* doesn't prevent them from being included in the EU 2030 RE target. Another issue stems from the feedstocks' classification of *Annex IX*, namely wastes, residues and co-products.[72] Provided that it is complicated to determine the category of belonging for several feedstocks, due to their multi-functionality, depending on their category of assignment they will be subject to different certification requirements. Beyond the risks stemming from the EU feedstock classification under *Annex IX*, raw materials can be classified under different categories at MS level. This creates further confusion and undermines any attempt of setting up harmonised criteria requirements.

The novelty of REDII is the introduction of sustainability criteria for solid biomass, ensuring that the latter won't be sourced through unsustainable pathways and the production process won't affect sensitive areas or represent a threat to biodiversity. However, the directive falls short of addressing sustainability requirements for forest biomass.[73] In fact, there is no requirement mentioning to what extent raw material can be extracted without causing environmental damage. Additionally, *Art. 29 of RED II* condemns agricultural biomass made from raw material obtained from land with a high biodiversity value.[74] Similar to forest biomass, the REDII lacks parameters to verify that extraction rates are kept at sustainable levels for agricultural residues, provided that displaced emissions are not considered.

F2F is considered the flagship of the EU Green Deal, a climate plan combining a series of cross-sectorial actions expected to pave the way to net-zero emissions by 2050. The strategy is based on the integration of top-down and bottom-up business models that entrust farmers and communities with an empowered role, namely the creation of a sustainable food system.[75] F2F aims at tackling food sustainability along the whole production chain, disclosing production transparency to enhance aware patterns of consumption and reverse climate change effects. Provided that EU food already ranks quite high in terms of sustainability, the strategy strives to further strengthen

[72] "RED II and advanced biofuels", T&E briefing
[73] Ibid
[74] EU directive 2018/2001, OJ (L 328), 21/12/2018, Art. 29
[75] Kerstine Appunn, "EU's Farm to Fork strategy impacts climate, productivity, and trade", Clean Energy Wire, March 5, 2021

sustainable practices through a series of "green" measures.[76] In a nutshell, the pillars of F2F mainly targets the use of pesticides, nutrients and waste management, antimicrobials sales, organic farming with a focus on crop diversity. The strategy is expected to be transposed into a legislative framework for sustainable food systems by 2023.

Although F2F can be considered as a significant step forwards in coupling bioenergy expansion with environmental protection, some gaps are yet to be addressed. First, a comprehensive definition of "food sustainability" should be provided in order to efficiently tackle the issue. Furthermore, provided that a new generation of GMOs have penetrated the EU market after heavy lobbying, alleged to improve sustainability, the framework concerning the sustainable use of pesticides must be reviewed.[77] The acceptance of new GMO types doesn't seem to be in line with the effort of "reducing dependency on pesticides", one of the strategy's cornerstone. Despite crop diversity being mentioned in the strategy as one of the pillars food systems should rely on, no specific action or timeline is given for enabling seed diversity. In fact, food security must be ensured through the harvest of different seed types to cope with the seasonal volatility of climate change. The protection of crops security and diversity is expected to be strengthen through unburdening the registration of new varieties of seeds and securing simpler market access for both traditional and locally adapted varieties. In other to tackle these issues, MS should harmonise their agricultural policies to share common efforts towards a sustainable food system pathway. Comprehensive guidelines for the resilience of both traditional and locally adapted species should be provided. Additionally, enhanced requirements for food labelling must be introduced to ensure products transparency and raise consumers' awareness. Finally, the lack of agro-ecological and organic farming incentives should be addressed in order to upscale EU producers' position in the sustainable food chain.

The RED II and the EU Green Deal mark a pivotal moment in the trade dynamics between the EU and Mercosur countries. Although both strategies fail to address persistent barriers to bioenergy expansion, they demonstrate an unprecedented political commitment to fight climate change. The

[76] Hanna Schebesta and Jeroen.J.L. Candel, "Game-changing potential of the EU's Farm to Fork Strategy", Nature Food 1 (October 2020)
[77] Elena S. Nicolás, "EU urged to stop export of toxic pesticides to third countries", Eurobserver, November 6, 2020

EU change of strategy is not an isolated phenomenon, it also affects the relations with its trade partners. Reducing the cap on the share of conventional biofuels in EU transport fuel (from 7% in 2020 to 3.8% in 2030) will have an impact both on EU biofuel producers and the agricultural industry in the Mercosur region, especially Brazil. EU biofuels producers are concerned that this cap could jeopardise investments in advanced biofuels and undermine famers' security of supply. If an FTA is ratified, a high risk of imported products infiltration will follow, damaging the EU's attempt to create the bio-economy targeted through its F2F strategy. In the meantime, Brazil is expanding its production of sustainable biofuels, expected to reach noticeable emission savings compared to fossil fuels and mitigate ILUC risk. Gaining more access to the EU market will barely affect Brazilian domestic consumption of ethanol, estimated to account for 90% of total production.[78] However, even though the majority of its production is destined to domestic consumption, the ratification of the FTA entails a larger share of exports. The regulations under the new EU environmental legislation don't explicitly apply to imported products, creating a paradox that would be overcome only if Brazil production proves to be sustainable. Unless the RED II extends biofuels sustainability criteria to imported products, unfair trade will permeate the trade dynamics among the two blocs.

The following section will shed light on the position of different MS about the possible change of the existing trade dynamics between the EU and MERCOSUR blocs, in view of the debated ratification of the FTA, exploring national tension lines among the main stakeholders involved.

2.4 Conflicting standpoints: pros and cons of the EU-MERCOSUR agreement according to selected Member States

This section will shed light on the position of 13 selected MS with regards to the ratification of the FTA signed in 2019, analysed in *Annex E*. Involving multi-level stakeholders with conflicting interests, the negotiations have triggered fragmented standpoints at national level. As discussed in the previous chapters, the liberalisation of "sensitive" products opens up doors to unfair competition due to the inevitable comparative advantage held by Latin American agri-food products. The cheaper prices of Latin American products can be explained by looking at lower production costs compared to the EU, high inflation, and limited control over the production

[78] Samuel White, "Biofuels emerge as burning issue in EU-Mercosur talks", Euractiv, October 5, 2017

process in the Mercosur bloc. Additionally, the agreement would allow hazardous products, such as pesticides, to gain greater access to the EU market, undermining its sanitary protocols. Eight MS are taking an unclear position about the ratification of the agreement due to lack of clarity of its environmental impact, tackled by the TSD chapter. Some MS have changed their "traditional" position towards the agreement in view of increasing climate concerns on the international sphere. Overall, since some European MS heavily rely on their agricultural sectors, the main perceived threats stemming from the possible ratification touch on local farmers and sanitary protection.[79] It will also be argued that the Brexit has dramatically changed the trade dynamics of the agreement.

After about 20 years of negotiations, the EU has strived to conclude a FTA with Mercosur countries, expected to be *win-win* due to the mutual exchange of shared knowledge, best sustainable practices in trade and foreign investments. However, the EU negotiations about the ratification of the FTA are in deadlock, getting to the conclusion that the latter cannot be ratified as it stands.[80] The shift to a predominantly hostile position has to be explained in the light of two recent changes in EU politics: Brexit and the emergence and/or enhancement of green consciousnesses across MS' national governments.

The departure of the United Kingdom (UK) from the EU bloc in January 2020 put the future of trade between the two parties at stake, being the agri-food sector the pillar of their trade relations. In order to avoid job losses and economic disruption in the agri-food industry, already hit by the Covid-19 pandemic, in December 2020 the UK and the EU signed an FTA, temporarily applied as of January 2021 and entered into force in May 2021. UK withdrawal from the EU also affected UK participation in European FTAs, being no longer a member. However, the UK is establishing independent trade deals with other countries, even though no Mercosur country is included.[81] Being the UK considered the most "pro-trade" MS, the trade dynamics within the EU bloc have changed, triggering a reconsideration of certain MS historical stance about the conclusion of the EU-MERCOSUR agreement.[82] Additionally, the absence of a trade agreement between the UK and Mercosur countries will affect the trade of agri-food products between the two regions, to the

[79] Klaudija Kremers, Yann Laurans and Tancrède Voituriez "The Future of EU Free Trade Agreements: European dialogue in light of the EU-Mercosur Association Agreement", IDDRI, no. 2 (February 2021)
[80] European Commission, "Overview of FTA and other trade negotiations" (updated in March 2021)
[81] Department for International trade, UK trade agreements with non-EU countries (updated on June 1st, 2021)
[82]Kremers *et al*.,"The Future of EU Free Trade Agreements"

detriment of Mercosur countries. On the one hand, the UK might prevent unfair trade opting out from a trade deal that would allow the entry of lower standard products in its domestic market. Contrarily, Mercosur countries will lose a strategic export-oriented partner.

