



universität
wien

MASTERARBEIT / MASTER'S THESIS

Titel der Masterarbeit / Title of the Master's Thesis

**“Politics of Biofuel in the EU and Mechanisms of
Global Energy Governance”**

verfasst von / submitted by
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angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of
Master of Arts (MA)

Wien, 2017 / Vienna, 2017

Studienkennzahl lt. Studienblatt /
degree programme code as it appears on
the student record sheet:

A 066 824

Studienrichtung lt. Studienblatt /
degree programme as it appears on
the student record sheet:

Masterstudium Politikwissenschaft UG2002

Betreut von / Supervisor:

Univ.-Doz. Dr. Thomas Nowotny

DANKSAGUNG

Ich bedanke mich bei allen, die mich bei der Abfassung dieser Arbeit unterstützt haben. Mein besonderer Dank gilt dabei meinem Betreuer Doz. Dr. Thomas Nowotny, meiner Gattin Adele sowie meinen Eltern, meiner Schwester Barbara und meinem Kollegen Herwig Meyer. Außerdem danke ich meinen InterviewpartnerInnen, die mir ihre wertvolle Zeit und Erfahrung zur Verfügung gestellt haben

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List of Acronyms

EC	European Commission
ECA	European Court of Auditors
ECJ	European Court of Justice
EIA	US Energy Information Administration
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FQD	Fuel Quality Directive
G7	Group of 7
GATT	General Agreement on Tariffs and Trade
GBEP	Global Bioenergy Partnership
GEG	Global energy governance
GHG	Greenhouse gas
IAEA	International Atomic Energy Agency
IBF	International Biofuels Forum
IEA	International Energy Agency
IGO	Intergovernmental Organisation
IIASA	International Institute for Applied Systems Analysis
ILUC	Indirect land-use change
IRENA	International Renewable Energy Agency
LUC	Land-use change
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
RED	Renewable Energy Directive
UNO	United Nations Organization
USA	United States of America
WTO	World Trade Organization

1 Introduction

This thesis sets out to explore the relation between the politics of biofuel in the European Union (EU) and mechanisms of global energy governance (GEG). The nature of global governance has been evolving constantly over the last decades. This is equally true for the governance of global energy issues. Still, there seems to be little literature dealing with the global dimension of energy governance (Florini and Sovacool, 2009). Furthermore, a lack of literature on the genesis of institutions of global governance has been observed. This has led to a lack of understanding about the ways institutions of global governance have developed over the last decades and about the “institutional mechanisms and political forces” that have been involved in this process (Simonis, 2005, p. 321, my translation).

Energy is closely related to the topics of environmental protection and anthropogenic climate change as well as to economic growth and development. Because of its fundamental nature for human society, the many issue areas and actors connected to it as well as the major challenges arising from it, energy is described in the literature as a “Mega-Issue” (Lesage, Graaf and Westphal, 2010).

The ways of finding agreements and solutions within the international community to complex global energy issues like energy poverty, climate change mitigation and the shift to renewable sources of energy have been changing during the last decades. National governments are increasingly confronted with a situation in which they are incapable of dealing with policy issues on their own and non-governmental actors increasingly take part in the policy process. This situation gives rise to several questions. How does the governance of renewable energy technologies take place in such an environment of a changing policy landscape? Where does the global community stand politically in the process of treating global energy challenges such as satisfying ever growing global energy demand, replacing fossil energy sources with renewable ones and enhancing the environmental sustainability of energy production and consumption? How well equipped are the current institutions and actors to treat these challenges appropriately?

While it won't be possible to provide answers to all these questions in this thesis, the case of biofuels in the EU has been chosen as an exemplary case to analyse the ways in which developments in the mechanisms of GEG take place in the context of the transition from fossil fuels to sources of renewable energy.

Liquid biofuels have been established as an alternative energy carrier in the transport sector. Kay and Ackrill pointed out that biofuels are an early example of the challenge to “decouple emissions growth from energy consumption in the economy” and furthermore represent an exemplary case to study the mechanisms of policies used in the process to achieve a successful transition to a low-carbon economy since “production technologies are well understood, the existing transport energy infrastructure can be used, major domestic agricultural producers will benefit, and only limited lifestyle changes currently are needed from consumers” (Kay and Ackrill, 2012, pp. 295–296). The authors conclude that “[i]f, given these advantages, biofuels policy is vulnerable politically, then policy instruments directed at sectors with more challenging low carbon transition paths are likely to struggle to achieve their objectives” (Kay and Ackrill, 2012, p. 296).

Transport is vital for the globalised economy. Due to its strong reliance on fossil fuels, the transport sector is one of the central sectors for global energy policy as well as for climate policy. According to the International Energy Agency (IEA), transport accounts for more than a quarter of global energy consumption. Furthermore, the IEA points out that “energy demand by transport has been rising for about 2% per year since 2000” (IEA, 2015, p. 40). Additionally, the IEA found that 93% of final energy consumption in transport in 2012 came from fossil fuels, while biofuels delivered 2% of the share in transport energy in 2012, which constituted “a sixfold increase since 2000” (IEA, 2015, p. 40). The IEA recommends that, while the overall energy demand in this sector should be stabilised or reduced, CO₂ emissions from transport should definitely be reduced as a means to mitigate climate change.

Figure 1 shows that the IEA proposes, among other measures, a further increase in the use of biofuels by 2025. This is meant to contribute to the use of renewable energy in transport and thereby to the global reduction of CO₂ emissions. According to these projections from the IEA, biofuels should account for a larger share in the global transport energy mix than

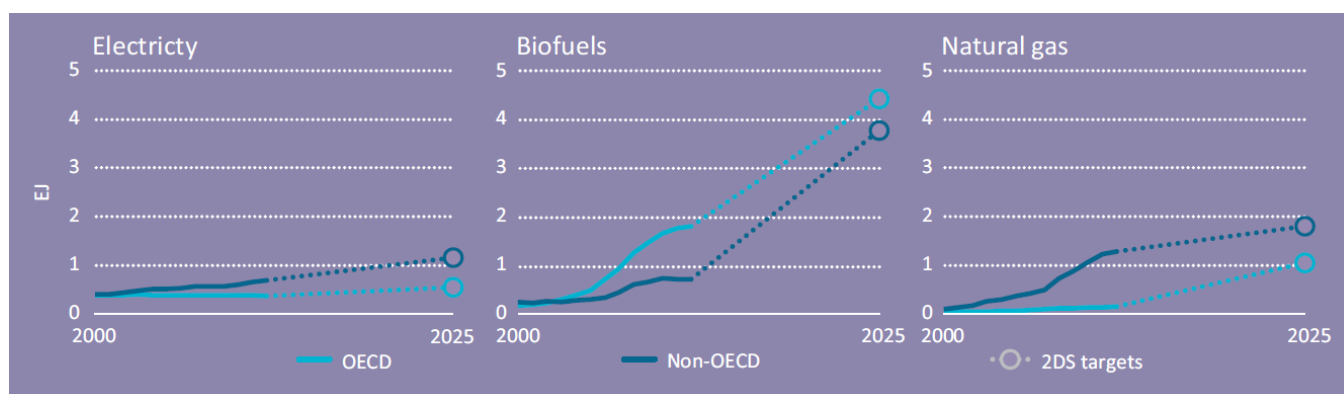


Figure 1: Alternative transport fuels in exajoule (EJ), OECD and Non-OECD 2000-2025

Source: IEA 2015, p. 41

electricity and natural gas combined by 2025 in order to reach the “2°C Scenario” (2DS) targets, which are indicated by the circles at the end of the lines. The IEA’s 2DS scenario assumes that the rise in global temperatures should be limited to 2°C to mitigate global climate change and that this can be achieved by significantly reducing overall greenhouse gas (GHG) emissions from human activities, most importantly from fossil fuel consumption but also concerning other sources of GHG emissions.

The governance of global energy issues in the 21st century faces an “energy dilemma” because of the simultaneous challenges posed by the needs to ensure a stable supply of affordable energy, i.e. energy security, and to reduce emissions of GHG, i.e. climate change mitigation (Bradshaw, 2010). This dilemma manifests itself in many ways, as Michael Bradshaw points out: “while there may be a single global energy dilemma, it is played out in very different ways across the states that make up the global political economy” (Bradshaw, 2010, p. 275). Especially the “developed market economies of the Organisation of Economic Cooperation and Development (OECD)” are dependent on affordable and relatively cheap fuels, since “its component economies and supporting infrastructure, particularly transport” are made possible exactly by this affordable kind of energy (Bradshaw, 2010, p. 276).

This connection becomes apparent in Figure 2. As the statistics of the US Energy Information Administration (EIA) show, the consumption of liquid fuels is closely linked to the oil price but the relation to the GDP is even stronger. The developments in the global GDP are related to developments in the price of crude oil. Modern western societies are shaped by a high GDP per capita, which evolved together with the industrial revolution, based on the technologies established around the use of fossil fuels. During the last decades, developing countries and emerging markets like India and China have been catching up both in energy use and GDP (Nowotny, 2011, p. 100). Therefore, volatility of the oil price causes uncertainty about the future global availability of affordable energy. This kind of uncertainty poses great challenges to governance and is sought to be minimised through several measures, for example through a system of oil reserves managed by the IEA. In addition, projections about developments in the energy markets are important as well as notoriously uncertain since there are many unforeseeable events influencing the global energy markets.

In general, rising crude oil prices lead to a decrease in the consumption of liquid fuels. However, there are differences between types of countries. For example, the OECD countries usually have higher “vehicle ownership per capita” and therefore it is much more likely that in

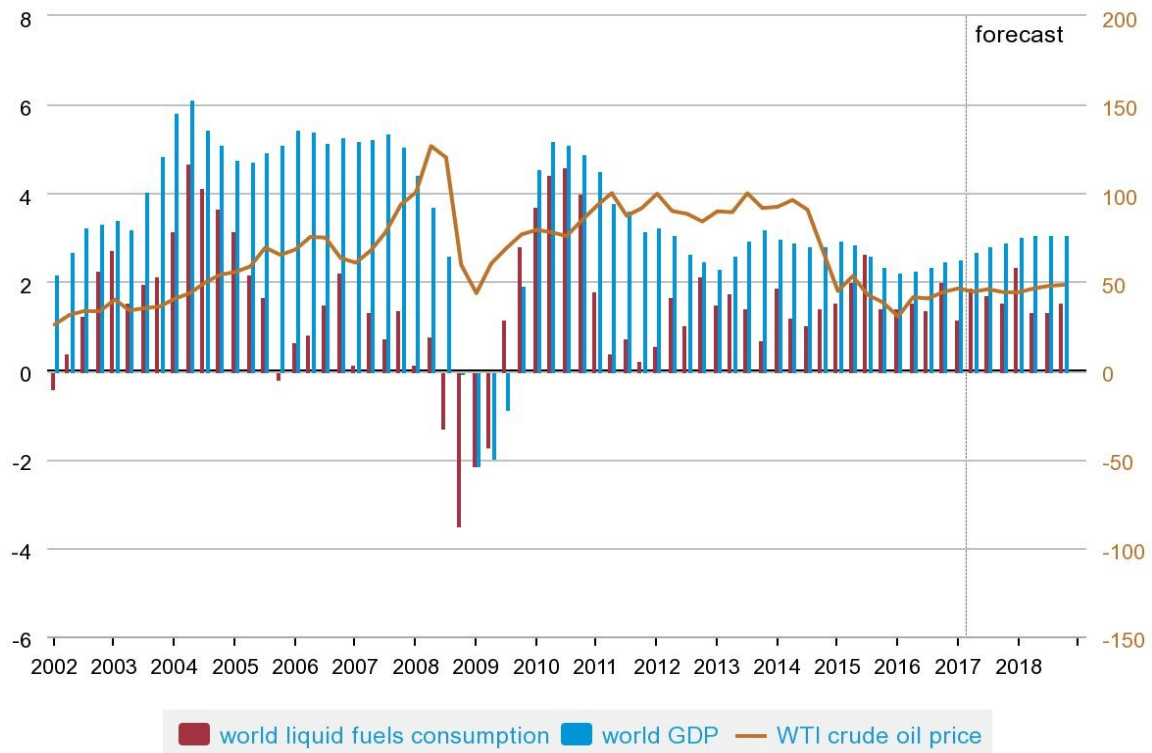


Figure 2: Oil Price in US Dollar, changes in liquid fuel consumption and GDP 2002-2019

Source: EIA Short Term Energy Outlook, Thomson Reuters, accessed June 2017, available at www.eia.gov/finance/markets/crudeoil/demand-oecd.php

these countries policies targeting the transport sector will have a larger impact on the overall consumption of oil (EIA, 2017). Furthermore, oil consumption per capita is higher in OECD countries than in Non-OECD countries while the growth in oil consumption is much larger in Non-OECD countries. Additionally, the link between economic growth and oil consumption is much more distinct in Non-OECD countries (EIA, 2017). The economic development of those countries is dependent on more and more oil. Among other factors, the growing demand for transport services in Non-OECD countries leads to this higher demand for oil (Bradshaw, 2010, p. 279). At the same time, the need to decarbonise the transport energy sector stems from the fact that it is highly dependent on fossil fuels and consumption of fossil energy causes anthropogenic climate change through GHG emissions (Bradshaw, 2010, p. 278).

The different implications of this energy dilemma for different countries with diverging interests and perspectives on the issues at stake make for a difficult but nonetheless important starting point for the governance of global energy issues. In this context, this thesis aims to analyse the implications of the exemplary case of biofuels in the EU for the mechanisms that are at work in GEG and specifically in the governance of emerging technologies and forms of

renewable energy like biofuels. The question of interest is how the governance of such technologies takes place and how it can effectively contribute to sustainable answers to the challenges evoked by the global energy dilemma.

The following sections will elaborate the different methods, concepts and theories that are used in this thesis. They build the basis for the formulation of the research question in chapter 5. Subsequently, the original research is conducted in form of a hermeneutic document analysis, expert interviews and a literature review. First, however, it is necessary to get an idea of what definitions of the term “biofuel” exist and to clarify what constitutes the topic of interest.

1.1 Biofuels

The term “biofuel” may refer to very different forms of energy carriers, according to the context in which it is used, ranging from solid wood to liquid and gaseous fuels with biological origin. In its general meaning, the term refers to any form of fuel derived from biologically grown products or their residues, including for example firewood.

More specifically however, the term has been linked to the large transport biofuel programmes in Brazil, the United States of America (USA) and the EU. In this context, and in the course of this thesis, the term biofuel refers to any form of fuel derived from biologically grown products which is used as a substitute for conventional fuels in transportation. These fuels are commonly produced in liquid form but there is also a relatively small amount of gaseous fuels of biological origin used in transport.

The two main kinds of liquid biofuels for transport are bioethanol which is used as a substitute for gasoline and biodiesel which is used as a substitute for conventional diesel. Additionally, there are other kinds of modern technologies referred to as “modern biofuels” or “advanced biofuels”. Some of these fuels are already applied in relatively small amounts, for example by using waste of biological origin, animal fat or used cooking oil as a source of energy. One example of application is biogas derived from agricultural residues which is already used by some local bus fleets in Scandinavia as fuel for public transportation (Jørgensen, 2012). However, most of the other forms of advanced biofuels like biofuels from straw, wood or grass or biofuels produced from algae are so far limited to research projects and are not yet applied on an industrial scale, mostly due to the reason of the relatively high costs of their production.

1.2 Policy Aims and Challenges

The original aims behind the recent large-scale biofuel programmes in Brazil, the USA and the EU relying on the first generation of biofuel technologies may well differ in their focus but still share three fundamental aspects. The main policy aims are, first, to reduce the dependence on imported fossil fuels while, second, boosting the respective national agricultural industries and, third, reducing GHG emissions from transport. While the relative importance of these aims differs in the cases of the biofuel policies in the USA, the EU and Brazil, all of them are in some way present in all three cases. In the EU, the policy aim of GHG emissions reduction was central to the legitimisation of its biofuel policy.

Originally, the belief that biofuels were beneficial for the environment was based on the assumption that emissions from the combustion of any type of biofuel would be largely compensated for by the growth of the crops which the biofuel was derived from. Over the last years, the most fundamental shifts in perspective have occurred regarding the assessment of the environmental sustainability of biofuels. This is largely due to the increasing understanding and awareness for the negative effects of land-use change (LUC) and indirect land-use change (ILUC) on the GHG emissions balance of certain biofuels.

The concept of LUC was used by the Intergovernmental Panel on Climate Change (IPCC) in its “Special Report on Land Use, Land-Use Change and Forestry” from 2000 to grasp the effect that the changes in human activities on land, e.g. increased agricultural production, has on “the global carbon cycle” and on the “carbon flows between different pools and how carbon stocks change” (IPCC, 2000). While the transformation of land through LUC happens directly and can be assessed and calculated with relative certainty, the effects of ILUC are very hard to measure and their degree is still contested. In the case of ILUC, the impacts of the changes in land use are not limited to their direct effects but include the notion that the demand for land that has been replaced will not just disappear but will be transferred to some other place, influenced by economic forces that are transmitted via global land markets (Kay and Ackrill, 2012). Today, it is commonly assumed that ILUC can have severe impacts on the GHG balance of first-generation biofuels under certain circumstances. These impacts have been underestimated in original biofuel policies. Moreover, different crops, production methods and geographic locations are already known to have very different implications for the overall GHG emissions of biofuel products (Valin, Peters and van der Berg, 2015). In some calculations, it is assumed that specific production and consumption patterns of biofuels from the first

technological generation can even result in higher GHG emissions than the use of conventional fossil fuels (Bailey, 2013, p. 270).

Because of the influence the media reports on the sustainability problems of biofuels around 2008 had on the public awareness of the environmental impacts of biofuels, the EU's central policy aim of increased environmental sustainability through biofuels became increasingly questionable. As a reaction to this problem, the EU has aimed at including the estimated effects of ILUC into the calculations of GHG values¹ of biofuels in a directive specifically dedicated to this topic (European Union, 2015). These attempts have however been met with opposition from the established biofuels industry within the EU since such an ILUC factor would have had a negative impact on the competitiveness of their products.

1.3 Controversies

The most controversial public discussions in the EU on the topic of biofuels have started around 2008 because of perceived global sustainability problems resulting from the large-scale production of the first technological generation² of biofuels for transport.