The last European Parliament elections saw a strengthened position of "green" parties, which reflected the modified political balances in the correspondent national parliaments. This paradigm shift in politics has to be interpreted as an increasing international pressure about climate change, triggered by the signature of the Paris agreement and the acknowledgement that the world reached a point of no return. Limiting the global temperature increase to 2° Celsius above preindustrial levels, with the ultimate goal of further pushing this target to 1.5° is a gargantuan endeavour. It requires all MS to revolutionise their domestic economies in order to adapt to the energy transition. This will imply an inevitable change of strategies both at national and European policy level. In countries that have based their economic prosperity on fossil fuel sources for decades, such as Germany and Poland, the phase-out of coal won't happen overnight. They will likely import coal abroad in the attempt to reach green targets at home, whilst creating negative externalities on the other side of the world, which is definitely not the aim of the Paris agreement.

The restart of high deforestation levels in the Amazon rainforest has been seen as the concretisation of international climate change concerns. This happening caused a great public opinion disapproval and further splits within MS national parliaments. If, one the one hand, blocking a trade deal that has been negotiated for over 20 years might seem foolish, it has to be considered what is at stake. In this case, saving the planet comes first. Although some MS are unconditionally against the ratification of trade deals, others have provisionally halted it until improved conditions are introduced in the TSD chapter. However, even though sustainable trade is enhanced, it will be difficult to assess its environmental impact, in view of secrecy of negotiations and lack of clarity[83]. Although Mercosur countries haven't rejected the trade deal, they expressed some reluctance in accepting it without improved conditions. Argentina fears that the EU high subsidies placed on its wine sector could undermine its local industry, whilst Brazil is mainly concerned about the loss of international trust in its agricultural products. Despite that, it is worth noting that Brazil has refused

[83] Tancrède Voituriez, "Accord UE-Mercosur : comment sortir de l'opposition entre commerce et environnement?", IDDRI, July 16, 2019

assessments on the TDS negative outcomes for deforestation and blamed EU green protectionism over its agricultural interests.[84]

Across the EU, MS have expressed different feelings about the ratification of the *in-principle* agreement, internally split up by different stakeholders' interests, whose powerful voice managed to lobby national government's deliberations in certain cases. Among the 13 MS analysed, two of them explicitly opposed the ratification of the agreement (France and Ireland), either through official motions against the ratification or explicit declaration by national presidents and/or high political representatives. Eight MS' position is unclear since their multi-level representatives from different industrial sectors, civil society and politics were unable to find a common solution or recently changed their stance (Germany, The Netherlands, Austria, Sweden, Belgium, Luxembourg, Poland, Romania). Only a small minority composed of Spain, Portugal and Bulgaria supports the conclusion of the agreement negotiations, as long as improved conditions are introduced in the TDS chapter.

Supporters of the agreement have been mostly identified as interest groups of national export-oriented industry and representatives of left-wing parties in MS' parliaments, mainly social-democratic political forces. To underpin the ratification, arguments somewhat in line with the founding principles of the FTA were advanced, namely enhancing foreign investments and trade opportunities. Spain considers the FTA as an important instrument to mitigate the political tensions with China, in view of China's emerging trade partnership with Mercosur countries. However, within the country there are also concerned voices mostly coming from Spanish agri-food cooperatives, who ask for reciprocity of food safety standards and trade fair conditions.[85] Like Spain, Portugal is historically and culturally tied to Mercosur.[86] However, it defended its commitment to multilateralism and internationalisation of national products as main reasons to proceeding with the agreement ratification, as long as a robust trade policy is enacted.[87] Bulgaria, as pro-export country, has traditionally supported the agreement. However, the possible

[84] Erixon, "Green protectionism in the European Union"
[85] Gerardo Fortuna and Natasha Foote, "Agrifood Brief, Special Edition: A closer look at EU agrifood trade.", Euractiv, December 11, 2020
[86] Beatriz Céu, "Portugal defends 'geopolitical' importance of EU-Mercosur trade deal", Euractiv, February 11, 2021
[87] Fortuna and Foote, "Agrifood Brief, Special Edition"

ratification of the FTA is rising discontent among Bulgarian beekeepers, since it would allow large imports of cheaper honey to entry the EU market, undermining local competitiveness.[88]

Opponents to the agreement have mostly been identified as interest groups' representatives, "traditionally sensitive" to agricultural problems or environmental issues. Local famers and small-scale sustainable agribusiness have expressed their concern about trading products largely exposed to market competition. NGOs and civil society's position is mainly driven by the risk of increasing global deforestation, further swayed by public opinion and international press. Besides, environmental degradation would undermine the achievement of the Paris Agreement's climate targets. The possible ratification of an FTA has pooled the discontent of several political parties. The Greens, in first place, followed by centre-left or centre-right parties and to a certain extent right-wing parties as well as socialist parties. Overall, the main common argument against ratification was the imported deforestation that it would trigger, aggravated by concerns about Brazil's *de facto* non-compliance with Paris agreement. France, as EU leading agricultural power, has explicitly condemned the conduct of Brazil's current president Jair Bolsonaro, whilst other countries such as Germany, beyond showing a general reluctance in engaging with trade deals, are about to take tangible measures to express their disapproval, planning to withdraw their support from the Amazon fund.[89] Ireland, another leading export-oriented country, blames the signatory parties of the agreement for disregarding the lack of standards-compliance of products imported from Mercosur. Mercosur traded goods are claimed to be "not equivalent in standards"[90] compared to EU products and thus harmful for consumers' health.

The sluggish negotiations dragged for over 20 years encompassed changes in national political leading forces and their relative economic strategies. Therefore, some traditionally pro free-trade MS like The Netherlands, Austria, Luxembourg, and Sweden have assumed harsher positions in time. Since the Greens acquired more power during the last Austrian elections, the country's political imbalance is reflected into its position with regards to the trade deal.[91] Belgium is a peculiar case since it is regionally divided: the Flemish government supports the FTA in view of its strong imports' reliance from Mercosur countries, mainly Brazil. Contrarily, the Wallonia

[88] Ibid
[89] Karla Mendes, "Germany cuts $39.5 million in environmental funding to Brazil", Mongabay, August 13, 2019
[90] Fortuna and Foote, "Agrifood Brief, Special Edition"
[91] Fortuna and Foote, "Agrifood Brief, Special Edition"

region, lobbied by local beef farmers, has issued a motion against the ratification of the FTA, criticising the lack of even trade rules across the two blocs. Luxembourg has turned out to be mostly against the trade deal, due to its strong meat industry lobby, advocating a deterioration of trade equilibrium. Sweden position, traditionally in favour of free trade, was swayed by the ongoing pandemic, which emphasised the need of producing food locally.[92] It is worth mentioning that some traditionally against-agreement countries like Poland and Romania seem also willing to change their position. In spite of a largely discontent meat industry, Poland has registered a positive trade balance since it joined the EU in 2004. Provided that its agri-food sector flourished since the country got access to EU benefits, its stance is biased by the fear of losing those advantages.[93] Romania is living the paradox of having a deficit from agri-food trade, despite its massive employment of workforce in that sector. Although the country used to be in favour of the FTA, its reliance on weather conditions has further aggravated its deficit in agriculture, igniting the desire of diversifying its production and gain value from other sectors. This is why its position about the agreement ratification is currently almost neutral.

In view of the thorny situation, many MS have suggested to renegotiate the agreement to "improve" its conditions. One of the main requests is to make the compliance to the Paris Agreement an "essential clause" of the FTA, in order to enhance its degree of enforcement.[94] Among the main claims raised, MS ask to dodge contradictions such as the exportation of pesticides banned at EU level to developing countries. According to certain MS, sustainable development policy and trade policy should be separated matters.[95] Others allege that, to overcome those gaps, more protection should be envisaged for exposed agricultural products, such as introducing labels to certify their non-interference with deforestation. These gaps shed light on the limits of the European "soft" approach, mainly based on dialogue-based mechanisms which struggle to be translated into effective enforcement.[96]

In the following chapter, the main stumbling blocks and conflicts studding the European bioenergy sector are analysed though the guidance of industry experts.

[92] Ibid
[93] Ibid
[94] Kremers *et al*.,"The Future of EU Free Trade Agreements"
[95] Ibid
[96] Kremers *et al*.,"The Future of EU Free Trade Agreements"

CHAPTER 3

This chapter is inspired by online interviews conducted with six representatives of different organisation and companies advocating and promoting the use of bioenergy, as explained in detail in the *Methodology* section. Thanks to their expertise in project management, I had the chance to extrapolate insights into the main European bioenergy stumbling blocks, conflicts and opportunities thanks to the voices of A. from Bioenergy Europe, a EU trade association of biomass and bioenergy companies; F. from a Portuguese R&D institution, namely the National Laboratory of Energy and Geology (LNEG); J. from ENVIVA, the world's largest producer of sustainable wood pellets; A. from AIEL, the Italian Agroforestry Energy Association; G. from EUBIA, the European Biomass Industry Association and C. from DENA the German Energy Agency, centre of expertise for energy efficiency and renewable energy sources. All the experts were asked the following questions:

3. *What are the main stumbling blocks in the expansion of bioenergy in the EU?*

b. Could it be stated that the existing barriers in the bioenergy field are reflected in the EU-MERCOSUR agreement? If yes, do you believe that the potential ratification of the in-principle agreement addressing TSD will overcome those barriers?

c. *How would you define the cooperation with the various stakeholders involved in the bioenergy field? With whom would you think your organisation/company may build win-win partnerships and why? With whom would you be less willing to collaborate with?*

3.1 Stumbling blocks in the EU bioenergy expansion

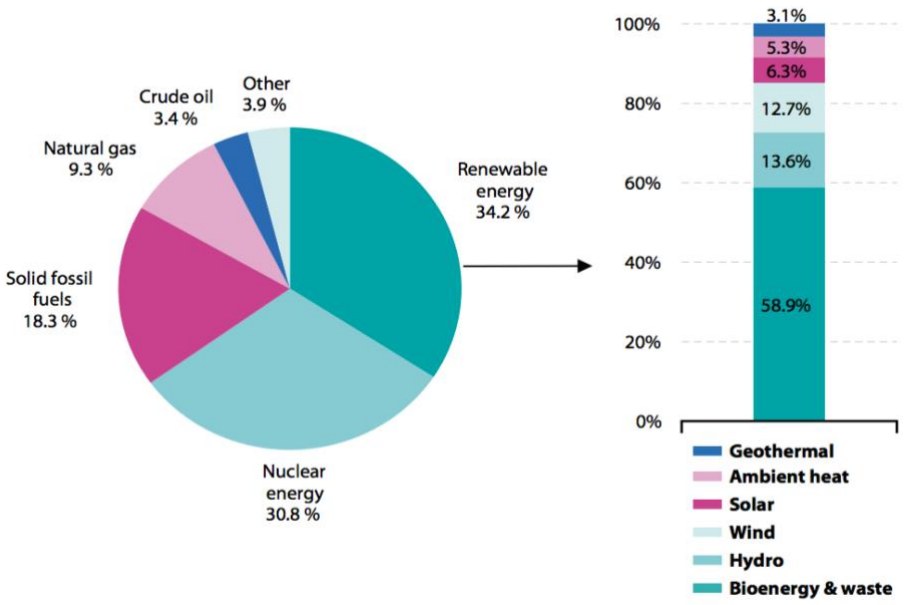
This section provides an overview of the EU bioenergy mix, focusing on its production of biofuels, woody, and agricultural biomass. The main take-aways from the answers to *question a* are summarised in *Annex F* and elaborated through this section in order to provide a clear depiction of the existing stumbling blocks in the EU bioenergy expansion. Provided that bioenergy can be produced via different feedstocks, the barriers to the expansion of biofuels, woody and agricultural

biomass are analysed. A focus is made on the obstacles to the development of international biomass projects in Latin America.

Bioenergy is associated to the process of production and conversion of biomass feedstock into energy. This conversion process branches off across solid, liquid, or gaseous forms of energy carriers that serve different energy sectors: heat, electricity generation and transportation. Contrarily to other renewable forms of energy, the fuel is not immediately available for free, raw materials must be sourced and produced and this implies relative costs.[97] However, bioenergy resources are largely available, easily storable and they are deemed to make valuable use of waste, exploring untapped potential from different sectors: agriculture, forestry, and transport.

Figure 13 shows that RE is the largest source of energy produced in the EU (34.2%), overstepping all fossil energy sources, as of 2018. Bioenergy (including waste) represents the leading source of renewable energy (58.9%).

Figure 13: Production of primary energy, EU-27, 2018 (% of total, based on tonnes of oil equivalent)

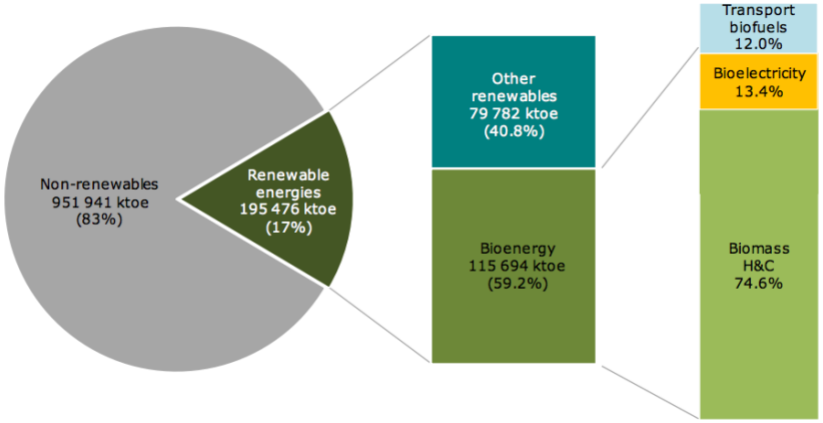


Source: Eurostat

[97] Eubia, Wikibiomass

As **Figure 14** demonstrates, EU bioenergy is mainly converted into biomass for heating and cooling (74.6%), and thus for domestic use, followed by bioenergy to produce bioelectricity (13.4%) and transport fuels (12%), as of 2016.

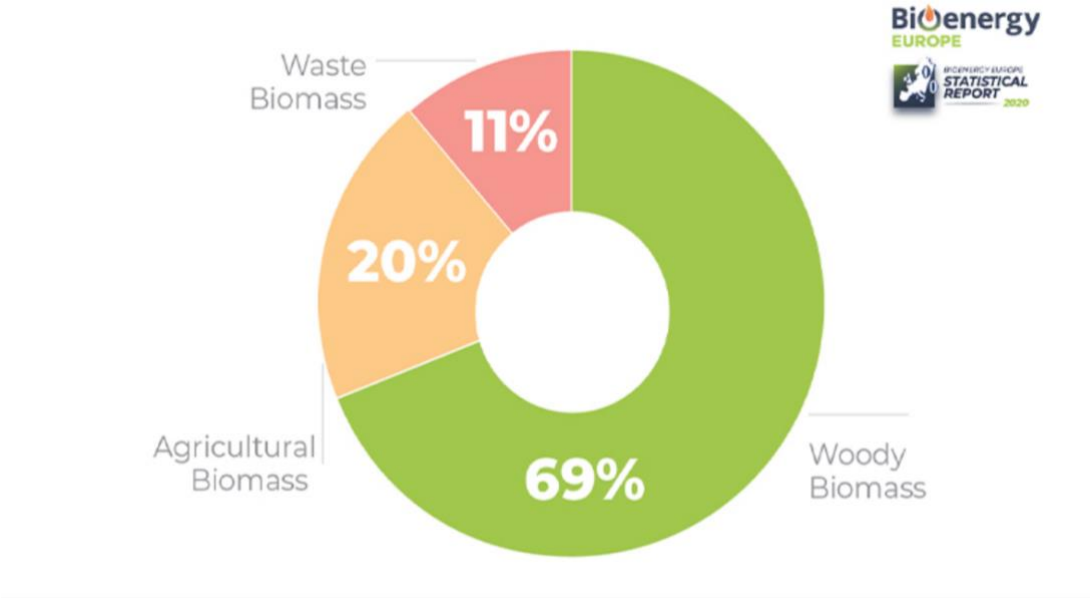
Figure 14: Share of RE in the EU's gross final energy consumption for 2016



Source: Eurostat 2018b

Among the raw materials used for heating and cooling, woody biomass is the predominant feedstock (69%), whilst the potential of agricultural biomass (20%) and waste biomass (11%) is limited (**Figure 15**).

Figure 15: Distribution of the different biomass feedstock for energy in 2018



Source: Bioenergy Europe

It has been discussed that conventional biofuel expansion is mostly undermined by the climate and food safety concerns of an adverse public opinion, biased by the negative stigma attached to biofuel's link with global deforestation. Additionally, *German et al.* argue that land for bioenergy is limited due to the imperative of meeting other societal needs, like dedicating lands for food production.[98] The EU is currently striving to overcome those barriers by enhancing certification schemes transparency and extending sustainability criteria to other biomass feedstocks. In addition, it is raising targets for fostering the production of advanced biofuels. However,

> […] *advanced biofuels are still subject to an unfair taxation compared to carbon emitting technologies, which doesn't contribute to mitigate the gap between the cost of advanced biofuels and conventional ones*.[99]

A mobilising policy, which goes beyond the establishment of renewable energy targets, could be the key to unlock advanced biofuels potential.