In the case of biodiesel, which is the dominant kind of biofuel used in the EU, the most common sources are oil crops like rapeseed oil in the case of production within the EU or soy oil and palm oil in the case of production in countries with tropical climate. For bioethanol, mainly used in the USA and in Brazil, sugar and starch crops like sugarcane or corn are the dominant source materials for conventional biofuel production (IEA, 2014b, p. 44). The intensified large-scale production of these food products for biofuels was perceived as a contributing factor to an increased demand for agricultural land and subsequently to an increase in food prices around the world in 2008, which showed its most extreme effects in poor countries (Bailey, 2013). The intensity of the causal connection between increased biofuel production and the high increase in food prices in 2008 is still subject to debate since there have been other factors influencing the increase in food prices like droughts, low yields and rising oil prices (Bailey, 2013; To and Grafton, 2015). Even though the food prices have fallen since 2008, the argumentative connection between global biofuel production and food prices is still maintained by critics of biofuel policies.

¹ The calculated GHG values are used as a threshold that defines which biofuels are eligible to be included into the share of renewable energy in transport the member states must attain to reach the EU's mandatory targets.

² Conventional biofuels are commonly referred to as the first generation of biofuel technologies which use agro-industrial products from edible plants as raw materials for biofuel production.

As a reaction to these controversies, several “scientific and policy-oriented studies and research projects” have been developed to formulate indicators for the sustainability of biofuels (Mol, 2010, p. 74). These initiatives occurred in the form of cooperation between public and private institutions and they have been concerned with the establishment of standards and mechanisms that would be able to effectively regulate the sustainability of biofuels (Mol, 2010, p. 74f).

Although there are some alternative technologies available for producing biofuels without using edible plants, these technologies are not yet economically competitive and are still not applied on a large scale. Examples include biofuels from organic waste and agricultural residues. Other types of advanced biofuels aim to use different biologically grown products as sources for transport fuel replacement products which don’t compete with food crops. Such potential sources for second generation biofuels are mainly lignocellulosic materials like switchgrass or wood (IEA, 2014b, p. 44). Some advanced biofuels are already applied on a small scale. Biogas from waste and residues is for example used in Denmark and Sweden for local public transportation and in some countries, biofuels from used cooking oil are produced in small amounts but overall, advanced biofuels play only a minor role in transport energy use.

Even more advanced biofuel technologies are still in their experimental stage. Among different technological developments there are also efforts to produce biodiesel from algae. However, these very advanced technologies are not yet commercially competitive.

1.4 Major Biofuel Programmes

One of the first countries to introduce the major production of liquid biofuels for transport has been Brazil which started in 1975 to produce bioethanol on a large scale making use of its established sugarcane industry (Coelho and Goldemberg, 2013, p. 462). The initial motive was to produce biofuels for national consumption so that the regional producers of sugarcane could sell their products on a national market and at the same time reduce the Brazil’s dependence on oil imports. However, Brazil soon developed ambitions to produce bioethanol for export and to promote biofuel production in other countries through the means of technology transfer (Franco *et al.*, 2010, p. 680; Coelho and Goldemberg, 2013), giving its biofuel industry both the possibility to trade biofuels on an international market and to sell their technologies in a sector they are specialised in.

Although the biofuels production remained lower than that of Brazil until 2005 (see Figure 3 and Figure 4), the USA has at least an equally long history of experiments with bioethanol as Brazil, using corn as raw material. In the 1970s, the USA started to produce larger

amounts of biofuels with the specific aim to increase energy security by reducing its dependence on imports of fossil fuels (Lawrence, 2010, p. 18). In the 1980s, the USA intensified production of bioethanol from large-scale corn plantations to support the agricultural sector and further increase energy security. In the early 2000s, the government of the newly elected President George W. Bush introduced specific biofuel legislation so that a certain amount of ethanol had to be used in transport fuels with the aims to diversify energy supply, reduce dependence on oil and create employment opportunities (Lawrence, 2010, p. 23f).

The third economic region to introduce a major biofuel programme was the EU. After an initial phase of preparatory studies and “research and demonstration projects” in the 1980s (Ulmanen, Verbong and Raven, 2009, p. 1407), the European Commission started in the late 1990s to create a system of incentives for the production of biofuels, favouring biodiesel from rapeseed oil and other plant oil crops since the amount of diesel cars was relatively large in the EU. The EU used tax exemptions and mandatory blending targets as the main policy instruments for the promotion of biofuels in transport, indicating the aim of a certain percentage of renewable fuels to be used in the transport energy mix of each member state. At the time,

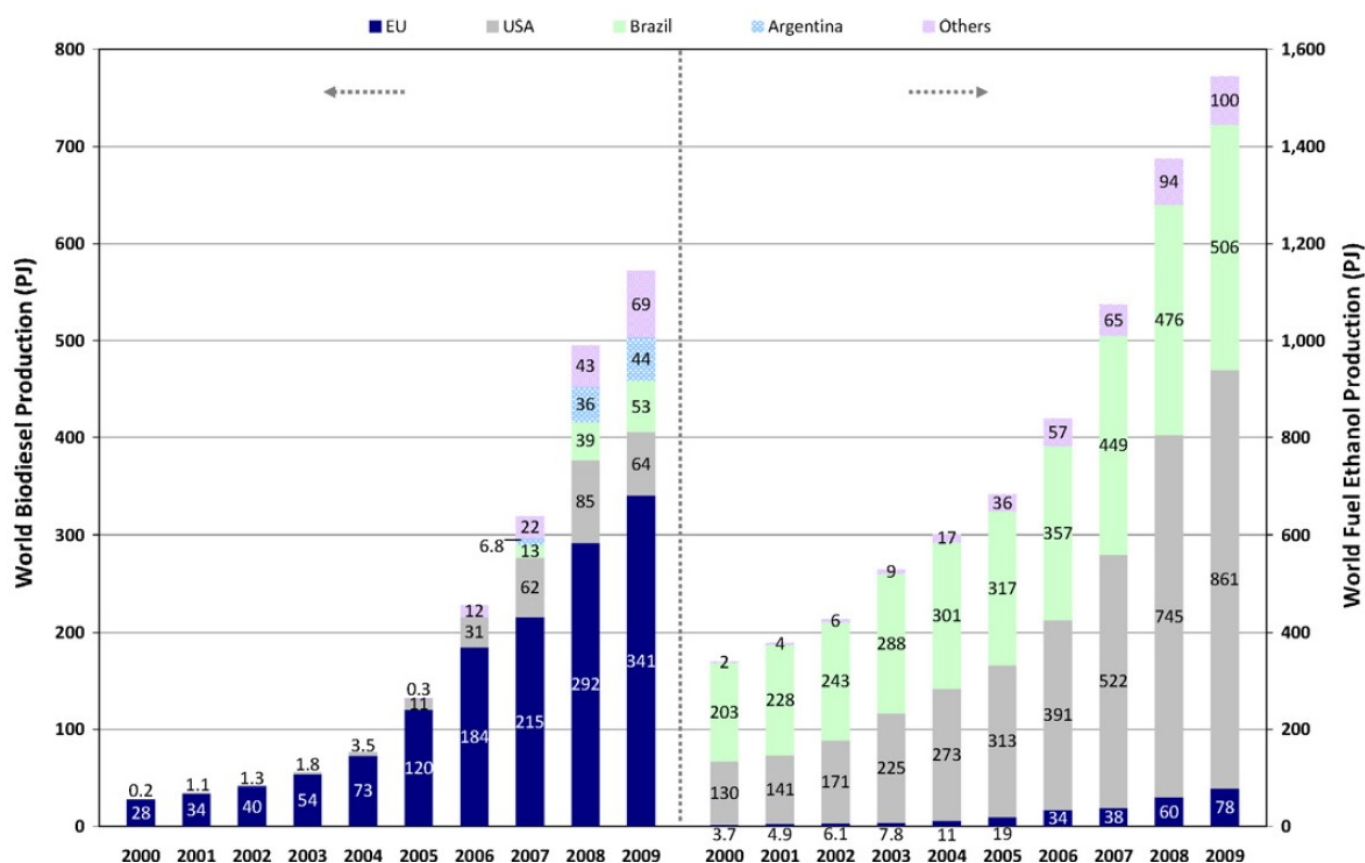


Figure 3: Production of biodiesel and bioethanol per country in petajoule (PJ) 2000-2009

Source: Lamers, P. *et al.*, 2011, p.2660

this was only possible to reach through the use of biofuels. The EU's target for renewable energy in transport is 10%. Lately, the applicable contribution of food based biofuels to this target has been limited to 7%, largely as a reaction to pressure from environmental groups that emerged because of sustainability problems with these technologies. The European Commission's proposal for a new directive on renewable energy initiated in 2016 includes the aim to gradually reduce the applicable share of those biofuels further to 3,8% by 2030 (European Commission, 2017).

1.5 The Global Dimension of the EU's Biofuel Policy

At its outset, the EU's biofuel policy has been designed to promote domestic agricultural production in combination with the aim to reduce GHG emissions from transportation and to increase energy security. At the same time the policy included the need to import biofuels and raw materials for the production of biofuels to reach the targeted blending quotas (Kay and Ackrill, 2012). Soon after the implementation of the EU's biofuel program, biofuel imports to the EU started to increase, primarily from countries like Brazil and the USA since these countries already had well developed biofuel industries. Other countries followed to expand their biofuel programmes for export to the EU. Argentina started to produce large quantities of biodiesel for export, mainly aiming at the European market (Lamers, McCormick and Hilbert, 2008). Additionally, countries like Mozambique, Indonesia, Malaysia and several other countries with tropical climate and cheap labour costs have started to produce biodiesel from oil-crops, mainly palm oil, for export to the EU (Lamers *et al.*, 2011). Figure 3 illustrates the development of the global liquid biofuel production per country from 2000 to 2009. In 2009, the total volume of annual bioethanol production was still more than twice the total amount of annual biodiesel production, but the increase in biodiesel production has been significantly larger and the producers are more heterogeneous. The USA and Brazil are the major producers of bioethanol, while the EU is the largest producer of biodiesel. The intensified global diversification of the production of biodiesel has taken shape from 2005 onwards.

In the public debate, first generation biofuels for transport have largely been criticised for their unintended negative environmental and social consequences in developing countries. These side effects have been identified by critics both on the local and on the global level. Production of transport biofuels in developing countries for export to the EU has been linked by critics to environmental problems. Those environmental problems, occurring mainly in biofuel producing countries, are meant to be addressed by the introduction of specific sustainability criteria for biofuels in the Renewable Energy Directive (RED) of 2009 (European

Union, 2009) which is about to be revised by the European Commission at the time this thesis is written. Only biofuels that meet the sustainability criteria of the RED are applicable in the calculation of the mandatory blending targets (see chapter 6.2.6).

On the one hand, the sustainability criteria may be regarded as a way of the EU to favour environmentally sound production in the exporting countries. On the other hand, this measure is interpreted by proponents of agro-biofuels from export oriented third countries as a protectionist measure which would stand in contrast to rules of the World Trade Organization (WTO). However, the EU's sustainability criteria have been designed "with WTO rules expressly in mind" (Kay and Ackrill, 2012, p. 302), making their persistence more likely. As an effect of these criteria and by increased agricultural production, the EU has nearly reached self-sufficiency of biofuels in 2014 and it has been argued that it "has effectively separated itself from the international market" with anti-dumping duties (Flach *et al.*, 2015, p. 2).

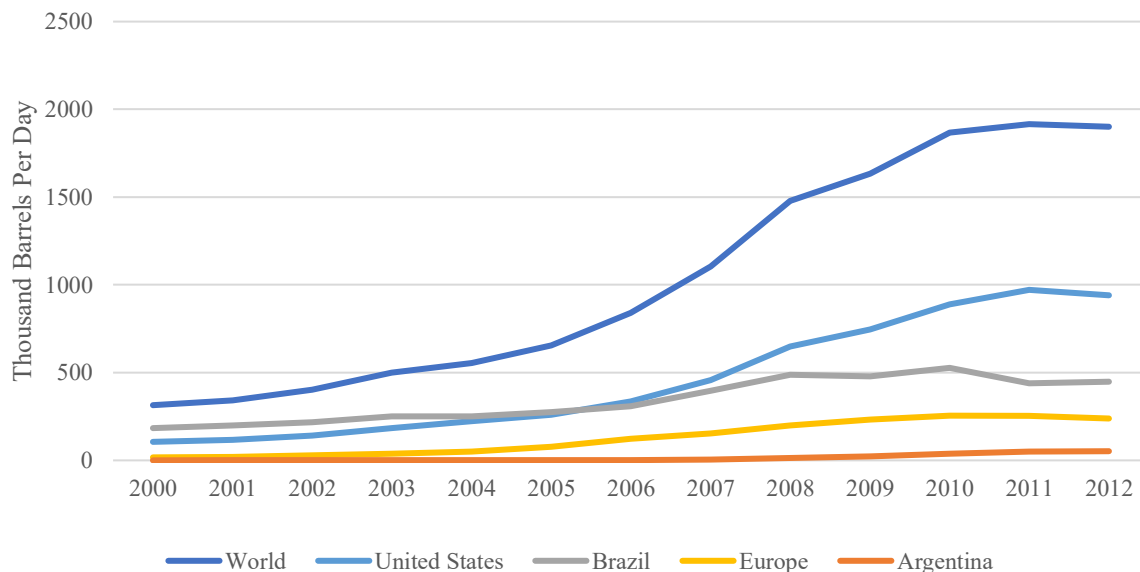


Figure 4: Global biofuel production 2000-2012

Source: Own diagram, data from the EIA, International Energy Statistics, available at www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=79&pid=79&aid=1

These developments imply that the EU's biofuel policy has already had a significant influence on the way global biofuel production is organised. This seems peculiar, since the share of biofuel production within the EU has been approximately only one eighth of global production, a quarter of the production in the USA and half of that in Brazil by 2012, as Figure 4 shows.

1.6 Research Interest

Initially, the EU's biofuel policy was designed to promote agricultural production within the EU but soon gave rise to increased global production of specific kinds of biofuels, i.e. mainly biodiesel from agricultural products for use in transport. This happened because the blending mandates of the EU gave incentives to private investors as well as governments in developing countries to produce biodiesel as cheaply as possible for the EU's market.

Subsequently, the EU aimed to change and influence the ways this production is organised by amending the rules for the mandatory blending of biofuels in its member states. This can be described as a form of governing through market based incentives on the demand side of the market for biofuels. It was intended to get biofuel producers to produce according to the new sustainability criteria through making the sustainably produced biofuels more competitive than their unsustainably produced counterparts. This behaviour can furthermore be interpreted as an expression of the way the European Commission applies "regulatory state tools" to deal with "energy market failures" (Goldthau and Sitter, 2014).

The views on the different qualities of biofuel technologies and their implications for the environment have drastically changed in the public perception during the last two decades. The shifts in perspective from the positive appreciation of the climate conservation effects of biofuels through GHG emission reduction towards more critical approaches and even in some cases to the rejection of the first generation of biofuels technology as a policy alternative have frequently been described in the literature (Ulmanen, Verbong and Raven, 2009; Lawrence, 2010; Jørgensen, 2012). In contrast, both critics and proponents of biofuels have given much less attention to a holistic perspective on the development of the EU's biofuel policy and of its specific role in the development of governance mechanisms applied in the transition from the current energy system based on fossil energy to renewable sources of energy.

This thesis has the aim to contribute to a better understanding of the processes and mechanisms in global governance which are at work within the larger frame of the shift from a world economy based on fossil fuels to a sustainable carbon-free economy based on renewable sources of energy. The politics of biofuel in the EU serves as a case study to observe the impacts of the developments in GEG over the last two decades. The research question that is elaborated in chapter 5 with the theoretical background of this thesis in mind is: *In how far has the development of the politics of biofuel in the EU been related to processes of change in global energy governance over the last twenty years?* The main research interest lies in the observation of mechanisms that are applied in the global governance of energy issues.

2 Methods

This section describes the methods used in this thesis to investigate the relations between mechanisms of global energy governance and the politics of biofuel in the EU. The analysis of international political phenomena is usually very complex and multi-layered, not least because there are many different actors involved in the international political process. These actors are active on different political levels that are affected by international decision making, ranging from interregional to national, subnational and local actors. Because of this complexity, cases of international politics are usually unique and cannot easily be grouped and analysed together. This is why case studies are common in the analysis of different phenomena in international relations (Bennett and Elman, 2007, p. 171). GEG is a typical example for the complexity of international relations. The qualitative methods outlined below are applied to trace the developments of the EU's politics of biofuel, the perspectives and actors' identity formations as well as historical developments within these structures over the last two decades.

In a first step, an analysis of the literature on the concepts of global governance and GEG in chapter 3 serves the need to map the existing mechanisms and actors in global energy governance. Furthermore, the review of the relevant literature shows the historical development of the institutional structures of GEG. With regard to the following analysis, the ideational aspects of this development are of special interest in this review.

The main research section in chapter 6 explores the origins of the politics of biofuel in the EU, as well as its developments and global effects. The subchapters are investigating this topic using several distinct methods. Chapter 6.1 consists of a literature review of the academic literature on the topic of interest, with an in-depth analysis of two articles that have been concerned with the development of the role of the European Commission in the EU's politics of biofuel on the one hand and with the global impacts that basic assumptions within the EU's biofuel policy have had on the other hand. This literature review opens the stage for the following research sections and their analysis against the backdrop of this literature.

Subsequently, a hermeneutic historical analysis of EU documents from the field of biofuels is conducted in chapter 6.2 with a focus on the early phase of policy formulation within this field. The documents are chosen from critical junctures in the policy formulation phase in the field of biofuels in the EU from the last two decades. This hermeneutic analysis aims to raise questions about the origins of the values and ideas that influenced the establishment of the prevalent structure in the foundational phase of the EU's biofuel policy.

Following the hermeneutic document analysis, seven expert interviews are summarised in chapter 6.3 which have been conducted with experts from the policy field of biofuels to gain insight into the processes that shaped the EU's biofuel policy. The expert interview is one of the methods available for tracing the developments in the perceptions of the EU's policy approaches in the field of biofuels. Furthermore, the specific knowledge of experts is especially important in an area of such high complexity as the global sustainability of biofuels. The analysis of this expert knowledge is crucial for the understanding of the embedded ideas and assumptions prevalent in the debate on biofuels in the EU that can gain influence on the policy process. Furthermore, by being actively involved in the processes of policy deliberation and application, the opinions of experts do often have a direct influence on the way biofuels are perceived in the EU's policy deliberation. This function of expert knowledge makes the interviews especially valuable since they allow to gain insight into the way the different ideas and meanings within the EU's biofuel policy are created and how they take effect.

In addition to the analysis of expert interviews, a review of secondary literature in chapter 6.4 on the topic of the global impacts of to the EU's biofuel policy offers insights into the perspectives that have been developed in the academic literature on the EU's politics of biofuel. This review shows how academic perspectives on the impacts of the EU's biofuel policy on different areas of global governance have developed. Furthermore, this literature review serves as a background for the subsequent analysis.