[98]Laura German *et al.*,"Sine Qua Nons of sustainable biofuels: Distilling implications of under- performance for national biofuel programs", Energy Policy 108 (April 2017)
[99] LNEG, *Interview*. Google Team, April 19, 2021.

The experts have identified different stumbling blocks in the expansion of woody biomass production. The first barrier stems from the decarbonisation of power plants to produce electricity, especially when companies are compelled to use existing infrastructure, as discussed in the following section.[100] A correlated issue is sea transport.

> […] *power plants must be fuelled with a high amount of raw material that requires to be shipped despite its slim energy efficiency (about 25% is actual yield, the rest is dispersed through heat).*[101]

Although shipping by using oil consuming bulk carriers is the most efficient and convenient way of transport for biomass, it is worth noting that raw materials are required to run burdensome distances in spite of their low energy density. In other words, the larger the mileage, the less sustainable the shipping. Regulating sea transport in terms of sustainability is difficult due to the difference in policies between the countries of shipping and delivery and the need for global agreements.[102] A further obstacle stems from the side effects of climate change. EU forests are being affected by adverse climate events, such as storms and hurricanes, limiting the availability of raw material. Unpredictable events such as parasites invasions might also affect the forests' yield.[103] The EU has a lot of untapped potential in terms of forests, either due to an environmentally sensitive public opinion and lack of incentives of investments. In fact, the majority of forest plots is private. In many MS, smallholders are discouraged from investing in their forest areas due to a burdensome regulation and high costs to pay upfront. Moreover, the disregard of forest areas leads to environmental degradation.

> *Forests need to be managed. If forests overgrow, trees will require more water to survive, stealing nutrients from other trees.*[104]

[100] ENVIVA, *Interview*. Google Team, April 15, 2021.
[101] AIEL, *Interview,* April 29, 2021.
[102] ENVIVA, *Interview*
[103] Italy's north-eastern forests have been extremely damaged by the Vaia storm of 2018 and the consequent invasion of a parasite, namely the European spruce bark beetle. Low quality raw materials yields are expected until 2024.
[104] EUBIA, *Interview,* May 18, 2021.

Unmanaged forests can produce drought, leaving room for potential forest fires and decline in forest health. This is a sensitive topic because it causes frictions with those stakeholders who advocate forests' preservation.

Among woody biomass, wood pellet is claimed to be a sensitive raw material, since it is subject to economies of scale that creates a high demand which doesn't offset its low economic value.[105] Besides, certification schemes for wood pellets fall shorts from ensuring the sustainability of raw materials, since domestic users of biomass are claimed to be more concerned about their efficiency.

> *Domestic biomass users are more interested in the quality of the product, and thus, its energy efficiency, rather than its environmental impact.*[106]

The agricultural sector discloses a huge untapped potential for biomass production.[107] Not only complex logistics covering large distances has been identified as a stumbling block for biomass expansion due to its carbon impact, but also for limits intrinsic to the logistics stage itself. Authors claim that losses in the harvest and the availability of suitable infrastructure to store and transport biomass should be considered.[108] Both the lack of incentivising policies to foster the use of agricultural biomass and awareness about advanced farming techniques further hamper biomass expansion. It is worth noting that farmers may be unwilling to pay costs upfront, for example in the case of cultivating perennial dedicated energy crops, or simply uniformed about the benefits they could seize. From the administrative side, a widespread lack of mobilisation can be seen as a further disincentive in agricultural biomass investments.

> *For example, in Spain there is a lot of potential stemming from olive trees' pruning that represents a valuable waste residue.*[109]

[105] AIEL, *Interview.*
[106] Bioenergy Europe, *Interview*, April 9, 2021.
[107] Nicolae Scarlat, *et al*., "Assessment of the availability of agricultural crop residues in the European Union: Potential and limitations for bioenergy use", Waste Management 30, no. 10 (October 2010)
[108] Iris Lewandowski, "Securing a sustainable biomass supply in a growing bioeconomy", Global Food Security 6 (October 2015)
[109] EUBIA, *Interview.*

EU investors face further barriers in developing biomass projects abroad, especially in Latin America.

> *The main difference between biomass and other RE such as solar and wind is that they entail much more administrative steps to carry out.*[110]

Overall, investors might show reluctance in engaging in projects undertaken in politically and economically unstable countries, further aggravated by overlapping institutions and lack of transparency. Moreover, long payback periods and the complexity of logistics in countries with poor transportation infrastructure deter many investors from taking investment risks. Lastly, another handicap of engaging in biomass projects is that it doesn't guarantee sustainability or environmental conservation.[111] The following section highlights the conflicts ignited by the barriers to the expansion of bioenergy in the EU.

3.2 A fragmented sector? Overview on the main stakeholders' conflicts

Although bioenergy is leading the RE sector in the EU, its acceptance is still uneven and represents a thorny matter. The current scenario discloses a fragmented energy sector studded with conflicts among the main stakeholders. *Question b* contributed to identify opposed stakeholders' positions and grasp the dynamics of the existing conflicts, summarised in *Annex G*.

Focus on conflict: Non-Governmental Organisations (NGOs) and Agroforestry/Biomass Industry

The agroforestry industry and trade associations of biomass companies have indicated NGOs as one of the main actors creating frictions. They have been either defined as:

> *stakeholders with an opposite environmental approach*[112] or
>
> *stakeholders who don't understand the potential of bioenergy*[113].

[110] DENA, *Interview*, May 27, 2021. *This is the personal evaluation of C. and is not the official position of DENA.*
[111] Ibid
[112] AIEL, *Interview.*
[113] EUBIA, *Interview*.

Environmental advocacy is one of the cornerstones of NGOs as WWF or Greenpeace. For this, they cannot ignore the indirect side effects stemming from an inappropriate use of bioenergy. Bioenergy can unlock enormous opportunities but must be handled in a sustainable way throughout its entire supply chain. Disputes involving bioenergy usually entails disagreements regarding the notion of sustainability.

The main objections raised by NGOs regards two main issues: emission accounting method and ILUC risks, with a special focus on soy production expansion in Brazil, already discussed in the previous chapter. Not only soy production is responsible for side effects such as land-use change, but its value chain is also "carbon-expensive". Several carbon-emitting activities are implemented for growing energy crops, including the use of fertilisers and its relative refining process.[114]

Assessing the carbon footprint of biomass and its relative carbon debt has always been in the spotlight of international debates. The first biomass emission accounting "loophole" was created by the Kyoto Protocol, ratified in 2009 in the attempt of mitigating GHG emissions.[115] Such agreement established that imported biomass can be considered carbon-neutral since its emissions are expected to be recorded, by default, in the exporting countries land use accounting. In this way, emissions were counted only once. Furthermore, GHG emissions are likely to have a greater impact in countries exporters of biomass rather than the opposite. Today, the issue of accounting emissions shifted to assess the extent to which the expected long-term benefits of bioenergy could pay back their carbon debt and restore a biodiversity equilibrium. According to WWF, the RED II falls short from tackling the issue of trees regrowth.[116] Since the sustainability criteria introduced by the revision of the directive are considered *largely meaningless*, the NGOs repeatedly insisted on the need of cutting incentives to the use of waste and residues in the EU.[117]

Further scepticism is raised by the conversion of coal-fired power plants to biomass. The UK is a leader in the conversion of coal-fired power plants across the EU, with Drax Power Station as the biggest RE power plant. Research argued that the shift from burning coal to wood pellets entails a

[114] Gates, How to avoid a climate disaster
[115] Robert Sanders,"Climate Scientists Uncover Major Accounting Flaw In Kyoto Protocol And Other Climate Legislation" ScienceDaily, October 23, 2009
[116] "500+ scientists tell EU to end tree burning for energy", WWF, February 11, 2021
[117] Ibid

burdening carbon dioxide cost to pay upfront.[118] This can be explained by looking at the lower energy content of biomass and thorny supply chain, that will produce more carbon dioxide (CO2) for each kilowatt hour of electricity generated in comparison with coal. Although vegetation regrowth is expected to reabsorb the excess of CO2 released, this will hinge on the time needed for regrowth to be effective.

Focus on conflict: Biomass industry VS fossil fuel industry

Fossil fuel industry lobby tends to advocate the industry from the risk of heavy disinvestments or stranded assets that the energy transition inevitably implies. A remarkable example of this is depicted by the shutdown of power plants in Germany, whose coal industry is leaded by powerful trade unions that hampered the implementation of the *Energiewende*[119] and strongly opposed the coal phase-out strategy enacted by the Coal Commission established in 2018[120]. In addition to coal, oil and gas sectors have also registered unprecedented losses since the world superpowers deliberated to pool efforts to achieve a green growth, whose pillar is replacing fossil fuels with green energy. Despite that, there are part of the world where the green transition is still barely addressed. It is worth remembering that fossil fuels still play an essential role in the housing sector in certain parts of the world, such as Sub-Saharan Africa.[121] The main arguments against the development of green energy is that it is a "non-controllable" source. "Decentralisation", regarded as one of 5Ds transforming the energy market,[122] in fact, leaves the producer powerless in terms of seizing the amount of energy produced, whilst empowers citizens through self-consumption. Another pitfall of green energy stems from the difficulty of storing it due to its intermittent nature, which requires to develop efficient technologies to cope with such a constraint. However, those technologies are often not immediately available and cost demanding.