The findings from the sections mentioned above lead to the discussion and the analysis of the relations between the developments in GEG and the ideas prevalent in the politics of biofuel in the EU, thereby providing an answer to the research question. After discussing and summarising the arguments made throughout the sections of the thesis, possible needs for further research are outlined and the thesis is concluded.

3 Concepts

This thesis refers to several concepts and terms that have been coined in political science and in the subfield of International Relations³. Furthermore, its focus is based on specific normative assumptions. This section elaborates the relevant concepts and terms as well as the normative assumptions underlying this thesis.

³ To differentiate between the academic discipline and the political field and subject of inquiry, only the discipline is written with capital letters, e.g. "International Relations" instead of "international relations".

3.1 Global Governance

Global politics is shaped by a shift from classical government to governance. The term government refers to the notion of a top down political process with clearly defined institutions that have the monopoly to exert regulatory power in a clearly defined territory, while the term governance is used to describe a political situation in which regulatory power rests with multiple actors, including states but also non-governmental institutions or private companies, with a more hierarchical structure (Nowotny, 2011, p. 231ff).

On the global level, these new ways of dealing with political issues have been described by the term global governance. There is a multitude of definitions of this term in the literature. Over the last couple of decades the expression has been developed as an analytical concept within the academic discipline of International Relations (Behrens, 2010, p. 93). At the same time, it has been applied in politics as a political concept with specific meanings and implications, as Brand elaborates in his paper “Order and regulation: Global Governance as a hegemonic discourse of international politics?” (Brand, 2005, p. 159). One central notion of this concept is that new actors have emerged on the scene of international relations in the context of an ever more interdependent and globalised world economy with increased economic cooperation, free trade and international communication and traffic flows. Intergovernmental organisations (IGOs) as well as non-governmental organisations (NGOs) and private companies, experts and interest groups increasingly influence the rule making processes at the international level (Nowotny, 2004, p. 594; Brand, 2005, p. 161).

Nation states are no longer the sole actors in international relations. National governments have become only one of several types of actors that contribute to the steering of the international system. The analytical term “governance” encompasses the whole range of rule-making and norm-setting activities, governmental as well as non-governmental ones, formal as well as informal ones (Rosenau and Czempiel, 1992, p. 4). There is no “central authority” to which “the knowledge required for action” would be available. Instead, this knowledge “rests with other actors in the network” (Minsch *et al.*, 2012, p. 187). These different kinds of actors gain relevance in all stages of regulation at the international level, including the processes of “agenda-setting”, “rule-making” and “rule-enforcement” (Nowotny, 2011, p. 231ff).

It is mostly recognised that the nation states are still the most important actors in international relations, both formally and factually (Wendt, 1992, p. 424; Nowotny, 2004, p. 537,593). First, they are formally important because of the concept of legal sovereignty in international law. Legally, no state can interfere directly in the territory of another state. Second,

they are factually important because the foundations of the international system have been developed with the nation state in mind. Institutions and processes are designed for states and their representatives. This favours their relative weight compared to non-state actors (Reinicke, 1998). Furthermore, especially the most powerful states still exert a multitude of tasks within international relations like taking leadership in certain issue areas and coordinating international cooperation (Lesage, Graaf and Westphal, 2010). The nation states still have the formal right to rule within their territories as they like and act on the international scene amongst legally equal entities without any formal authority to control or limit their actions effectively, e.g. through the use of force. For this reason, the international order is frequently described as an anarchic system. However, the term “anarchic” should only be used here in a theoretical way. Given the amount and measure of legal and informal constraints states find themselves to be bound by, be it in the form of treaties or in the form of international customary law, it seems to be questionable to what degree the literal meaning of the term “anarchic” aptly describes the nature of the international system if this term would entail the implication of a meaning of “disorder” (Rosenau and Czempiel, 1992, pp. 7–8). The international system is not characterised by disorder but merely by a lack of central authority.

The concept of global governance assumes that growing interconnectedness between states and the emergence of more and more “cross-frontier problems” limits the capabilities of national governments to effectively deal with many policy issues on their own. This leads to the assumption that policy issues are increasingly brought to the international level where they are dealt with by several nation states together and with the inclusion of private actors (Brand, 2005, p. 161). Private actors are assumed to have better information, knowledge and understanding of increasingly complex, technology driven and fast-changing public policy issues and their inclusion into the global policy process is therefore regarded as necessary and as an opportunity to increase the acceptability and the legitimacy of global public policy (Reinicke, 1998, p. 90).

Rosenau states that “[a]s the scope of the transformation widens and as its pace intensifies, the more urgent do questions about the nature of order and governance become” (Rosenau and Czempiel, 1992, p. 1). Within the academic investigations into global governance, studies in the issue areas of economic policy and health policy have long been the dominant subjects of interest. Studies dealing with the subject of global governance in the field of energy have only recently been published more numerously. This thesis aims to contribute to the exploration of the characteristics of governance in the vast and constantly evolving field of GEG.

3.2 Global Energy Governance

This section analyses academic contributions in the field of GEG to explore the current understanding of GEG and the developments that have already been observed in the literature. During the last years, there has been an increasing number of academic contributions covering the topic of GEG. Still, the central topic of global governance mechanisms still gets relatively little attention.

It is noted in the literature that the landscape of global governance in the field of energy is highly fragmented (Florini and Sovacool, 2009; Lesage, Graaf and Westphal, 2010; Goldthau, 2011). Existing institutions either cover sectoral energy issues as for example in the case of the International Atomic Energy Agency (IAEA) or the International Renewable Energy Agency (IRENA) or they are limited in their membership to regional areas as for example in the case of the International Energy Agency (IEA) which is affiliated with the Organisation for Economic Co-operation and Development (OECD).

Membership	Mandate	Forum	Year of inception	Number of member states	Seat of the Secretariat
Multilateral (membership open for all)	Comprehensive	The World Bank	1944	185	Washington
		United Nations Commission on Sustainable Development (CSD)	1993	192	New York ^b
		Various other UN bodies and specialized agencies	n/a	n/a	n/a
	Specific	International Atomic Energy Agency (IAEA)	1957	145	Vienna
		International Energy Forum (IEF)	1991	89	Riyadh
		United Nations Framework Convention on Climate Change (UNFCCC)	1994	192	Bonn
		International Renewable Energy Agency (IRENA)	2009	75	Abu Dhabi ^c
Plurilateral (restricted membership)	Comprehensive	Group of Eight (G8) + Outreach Five (O5)	1975	8 (13)	n/a ^d
	Specific	Nuclear Energy Agency (NEA)	1958	28	Paris
		Organization of the Petroleum Exporting Countries (OPEC)	1961	12	Vienna
		International Energy Agency (IEA)	1974	28	Paris
		Gas Exporting Countries Forum (GECF)	2001	14	Doha
		International Partnership for Energy Efficiency Cooperation (IPEEC)	2009	13	Paris
Regional or interregional	Comprehensive	Various regional organizations ^a	n/a	n/a	n/a
		Asia-Pacific Economic Cooperation (APEC)	1989	21	Singapore
	Specific	Organización Latinoamericana de Energía (OLADE)	1973	26	Quito
		Energy Charter Treaty (ECT)	1998	47	Brussels
		African Energy Commission (AFREC)	2000	23	Algiers

Notes (a) Including but not limited to the European Union (EU), the Association of Southeast Asian Nations (ASEAN) and the North American Free Trade Agreement (NAFTA). (b) The Division for Sustainable Development at the UN Department of Economic and Social Affairs (UNDESA) serves as the CSD Secretariat. (c) As from 2011 Masdar City will host IRENA's seat of the Secretariat (d) The G8 does not have a permanent secretariat.

Table 1: Most important international organisations dealing with energy issues

Source: Lesage *et al.*, 2010, p. 51

Table 1 gives an overview of the most important international organisations dealing with energy issues including information on their scopes and mandates. In this table, the EU is mentioned under footnote “a” as one of the “Various regional organizations” with “Regional or interregional” membership and a comprehensive mandate. Other organisations mentioned in

this list include international organisations with multilateral membership, most of them from the framework of the United Nations Organization (UNO), both with comprehensive mandates and specific mandates to deal with energy issues.

This list mentions only one plurilateral institution with a comprehensive mandate, the Group of 8 (G8)⁴, an international forum that takes place in the form of annual meetings of the heads of state of the eight leading industrialised countries. In contrast, there are several examples of plurilateral institutions and many examples of regional or interregional institutions covering comprehensive or specific energy issues mentioned in this list. Interestingly, although institutions like the World Bank are mentioned as important institutions in GEG, the WTO is not listed at all. This seems surprising, given the importance of trade related aspects for global energy issues.

One of the most prominent institutions in global energy governance is the International Energy Agency (IEA). In Table 1 it is listed as an example of an international organisation with restricted plurilateral membership and a specific mandate for dealing with global energy issues. It has been created in 1974 by the countries of the OECD with the purpose of regulating the global oil market as a reaction to the global oil crisis of the 1970s. Even though the IEA covers a wide range of energy issues with global dimensions, it lacks the characteristic of universal membership since membership is limited to the member states of the OECD. The IEA conducts studies and surveys on different topics covering global energy issues such as energy efficiency, energy and the environment and international energy relations. It is furthermore one of the central aggregators of data on a wide range of issues related to energy production and consumption and provides comprehensive statistical data on several global energy issues.

The IEA's lack of universal membership means that it is not representing all nations. In fact, there is no centralised global institution when it comes to effectively managing the pressing questions surrounding global energy issues. As Ann Florini has pointed out, there is still “no overarching institutional organization [...] mandated to address any of the collective action issues that energy poses” (Florini, 2008, p. 8). Therefore, the governance of global energy issues often takes place in a political space between the parts of the existing institutional structure and works in conjunction with several overlapping institutional arrangements that exist in specific issue areas but which don't individually cover the whole spectrum of issues that are connected

⁴ The forum has in the meantime returned to the format of the Group of 7 (G7). Russia was excluded because of the annexation of Crimea in 2014.

to many global energy problems. Minsch *et al.* define GEG with reference to the article “Who governs energy?” by Florini and Sovacool from 2009 as follows:

Global energy governance refers to international collective activities that manage and distribute energy resources and services in order to overcome public goods problems and externalities, many of which are increasingly cross-border phenomena. (Minsch *et al.*, 2012, p. 284)

The actors who take part in the governance of these issues can be diverse. To name but the most common ones, they can be states, IGOs, NGOs but also groups of states like the G7, groups of scientists offering scientific expertise on certain topics or even private actors from civil society functioning as pressure groups. Furthermore, private economic actors like energy corporations and industry associations can take part in the governance of these issues. Some of those diverse actors are relatively new to the stage of global governance and are not yet integrated in the already existing structures and mechanisms of GEG (Lesage, Graaf and Westphal, 2010).

3.3 Power Relations

On a general level, it is commonly noted that the international system is characterised by a fundamental shift in power relations. The western domination of international relations is increasingly challenged by rising economic and political powers from other world regions like Asia or South-America. This shift in power relations is among other developments reflected in the formation and rise of new international institutions like the G20. Considering the ongoing economic and political developments in the international system, these relatively new institutions comprise more of the players with economic and political powers than did the previously dominant institutions like the G7/G8. This is especially important in the field of GEG since the growth in energy demand and consumption of fossil fuels is largely expected in non-OECD countries while energy demand in industrialised western countries is expected to stagnate overall in the mid-term future (Ebinger and Avasarala, 2013, p. 197).

Furthermore, the new economic and political powers are usually countries whose economies are dependent on large amounts of cheap energy. Still, these countries often have a different approach to energy security than their industrialised counterparts. For developing countries it is of primary concern to establish basic access to energy services for their citizens, not to merely maintain an already existing energy system, as is usually the case in western countries (Ebinger and Avasarala, 2013, p. 201).

In terms of international trade in energy, industrialised economies are bound to lose in relative importance because of the growing increase in energy demand from emerging countries. Therefore, the industrialised countries equally lose much of their ability to influence the global energy markets. However, it is still true that some of the most dominant economic and political powers are located in western industrialised countries. They are going to play an important role in the governance of global energy issues, first because of their economic weight and second because of their already large share of global energy consumption (Lesage, Graaf and Westphal, 2010).

3.4 Conferences as Mechanisms of Global Energy Governance

In the unstructured and fragmented area of global governance, world conferences stand out as one of the central and most visible mechanisms of global governance (Simonis, 2005, p. 319). In their book on the topic of GEG, Lesage *et al.* have linked the many questions that the governance of global energy issues faces in the 21st century. One of the central topics of concern is the ongoing shift in power constellations in the international system, as the title “Global Energy Governance in a Multipolar World” already suggests. The authors describe the ongoing developments in the international system as a shift from what they call “unipolarity” to “multipolarity” (Lesage, Graaf and Westphal, 2010). These terms already show a certain state-centred aspect of the authors’ perspective since the emphasis on the “polarity” of the international system implicitly focuses on states that build these poles (Nowotny, 2004, p. 589). This state-centred perspective has to be kept in mind in the subsequent analysis of this book, since this focus often tends to overlook contributions to global governance from such diverse and more and more important non-state actors as NGOs and private companies. The authors explicitly put their focus on “intergovernmental organizations” and “omit non-governmental organizations” (Lesage, Graaf and Westphal, 2010, p. 51).

The effective governance of the central strategic energy issues of supply security, environmental sustainability and economic efficiency builds the “strategic triangle of energy policy making” as depicted in Figure 5. The combination of these aims is the main task of GEG that nations must pursue and coordinate amongst themselves. At the same time, powerful nations are seen to be reluctant to delegate the competencies of the governance of these energy issues to international institutions, mainly because of reasons of national security, indicated by the security of affordable supply of energy for domestic consumption. In addition to this focus on national security of energy supply, the narrow economic interests of individual nations can be a central barrier to common energy policies.

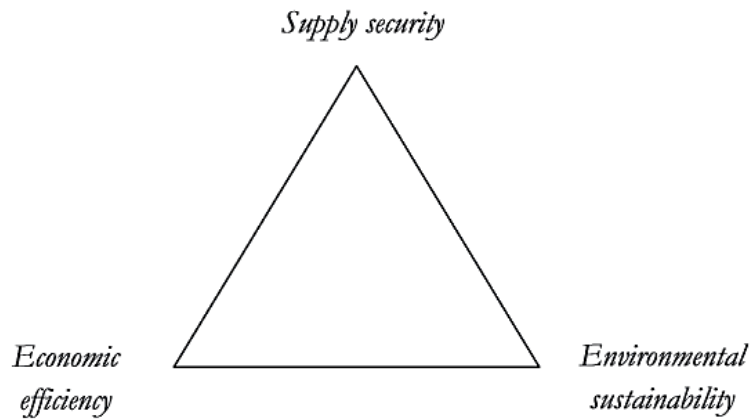


Figure 5: The strategic triangle of energy policy making

Source: Lesage *et al.*, 2010, p. 38

The contributors to the publication in focus regard global energy issues as being largely influenced by international power relations. Therefore, “major power concerts” are regarded by the authors as the most likely fora for GEG to take place with visible and lasting effects. With a reference to Keohane and Nye’s concept of “complex interdependence” they assume that “[e]xternalities cannot be adequately addressed by governments individually” (Lesage, Graaf and Westphal, 2010). Furthermore, there are not yet any effective institutions of GEG established which would be able to serve as institutionalised structures for the effective implementation of global energy policy. According to the views of the authors, the main task of existing international institutions in the field of global energy is merely to pool expertise on specific energy issues. The two most important tasks for GEG in order to build a sustainable energy system are seen to be the fight against energy poverty on the one hand and the successful management of the energy transition on the other hand (Lesage, Graaf and Westphal, 2010, pp. 40–41). In this book, the term “major power concerts” refers to international fora like the G7 (G8 at the time this book was published), the G20 or the Major Economies Forum. These fora are not fully institutionalised since they don’t have a secretariat or staff. They are formed by regular meetings of a specific selection of heads of state who discuss important issues and make binding decisions. This reflects the relatively new character of a world in which multiple national structures share similar amounts of power. At the same time, these structures leave room for some of those powers to take leadership in the governance of global energy issues.

The currently existing structures of GEG in form of “major power concerts” are seen to likely be dominated by the most powerful nations because of their strong interests in national security. This dominance can take the form of “leadership” which is regarded by the authors as a necessity in this segmented governance structure for making active policy decisions, e.g.

within the global shift towards renewable and sustainable sources of energy and in general to regulate major global energy issues.

Figure 6 illustrates the process of leadership in GEG through major power concerts. This depiction shows that the incentive to seek leadership within the process of global energy governance stems both from national interests and from the values that build a “sense of global responsibility” as well as from the values associated with the process of global governance i.e. “basic trust and mutual respect” as well as a sense of a “basic shared purpose”. In the process of the conference mechanisms, the role conception is that of a “leading body in global governance”. The output of this process consists in policies which either serve the purpose to guide global governance or to coordinate the national policies of member states.