[118] Michael Buchsbaum, "Rethinking biomass' carbon loophole: will the EU chart a more science-based course?", Energy Transition, August 21, 2020
[119] Germany's long-term strategy for the development of a low-carbon energy system based on renewable energy and energy efficiency.
[120] Philipp Litz, "Commission du charbon en Allemagne: Quel modèle de participation pour la transition énergétique?", FES Paris (November 2020)
[121] Inspired by lecture with Philippe A. Charles, Total, October 26, 2020
[122] "Towards Energy Union Act II: a new European energy-climate leadership", Foundation Robert Schuman, March 12, 2018

Focus on conflict: Agroforestry industry VS "green" policy makers

EU policy makers are blamed for enabling policies that hinders the interests of agroforestry and biomass producers for alleged sustainability concerns. Those concerns are consequently reflected in policies such as RED II and ILUC directive, and strategies as Farm-to-Fork. AIEL argued that:

> […] *parts of the supply chain are extremely difficult to decarbonise, preventing their bioenergy production to be 100% carbon neutral.*[123]

The main barriers to decarbonisation have been identified as the sourcing of raw materials and logistics. In fact, machineries implemented in raw material manufacturing are deemed responsible for releasing non-biogenic carbon emissions.[124] However, policy makers tend to blame the agroforestry industry for producing "grey" emissions during the combustion phase, even though those emissions are coming from biogenic carbon.[125] Being the manufacturing machinery a niche sector, it is quite complicated to purchase "sustainable" equipment.

> *The main cause of opposition is due to a scarce knowledge of agroforestry practices*.[126]

Additionally, to mitigate total GHG emissions is also imperative to rely on an efficient logistics. Fragmented supply chains have to deal with transportation, which could either cover short or long distances along different sites of supply, manufacturing, and production. While the so-called *simple logistics*, namely the one that covers short distances, ensure a high level of sustainability, *complex logistic*, namely the one that covers long distances, doesn't.

> *Although long distance transportation could ensure a partial compliance with sustainable criteria, it will be more difficult to reach net zero emissions.*[127]

[123] AIEL, *Interview*
[124] Non-biogenic emissions increase the total amount of carbon in the biosphere-atmosphere, for example those associated with fossil fuels' combustion.
[125] Biogenic carbon emission that are part of the carbon cycle of biomass, its combustion returns to the atmosphere the carbon that was absorbed as the plants grew.
[126] AIEL, *Interview*
[127] Ibid

DENA offered an interesting perspective on international bioenergy projects.[128] Frictions are more likely to happen in bigger-scale projects involving multi-level stakeholders. Local communities' rights are asserted to be mainly affected by the implementation of large-scale projects. Stakeholder dialogue is claimed to be missing in large-scale projects, and if there is dialogue, it is not well defined. The structural gaps discussed in the previous section create loopholes to externalise environmental costs. South America is described as:

> […] *a great place to externalise those costs because there is no dense population but plenty of land,*
> *no comprehensive statistics nor data transparency*.[129]

The analysis of the existing stumbling blocks in the EU bioenergy expansion and the conflicts that permeate the sector are paramount to understand the difficulties embedded in the ratification of the FTA , resumed in the next section, and its chances of success.

3.3 EU-MERCOSUR agreement: a new opportunity or an empty shell?

This section debates the capacity of the TSD chapter to overcome the existing stumbling blocks in the EU bioenergy expansion through the establishment of measures addressing environmental protection. It is proceeded as follows: first, the perspective of the experts is disclosed through elaborating answers to question *c.* Then, it is argued whether the stumbling blocks in the EU bioenergy sector are reflected into the TDS chapter of the FTA. Lastly, a special emphasis is placed on the contradictions stemming from the new clause of the agreement, meant to tackle environmental degradation.

Overall, the interviewees have disclosed a little knowledge about the EU-MERCOSUR agreement and its TSD chapter's implications in the bioenergy sector. Thus, they mostly elaborated their answers based on assumptions.

[128] DENA, *Interview*
[129] Ibid

It can be inferred that the agreement indirectly addresses bioenergy, covering residues of energy carriers such as ethanol.[130]

A special emphasis is placed on the unclear guidelines for trading bioenergy, in particular woody biomass. In fact, despite the TSD chapter emphasises the need of combating illegal logging and preserving biodiversity, export volumes are by no means clear due to the difficulties of tracking and quantifying bioenergy residues' volumes.

Although the EU-MERCOSUR agreement establishes specific criteria on commodities trade and their relative export duties, there are no binding criteria nor specific guidelines addressing woody biomass trade.[131]

The main implications of the possible ratification of the FTA have been identified as: 1. increased deforestation; 2. unfair product treatment.

Although the agreement could benefit the regional development of Mercosur countries in view of cheaper import and export costs, there are two main factors to be considered: the evolution of the Covid-19 pandemic and the delimitation of the Amazon forests. The pandemic has hardly hit the economies of Mercosur, already affected by political instability and economic recession. Additionally, the management of the bioenergy industry in Brazil risks to have a negative impact on the environment. According to DENA, one major gap is represented by the failure of delimiting the perimeter of the Amazon Forest State, which falls short of tackling ILUC risks.

As long as the perimeter of the Amazon Forest State is not well defined, the expansion of soybeans will persist, as well as deforestation.[132]

Being Brazil one of the major producers of bioethanol, the importation of soybeans and sugar in the EU at favourable export duties will raise great discontent among European farmers, compelled

[130] ENVIVA, *Interview*
[131] AIEL, *Interview*
[132] DENA, *Interview*. *This is the personal evaluation of C. and is not the official position of DENA.*

to comply with sustainable requirements that might be bypassed from the competition. In fact, even though imported products should be forbidden from entering the EU market unless they ensure compliance with domestic sustainability standards, the REDII doesn't envisage clear enforcement measures to tackle violations. This is claimed to place EU policy's credibility at stake.

> *[…] importing conventional biofuels whilst striving to foster advanced biofuels production at home would undermine EU credibility.*[133]

The existing stumbling blocks in the EU bioenergy expansion are mostly not reflected into the TDS chapter of the EU-MERCOSUR agreement. Conventional biofuels risks are took on generically, through a legislative framework to overcome ILUC risk, disregard for local food safety standards, local communities exclusion from "sustainable projects" and biodiversity preservation. For instance, *Art. 7 on Trade and Biodiversity* calls for a "reduction of illegal trade in wildlife" and "encourage trade in natural resource-based products obtained through a sustainable use of biological resources […]".[134] In other words, it bans products sourced from protected areas or processed in the disregard of sustainable practices. However, the TDS falls short of introducing mechanisms to deal with the lack of Mercosur countries' independent certification and traceability of products.[135] Although the chapter refers to best practices exchange with "initiatives and good practices on trade […] with the aim of conserving biological diversity", it is inconsistent with providing concrete tools and guidelines for enhancing shared knowledge, such as boosting R&D for advanced biofuels. Art. 8 strives to enhance the sustainable expansion of woody biomass by "implementing measures to combat illegal logging". However, it is worth noting that Brazil didn't meet the deforestation reduction target set at 3.900 cube km for 2020, according to its National Climate Change Policy (NCCP).[136] Provided that, not only the country's pledge to achieve zero deforestation by 2030 seems to postpone the "urgency" of fighting global deforestation, but it also lags behind the previous targets set by the NCCP for 2020. Art. 11 addresses the "responsible management of supply chain through responsible business conduct".

[133]EUBIA, *Interview*
[134] EC, "Trade part of the EU-Mercosur Association Agreement"
[135]"Is the EU-MERCOSUR trade agreement deforestation-proof?", Amazon Institute of People and the Environment - Imazon (Belém, 2020)
[136] Angelo and Rittl, "Is Brazil on the way to meet its climate targets?"

The sustainable management of the entire value chain is paramount to ensure bioenergy lifecycle sustainability. However, no guideline is given about the implementation of concrete actions to effectively enable a responsible management. Overall, the TSD chapter is based on broad guidelines lacking a legally binding framework to deal with non-compliance behaviours.

The generic terms of the TDS chapter leave large room for distortions and can be easily dodged in view of the absence of enforcement tools. The Brazilian Minister Ricardo Salles has been recently accused of smuggling exports of lumber from the Amazon region to the US and the EU.[137] Paradoxically, not only does Salles covers the position of Environment Minister of Brazil, but he was also the head of the US-Brazil talk over funding to safeguard the Amazon rainforest. The systemic corruption of Brazilian institutions represents a real threat to the implementation of fair and sustainable trade. Loopholes have also left room for companies conducting illicit activities. JBS, a Brazilian giant which is the world's largest processor of meat, has been repeatedly reported for exporting contaminated meat and being involved in illegal trade.[138] Not only had the company put European consumers at risk by bypassing EU food safety standards[139], but it is also contributing to global deforestation. In 2017 the company was sanctioned $7.7 million for sourcing cattle from illegally deforested areas in the Amazon State of Pará. However, its illegal network of indirect suppliers didn't end with the signature of the FTA. In 2020, the company was reported again for buying cattle from a protected reserve in Mato Grosso State. As long as the aforementioned trade distortions fail to be addressed, the EU-MERCOSUR agreement is likely to turn into an empty shell.

3.4 Focus on major stakeholders' interests: new room for cooperation?

Could win-win cooperation overcome existing deadlocks in the expansion of the local bioenergy supply, mitigating the environmental side effects of bioenergy expansion? Authors claim that:

[137]Lisandra Paraguassu *et. al*, "Brazil environment minister targeted in wood-smuggling probe", Reuters, May 19, 2021
[138] Elena Pavlovska,"Foreign company engaged in illicit activities intends to move to the EU", New Europe, December 4, 2020
[139] Andrew Wasley *et al.*,"Brazil sent one million salmonella-infected chickens to UK in two years", The Guardian, July 3, 2019

[…] biofuel production advances furthest when relevant industry sectors align with each other.[140]

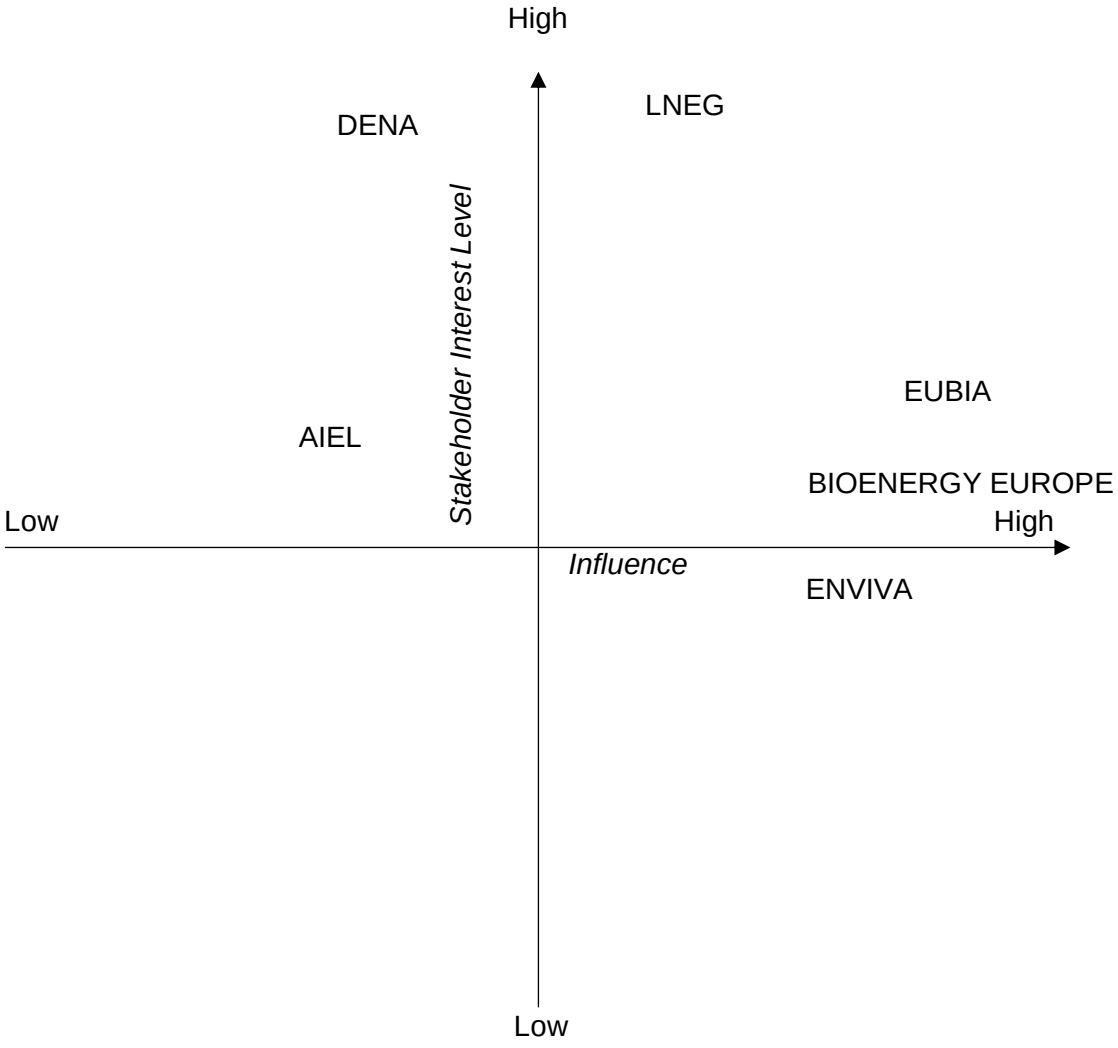
This section sheds light on the experts' perspectives on cooperation opportunities in the bioenergy sector, summarised in *Annex H*. A stakeholder mapping emphasises the level of influence and interest of each stakeholder. It is argued to what extent different stakeholders' interests overlap, leaving room for shared knowledge and best practices.

The experts interviewed come from different environments, advocating both mutual and diverging interests and showing different willingness of cooperation with new partners. **Figure 16** depicts the position of different stakeholders in the bioenergy sector, collocating them according to their level of interest in creating partnership and their relative influence on the policy-making sphere. The vertical axis represents the level of stakeholders' interest. The horizontal axis represents the range of stakeholders influence in decision-making. The map reveals that strong interests don't necessarily entail large levels of influence in the bioenergy field. Despite being largely committed to international cooperation, DENA's sphere of influence is limited to the practices of national companies exporting their knowledge abroad. AIEL's trade is subject, and often hampered, by EU policies. EU policy makers, in fact, are sometimes blamed for underestimating national specificities when making regulations.[141] Not only is AIEL's will to cooperate limited to organisation with their same environmental vision, but it is further constrained by national regulations, sometimes clashing with supranational ones. LNEG is highly committed to open up new opportunities of cooperation with other bioenergy stakeholders, sharing expertise with actors standing at different segments of the supply chain. However, as in the case of AIEL, its sphere of competence is limited, and sometimes hindered, by national specificities. Multinational companies as ENVIVA own a large influence in their operational fields and are likely to be more effective than EU institutions in enforcing immediate measures and standards of compliance. EU directives, in fact, usually undertake sluggish procedures of transposition before being addressed by MS' national law. However, as in the case of AIEL, ENVIVA's level of cooperation is either limited to organisation with their same environmental vision or willing to change their carbon-based strategy. Both EUBIA and Bioenergy Europe are supranational organisation with a high influence over their

[140] German *et al*., "Sine Qua Nons of sustainable biofuels", 810-11
[141] AIEL, *Interview*

members, namely national representatives of the biomass and bioenergy industry. However, they tend to cooperate with actors having a pro-European vision of the energy transition, namely those underpinning a strong environmental advocacy.

Figure 16: Stakeholders map in the bioenergy sector



Throughout this chapter, it has been argued that the TSD clause "as it stands" might fail in addressing the existing stumbling blocks embedded in the EU bioenergy expansion, turning the EU-MERCOSUR agreement into an empty shell. First, it is paramount to define clear

commitments and means of enforcement within international bioenergy trade. The TSD chapter should be strengthen with the provision of a fund to underpin sustainable land use, focusing on the regions with highest risks of both direct and indirect deforestation caused by ILUC. The inclusion of local communities in the supply chain should be further enhanced with verification mechanism to ensure prior consultation and land rights. Indigenous territories should be officially delimitated in order to discourage land rights violations.[142] The existing conflicts could be offset by increasing the transparency of international trade flows data and harmonising policies at EU level. Besides, leveraging on the opportunities of cooperation offered by multi-level expertise and dialogue might contribute to unlock the unexplored potential of biomass.