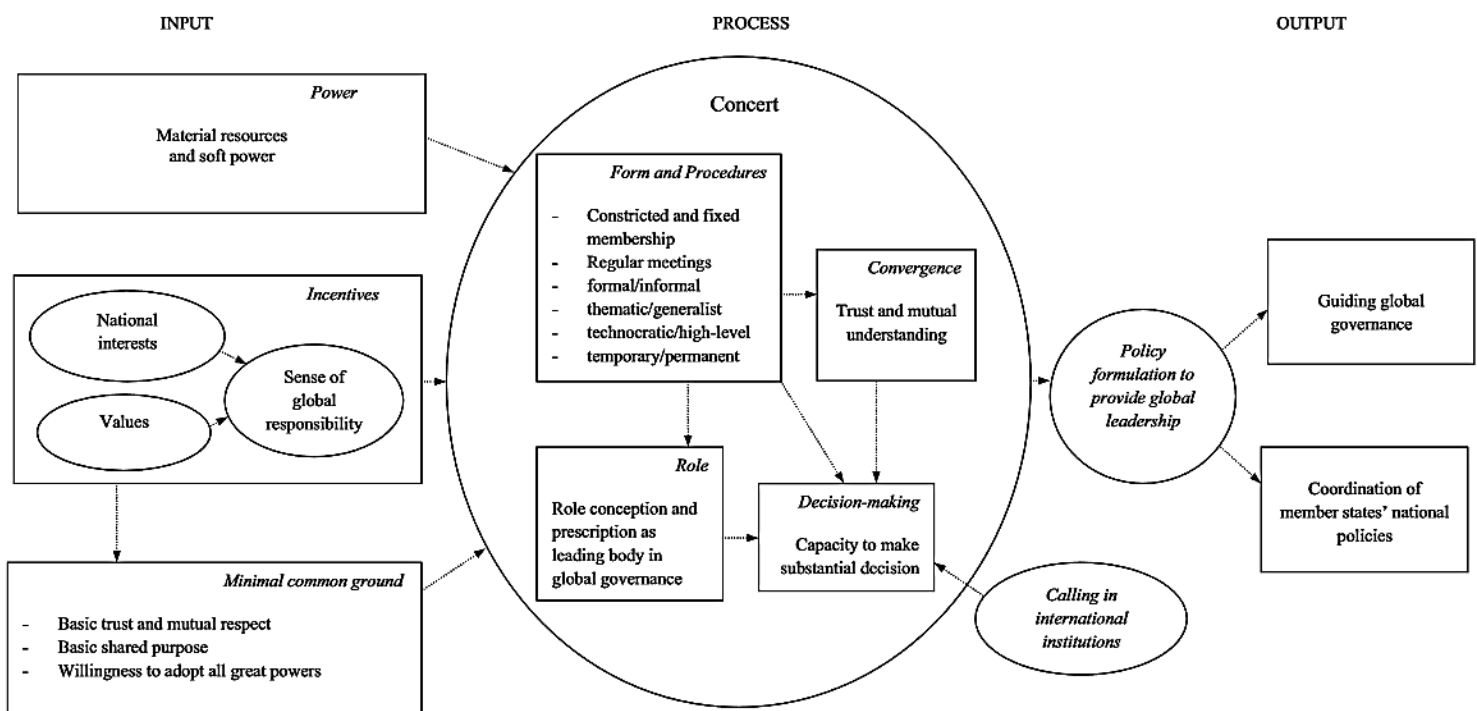


Figure 6: The process of leadership through major power concerts

Source: Lesage *et al.*, 2010. p. 82

At the time of the initial formulation of its biofuels policies, the EU did seek the role of a global leader in the fight against climate change and in the field of renewable energy technologies. Due to several developments that have been described as economic and political crises, both on a global level and with consequences within the EU, the role of the EU as a global leader in the fight against climate change has been somewhat diminished over the last years. However, the introduction of renewable energy in transport is still one of the most prominent and important factors in the legitimisation of the biofuel policy of the EU.

3.5 Normative Assumptions

The distinction between empirical observations and normative judgements is essential to scientific inquiry. At the same time, every scientific inquiry is in some way normative since it makes decisions about what to look at and how to look at it. Therefore, it is necessary to be aware of this unavoidable bias and to make it as clearly visible as possible.

The normative base of this thesis draws upon insights from social ecology studies. One normative assumption derived from social ecology is that energy systems are social systems as much as they are technological systems (Spreng *et al.*, 2012). Therefore, the social dimension of energy issues will be considered and focused on in this thesis.

4 Theories

The concept of global governance is not in itself a fully developed theory of International Relations. It makes no general assumptions about the nature of the interests, preferences or the behaviour of international actors. Therefore, the theoretical base of this thesis needs to refer to theoretical models which offer more explanatory value with regard to the processes and mechanisms of global politics.

The main theoretical assumptions applied here for this purpose are rooted in the theoretical concepts of historical institutionalism and constructivism. Both approaches share some fundamental perspectives with the concept of global governance and are therefore well suited for this combination. Furthermore, they contribute frameworks which are necessary for the understanding of the processes of interest in this thesis. In complex and highly technical policy fields like energy policy and environmental policy, political power is, even more than in other fields, intertwined with expert knowledge. The role of ideas and their development over time becomes central to an understanding of the ways in which policy-making takes place and of major changes and shifts within these policy areas (Hall, 1993, p. 292).

For the theoretical frame, historical institutionalism contributes the concepts of path dependence, institutional layering, incremental reform and institutional development over longer periods of time, all of which are at the core of the theoretical assumptions this thesis applies in order to describe the institutional developments of interest in the area of GEG (see chapter 4.1). Past developments matter in the formulation of new policies just as much as new insights do (Hall, 1993, p. 277). While historical institutionalism focuses on the fact that state preferences are dependent on past choices and historical developments, constructivist approaches add another important dimension to the analysis of global politics this thesis needs

to take into account, i.e. the formation of interests, identities and meaning through interaction (see chapter 4.2). Even more fundamentally, the whole way in which policy problems are regarded is based on specific ideas which are prevalent in “policy paradigms”, a term that is defined by Hall as a “framework of ideas and standards that specifies not only the goals of policy and the kind of instruments that can be used to attain them, but also the very nature of the problems they are meant to be addressing” (Hall, 1993, p. 279).

4.1 Historical Institutionalism in International Relations

This chapter elaborates the contributions of the theoretical approach of historical institutionalism to the perspective of this thesis. Therefore, it is of special interest to line out which assumptions this approach shares with the concept of global governance.

Within the academic discipline of International Relations, historical institutionalism is an underrepresented theoretical approach although it does have many features which make it very useful for studies in the field of global politics (Fioretos, 2011, p. 368). Its main assumptions fit well with many phenomena observable in the international system like the “prevalence of incremental reform over stasis and fundamental transformations”, part of which is the phenomenon of “institutional layering” (Fioretos, 2011, p. 369).

Historical institutionalism rests its explanatory focus on the dimension of time in the explanation of political phenomena. Its main concepts are those of path dependence, sequencing, incremental change and institutional development over longer periods of time. These concepts focus primarily on the temporal dimension of political processes. By the means of these concepts, it is possible to explain the long-term continuation of governance gaps within certain policy fields and of unintended consequences which derive from certain institutional designs within international relations with a detailed analysis of “the interests that large states often have in reproducing established practice” rather than with “generic reference to incompatible national interests” (Fioretos, 2011, p. 387f).

Path dependence is often regarded as the central concept of historical institutionalism. It is based on the notions of “lock-in effects” and “positive feedback effects” from extant institutional designs (Fioretos, 2011, p. 377). Founding moments are regarded as especially important by historical institutionalism.

The outcome is that patterns of adaption that would ensure greater collective efficiency often do not occur, that positions of privilege and divisions of labor

regularly persist though relative balances of power shift, and that institutions frequently outlive their original rationale. (Fioretos, 2011, p. 376)

Incremental change describes a situation in which institutions do show signs of reform and adaptation to new environmental conditions, albeit in a partial and not in a fundamental way. The development of institutions in form of incremental change rather than transformative shifts despite situations like crises can be explained by an historical institutionalist approach. From this theoretical perspective, sudden fundamental reforms are seen to be very unlikely unless there are severe changes in the surrounding basic conditions. This unlikeliness of fundamental change is caused by the interests of powerful actors in extant institutional structures. In international relations, this behaviour leads to policy incoherence. As Fioretos points out:

The paucity of adaption in extant design (due to earlier patterns of specialization) and the comparatively lower political costs of addressing emerging challenges by creating new international institutions with limited authority rather than fundamentally reforming extant ones cause policy incoherence. (Fioretos, 2011, p. 390)

What Fioretos means by the term “policy incoherence” is a situation in which “separate international organisations address specific issues with little coordination” (Fioretos, 2011, p. 390). The situation outlined above is described by the term “institutional layering”. The field of GEG can aptly be characterised in such a way as is further elaborated in the analysis below. In the previous sections of this thesis, it has already been noted that the institutional landscape in the field of global energy regulations has evolved in a very piecemeal and unstructured manner. Therefore, it is likely that many cases of overlapping mandates and policy incoherence do occur in this field.

There are quite a few links where historical institutionalism shares assumptions with the concept of global governance. Rosenau defines global governance broadly as “routinized arrangements through which world politics gets from one point in time to the next.” He further mentions that “[s]ome of the arrangements arrive [...] from the aggregation of individual decisions that are designed to serve immediate subsystem concerns but that cumulate to system-wide orderly arrangements” (Rosenau and Czempiel, 1992, p. 5). This statement fits well with the concepts derived from historical institutionalism like institutional layering, sequencing and the paramount importance of founding moments.

Another parallel between Rosenau's understanding of global governance and historical institutionalism arises when he asserts that within change processes "people become apprehensive over the loss of pre-change stability and fearful that change might result in institutions and conditions less satisfying than those which prevailed earlier" (Rosenau and Czempel, 1992, pp. 9–10). This is very much in line with the assumptions of historical institutionalism. As Fioretos says,

[...] the degree of change from an historical reference point is a key factor in shaping preference orders in historical institutionalism. Such changes affect the extent to which people gain or lose access to the advantages (or disadvantages) they associate with past designs, including those that confer positions of privilege that translate into forms of enduring influence as well as those that generate increasing returns, positive externalities and other benefits over time. (Fioretos, 2011, p. 373)

These two quotations show how close Rosenau's conception of change within global governance is to an historical institutionalist perspective on change processes in international relations.

Rosenau stresses the "multidirectionality of causal flows" in global politics and finds an "interactive perspective [...] preferable to attempting to locate them in temporal sequences" (Rosenau and Czempel, 1992, p. 17). This statement is in contrast with the concept of "sequencing" which is a core assumption of historical institutionalism. However, the concept of sequencing does not necessarily point to direct and unidirectional causal relationships. It rather focuses on a perspective which takes into account that prior events and choices do have some kind of impact in some kind of way on following events and choices (Pierson, 2004; Fioretos, 2011). Put in a more general way, it means that the "strategic context in which states operate takes on different properties over time" (Fioretos, 2011, p. 394) This interpretation of the concept of "sequencing" is more compatible with Rosenau's understanding of feasible ways to structure explanatory argumentation in research agendas within the field of global governance since Rosenau's perspective on change processes in global politics is defined by a similar line of thought, as the statements outlined above show.

4.2 Constructivism in International Relations

In conjunction with the historical institutionalist approach, this thesis applies a constructivist approach to trace the roles of interests, identities, assumptions and preferences of actors within the processes of GEG and to include them in the analysis of the politics of biofuel

in the EU. The different actors' perceptions of policy problems like environmental issues and possible solutions to these problems play a decisive role in the way decisions in these areas are made. This is especially relevant in the case of biofuels. The FAO puts it this way:

The future evolution of the political will to support biofuel blending in transportation fuel represents the key uncertainty to the sector. This decision process will be shaped mainly by macroeconomic developments in key countries, relative prices of feedstocks and fossil fuels, **prevailing views on environmental benefits of biofuels** and the global food security situation. (OECD and FAO, 2015, p. 127, my emphasis)

Two major levels of perceptions are present in this perspective on the development of global biofuel policies. First, the biofuel industry's "key uncertainty" is invoked as being the direction of the political decisions made on the biofuel blending mandates of major economies. This represents the level of perception on the side of the biofuel producing industry and how they judge the economic possibilities that biofuels offer. Second, one of the major factors influencing the decision processes in the key area of blending mandates are seen to be the "prevailing views on environmental benefits of biofuels". This is certainly a question that is first and foremost located on the side of the political decision makers but it is also relevant on a more general, public level, both influenced to some degree by the scientific conceptions of biofuels.

If the environmental benefits of biofuels were not regarded as plausible by decision makers, but also by advising scientists, civil society and the biofuel producers, public investments in biofuels would lose the legitimacy they receive from being regarded as an environmental policy. Issues surrounding biofuels are discussed with different arguments and with different assumptions when they are perceived as an environmental policy than for example when they were regarded merely as part of agricultural policy or as part of energy policy without the influence of environmental questions. The views of the involved actors on the "environmental benefits" of biofuels therefore heavily influence the perspective on possible implications of biofuel policies and how these policies may develop in the future. The way these views on the "environmental benefits" of biofuels are constructed in global energy governance is influenced by a range of factors.

One of the central assumptions of constructivism in International Relations focuses on the socially interactive dimension of the way identities and interests are formed. It is assumed that "the meanings in terms of which action is organized arise out of interaction" (Wendt, 1992,

p. 403). By the way actors interact with each other on specific topics, they give meaning to what they are acting on. For example, as Wendt argues, the absence of a central authority in international relations does not imply *per se* that states are necessarily self-interested entities. It is also possible to observe cases in which states “identify positively with one another so that the security of each is perceived as the responsibility of all” (Wendt, 1992, p. 400). Such arrangements are described as “concerts” or “‘collective security’ arrangements” (Wendt, 1992, p. 401). The point Wendt makes here is that it is necessary to take into account “the intersubjectively constituted structure of identities and interests in the system” of international relations (Wendt, 1992, p. 401). The interaction between the actors makes their behaviour visible to each other. This serves as a basis for each of the actors to form their own identities and to make judgements about the identities of each other.

A similar approach is to be observed within the concept of global governance. Rosenau argues that governance is “dependent on intersubjective meanings” and that it “works only if it is accepted by the majority (or at least by the most powerful of those it affects)” (Rosenau and Czempiel, 1992, p. 4). This dimension is crucial for the understanding of the functioning of global governance, especially regarding energy issues, considering its lack of a central authority. Although there is a large number of institutions dealing with a wide range of global energy issues, many new energy related problems are dealt with in an “institutional void” where there are “no generally accepted rules and norms according to which policy making and politics is to be conducted” (Hajer, 2003, p. 175). The absence of a clear institutionalised polity makes the struggle to deal with these issues dependent on discursive and deliberative practices that are supposed to “generate trust among mutually interdependent actors” (Hajer, 2003, p. 184). This policy deliberation entails the focus on “different viewpoints” of the actors involved and the search for “shared understandings and adherences” (Hajer, 2003, p. 183). Therefore, the search for actor’s identities is important to the understanding of policy making in the context of a political landscape in which a lack of generally accepted rules for political action exists.

4.2.1 Technology and governance gaps

Governance gaps, as described by historical institutionalism, can be described in constructivist terms as the product of specific assumptions and viewpoints on a subject which do not cover the issue area in the field where a perceived governance gap occurs. This rationale is applicable to the governance of the technology of biofuels in the EU, as will be pointed out in chapter 7. The meanings of technologies and scientific knowledge are to a large extent defined by the scientific consensus and social practices they were conceived in, or to put it

differently by the “stories” that surround them (Hajer, 2003, p. 186; Jørgensen, 2012, p. 170). Ulrik Jørgensen points out that

[b]asic qualities assigned to technologies are not intrinsic properties but instead depend on the network of relations to actors specifying these qualities and reflect the perspectives and context in which this technology operates. (Jørgensen, 2012, pp. 168–169)

This implies that what policy makers in the EU as well as in biofuel producing third countries make of the technology of biofuels and which attributes they relate to it is fundamentally determined by the different, changeable and competing perspectives on the subject which are present within the policy networks they are placed in. In turn, their actions also have an impact on the perspectives of other global actors. The field of biofuels can be described as an especially contested area since the perspectives are very diverse and the environmental issues become more and more urgent.

In accordance with historical institutionalism, it can be argued that there are ideas embedded in institutions which were prominent at the foundational moments of the relevant institutions and which persist despite the common acceptance of new ideas only because of their status within the existing institutions. Historical institutionalism describes this phenomenon as “the role of sequence” (Fioretos, 2011, p. 381). Prior ideas are at the same time regarded as a manifestation of the historic constellation of interests and perspectives that were present at the moment of the creation of the institution in question and as an important factor in the formation of actors’ identities and understanding of current problems.

To put it differently, some governance gaps can be explained by “knowledge gaps” (Hajer, 2003). These knowledge gaps are caused by the specific problem perceptions of policy actors which already exclude certain perspectives and are influenced by the structures of “established institutions” these actors operate in (Jørgensen, 2012, p. 170).

4.2.2 Conflict and interests

In a similar way as in historical institutionalism, the “actors in the dominant sociotechnical regime” are found to be less willing to “experiment and develop new technologies” (Jørgensen, 2012, p. 185). This task is bound to be undertaken by smaller and less involved actors like NGOs which have less interests in preserving extant designs. However, the development of alternatives has to be rooted in a “context of conflict and constant

negotiation” rather than based on a top-down decision for one specific technology or policy scenario since

[t]he leap to a definitive solution by seeking the most convenient or efficient technology may lock out committed innovators and entrepreneurs, as well as processes in which learning and piecemeal engineering can be practised. (Jørgensen, 2012, p. 187)

This idea of deliberative policy-making in the process of the global energy transition is closely linked to the ideas of global governance and GEG. Smaller and more unconventional policy actors are meant to contribute to the policy making process in the international arena and in the global transition to renewable sources of energy.

Furthermore, it is important to adapt the funding and promotion of new technologies according to their level of efficiency, otherwise the development of new technologies might be hindered by the success of their early stages, since “far too many early designs might have been installed and not renewed once the next generation [...] came along” (Jørgensen, 2012, p. 187). This situation can be compared to the concept of path dependence developed in historical institutionalism. Lock-in effects may appear on the institutional level as well as on the economical level.

As a result of the constructivist perspective, it becomes clear that there usually is more than one path the development of a specific technology can take, since the interests and perspectives of the actors involved, i.e. policy makers, entrepreneurs or NGOs can differ widely. As soon as the political implementation of a specific technology gives rise to certain interest groups in an economic field, as has happened in the case of biofuels in the agro-economic sector (Bailey, 2013), these interest groups might become strong enough to defend their interests in the current stage of technological development even when there are more efficient and more favourable technologies available. This might become the case with second generation biofuels (Bailey, 2013, p. 277). Depending on the qualities assigned to certain technologies of first and second generation biofuels, these new technologies might even become attractive options for actors already involved in the production of first generation biofuels. The steering of the development and advancement of renewable energy technologies and the perspectives involved in this process are therefore in constant need of critical examination.

5 Research Question

After laying out the theoretical foundations of this thesis in the previous sections, this section elaborates the main questions of interest of this thesis. As has just been pointed out, there are specific areas where the concept of global governance overlaps with the theoretical approaches of historical institutionalism and constructivism. The aim of this thesis is to explore the mechanisms of GEG and their relation to the politics of biofuel in the EU. What are the implications of the case of biofuels for GEG? The theoretical approaches outlined above have already given rise to some possible ways to formulate specific inquiries.

There are many questions that are of interest in the issue area of GEG and biofuels in the EU. Some of them are: To what extent do policy agents in the EU make use of existing institutions of GEG and to what extent do they operate outside of these institutions or develop them further? Conversely, in how far are European policy actors affected or constrained by existing institutions of GEG, for example in how far is the EU's capacity of adaption and problem solving regarding biofuels promoted or hindered by extant institutional structures of GEG? Given the difference between positive expectations about biofuels and the subsequent realisation of their negative side effects, what kind of mistakes were made, can they be corrected or avoided in other similar policy areas, and if so, how? Considering the implications from historical institutionalism, questions arise from the concepts of path dependence, institutional layering and incremental reform. In how far can the politics of biofuel in the EU be described as a disruption or a part of the path dependence of the developments within GEG? To what extent is the EU's approach to global biofuel governance characterised by the tendency to use extant institutional structures or to create new ones? In how far is the politics of biofuel in the EU characterised by incremental reform as opposed to disruptive change as a reaction to global sustainability issues in biofuel production? Another set of questions can be derived from the constructivist theoretical approaches. What is the perceived identity of the EU in the area of global biofuels and how is it constructed? What kind of values does the EU's politics of biofuel represent in GEG and how did they change over the last decades?