[142]"Is the EU-MERCOSUR trade agreement deforestation-proof?", Imazon

Conclusion

Current research on bioenergy in international trade agreements does not solve the contradictions stemming from bioenergy expansion. Although the EU has already developed a high expertise in bioenergy, its future expansion is hampered by several stumbling blocks, encompassing a widespread lack of acceptance and legislative frameworks to source bioenergy from different biomass feedstocks. The dimension of conflict in the EU bioenergy sector is paramount to international trade. It is argued that national interest groups' power often transcends national borders, swaying supranational decision. This could lead to the disruption of trade equilibrium, threatening the conclusion of international negotiations, as in the case of the EU-MERCOSUR agreement. Moreover, the negative stigma attached to bioenergy, especially biofuels, is linked to the path dependency of policies that repeatedly failed in addressing the environmental side effects of is domestic expansion, namely land change use and deforestation. Furthermore, even though the EU is the only world superpower to have created a system of *meta-standards* to gain access to its domestic market, its policies lack enforcement sanctions to non-compliant imported biofuels, leaving room for loopholes. For this, a just international bioenergy trade is needed to ensure sustainable local development and safeguard the environment.

Stakeholder interviews revealed a scarce knowledge of the EU-MERCOSUR agreement and tend to believe that bioenergy's relevancy to the agreement is limited. The system of tariff and quotas in place is regulating a limited market where around only 4% of bioenergy is imported to the EU.[143] The truth is that this agreement will make a difference for bioenergy only if the debated FTA is ratified. In that case, EU farmers are likely to be affected by unfair trade practices unless the existing policies are revised to address sustainability criteria for imported bioenergy. Besides, the removal of green protectionist barriers to trade is expected to cause negative externalities, leading to increasing deforestation and reliance on detrimental agricultural models of production. The TSD chapter of the agreement emphasises the need of trading goods in the respect of the environment. However, without adequate enforcement tools and mechanisms to avert the lift of trade barriers, this condition remains a mere recommendation. This is why many signatory parties are so reluctant in ratifying a FTA.

[143] Bioenergy Europe, *Interview*

The research question lingers over the potential of innovative bioenergy policies in overcoming the existing barriers. Beyond the RE targets already in place, a mobilising policy is needed to foster the development of advanced biofuels, reducing their Green Premium, namely the additional cost of choosing clean technologies over those that emits greater amounts of GHG, to unlock their attractiveness on the market. [144] Besides, strengthening cooperation between multi-level stakeholders coming from different institutional spheres (industry, politics, academia) might further contribute to exploit the untapped potential of bioenergy, especially biomass from agriculture and forests. However, reverting the negative connotation of bioenergy's carbon debt is paramount to appease existing conflicts. Bioenergy Carbon Capture (BECCS) is expected to solve this gap. Contrarily to technologies already available, BECCS can achieve negative emissions, which is the permanent removal of GHG emissions from the atmosphere, going beyond a temporary carbon sequestration. Negative emissions will be of paramount importance to achieve national net-zero targets, in view of hurdles derived from different sectors. They will help tackling the elevated abatement costs of sectors such as agriculture, or the unfeasibility of others, such as aviation. Future research should also consider innovation in biochar technologies, namely charcoal stemming from the decomposition of biomass under pyrolysis, which serves both as agricultural fertiliser and Carbon Capture and Storage. Besides, projects that couple CO2 emissions reduction with the mitigation of livestock waste should be further explored through the development of biogas projects. Lastly, authors claim that further research in circularity could offset trade dependency and ensure the security of EU domestic supply. This could be achieved by deploying recycled raw material from the energy intensive industry.[145]

However, enabling technologies must be coupled with clear commitments in the regulation of bioenergy international trade under the EU-MERCOSUR agreement. The EU holds two weapons of negotiation: the access to its internal market and a strong environmental ambition.[146] The EU should reverse the logic of its long-lasting trade negotiations, levering on its internal market to obtain an increase of common efforts in view of the climate urgency, instead of the fragile *status quo* that currently permeates the two blocs. Only in this case the agreement won't be regarded as

[144] Gates, How to avoid a climate Disaster
[145] Tomas Wyns and Gauri Khandekar, "Industrial Climate Neutrality in the EU: Outline of an Integrated Industrial Green Deal", Intereconomics, Vol. 54, no. 6 (2019)
[146]Voituriez, "Accord UE-Mercosur"

an empty shell, meeting all EU ambitions, including leading the world in the fight against global warming and environmental erosion.

Lastly, future research should explore the comparative studies of other EU trade agreements impact on other bioenergy trade routes.

Annex A - Different types of bilateral trade agreements (inspired by Querci, 2017)

FCA	FTA (in-principle agreement)	IAA
in force since 1999	**signed in 2019, but yet to be ratified**	**ultimate goal of negotiations**
It strengthens existing trade relations between the parties and lays the foundations for an Interregional Association between the EU and the Southern Common Market (MERCOSUR)	Both parties agree to trade freely with one another without imposing tariffs on established goods. Based on three main pillars: > parties' commitment to achieve mutual interests (through enhanced cooperation and political dialogue) > involvement of civil society > dispute settlement mechanism	It aims at setting up an all-embracing framework to conduct bilateral relations. It would cover full trade liberalisation and the support of the integration of Mercosur, enhancing dialogue and consultations between the parties > much wider scope than an FTA'S. In such a framework, it is possible that a "trade chapter" of an IAA transforms in an autonomous FTA

Annex B - SWOT of the EU-MERCOSUR TSD

STRENGTHS	WEAKNESSES
- parties commitment to achieve mutual interests/global sustainability concerns - involvement of civil society to monitor the TSD implementation - enhanced trade and investment opportunities - precautionary principle immediately enforced - partial market liberalisation	- uncertainty on the agreement ratification (diverging stances of signatory parties) - risk of loose implementation due to vague terms used - lack of synergy between the two parties/unbalanced relation of power - lack of performance indicators - inadequate funding
OPPORTUNITIES	**THREATS**
- boosting of green consciousness - unify best practices and best strategies for the environment - worldwide sustainable use of natural resources - “standardisation” of sustainable criteria	- unlikeliness to reach global consensus - ineffectiveness due to free-rider advantages of non-signatory parties - direct/indirect deforestation triggered by market liberalisation - unrealistic goals of international treaties (Paris Agreement)

Annex C- Overview on EU Bioenergy policies in the period 2003-2015

	Targets	Level of enforcement	Weaknesses	Driving factors
Fuel Quality Directive (Directive 2003/30/EC)	Recommended minimum blending percentage of biofuels in the transport sector (2% by 2005, 5.75% by 2010)	***Low***, non-mandatory national targets for biofuels.	It excludes air transport fuel consumption; no consideration for biofuel feedstock from carbon-rich or biodiverse land; no consideration for life cycle GHG emission savings of fuels supplied for road vehicles	Secure energy supply, foster regional growth

	Targets	Level of enforcement	Weaknesses	Driving factors
RED (Directive 2009/28/EC)	Mandatory target of 20% renewables in all energy used + sub-target of 10% renewable energy share in the transport sector by 2020. No biofuel feedstock from carbon-rich or biodiverse land, minimum threshold of 35% greenhouse gas (GHG) savings compared to fossil fuel (raised to 60% in 2017)	***Medium***, it requires National Renewable Energy Action Plans by June 2010	Include incentives for ground transportation but ***not for aviation;*** no consideration for life cycle GHG emission savings of fuels supplied for road vehicles; voluntary nature of certificate schemes; blurred definition of "marginal" land; outsource of the production to the Global South; violation of WTO law (GATT, Articles I, III and XI)	Mitigate carbon lock-in in the transport sector, reduce GHG emissions and foster regional growth

	Targets	Level of enforcement	Weaknesses	Driving factors
Revised Fuel Quality Directive (Directive 2009/30/EC)	- 6% reduction in the GHG intensity of fuels traded in the EU by 2020 (2% indicative reduction by 2014 and 4% by 2017); - 2% reduction in the GHG intensity of fuels traded in the EU by 2020 from developments in new technologies, such as Carbon Capture and Storage (CCS); - 2% reduction in the GHG intensity of fuels traded in the EU by 2020 from the purchase of Clean Development Mechanism (CDM) credits under the Kyoto Protocol.	***Medium-high***: it requires a 2010 reference value for life cycle GHG emissions per unit of energy from fossil fuels to enable the calculation of GHG savings from biofuels and alternative fuels. From 2011 fuel suppliers must report annually to Member States on the life cycle GHG emissions per unit of fuel supplied.	Responsibility for reducing life cycle GHG emissions of fuels traded is placed on fuel suppliers ("meta-standards"); little consideration of leakage effects; inclusion of 'high ILUC risk' biofuels.	Reduce the fuels' life cycle GHG emissions through the establishment of environmental requirements for gasoline and diesel fuel

	Targets	Level of enforcement	Weaknesses	Driving factors
ILUC (Directive EU 2015/1513)	Cap of 7% on the contribution of biofuels produced from 'food' crops, greater emphasis on the production of advanced biofuels from waste feedstocks, certification of low-ILUC risk biofuels	***High***, Member States must transpose the legislation into national law by 2017.	Lack of integrated land use planning at regional and national levels, including effective territorial policies aimed at preventing unsustainable land use conversions in all sectors.	Tackle indirect land-use change emissions

Annex D - Overview on EU Bioenergy policies in the period 2018-2020

	Targets	Level of enforcement	Weaknesses	Driving factors
Farm-to-Fork (2020)	- Reduce the use and risk of chemical and more hazardous pesticides by 50%; - Excess of nutrients: reduce nutrient losses by at least 50% while ensuring there is no loss in soil fertility + reduce fertiliser use by at least 20%; - Reduce the sale of antimicrobials for farmed animals and in aquaculture by 50%; - 25 % of total farmland being used for organic farming by 2030 (crop diversity); - Waste: reduce food waste at a retail and consumer level by 50%.	***Medium***: Legislative framework for sustainable food systems to be enacted by 2023	Unresolved ambiguity of what is meant by 'food sustainability' or 'sustainable food system' Limited coordination with the EU MS New generation of GMOs presented to "improve sustainability" after heavy lobbying. No specific action and/or timeline is given for enhancing seed diversity More actions needed on food labelling.	Addressing food sustainability in a comprehensive manner, from primary production to the consumer, to create an integrated and effective sustainable food system.