While not all of these questions can be definitively answered in the course of this thesis, they are relevant in mapping the field of interest. The focus of this thesis is the interrelation between the politics of biofuel in the EU and mechanisms of global energy governance. The central research question that is to be discussed here is: *In how far has the development of the politics of biofuel in the EU been related to processes of change in global energy governance over the last twenty years?* This question aims to analyse the co-development of mechanisms

in GEG and the politics of biofuel in the EU against the backdrop of the historical developments of the last two decades in the field of the EU's biofuel politics and its global repercussions. Rather than focusing on one direction of influence, the multidirectionality of causal flows is taken into account since developments in global energy governance might have influenced the politics of biofuel in the EU and vice versa. The timeframe of two decades is chosen in order to include the identity-building phase before the EU's biofuel program was effectively initiated in 2003.

6 The Origins of the Politics of Biofuel in the EU and their Effects

The EU's politics of biofuel is strongly rooted in several distinct policy fields. It is fundamentally a cross-sectoral policy issue covering energy issues, environmental issues like climate change as well as agricultural issues because of its primary focus on agricultural products. Within the EU's political system it is located in the organisational area of Rural Development in the Directorate-General for Agriculture of the European Commission (Kay and Ackrill, 2012, p. 300). Because of the increased international trade in biofuels, it is furthermore linked to international economic policy and trade policy, as the trade disputes with Argentina and Indonesia over biodiesel imports to the EU have shown. Because of this spread over different policy areas, there are several actors from the divergent policy sectors of the EU's biofuel policy which bring different and partly competing interests to the fore.

In a similar way, the overarching energy issues in global energy governance range from the issue of ensuring stable security of energy supply to the task of combining sustainable economic development with efficient environmental protection by significantly reducing CO₂ emissions from the energy sector, both by limiting the amount of energy used by the different sectors and by promoting carbon-neutral, renewable sources of energy.

Following the principles of historical institutionalism, it can be assumed that the current politics of biofuel in the EU is influenced by past decisions made by actors in this policy area and by the ideas and values implemented in the institutional structure that has been established in the past. Kay and Ackrill (2012, p. 300) describe the EU's biofuel policy as having been developed and implemented at the backdrop of a decade in which the EU "has positioned itself as a global leader in climate change politics". While this role has been weakened after the economic and financial crisis, the EU has soon regained some momentum and has actively sought an international agreement on GHG emissions reduction of legally binding character for the climate conference in Paris in December 2015 (Buchan, 2015, pp. 363–364). Although the

agreement that has been reached at this conference has been celebrated as a breakthrough in climate politics because of the large number of states that have agreed to cooperate and the aims they agreed on, there are still many open questions when it comes to the implementation of the agreement. Furthermore, the election of Donald Trump as president of the United States, who has declared he might cancel the implementation of the agreement in the USA, has reintroduced insecurity to the situation of global climate politics. China has nevertheless assured that it will stick to the agreed terms. In a way, the EU still struggles to regain its role as leader in international climate politics compared to the many initiatives it took and declarations it made before the financial crisis of 2008.

6.1 The EU's Politics of Biofuel – Literature Review

This section explores literature on the way the EU's politics of biofuel has developed and on fundamental ideas that have been implemented at its beginning.

Within the literature on the EU's politics of biofuel, there are several examples of in-depth analyses of the role of the European Commission in setting the stage for the development of biofuels and to regulate their environmental effects. Furthermore, the assumptions that have been at the foundation of the EU's biofuel policy have been analysed by several studies. Two representative articles from this literature covering these aspects will be reviewed in the following analysis.

Niko Humalisto from the Department of Geography and Geology of the University of Turku has given a thorough account of the European Commission's role in the development of the EU's biofuel policy between 1992 and 2012 (Humalisto, 2013). At the same time, the focus of the paper lies on the "spatiality", i.e. the geographical aspects of the EU's biofuel policy and its relations to the changes in the way the European Commission governs biofuels.

Before Humalisto's article appeared, a group of researchers from different countries had published an article on the assumptions that are underlying to the EU's biofuel policy and the effects these assumptions have had in the cases of biofuels policies in Germany, Brazil and Mozambique (Franco *et al.*, 2010). These effects will be discussed subsequently in the next section.

6.1.1 The biofuel assemblage

Humalisto uses the scientific term "assemblage" to refer to an analytical lens that includes all kinds of elements and actors connected to the EU's biofuel policy. One of the advantages of using this broad concept is that it does not overestimate the importance of some elements of the

policy process over others but instead is meant to cover all possible “explanatory resources” playing a role in the policy since any element that is connected to the European Commission’s biofuel policy, be it technical, political, physical or ideational is regarded as part of the assemblage (Humalisto, 2013, p. 481f).

zzHumalisto identifies three phases of the EU’s biofuel development that show how the changes in the geographical dimensions of the EU’s biofuel policy are connected to changes in the policy instruments and modes that the European Commission has been applying in order to govern biofuel development (Humalisto, 2013, p. 483).

Phase	Topology of the assemblage	Mode of connecting	State of the assemblage	Key instruments of steering
1992–2003	Regional	Strategic, enabling	Emergence of the assemblage around EU agricultural operators	Tax exemptions, standards, strategies, funding for R&D
2003–2008	Networked	Incentivizing, globalizing	Fast growth of biofuels, connecting with biofuel producers and traders of the Global South and the USA	Indicative targets of biofuel consumption, incentives to alternative fuel vehicles, free trade agreements, legal proceedings against EU Member States for non-compliance
2008–	Fluid	Regulative, calculative	Slowing growth of biofuels, the growing importance of advanced biofuel producers	Obligatory renewable fuel GHG reduction targets in transport, increasing trade regulation, biofuel sustainability criteria, a proposed 5% cap for crop-based biofuels eligible for subsidies

Table 2: Characteristics of the three phases of the politics of biofuel in the EU
Source: Humalisto, 2013, p. 483

Table 2 gives an overview of the phases Humalisto has identified in the development of the politics of biofuel in the EU. Furthermore, it describes and summarises their main features. The developments Humalisto pointed to are described and analysed in the subsequent chapters.

6.1.2 The roots of the biofuel assemblage (1992-2003)

The first phase, the “emerging biofuel assemblage”, started in “the mid-1990s when the Commission’s strategies and action plans set the future agenda for energy and traffic” (Humalisto, 2013, p. 484). It is characterised by a focus on the regional development of biofuel production within the EU. Although the Commission already pointed to alternative sources of biomass which could be used for biofuel production, the European biofuel assemblage was soon clustered around leading actors from the agro-industrial sector. According to Humalisto, this

happened not least because in the beginning of its biofuel policy, the European Commission aimed to reduce dependence on energy imports by producing biofuels within the EU and at the same time wanted to establish new markets for the European agricultural industries (Humalisto, 2013, p. 485). This was achieved through agricultural incentives and tax exemptions for crop-based biofuels. At the same time, Humalisto points to the fact that the efforts to achieve standardisation of biofuel technologies and mandates in member states as well as the liberalisation of internal energy markets were not only designed for the benefit of internal producers. They already constituted incentives for the “globally operating parts of the assemblage” since these international actors would be able to benefit from the large market and from the reduction of “internal market barriers” (Humalisto, 2013, p. 484).

6.1.3 Globalisation (2003-2008)

During the second phase of EU biofuel development which Humalisto sees starting around 2003, the global dimension of the EU’s biofuel policy became more and more relevant. This phase is characterised by an active support of global trade in biofuels and therefore by a new topographical, i.e. geographic global structure of the biofuel assemblage. This new structure is described as “networked”. The EU’s policy aims started to include the arguments that farmers in the global south would benefit from increased trade in biofuels and that developing countries would be able to benefit from it economically (Humalisto, 2013, p. 486f). At the same time, new technologies made biofuels from “tropical feedstock” substantially cheaper than biofuels from “domestic crops of the EU” (Humalisto, 2013, p. 486).

The significant rise in biofuel consumption within the EU was primarily caused by the Biofuel directive of the European Commission that set indicative targets for the share of biofuels in traffic, 2% by 2005 and 5,75% by 2010 (Humalisto, 2013, p. 485). According to Humalisto, this shows that biofuels were regarded as the best possible available policy option in order to establish sources of renewable energy in the transport sector, since other options did not receive such “ambitious targets”. Still, many member states did not meet the indicative targets for biofuels and had to face legal complaints from the Commission.

Many of the member states used the policy instrument of tax exemptions to promote biofuels in order to reach the targets and, as a result, the biofuels industry became more lucrative “for oil companies to invest in” (Humalisto, 2013, p. 486). At the same time, Humalisto shows that one of the aims of the European Commission during this phase was for Europe to “signal its determination to curb the use of oil”, not least due to the continually rising oil price of that time.

Another argument for the EU was that economic cooperation with other “economic regions” would enhance energy security in Europe (Humalisto, 2013, p. 486). This fits the observations of other authors that the EU’s governance of energy issues has been to a large extent characterised by economic considerations, despite its rhetoric of sustainability and climate conservation, even in such initiatives as its “Global Partnerships for Renewables Technology” with individual countries (Youngs, 2013).

The globalised biofuel assemblage had impacts on the way biofuels were governed by the EU. Interest groups from biofuel producing regions aimed to take part in EU biofuel policies. Furthermore, in 2007, the EU actively promoted global production and trade in biofuels, e.g. in the form of free trade negotiations and in “the setting of the Tripartite Task Force between Brazil, the EU and the USA to enable the free circulation of biofuels through standardization” (Humalisto, 2013, p. 487). In the same year, the International Biofuels Forum (IBF) has been created following an initiative of the United Nations. Members of the IBF are the European Commission as well as the USA, Brazil, South Africa, China and India. The IBF aims to improve standards for biofuels and connects countries with available agrarian resources like arable land and biomass to those with developed biofuel technology and industries.

Humalisto points out that after the rise of oil prices in 2003, the commercial viability of biofuels led to an increase in trade with regions from “the USA, Brazil, Argentina and Malaysia”, with the Rotterdam harbour as part of the central infrastructure in the trade segment of palm oil which created benefits for refineries located at the harbour.

Nevertheless, agricultural interest groups within the EU, like the European Biodiesel Board, urged the European Commission to protect the European markets from global competition. These efforts resulted in 2009 in “a provisional anti-dumping duty on the imports of biodiesel originating in the USA” because of existing subsidies on soy oil in the USA (Humalisto, 2013, p. 487).

6.1.4 Adaptation (2008 onwards)

The environmental costs of biofuels imported from countries without “environmental and climate standards” became more and more visible since “NGOs and scientific advocacy groups” pointed to several of the problems that are connected to the production of biofuels from edible agricultural products in developing countries (Humalisto, 2013, p. 488). These problems included “the displacement of subsistence agriculture, tropical forest loss, and volatility of food prices” and were partly influenced by European companies producing biofuels in the “Global South” (Humalisto, 2013, p. 488).

At the same time, they were partly induced by the more complex mechanisms of indirect land-use change. According to Humalisto, this concept describes “a process whereby biofuel development causes land-use changes by displacing original land-use patterns that can actualize as iLUC [sic!] elsewhere” (Humalisto, 2013, p. 488). In this way, the rapid development of the EU’s biofuel market showed environmental consequences that were not directly connected to biofuel production. Indirect land-use changes “emerge at different times and within different prevailing conditions” (Humalisto, 2013, p. 488).

In order to regulate these environmental drawbacks, the EU introduced “an obligatory 10% renewable fuel consumption target and 6% reductions in road fuel GHG emissions by 2020, imposing strict trade regulation, and the binding biofuel sustainability criteria” (Humalisto, 2013, p. 489).

These regulatory measures signify a change in the policy mode as opposed to the “incentivizing mode” of the former phases. Furthermore, the sustainability criteria introduced to exclude environmentally harmful biofuels focused on the carbon emissions over the whole life cycle of biofuels, including “production, refining and transportation”. According to Humalisto, many European agricultural products don’t meet the “default GHG emission-saving values set in the biofuel sustainability criteria”, which he describes as a way of the European Commission to use this policy instrument to steer the biofuels industry in the direction to increasingly develop and use biofuel technology that relies on forestry products as well as waste and residues which “do not require land-use changes” (Humalisto, 2013, p. 489). However, as will be pointed out below, the environmental impacts of these technologies must equally be assessed carefully since they can have similarly damaging effects if they exert additional pressure on land markets.

Because this differentiation relies on the calculation of GHG emissions, certification and modelling have become decisive tasks within the biofuel policies. There has already been a directive proposal in 2012 to introduce “a 5% cap for crop based biofuels in regard to the 10% target for the share of renewable fuels in 2020” (Humalisto, 2013, p. 489). Furthermore, crop based biofuels should not be eligible for subsidies after 2020. This shows that the EU aimed to reduce the connection between biofuels and agriculture at least since 2012. Humalisto argues that this might be because the “Nationally Reported Action plans for EU Member States” showed that many Member States originally planned to further increase the use of crop-based biofuels to reach the EU’s targets for renewable fuels in transport (Humalisto, 2013, p. 490).

In the conclusion of his article, Humalisto calls on the Commission to make more use of policy instruments that take into account the geographical aspects of biofuels and not simply to reduce the choice to GHG emissions calculations because this would “de-politicize[...] the complex questions of promoting biofuels”. However, he is positive about the aim to “utilize organic waste and residues more efficiently” (Humalisto, 2013, p. 490). The Commission’s policy steps in this direction have been gradual and not disruptive as Humalisto points out. On the other hand, they don’t “encourage developing social, environmental or climatic performance in crop-producing assemblages that are already connected with EU biofuel development” (Humalisto, 2013, p. 491). Furthermore, the European Commission should use policy instruments that take into account the topological, i.e. geographical qualities of the biofuel producing regions, like supporting “land-use planning, the protection of vulnerable ecosystems or [...] the rights of subsistence farmers” (Humalisto, 2013, p. 492).

Humalisto’s call for a stronger focus on the geographical aspects of biofuel production has been reinforced by other researchers, e.g. by a study published by researchers from the IIASA which has shown that the environmental performance of biofuels is largely dependent on the location of their production (Elshout *et al.*, 2015).

6.1.5 Assumptions in the EU’s biofuel policy

Before conducting the analysis of central EU policy documents, it is noteworthy that the authors of the article on the assumptions in the EU’s biofuel policy have identified three main policy arguments as defining aspects of the way the European Commission has been treating the subject of biofuels. These three core assumptions have been identified as fundamental ideas about the way biofuels would increase energy security through the diversification of energy sources, ameliorate environmental protection through GHG savings and drive rural development both within the EU and abroad (Franco *et al.*, 2010).

First, the production of domestic biofuels is reckoned to reduce the dependence on oil imports and thereby to diversify energy sources and increase energy security. Second, it is assumed that biofuels have a positive environmental effect because they are thought to reduce the emissions of GHG, especially of CO₂. Third, because of the belief that there is “marginal” land available globally that is suitable for production of biofuels but not used for the production of food products, it is imagined that the promotion of biofuels has positive effects on the economic development of rural areas. (Franco *et al.*, 2010, p. 669)

The ongoing development of these assumptions within the EU’s biofuel policy has been characterised by a strong focus on biofuels derived from agricultural products according to the

authors of this article. At the outset, this was not the only option for the production of biofuels since the term „biofuel“ has long been used by environmental groups to refer to energy derived from organic waste and residues (Franco *et al.*, 2010, p. 665). In order to stress the focus on biofuels derived from large-scale agricultural production, the term „agrofuels“ was coined and is still used, mainly by critics of biofuels, in order to differentiate between these mainstream biofuels and other forms of biofuels derived from other kinds of organic matter (Franco *et al.*, 2010, p. 687).

As the article points out, the EU’s assumptions on the positive effects of biofuels are contradicted by the experiences with the country cases the authors explored. First, the assumption that biofuels have benefits for the environment because they reduce GHG emissions has shown to be largely dependent on the specific production method and on the location where the crops for the biofuels are grown. In some cases, the production of biofuels can even aggravate environmental problems, e.g. through the use of fertilisers or the destruction of “carbon sinks” in tropical areas, making the overall GHG balance of some biofuels even more environmentally harmful than that of fossil fuels.

Second, the EU’s biofuel policy is based on the belief that biofuels increase energy security by diversifying energy sources for transport. One of the fundamental ideas is that certain amounts of energy crops could be produced within the member states and thereby reduce their dependence on oil imports. However, the development of the biofuel market has shown, according to the authors of this article, that more and more biofuels and oilseeds are imported which undermines the aim to reduce the dependence on energy imports (Franco *et al.*, 2010, p. 689).

Third, the positive supposition that rural areas would benefit economically from biofuel production is equally contested by the authors of this article. This assumption about the economic possibilities of a biofuel economy entails the idea that the agrarian resources for biofuels can be produced on “marginal” land which means low quality land not suitable for production of food products. This kind of land is thought to be available in the EU as well as in developing countries. However, the authors argue that there are many cases which show how the production of biofuels is indeed a way to increase the share of “quality land” used by large agro-industrial companies as opposed to rural farmers (Franco *et al.*, 2010, p. 690). This further strengthens one of the main arguments used by biofuel critics aiming to show that the effects of biofuels on GHG emissions savings are in effect counter-productive and that the EU’s intended ideas about the benefits of biofuels don’t hold up to reality. Additionally, there are

concerns by human rights organisations about dispossessions and negative effects of land-use change on the lives of rural communities (Franco *et al.*, 2010, p. 691).

6.2 Tracing the Origins – Hermeneutic Analysis

The three core assumptions present in the EU's politics of biofuel laid out in the last section can be observed in EU documents from the last two decades. They are already present in the origins of the EU's biofuel policy. The origins of the positive assumptions about biofuels can be traced to the onset of the EU's biofuel policy in the 1990's. The fundamental aspects of the biofuel policy have been shaped by the development of these underlying assumptions about the way biofuels can contribute to the solution of several societal problems at once. These assumptions still influence the way the EU's politics of biofuel works and the way it is reconstituted and redirected whenever adaptations are necessary, e.g. when problems with the current model of the politics of biofuel arise.

This section traces the origins of the assumptions on the economic, ecological and societal effects of the promotion of biofuels in the EU by reviewing key documents of the EU's biofuel policy. The documents are selected so that they represent the different stages in the development of the EU's policy of biofuels.

To trace the development of the EU's biofuel policy, central policy documents and studies from different EU institutions published over the last two decades have been selected for the analysis. The different stages of policy development are categorised with regard to existing research on the subject.

First, there is the "initial phase" of policy development, characterised by Humalisto as more focused on the internal development of the biofuels market while already including some elements of international trade. In order to analyse the fundamental aspects of this phase, a study published by the European Commission is analysed concerning the "Application of biologically derived products as fuels or additives in combustion engines" from 1994. This document provides insight into the scientific assumptions about the technological implications of liquid biofuel in transport present at the time shortly before the onset of the intensified biofuels programme in the EU.

Second, the "globalising phase" starting around 2003 is characterised by a shift of focus to the global market of biofuels and to more intense regulation of production in the global south, i.e. in developing countries with tropical climate. During this phase, international trade in biofuels has intensified and the rules that enhanced this trade were based on the EU's mandatory blending quotas which took effect in 2003.

Third, what's referred to here as the “adapting phase”, Humalisto describes as the phase “countering the process of dislocation”, starting around 2008. During this phase of the policy development, the EU attempts to adapt the politics of biofuel in such a way that negative environmental effects are minimised or avoided entirely.

In addition to these phases found in the literature, a fourth phase is added, the phase of “continuing adaptation”. In 2015, the Commission has decided to limit the amount of crop based biofuels that can be attributed to the mandatory blending quotas. About the same time, imports of biofuels from Argentina, Indonesia and other biofuel exporting countries have been restricted due to competition concerns. In 2016, however, the European Court decided that these restrictions are not legal and have to be lifted. Furthermore, the European Court of Auditors has criticised the Commission’s sustainability certification regime as incomplete and ineffective.

Still, the European Commission continues to support the use of biofuels in the member states. In its latest draft for the revised Renewable Energy Directive from December 2016, the Commission merely proposes to gradually limit the eligible share of first generation biofuels in transport to 3,8% by 2030 while upholding the overall aims for renewable energy in transport (European Commission, 2017). For the time being, the Commission sticks with the already mentioned arguments in relation to the benefits of biofuels under the precondition that their negative environmental and social effects are accounted for and are effectively abated.

6.2.1 Initial phase

Early policy ideas for biofuels in the EU took shape in the 1980s after the oil price crisis of the 1970s. In 1987, a report on the economic feasibility of biofuels was drafted for the European Commission (Agro Développement, 1987).

Seven years later, in 1994, the European Commission published a study on the “Application of biologically derived products as fuels or additives in combustion engines”. This study was conducted by the “Agro-Industrial Research Division” of the Directorate-General XII – Science, Research and Development and was part of the “Third Framework Research Programme, in Agriculture and Agro-industry (AAIR) (1990-1994)” (European Commission, 1994, p. xi). One of the parts of this research programme focused on the development of new non-food products of agricultural origin, and the study at hand evaluated the case of biofuel production. This study is in many ways representative for the policy aims prevalent in the discourse of the topics of biofuels at that time. It is a compendium of many scientific studies with different opinions on biofuels and it weighs the different arguments against each other.

The study is divided into four sections. The first section deals with the technical applications of existing biofuels, while the second section is mainly concerned with potential benefits of biofuels for the agricultural industries. The third section explores several kinds of estimated environmental effects of biofuels, both positive and negative, and the fourth section discusses the economic aspects of different biofuels including the question of increased energy security.

6.2.2 Focus on the agricultural industry within the EU

As the authorship of this study already suggests, the focus of this document lies clearly on the economic possibilities that biofuels are assumed to entail for the agricultural industry. Indeed, it becomes clear from the start that there are mainly agricultural aspects considered in this study. The second paragraph of the introduction suggests two of the main assumptions the authors make in this study:

Biofuels present a big potential for the future needs of energy. An efficient agriculture is potentially able to provide the mankind world with raw materials for food, fiber and also energy. (European Commission, 1994, p. 2)

This quote shows that biofuels and agriculture are linked very directly in this study since there are no alternative options mentioned that might be able to produce biofuels. The focus is merely set on the “efficiency” of agriculture.

Given that agriculture might become efficient enough, it is claimed that agriculture will be able to satisfy energy demands in addition to the demands for food and fibre production. Furthermore, the situation of agriculture in the EU is described as being characterised by “surplus production” and the only real option to deal with this situation of surplus production is described as increasing the use of energy crops, since all the other options the authors can come up with (“[t]he set-aside of land for cultivation, dedicating the surplus land for forestry, hunting and recreation”) seem less favourable to them (European Commission, 1994, p. 2).

Furthermore, the intensified production of biofuels by the agricultural industry is meant to bring about environmental benefits by reducing GHG emissions from transport. Another argument for biofuels from agricultural production used by the authors of this study is that agricultural production can be diversified by including energy crops which is said to be in line with the interests of the “European Community” (European Commission, 1994, p. 3). At the same time, the assumption that biofuels will help to increase the EU’s energy security through

the diversification of energy fuel sources is mentioned at the very beginning of the introduction of this study with a reference to the oil crisis in the 1970's (European Commission, 1994, p. 2).

Section two of the study deals with the potential benefits of using agricultural commodities from EU agriculture as energy sources. In this section, the potentials for rural development are the core argument for the benefits of the use of biofuels in the EU (European Commission, 1994, p. 85f). At the same time, this section points to the limitations of using biomass resources for the production of ethanol because of "its capacity to affect the market of a number of related agricultural products" (European Commission, 1994, p. 76). It is also mentioned that governmental intervention is necessary for the introduction of biofuels since they are not the most cost-effective way of reducing GHG emissions but are nevertheless assumed to entail other positive effects, like "potential agricultural and wider benefits". Concerns about "indirect effects on the land, water and air" are only mentioned shortly. A detailed discussion of the environmental effects of biofuels follows in section three (European Commission, 1994, p. 78).

The benefits for the agricultural industries in the member states of the European Communities, which comprised twelve countries at the time of publication of the study, are the core argument of this study. There are different benefits assumed for the agricultural industries, each dealt with in a dedicated subchapter. The first expected benefit is labelled the "Improvement in agricultural resource utilization and related extensification measures". This argument is primarily linked to the idea of the use of idle and unused "marginal" land as well as to the better allocation of the connected agricultural subsidies within the Common Agricultural Policy (CAP) of that time (European Commission, 1994, p. 81ff). It is also linked to the problem of surplus production which was a prevalent problem at the time the study was written and is referred to in many stages of this study.

The second expected benefit of an intensified production of biofuels for the agricultural industries in the member states is described as an "Increase in farm incomes and market diversification". The basic assumption is that the promotion of the production of agricultural products for non-food uses, like for the use as biofuels, can reduce the need for the CAP to allocate "compensatory payments" to farmers for set-aside land (European Commission, 1994, p. 84).

The third expected benefit of biofuel production in the EU is the "Reduction of agricultural commodity surpluses and derived support payments". The problem of surplus production was connected to financial incentives. However, it was not even regarded as certain

by the authors that the intensified promotion of energy crops would automatically reduce the surplus production of certain agricultural crops (European Commission, 1994, p. 84).

The fourth expected benefit is the revitalisation of less developed rural economies, mainly through the means of employment generation. It is assumed that the production of biofuels leads to increased “utilization of farm resources, with the end result of rising incomes and direct employment on the farm”. However, it is also mentioned that the “recent trends in automation and related technologies in the processing sectors might limit the employment and income growth potential of the biofuels initiative” as well as the fact that biofuel production relies on large-scale production which means that “economies of scale are vital to compete with other final utilizations and other energy resources” (European Commission, 1994, p. 86).

Finally, the fifth benefit of biofuel production in the EU is expected to be the shift in international trade in agricultural products since the surplus production in the EU has led to a situation in which the EU subsidised exports from the EU to other countries. The promotion of biofuels was expected to reduce surplus production and exports while at the same time creating the possibility for “high-value industrial exports” from the biofuel technology sector. Additionally, third countries would benefit because they would have the opportunity to make use of the available markets. Similarly, the use of crops for fuel would alleviate the pressure on international trade in agricultural products since there would be less need for “trade protection of some food crops” (European Commission, 1994, p. 87).

What these five expected benefits for the European agricultural industry by intensified biofuel production have in common is that they assume a situation of surplus production and of available land as resources as well as the focus on the production of biofuels within the EU. Under these circumstances, it is assumed that biofuel production can contribute to an amelioration of the EU’s agricultural industries.

6.2.3 Environmental concerns

Section three of the study deals with the envisioned environmental effects of biofuels, both positive and negative. The paramount perspective of this study on environmental effects of biofuels lies in the health effects of biofuels. Among different implications for air and water quality, the authors of this study are sceptical when it comes to the climate preservation effects of biofuels. They point to the fact that “the normal growth of traffic” would possibly undo any gains in efficiency or relative emission reductions, and therefore contradict the aim to reduce overall GHG emissions (European Commission, 1994, p. 178). Still, the potential of biofuels to be “sustainable” under certain conditions is asserted. A special regard, according to the

authors, is meant to be put on “the number of hectares of land set aside for energy crops” in order to avoid “a rise in food prices” (European Commission, 1994, p. 179).

However, the overall assumption underlying many arguments of this study is that biofuels are good for the environment since they are “renewable” and therefore “environmentally friendly” (European Commission, 1994, p. 167). Furthermore, it is mentioned that even third world countries could benefit from biofuel technology (European Commission, 1994, p. 126).

6.2.4 Energy security

Section four of the study entails the argument that biofuels can contribute to better energy security in the EU. The situation of the oil price crises in 1973 and 1979 as well as the aims of the European Energy Charter are invoked (European Commission, 1994, p. 137). However, it is assumed, that the reduction of imports of fossil fuels can only be achieved “gradually, and over a very extensive period of time” (European Commission, 1994, p. 182)

In the European Commission’s white paper „Energy for the future: Renewable sources of energy“ from 1997, the argument that liquid biofuels for transport can reduce the dependence on foreign oil imports is mentioned in conjunction with the statement that „[f]uture development of biofuels will have to be based mostly on production in Europe“ (European Commission, 1997, p. 38).

As Franco *et al.* (2010, p. 667) have pointed out, the initial biofuel policy of the EU aimed to increase agricultural production within the EU in order to reduce dependence on energy imports. However, there has been a change in arguments and the environmental arguments of emission reduction soon became more important, while energy security persisted as a minor argument in later policy documents. Soon, the global trade in biofuels became an important part of the EU’s biofuel policy.

6.2.5 Globalising phase

The legislative procedure for the “Biofuels Directive” 2003/30/EC took place between 2001 and 2003. The directive was the attempt to create demand for renewable fuels in transport by promoting the use of liquid biofuels (European Union, 2003). Therefore, the directive is strongly linked to claims of environmental protection. The environmental aims, especially of climate conservation, were paramount to the European Commission to legitimise its biofuel policy. The opinion statement of the European Economic and Social Committee (EESC) even argues that the environmental arguments would have to be outlined more clearly, since they were regarded as central to the directive (EESC, 2002).

The underlying assumptions about rural development and energy security persisted in the directive. The effect of the biofuels directive was that a market for biofuels was created in the European Union which had both influences on the domestic market of agricultural products as well as on the international market. The Economic and Social Committee declared in its opinion statement of 2002 that Brazil and the USA would most likely benefit from the international market of biofuels since they already had a developed industry and that developing countries may also have opportunities to benefit (EESC, 2002).

Potential negative environmental impacts caused by a globalised network of biofuel production were not mentioned in the original biofuels directive from 2003, neither on the domestic scale nor on the international scale, even though the opinion statement of the Economic and Social Committee from 2002 already mentioned the need to further investigate the nature of the environmental effects of biofuels (EESC, 2002). The directive only hints at the fact that environmental concerns still exist by stating that

[a]n increase in the use of biofuels should be accompanied by a detailed analysis of the environmental, economic and social impact in order to decide whether it is advisable to increase the proportion of biofuels in relation to conventional fuels. (European Union, 2003)

These impacts are in the context of the original directive primarily thought of as concerning the member states and the common agricultural policy of the EU.

In 2006 the European Parliament published a resolution to the Commission concerning issues surrounding the biofuels legislation (European Parliament, 2006). This resolution only mentions potential environmental drawbacks of biofuels on an international scale in a relatively modest way, the technology of biofuels is largely perceived as beneficent. The resolution is primarily concerned with the optimisation of the management of the technology and with the proper implementation of the legislation in the member states. It is also mentioned in paragraph 31 that the Commission's politics of biofuel might help the EU to fulfil obligations to the WTO to reduce "Community stocks of intervention cereals". Paragraphs 55 and 56 of the resolution mention the need of the Commission to negotiate WTO rules and even argues that a "new WTO agreement" might be necessary to "enable the EU to ensure that imported biofuels meet certain sustainability criteria, predominantly in the environmental field" (European Parliament, 2006). The resolution argues in paragraph 57 that although the EU would be dependent on the international market and would "not yet" be self-sufficient concerning biofuels, the "promotion of domestic production" should be the main goal of the Commission's policy. However, the

subsequent paragraph 58 states that in line with the European strategy for sustainable development, a certain amount of imports in bioethanol should be accepted for a certain period. This shows that the international development of biofuel industries was regarded as beneficial. Paragraph 73 of the resolution states that trade in biofuels with developing countries should be “balanced” and that it should “focus on countries meeting their own energy needs rather than solely developing their export capacity”(European Parliament, 2006).

Although the state of biofuels technology and implementation is not seen as negative, the resolution still contains calls to further develop second generation biofuels and to efficiently use existing technologies like the conversion of organic waste to biofuels. It further contains the call for the implementation of a “mandatory and comprehensive certification scheme” concerning the sustainability of all stages of the production of biofuels both within the EU and imported from third countries (European Parliament, 2006). Subsequently, issues such as competition with food production, LUC and the destruction of rainforests are recognised as important and potentially negative issues in relation to the further implementation of biofuels. In paragraph 46, the resolution calls for a “comprehensive certification scheme” concerning the sustainability of all palm oil imports into the EU, thereby including palm oil used for food products (European Parliament, 2006).

6.2.6 Adapting phase

Since the international market for biofuels kept expanding and environmental concerns about biofuel policies were raised more and more strongly by NGOs, the media and several scientific institutions, the European Commission had to react to the pressure and eventually introduced a sustainability certification regime for biofuels in its Renewable Energy Directive which became effective in 2009 (European Union, 2009). This certification regime has been the first attempt to govern the environmental sustainability of the cultivation of crops as well as the production and processing of biofuels within the EU as well as in biofuel producing countries outside of the EU.

In order to praise the benefits of biofuels for the EU, the RED focuses in its introducing paragraphs more on the argument of the increased security of energy supply through the use of biofuels in transport which is said to be “most acute” (European Union, 2009). However, it is also clear that the RED is formulated around the basic idea that biofuels will be produced in third countries and there will be a large amount of imports of biofuels and feedstock for the production of biofuels into the EU. It’s the intention of this directive to ensure the sustainability of the production of biofuels both within the EU and in third countries.

Paragraph 74 of the RED states clearly that the Commission was aware of the encouraging effects that the directive would have on the international market for biofuels. The attempt to effectively implement criteria for the sustainability of biofuels which should be effective in third countries has been subject to many constraints since the EU doesn't have legislative authority in these countries and is furthermore bound by obligations of the WTO norms concerning international trade. Therefore, the RED does not include the protection of social standard into its sustainability criteria. The approach chosen by the European Commission was rather to combine its system of mandatory blending targets for biofuels with the implementation of certain mandatory environmental sustainability criteria. To be applicable to the national blending targets, biofuels must be certified by one of the recognised voluntary certifying institutions concerning the sustainability criteria of the RED. However, due to the anticipated limitations of the WTO rules, the EU did not include social criteria of sustainability in the list of sustainability criteria of the RED. Instead, it was intended, as Paragraph 74 states, that there should be either multilateral or bilateral agreements which cover these issues or that a system of private and voluntary certifying institutions would implement their own set of additional sustainability criteria including social aspects (European Union, 2009). In the same paragraph, the RED calls on the member states to "require economic operators to report on these issues" in case there are neither agreements nor certification schemes in place. In 2011, the Commission published a decision requiring member states to gather "certain types of information" on these issues of sustainability which go beyond the environmental categories of the sustainability criteria and also cover social aspects (European Commission, 2011).

Many potential environmental drawbacks that may be caused by biofuel production are considered in the directive like the "cultivation of raw materials for biofuels and bioliquids in places where this would lead to high greenhouse gas emissions" which should be avoided (European Union, 2009). The concept of indirect land-use change is also mentioned in paragraph 85 and the directive refers to the future analysis of this concept through the European Commission. In the same paragraph, the directive argues that the pressure on agricultural land will be rising globally because of the different national policies for biofuels and therefore the directive hints at the need to "promote the use of restored degraded land" (European Union, 2009). This concept is still debated today since it is often very hard to establish which kind of land is used in what way. Therefore, it is argued that generalisations about land-use possibilities should be avoided and the classification of land should happen on a case by case basis (AETS Consortium, 2013).

The RED further states that it should be an aim of the Commission to encourage “other biofuel-consuming countries” to implement policies similar to those of the EU, i.e. the introduction of sustainability criteria. Domestic production of biofuels within the EU was still a central topic for the Commission at the time. In 2010 the Commission mentioned the large-scale production of “sustainable biofuels” as one of its major projects in its “Energy 2020” strategy paper from 2010, hinting at the already existing domestic European biofuels industry which was meant to be supported in the course of the energy 2020 strategy (European Commission, 2010).

However, trade in biofuels became more and more important and the issues surrounding biofuel imports are one of the central topics of the RED. Some of the subsequent paragraphs show the importance biofuel imports already had. They have become the dominant factor in the question of the sustainability of biofuels. Questions surrounding the effectiveness of the evaluation of the sustainability of biofuels, concerning the environmental as well as the social dimension, have been subject to debate until this day.

Paragraph 69 of the RED defines the need for the sustainability criteria to avoid the destruction of biodiverse lands through biofuels, whereas paragraphs 70-73 cover the issue of carbon emissions caused by the cultivation of biofuels on certain types of “carbon rich land” which should be avoided in most cases and otherwise accounted for in the overall estimation of the GHG effects of biofuels. This section seems to be in contrast with the idea of ILUC which argues that land-use change does not only happen directly but also indirectly for example through market mechanisms on the global agricultural markets. This kind of land-use change can hardly be tackled by a list of lands that should not be used for biofuels and it would be very hard if not impossible to reliably show that there has been no kind of ILUC through biofuels which did affect these kinds of biodiverse or carbon rich types of land.