	Targets	Level of enforcement	Weaknesses	Driving factors
RED II, Directive (EU) 2018/2001	Overall target of 32% for renewable energy in the energy mix, transport target of 14%, gradual phase out of crop-based biofuels from 7% in 2020 to 3.8% in 2030 Introduction of sustainability criteria for solid biomass; Prohibition of growing biofuel feedstocks in areas that already contain a high carbon stocks (wetlands or forests) or have high biodiversity; Advanced biofuels (from specific feedstocks) and other low-carbon alternatives to replace conventional biofuels in aviation, shipping, and road transport sector.	***High***: Transposition of RED II by Member States is due by June 31st, 2021.	Inclusion of unsustainable feedstocks in the list Ambiguousness of Annex IX's transparent criteria Blurred/uneven classification of raw materials depending on MS Lack of sustainability requirement for forest biomass (no requirements about maximum extraction rate) Agricultural residues: criteria do not ensure that extraction rates are kept at sustainable levels	Enhancing the use of renewable energy in all sectors: electricity, heating and cooling, and transport.

Annex E - Position of selected MS (13)

	OVERALL POSITION	PROS	WHO SAYS YES	CONS	WHO SAYS NO
France	**against**			unfair competition, imported deforestation (Brazil *de facto* non-compliance with Paris agreement), threat to Paris Agreement's climate targets	French farmers, agricultural unions, civil society, centre-right party, conservative party
Ireland	**against**			undermined agricultural interests, more exposure to sectorial competition	Irish farmers, interest groups, beef industry, Green party, conservative-liberal party
Germany	**unclear**	enhancement of foreign investments and trade	Christian-democrat party	Amazon's deforestation	German farmers, Greens, powerful NGOs, interest groups, agribusinesses
The Netherlands	**unclear**	enhancement of foreign investments	Industry interest groups	unfair competition, enhanced animal exploitation, environmental degradation, threat to Paris Agreement's climate targets	Dutch farmers, NGOs, diary lobbies, conservative-liberal party, animal welfare party
Austria	**unclear**	significant opportunities for the export-oriented Austrian economy	Austrian industry, Christian-democratic party	exposure of beef sector, little enforcement of production and food standards, negative impact on consumers, Amazon's deforestation	Austrian farmers, interest groups, Greens, Austrian's People Party

	OVERALL POSITION	PROS	WHO SAYS YES	CONS	WHO SAYS NO
Belgium	**unclear**	strong imports' reliance from Mercosur countries, concerns about pork exports (embargo from China)	Flemish government	threat to climate, consumer health and safety, existence of small-scale and sustainable agriculture	Wallonia region and local beef farmers
Sweden	**unclear**	globalisation, enhanced trade and foreign investments	Swedish industry interest groups	environmental degradation, imported food undermines local production	Swedish government
Luxembourg	**unclear**	enhanced trade and foreign investments	Luxembourg government (majority)	Brazil *de facto* non-compliance with Paris agreement	Pig and beef farmers, diary industry, opposition parties (CSV, Piraten, Déi Lénk and ADR)
Poland	**unclear**	enhancement of foreign investments and trade	Polish government (majority), Polish industry	unfair competition, especially for meat producers	farmers who work in dairy and poultry
Romania	**unclear**	enhancement of foreign investments and trade	Romanian industry	deficit from agri-food trade	Romanian farmers

	OVERALL POSITION	PROS	WHO SAYS YES	CONS	WHO SAYS NO
Spain	**pros**	important tool to compete with Chinese companies	Coalition forged by PSOE and left-wing Unidas Podemos, autonomous regions and the local agri-food sector	Concerns about food safety standards and trade fair conditions	Spanish agricultural organisations and agri-food cooperatives
Portugal	**pros**	multilateralism commitment, internationalisation of national products	Portuguese government, Confederation of Portuguese Farmers (CAP)		
Bulgaria	**pros**	enhancement of foreign investments and trade	Bulgarian government	threat to honey sector	Beekeepers

Annex F - Stumbling blocks to biomass expansion

Agricultural biomass	Woody biomass	Biomass investments (focus on Latin America)
Lack of incentives; large distance transport; handling and disposal is often a burden for farmers and communities; lack of awareness about advanced farming techniques; perennial dedicated energy crops: high capital costs for the establishment of the plantations; lack of information and mobilisation	Difficulty in decarbonising former power plants; sea transport; certificates looking at quality but not at sustainability; adverse climate events; adverse public opinion; side effects of non-intervention in forestry areas; lack of incentives for forestry areas smallholders; economies of scale but low economic value; illegal logging; exclusion of local communities	Long payback periods; uncertainty of investments in unstable countries; complexity of logistics; overlapping institutions; lack of transparency; many administrative steps comparing to other RE; thorny renewable energy source

Annex G - Conflicts between major stakeholders in the bioenergy field

Stakeholders	Category	Type of bioenergy	Conflict
BIOENERGY EUROPE	EU trade association of biomass associations and bioenergy companies	Agriculture biomass, woody biomass	> NGOs
National Laboratory of Energy and Geology (LNEG)	Portuguese national R&D institution	Biofuels, solid biomass	> Fossil fuel industry lobby
ENVIVA	Bioenergy company, world's largest producer of sustainable wood pellets	Woody biomass	> paper industry > populistic parties
AIEL	Italian Agroforestry Energy Association	Woody biomass	> stakeholders with a different environmentalists approach (NGOs, bottom-up movements) > policy-makers
EUBIA	European Biomass Industry Association	Agriculture biomass, woody biomass, biofuels	> stakeholders who don't understand the contribution stemming from bioenergy (ILUC risks)
DENA	German Energy Agency	Agriculture biomass	Large-scale projects involving multi-level actors

Annex H - Interest and room for cooperation between major stakeholders in the bioenergy field

Stakeholders	Interests	Cooperation
BIOENERGY EUROPE	Introduce price signal; stop subsidies for fossil fuels; phase-out non-natural gas (waste); higher integration of biomass for heating and cooling; REDII: review of sustainability criteria; sustainable management of biomass life-cycle emissions	> other bioenergy actors (biogas) > academia > EU policy makers
National Laboratory of Energy and Geology (LNEG)	Unleash biomass potential through new technologies (storage); co-generation; boost advanced biofuels production (2025-2030); sharing knowledge and best practices with car manufactures, transport industries; sustainable management of biomass life-cycle emissions; stop subsidies for fossil fuels	> economic operators for biofuels production, heat and electricity from biomass, as well as biofuels importers; > entrepreneurial associations (example biofuels exporters, petro-chemical enterprises etc.)
ENVIVA	Open up new market possibilities; demonstrate sustainability of supply chain; harmonise wood pellet trade across MS through certification schemes; decarbonise power plants via BECCS; decarbonise electricity use; increase public acceptance; enhance policies regulating sea transport	> Former producer of coals (power plants, steel plants, cements etc.) people who are interest in climate change and want to decarbonise their assets. > Forest industry > Saw-milling industry > Forest-owners > Politicians and civil society that are interested in cost effective and sustainable climate mitigation that ensure power and heat 24/7
AIEL	Acceptance of non-100% carbon neutral production stages; fight illegal logging; increasing public acceptance; RED II: harmonise woody biomass definitions across MS; sustainability criteria: shift to suppliers	> EU trade associations (Bioenergy EU) > LegAmbiente, environmental association > Kyoto Club, non-profit association promoting energy efficiency > Academia
EUBIA	Unleash biomass potential through new technologies (storage); co-generation; incentives for advanced biofuels	> University dealing with R&D projects > companies which develop co-generation plants

DENA	Decarbonise supply chains in bioenergy projects; internalisation of negative externalities	> Biogas registry

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