6.2.7 Continuing adaptation

In the following years, the concept of ILUC became more and more relevant in the debate around biofuels. However, the need to promote the use of renewable energy in the transport sector was still growing and biofuels were still regarded by the European Union as one of the most important available options to reach this aim, as the ILUC Directive from 2015 states in paragraph 7 and 9 (European Union, 2015). However, possibly due to the contested nature of biofuels the Commission only mentioned them in its “Energy Union Package” from 2015 in the context of the challenge to develop technological leadership in renewable energies (European Commission, 2015). This shows that the political focus of the Commission’s biofuel policy

shifted to the technological development of “advanced biofuels” i.e. second generation biofuels that are not based on food products. It was indicated by the Commission already in 2016 that the first generation of biofuels should not receive any more support after 2020 (European Commission, 2016, p. 5).

The ILUC directive identifies its understanding of the concept of ILUC and the estimated effects of the indirect environmental consequences caused by the production of biofuels with regard to greenhouse gas emissions, in paragraph 4:

Where pasture or agricultural land previously destined for food and feed markets is diverted to biofuel production, the non-fuel demand will still need to be satisfied either through intensification of current production or by bringing non-agricultural land into production elsewhere. The latter case constitutes indirect land-use change and when it involves the conversion of land with high carbon stock it can lead to significant greenhouse gas emissions. Directives 98/70/EC and 2009/28/EC should therefore be amended to include provisions to address the impact of indirect land-use change given that current biofuels are mainly produced from crops grown on existing agricultural land. Those provisions should take due account of the need to protect investments already made. (European Union, 2015)

The last sentence of this paragraph demonstrates the awareness of the European Union that these changes in the calculation of the sustainability of biofuels and the concurrent subsidies will have a negative impact on the overall rentability of the current biofuel products and the Commission shows its commitment to protect the interests of the current biofuel producers to a certain degree.

Since almost all biofuels are grown on arable land, as paragraph 5 confirms, the ideas that are presented in the ILUC directive are that it is both necessary to establish the effects the different types of crops have on the overall GHG emissions of each type of biofuel and to further encourage the development of new and advanced biofuel technologies using non-food based sources. However, as paragraph 6 shows, the sustainability of those sources which are labelled as sustainable, for example of biological waste and residues, must equally be assessed thoroughly. These assessments have obviously often been neglected in the past since the paragraph refers to the problem that there have occurred cases in which residues have been artificially produced that stem “from a production process which has been deliberately modified for that purpose” (European Union, 2015).

The idea that advanced biofuels will be able to contribute to the decarbonisation of the transport sector beyond 2020 is prevalent in paragraphs 7 and 9. Biofuels that have a low risk of causing indirect land-use change while contributing to the reduction of GHG emissions from transport are meant to be promoted. In this regard the paragraph refers directly to the potential of biofuels from waste and algae. However, paragraph 15 states that different types of waste are already regarded as a resource for other purposes than for the generation of biofuels. The member states are called upon to take into account the existing recommendations to use waste resources as efficiently as possible. At the same time, it is mentioned that the possibilities for fraud in this area should be minimised by the member states. This shows that the conflicting issues around waste as a resource and the possible problems like fraud have already been considered in the formulation of this directive. Still, biofuels from waste constitute a form of advanced biofuels and are “assigned a zero emissions factor” since they “do not lead to additional demand for land” as paragraph 21 states (European Union, 2015).

In paragraph 12 of the ILUC directive, the different contested assumptions around the effects of ILUC are addressed. The effects of indirect land-use change are estimated to take place mainly in countries outside the EU and it is particularly assumed that biodiesel from oil crops causes the strongest and most problematic effects of ILUC “with regard to the conversion of tropical forests and peat land drainage”. As a reaction to the effect caused by ILUC, the directive foresees two new targets. First, it increases the threshold of GHG emissions savings that new installations producing biofuels have to meet. Second, it aims to reduce the incentives for conventional biofuels by reducing “the amount of biofuels and bioliquids produced from cereal and other starch-rich crops, sugars and oil crops and from crops grown as main crops primarily for energy purposes on agricultural land” that can be counted towards the targets for renewable energy in transport, as paragraph 17 states (European Union, 2015).

Non-food crops can have an ILUC effect, too, when they are grown on “existing agricultural land”, according to paragraph 22. Information on this kind of biofuels is limited, however. In paragraph 23, the directive gives incentives to increase yields from existing agricultural lands since this would contribute to mitigating effects from ILUC.

Paragraph 24 proposes that the Commission should ensure that the recognised voluntary schemes for the certification of the sustainability of biofuels regularly report on their activities and that these reports should be made public. This shows one of the drawbacks of the system of private certifying institutions. The accountability for the actions undertaken by these institutions is a question that has obviously already come up at this point. This paragraph

promotes the idea that by reporting publicly on their activity, the legitimacy of these private certifying institutions can be enhanced.

Paragraph 26 refers to the need to respect the human rights issues that can be caused by biofuel development and calls upon the member states to ensure the “security of land tenure and land-use rights” in the context of investments in agriculture. However, when it comes to the effectiveness of the EU’s sustainability criteria to ensure the environmental and social sustainability of land acquisitions by European Investors in developing countries in Africa, Stefania Bracco has shown that the current sustainability criteria have been largely ineffective in this regard (Bracco, 2015).

Paragraph 27 calls for the exploration of possibilities to reliably show that certain amounts of biofuels in certain projects did not lead to indirect land-use change, for example because the additional amounts of biofuel were produced due to productivity improvements. However, even if such options of certification were found, it would only be applicable to those amounts of biofuels that were reliably shown to stem from such measures that did not lead to ILUC.

The current proposal for a new Renewable Energy Directive from the European Commission initiated in 2016 foresees a gradual reduction of the applicable contribution of food based biofuels to the mandatory amount of renewable energy in transport from 7% to 3,8% by 2030 (European Commission, 2017). At the same time, the proposal includes the aim of setting a minimum contribution of advanced biofuels, starting in 2021 at 1,5% and gradually increasing “up to at least 6,8% in 2030”, as Article 25 points out (European Commission, 2017). The kinds of advanced biofuels applicable are defined in an exhaustive list in Annex IX to the proposal and are meant to have an overall GHG emission savings of at least 70%.

6.2.8 Internal challenges for the EU’s biofuel policy

The European Court of Auditors (ECA) has published a review of “[t]he EU system for the certification of sustainable biofuels” in 2016 (ECA, 2016). This report mainly criticises two features of the current system of the certification of biofuels in the EU.

First, it criticises the lack of effective sustainability criteria in the case of biofuels produced from waste since the evaluation of the origins of biofuels declared as stemming from biological waste is found to be insufficient. As an example, the report argues that since used cooking oil is counted as waste and is therefore applicable to double counting in the blending targets, biofuels from these sources may yield a higher price which in turn leads to incentives to use virgin vegetable oil and declare it as used cooking oil. Paragraph 40 argues that the Commission has to effectively introduce new measures which ensure that the voluntary

schemes include the origin of the biomaterials declared as waste in their certification of the sustainability of biofuels since the incentives should only apply for real waste products (ECA, 2016).

Second, the ECA finds in paragraph 28 that even though the RED requires it, three of the four voluntary certification schemes approved by the European Commission don't reliably assess the biofuel producer's conformity with the EU environmental requirements for agriculture (ECA, 2016). Furthermore, paragraphs 30 and 31 declare the issues around the reporting of socioeconomic sustainability standards as still largely unresolved. The ECA shows that although the socioeconomic sustainability problems of biofuels such as "land tenure conflicts", "poor working conditions" and "health and safety risks" are already mentioned in the RED, most of the voluntary sustainability schemes recognised by the Commission don't include these issues in their assessments. Only one of the four voluntary schemes "included the verification of socioeconomic effects" (ECA, 2016). In January 2011, the Commission published a decision in which member states are required to obtain "certain types of information about biofuels and bioliquids" from economic operators, especially "on certain additional environmental and social aspects" (European Commission, 2011). However, the report by the ECA finds that the Commission did not check whether the voluntary certification schemes evaluate the non-mandatory socioeconomic factors of the sustainability of biofuels.

At the same time, the trade related aspects of biofuels have been challenging internally for the European Commission as well. In 2013, the EU introduced anti-dumping import tariffs for bioethanol imported from the USA and in a later step also for biodiesel imported from Argentina and Indonesia. There was an implementing regulation by the Council of the European Union which introduced the anti-dumping import tariffs on biodiesel from Argentina and Indonesia following a complaint by the European Biodiesel Board (EBB), an organisation which represents more than half of the EU's biodiesel industry (Council of the European Union, 2013). Subsequently, both countries filed cases against the EU before both the WTO and the European Court of Justice (ECJ) in which they challenged the introduction of the import tariffs as unjustified. In 2016, there was a ruling by the ECJ which declared that the import tariffs on biofuels from Argentina were not justified (European Court of Justice, 2016). The import tariffs on biofuels from the USA have equally been found to be unjustified. For the time being, the tariffs rest in place since the judgements can still be appealed.

6.3 Developments of Perspectives – Summary of Expert Interviews

To trace the developments of the different ideas and values designated to the aims embedded within the EU's biofuel policy, seven interviews have been conducted with experts from different backgrounds, each concerned with the EU's biofuel policy in a different way⁵. Most of the interviewees have asked not to be named due to publicity restrictions of their employers. In fact, this can be regarded as a positive factor for the analysis since they may have been able to include more of their subjective personal experiences and opinions during the interviews.

The selection of the interview partners was based on two different research aims. The first research aim was to understand the way interest representation in the EU's biofuel policy has been influenced by the developments in this field. National experts who have been concerned with the representation of specific interests in the EU were interviewed to gain insight into these processes. The interview partners included officials from Austrian federal ministries, i.e. from the Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) as well as from the energy section of the Federal Ministry of Science, Research and Economy (BMWF), representatives from the Austrian Economic Chamber (WKO) and the Austrian Chamber of Agriculture (LKO) concerned with the representation of the interests of the Austrian biofuels industry, as well as an expert from an NGO which is active in the field of transport policy and environmental protection (the VCÖ).

The experts have been concerned with the EU's biofuel policy in several ways, e.g. in the form of implementing the EU's directives in Austrian law or by having been involved in the representation of specific interests, be it the interests of the Austrian government, the interests of the already established biofuel industries, the agricultural industries or the interests of environmental protection groups. This kind of interest representation usually takes place on multiple levels of decision making, from the local and regional level, to the national level and to the supranational level of the EU. Some of the interviewed officials from Austrian ministries have been concerned with the application of the EU's biofuel policy in Austria while others have taken part in consultations of the European Commission concerning the legislative procedures of the relevant directives concerning biofuels. In a similar way, the representation of private interests at the EU by the Austrian economic chamber and the Austrian agricultural chamber on the one hand and by environmental NGOs on the other hand usually takes place in many forms aiming to influence the development of the EU's policy. These interviews offer the

⁵ Detailed information about the interviews can be found in the Appendix.

perspective of those included in the representation of interests in the policy making process and provide the possibility to gain insight into the way the issues connected to the EU's biofuel policy have changed over the last years.

The second research aim was to understand the way the scientific foundations concerning the estimation of potential advantages and disadvantages of the large-scale application of biofuels have evolved. This adds a different perspective to the first approach of conducting interviews with national representatives of Austrian ministries, NGOs and economic interest groups active in the representation of interests on multiple layers of decision making. The scientific foundations of the estimation of the consequences of global biofuels are at least in theory not directly linked to individual interest groups. Two interviews were conducted with experts active in international research institutions, which have been concerned with creating scientific models and reports concerning issues of global biofuel policies, the IIASA and the FAO.

First, an economist from the International Institute for Applied Systems Analysis (IIASA) was interviewed. This interview provides insights into the perspective of an international research institution which has been directly involved in the creation of the scientific models used for modelling the sustainability of global biofuel production. In 2013, the IIASA was consulted by the European Commission on the topic of modelling the differences of the impacts of ILUC caused by the different feedstocks used for biofuel production in different locations in third countries. This perspective allows to observe the scientific foundations the European Commission relies on when it comes to the estimation of possibilities and threats connected to the large-scale technological application of biofuels. However, a drawback of this direct involvement is that it may not allow the interviewee to offer all available information because of the need for secrecy in an ongoing report. In any case, this interview offers insights into the perspective of the assumptions prevalent in the scientific foundations of the EU's decision making.

Second, a researcher from the Food and Agriculture Organization of the United Nations (FAO) was interviewed. This interview equally offered the possibility to gain insight into changes of the EU's biofuel policy over the past decades with special regard to the international dimension of the changing patterns of biofuel production and consumption and their influence on developing countries.

Both interviews with experts from international institutions concerned with the EU's biofuel policy show how the perspectives of such international institutions have evolved. These

institutions play an active role in the policy deliberation of biofuels since they provide scientific estimations of the impacts of global biofuel policies. These estimations may concern aspects of development policy as well as environmental policy and economic policy.

In each of the seven expert interviews conducted for this thesis, the core values of the EU's biofuel policy that have been identified in the analysis of the literature as well as in the EU documents were discussed and elaborated in the light of the specific developments that have taken place in the EU's biofuel policy as interpreted by each of the interviewees. In general, it is notable that the EU's biofuel policy was perceived during the interviews as having evolved from optimism and enthusiasm in the beginning to a more strictly regulated policy instrument which integrates different, soberer and more nuanced policy aims.

6.3.1 Agriculture

It became clear in all interviews that from its outset, the main function of the EU's biofuel policy has been the promotion of agricultural actors in the EU. The situation of overproduction of many agricultural products in the EU in the 80's and 90's has been mentioned in most interviews as one of the historic causes that led to the need to create new markets for those agricultural products from the EU. This is generally regarded as one of the most important drivers for the establishment of the roots of the EU's biofuel policy. Economic considerations have been made regarding production, taxes and trade in biofuels. The possibility to decrease the pressure on agricultural markets caused by overproduction in the EU has been identified as one of the main arguments used for the establishment of biofuels in the beginning.

However, it was equally acknowledged in all interviews that the much more prominently proclaimed and publicly legitimising aim of the EU's biofuel policy has been to increase the share of sustainable and renewable energy in transport and to reduce GHG emissions by introducing climate friendly biofuels.

The overarching aim of sustainable biofuels for transport has become connected to the economic and social interests that have emerged from the establishment of an industry around biofuels producing crop based biofuels of the first generation which is tightly linked to the agricultural production of biomass. In addition, the production of some biofuels was found to be linked to the production of by-products like protein for animal feed which would have to be imported if it were not available as a by-product from biofuels production.

One of the main influences that shaped the politics of biofuel in the EU has been the debate around the link between biofuel production and consumption in the EU and rising global food prices which had its first peak in 2008. This debate has been present during the interviews

in the arguments of both proponents and critics of the EU's biofuel policy. It was generally believed that the emerging trade in biofuels and the increased agricultural production for biofuels in developing countries has created a direct link between the politics of biofuel in the EU and negative environmental consequences in these countries. The interview partners differed however in their arguments about how to react to this problem, usually arguing in favour of the interests of the stakeholders their institutions represent.

6.3.2 Energy security

In addition to the aim of supporting the European agricultural industry, another less visible aim of the EU's politics of biofuel was found to be to reduce the dependence on energy imports and to increase energy security with biofuels. This aim has been mentioned in several interviews, though by far not as prominently as the aim to reduce GHG emissions. The use of biofuels in transport was intended to bring about a diversification of the sources of energy supply in transport, to reduce the dependence on oil and to increase the use of liquid energy carriers produced in the EU for the transport sector.

In the context of the EU's politics of biofuel, the aim of energy security has not been articulated as strongly as for example in the USA or in Brazil. This was reflected in the interviews, since most interviewees didn't think this aim was of large importance for the European Commission. However, the question of security of supply for the transport sector has been mentioned as an issue connected to the support of the EU's biofuels industry. In some of the interviews, security of energy supply has been mentioned as a topic that has been related at some point in the past to the discussions around biofuels in the EU, especially in cases of critical infrastructure like emergency vehicles and police and military vehicles.

The large amount of international trade in biofuels has introduced a new kind of dependence on foreign producers of biomaterials. Some interviewees argued that there is still a large potential for production of conventional biofuels in Europe, i.e. in the EU and in neighbouring countries. They based their arguments on the assumption that there are areas with unused arable land or agricultural land that can be used more efficiently. As prominent examples Romania, Bulgaria and Ukraine have been named. The idea to increase energy security by producing energy in the EU's zone of influence has been connected to the idea of supporting the production and consumption of biofuels in the EU, although it was not the most prominent argument for the support of biofuels during the interviews.

6.3.3 Sustainability

The most strongly publicly proclaimed aim of the EU in relation to its biofuel policy has been to save GHG emissions from transport. This aim is at the forefront in most of the EU's policy documents and it is often connected to the idea of the EU as a leader in climate change mitigation. It was also identified in most of the interviews as a central policy of the EU's biofuel policy.

The interviewees differed in their assessments regarding the sustainability of the current system of biofuel production and consumption. In this area, the shift in focus has been especially large since the implementation of the EU's politics of biofuel.

While environmental organisations have had a positive view on the idea to produce biofuels from waste and residues, soon after the implementation of the EU's biofuel policy they hinted at environmental problems caused by the large-scale biofuel industry that was established relying on the tax incentives created by the EU's biofuel directive of 2003. It was noted by several interviewees that the general apprehension of the sustainability of biofuels worsened after the debate around rising food prices in 2008 and the subsequent debate around ILUC which is still ongoing. In the eyes of many environmental organisations, the EU's biofuel policy is linked to the interests of the agro-industry and oil companies investing in these technologies to achieve a prolongation of their old business model. Some interviewees mentioned that when certain models and calculations of ILUC are considered, the GHG balance of some biofuels becomes negative depending mainly on the type of feedstock and the location where it is grown. Additionally, another line of criticism around the sustainability of biofuels argues that the sustainability criteria⁶ the EU implemented the RED in 2009 don't include mandatory social standards because of fears that this would contradict international trade laws, especially the WTO regulations (Ponte and Daugbjerg, 2015).

Biofuel producers and the representatives of the interests of the biofuels industry make more positive estimations about the sustainability of their products. Furthermore, they argue that it is necessary to protect the investments made in building large-scale biofuel plants. They urge the European Commission to refrain from lowering biofuel quotas for first generation biofuels since the way the sustainability of certain types of biofuels is calculated is still subject to debate. The very concept of ILUC still seemed very abstract to some of the interviewees.

⁶ As noted above, the European Commission has developed a model which relies on private institutions offering sustainability certifications which sometimes may include social standards. Ponte and Daugbjerg show that this policy model has had specific transnational consequences (Ponte and Daugbjerg, 2015). Overall, they observe that these certifications take place in an especially complex regulatory environment. See chapter 6.4.5.

The inclusion of an ILUC factor into the calculation of the GHG balance of biofuels for biofuel producers in the EU was one of the main factors of debate regarding the EU's ILUC directive. It was mentioned several times during the interviews that the biodiesel industry in the EU would have been hit especially hard by the proposed ILUC factor since oil seeds are regarded to have an especially large impact on ILUC. Additionally, the interviewees argued that there are no established alternatives to the first-generation biodiesel technology, which would make the blending targets set by the EU unreachable. In general, the estimations about the sustainability of biofuels based on the concept of ILUC are perceived to be very complex and characterised by a high degree of uncertainty which seems to make the debate around ILUC often more emotional than based on facts.

6.3.4 Outlook

When it comes to the impressions of the interviewees concerning the likeliness for future developments in the EU's biofuel policy, most of the interviewees mentioned the declining role of conventional biofuels but at the same time predicted some kind of possible field of application for advanced biofuels, be it in the area of aviation, maritime shipping or the use of agricultural machines and heavy machines in industrialised as well as in developing countries using locally and sustainably produced biofuels.

At the same time, some of the outlook scenarios the interviewees mentioned included the need to further tackle problems that might arise in the field of biofuels. In several interviews, the idea to use waste and residues from biological origins for the production of biofuels was linked to the problem of increased pressure on certain waste products that are already used in other areas like straw in the agricultural sector. Furthermore, there are certain problems when it comes to ensure that waste products were in fact waste before they were converted to biofuels and that they were not artificially created for the sole purpose of biofuel production. Only the efficient use of real waste products should benefit from the incentives for advanced biofuels.

The current proposal of the European Commission for a recast of the Renewable Energy Directive was met with scepticism, both from proponents and from critics of biofuels. While critics argued that the gradual fade out of food based biofuels from 7% in 2021 to a maximum share of 3,8% by 2030 would be too slow for an effective abatement of their increasing sustainability problems, proponents of biofuels criticised that this rate was scientifically unjustified and would still pose an economic threat to the established biofuel industry in the EU. Some of the interviewees argued that the proposed minimum share of advanced biofuels of 1,5% by 2021 could not be met considering the current state of advanced biofuel

technologies, and that the possibility to reach the aim of 6,8% by 2030 would therefore equally remain uncertain. Furthermore it was criticised that the exhaustive list of feedstocks and technologies for advanced biofuels in the proposal for the new Renewable Energy Directive would be too rigid. This argument was by the way also raised in an opinion statement by the EESC on the European Commission's proposal (EESC, 2017).

6.3.5 Global effects of biofuels - IIASA

Regarding the scientific fundamentals of the EU's politics of biofuel, the interviews with researchers from IIASA and from the FAO are of special relevance. These institutions are two examples of the role that modelling and research play in the framing of the future development of the EU's politics of biofuel. They provide scientific advice, studies and reports which are used by the European Commission in the drafting and redrafting of its policies. The following analysis focuses on the interview with the researcher from IIASA.

As mentioned above, the IIASA has most recently been involved in a study on the effects of ILUC caused by EU biofuels. This study has been commissioned by the European Commission and has been conducted between 2013 and 2015. The study was initiated by the Directorate-General for Energy of the European Commission⁷. Two other research institutions, Ecofys and E4tech, worked together with IIASA to model the effects of ILUC on the assessment of GHG emissions from the EU's policy concerning biofuels (Valin, Peters and van der Berg, 2015). This study on the land-use effects of the politics of biofuel in the EU has been conducted by IIASA within its "Ecosystem Services and Management" research division.

The main topics of this interview concerned the sustainability issues that arose from global and European biofuels policies, the possibilities to model the different effects from those biofuel policies and to influence the negative outcomes of these effects as well as the different perceptions by different interest groups on these issues.

The outset of the EU's biofuel policy had been determined by aims to increase agricultural production within the member states. However, the interviewee mentioned that the EU's biofuel policy included a much larger share of explicitly articulated environmental aims already from the beginning than for example the biofuel policy in the USA which was much more focused on energy security. The influence of environmental issues on the EU's biofuel policy has led to

⁷ Interestingly, the previous study on ILUC that was the basis for the EU's ILUC directive of 2015 has been commissioned by the Directorate-General for Trade while the organisational centre of the EU's biofuel policy lies in the section for Rural Development in the Directorate-General for Agriculture. This illustrates the different organisational sectors that deal with biofuel issues within the European Commission and hints at a development in the problem perceptions connected to biofuels.

overlapping policy areas where different competing interests had to be combined in a single coherent policy for EU biofuels. Therefore, the main challenge in the EU has been to deal with environmental aims and agricultural interests at the same time. At the outset of the intensified programme for biofuels in the EU, the aims of energy independence have been much less pronounced than in the USA. Even now, the aims of energy security play only a minor role in the EU's biofuel policy. Conversely, the influence of large agro-economic actors is still regarded as prevalent today.

After the global food price spikes and the following discussions about the relative influence of biofuels on the pressure on global food prices, there has been a shift in the perception of first generation biofuels by stakeholders. The idea of biofuels from edible plants has become much less attractive and the first generation of biofuels from edible plant products in the EU is seen to be "close to saturation". The technologies producing advanced biofuels from switchgrass, straw, corn-silage or other non-edible plant products like forestry residues have recently been given more attention by stakeholders. Still, this development is regarded critically by the interviewee since some of these new products might entail similar environmental risks as first generation biofuels when produced in large-scale dimensions. They might build the base for a new kind of biofuels industry which creates additional demand for land resources, water resources and fertilisers.

The formation of new economic interests in this field with different competing groups is perceived to be one of the most acute challenges for biofuels in the EU. There are believed to be differences in the interests depending on which raw materials can be used by which actor. Some of the new sources of biofuels like straw from wheat production are seen to be attractive for the established agro-economic interest groups producing biofuels from edible plant products because they don't need to change their crops and can sell a product they already produce. Other sources for biofuels are seen to be less attractive for the already existing biofuels industry which means that new economic actors might see the chance to invest in this area. This would possibly create new demand for land from actors which have not been active in the market for agricultural land before.

The interviewee argued that the EU has the potential to effectively steer the international trade in biofuels since WTO norms do not prohibit the introduction of sustainability criteria valid for all producers, i.e. not only directed at individual producers. The EU's sustainability criteria for biofuels are generally believed to be in line with WTO law. However, the interviewee pointed out that they can only be effective if they don't neglect the imports of crops

or oil which may be processed to biofuels within the EU. While sustainability criteria for biofuel production are regarded as a positive and promising way to enhance the environmental sustainability of biofuels, the interviewee argued that they need to be extended to other agricultural products, especially those for food and feed.

The EU's ability to counter negative effects from ILUC is regarded as much less pronounced than the ability to influence international trading patterns because of the complex dependencies arising from ILUC. Instead of regulating the demand side of biofuels to fight deforestation and other negative environmental effects, it would be more effective to counter these negative effects directly, the interviewee argued.

Furthermore, the dependencies between the price of crude oil and biofuels are found to be rather complex. At first sight, it seems like oil would be directly competing with biofuels but there are also other factors reinforcing biofuels since for example a low oil price usually leads to higher demand for transport fuels which in the case of biofuel blending mandates also leads to more demand for biofuels. Additionally, a lower oil price leads to lower prizes for fertilisers and subsequently to an increase in agricultural production which tends to make biofuels cheaper.

6.3.6 Development policy - FAO

The following analysis focuses on the interview with the researcher from the Food and Agriculture Organization of the United Nations (FAO). The FAO is an international organisation dealing with global issues concerning the agricultural sector and food production as well as development policy. Activities in global energy governance include studies on the application of sustainable energy sources in developing countries as well as the analysis of interlinkages between agriculture, food production and sustainable energy production. In this regard, the organisation is concerned with matters of environmental economics and is an active participant in the methodological development of tools to assess the viability of sustainable energy technologies. Therefore, the models, reports and activities of the FAO have the potential to become effective in global energy governance since they are used in the policy deliberation on development and sustainable agriculture and the issues surrounding renewable energy production from biomaterials by different actors in industrialised as well as in developing countries. They are also relevant in connection to other agricultural issues like food production and land use.

The issues surrounding the production of sustainable renewable energy from biomaterials are generally regarded from a development perspective by the FAO. Therefore, the implications

of biofuels for developing countries are at the core of the FAO's analysis of biofuels. The potential benefits of biofuels are in these cases more focused on the increase of energy security and availability of energy in rural areas by using agricultural residues or locally grown crops for biofuels. The production of liquid biofuels from specifically grown crops is however not regarded as a universal policy alternative but rather as a possibility with benefits and drawbacks in terms of sustainability that must be reviewed on a case by case basis.

When it comes to the use of biofuels on a larger scale, the implications for developing countries are regarded as much more negative in many ways. The pressure of international markets for biofuels made from agricultural products creates increased demand for agricultural land. Therefore, biofuel investors, especially from Europe, are a major driver for land acquisitions in developing countries. This phenomenon is known as land grabbing. The EU's sustainability criteria did not successfully reduce the pressure on international land markets. There are several international roundtables, private and voluntary certification schemes which are created by companies to regulate their own sustainability. These initiatives try to regulate certain aspects of the sustainability of biofuels but they are not effective in regulating issues like land grabbing and they often suffer from many issues like the ineffectiveness of their comply mechanisms and the lack of enforcement of violations. The two other foreseen possibilities for the certification of the sustainability of biofuels, bilateral agreements and national systems of certification, are not used by most actors in this area.

The developments in the EU's biofuel policy are largely attributed to the changes in public opinion on the sustainability of biofuels since the media has had a major impact on the way biofuels are perceived by the electorate. Especially the first generation of biofuels is perceived as a driver for land-use change and as a factor which potentially leads to rising international food prices. Furthermore, the development of energy markets, especially of the oil price, has a major impact on the economic viability of biofuels. This adds to the complexity the EU must consider in its regulations of biofuels. Furthermore, it is mentioned that large-scale agricultural activity is itself linked to the development of the oil price since agricultural machines are largely driven by fossil fuels and large-scale agriculture relies on artificial fertilisers which are also connected to fossil fuels.

In the development context, there are believed to be potentials for sustainable sources of renewable energy in the form of biofuels, given that they are produced locally on a small-scale basis. The EU's system of blending targets on a scale that relies on the import of feedstock or biofuels in the context of international trade is regarded as an inherently unsustainable system.

The interviewee argued that it may not be possible to effectively make this system fully sustainable since international trade rules of the GATT and the WTO may not allow the implementation of such criteria that would be necessary to overcome the environmental and social problems of biofuels like for example the problem of land grabbing in developing countries.

6.4 Global Repercussions – Literature Review

In the academic literature, the political issues surrounding the EU's system for the certification of the sustainability of biofuels have already received some attention. The strong inclusion of private actors has introduced new forms of regulatory structures. The nature of these new regulatory structures has been described by the term “transnational hybrid governance” (Ponte and Daugbjerg, 2015). Furthermore, biofuels are regarded by some authors as an exemplary case for the difficulties and problems the management of alternative energy resources might entail (Kay and Ackrill, 2012). This section reviews the already existing literature on the influence of the EU's politics of biofuel in different spheres of global politics.

6.4.1 International institutions and the governance of biofuels

There have been several attempts to create new fora on the global level for the regulation of issues around biofuels. So far, their influence on the governance of global issues concerning biofuels remains limited. One example for such an institution is the “Tripartite Task Force” created in 2007 as a forum for information sharing on biofuels between Brazil, the USA and the EU. Another example is the “United Nations International Biofuels Forum” (IBF) which was equally created in 2007. The IBF also has the aim to facilitate the sharing of information and experiences with biofuel production between member states and includes China, India and South Africa besides the main producers Brazil, the USA and the European Commission.

Another example for an international forum that is concerned with biofuels is the Global Bioenergy Partnership (GBEP) that was introduced in 2005 by the G8+5 in its “Gleneagles plan of action” and founded in 2006 by the Commission on Sustainable Development (CSD). The original purpose of the GBEP is to promote the global use of bioenergy with a special focus on developing countries. The GBEP is described by Kay and Ackrill as a forum for informative discussions but without major impacts on policy making (Kay and Ackrill, 2012, p. 302).

All these attempts to create new institutions seem to be in accordance with the assumptions of historical institutionalism that new problems lead to the creation of new institutions with specific tasks instead of the adaptation of existing institutions. In the case of

GEG this adds to the already existing plethora of institutions and to the phenomenon of “institutional layering”.

6.4.2 Non-state actors

In their article on the EU’s politics of biofuel, Kay and Ackrill point to the emergence of non-state actors in the international governance of biofuels. They argue that this emergence is notable since the implementation of some aspects of biofuels sustainability criteria happens within international commodity “roundtables”, made up of economic and civil society actors (Kay and Ackrill, 2012, p. 302). International roundtables are a form of self-regulation of private economic actors coming together to set their own rules and standards. One prominent example is the RSB, the “Roundtable on Sustainable Biomaterials” (before 2013 the name of this roundtable was “Roundtable on Sustainable Biofuels”). In such international roundtables, private economic actors, i.e. usually representatives of large producers, discuss regulations for sustainability issues they can agree to voluntarily adhere to.

6.4.3 Global impacts of the EU’s biofuel policy

For their article on the EU’s biofuel policy, Kay and Ackrill have led a series of interviews with officials concerned with biofuel policies in the EU, the USA and Brazil. They identify similarities and differences in the biofuel policies of the EU and the USA. Most notably, they mention “energy security, climate change mitigation and rural development” as core elements of both the EU’s and the USA’s biofuel policy (Kay and Ackrill, 2012, p. 299). While the USA mainly showed to be interested in the energy security aspect and only later made serious efforts to consider the potential environmental benefits of biofuels, the EU has “positioned itself as a global leader in climate change politics” during the decade preceding intensified biofuel production and put its focus more on the aspects of environmental sustainability and rural development (Kay and Ackrill, 2012, p. 300).

The EU’s mechanisms regulating the sustainability of biofuels have been developed considering the environmental impacts of the EU’s biofuel policy in third countries. Several types of markets play a crucial role in the policy making surrounding biofuels. Biofuel markets overlap with energy markets and markets for agricultural commodities “which are volatile and thus transmit price uncertainties to biofuel markets” (Kay and Ackrill, 2012, p. 296). According to Kay and Ackrill, low oil prices make biofuels less competitive and high food prices may increase the pressure on certain sources of biofuels like sugarcane in Brazil (Kay and Ackrill, 2012, p. 302). Furthermore, increased demand for biofuels and for agricultural production

influences land markets. Increased production of first-generation biofuels has led to increased demand for agricultural land on a global scale (Kay and Ackrill, 2012, p. 303; Bracco, 2015). In a study on the effectiveness of the EU's biofuels sustainability criteria to regulate foreign land acquisitions that European companies undertake in developing countries, Bracco has observed that "biofuels feedstock cultivation is by far the main purpose for European land acquisitions", which were at the time of the study focused on developing countries in Africa (Bracco, 2015, p. 133).

The production of biodiesel as well as ethanol is rising in developing countries. In theory, the EU has implemented procedures for actors from developing countries to take part in the policy process of the formulation of the sustainability criteria for biofuels. However, due to several factors like a lack of information and resources these options are rarely made use of (Di Lucia, 2010). The EU's influence on these actors happens mainly through the regulation of market based mechanisms.

6.4.4 Interactive governance and ILUC

In recent years, there have been several publications on the effects of the EU's regulation of the sustainability of biofuels and the way environmental governance is carried out. This section analyses some of those publications and analyses the prevalent perspectives on the governance mechanisms that are related to biofuels in the EU.

Kay and Ackrill suggested already in 2012 that political measures must actively be taken to ensure the economic competitiveness of biofuels as well as their sustainability. At the same time, they suggested that political mechanisms need to ensure the long-term incentives for biofuel development in the global transition towards a low-carbon economy and to reduce uncertainty to promote the development of advanced biofuel technologies, if biofuels are meant to be a significant part of a future sustainable energy mix. The authors point out that policy-makers must show a "credible commitment to longer term targets for biofuels" in order to establish a path towards a future "biofuels economy" (Kay and Ackrill, 2012, pp. 303–305).

Di Lucia provides a similar assessment of the situation and similar policy advice concerning the governance of biofuels, in particular concerning their sustainability, in his paper on the "governability of transport biofuels in the EU" (Di Lucia, 2013). In this paper, the author focuses on the question of the "governability" of biofuels in the EU and applies the concept of "interactive governance" which allows him to include the governing activities from societal actors into the analysis in addition to more traditional forms of governmental activities by official bodies (Di Lucia, 2013, p. 83). This concept distinguishes several aspects of the

governance process. Most importantly there is the distinction between the three fundamental elements of the “System-to-be-governed (SG)”, the “Governing System (GS)”, a subsystem composed of the “actors and institutions” involved in the governance process, and the “Governing Interactions (GI)” which happen between these two systems in the form of “interventions” when the SG intervenes into the governance process, or in the form of “interferences” when the GS sets hierarchical rules and interferes into the SG, and also in the form of “interplays” when the hierarchical actions of the GS are accompanied by collaborations with the SG (Di Lucia, 2013, pp. 83–84).

Di Lucia shows that the governability of the EU’s biofuel system has decreased substantially over the period 2003-2012. The “deadlock” that has been created within the EU’s biofuel policy owes largely to the fact that the globalised market and its impacts on the overall sustainability of biofuels have become an issue to be governed by the Governing System while at the same time there exists “a lack of governing capacity at international/global level” (Di Lucia, 2013, p. 86). Furthermore, many diverging and mostly conflicting and even contradicting views by different actors like farmers, biofuel industry lobbyists, environmental NGOs and other actors concerned with the EU’s politics of biofuel have evolved between 2003 and 2012, most importantly concerning the severity of the impacts of ILUC on the sustainability of biofuels (Di Lucia, 2013, p. 82).

This increasing confrontation and conflictual situation among actors in the EU’s biofuel policy, especially concerning the issue of ILUC, is a fact that has been observed by several authors concerned with the topic of the EU’s biofuel policy. Humalisto has pointed to this fact in his analysis of the different actors taking part in the EU’s biofuel policy formulation. He has identified eight different clusters of actors with different attitudes towards the issues surrounding ILUC (Humalisto, 2015, p. 153ff).

ILUC is described by Di Lucia as a debated concept which “can only be measured and illustrated through modelling” and which creates “a context of high scientific uncertainty” for policymakers (Di Lucia, 2013, p. 82). This increasing complexity in conjunction with the conflicting views of actors on the subject of ILUC is regarded as one of the major obstacles to the governability of biofuels (Di Lucia, 2013, p. 85). In addition to these conflicting interests within the Governing System leading to a reduction of its governance capacity, Di Lucia observes a further lack of “governing capacity at global and international level” as well as a constant lack of “collaboration especially at international level” in the governance process around biofuels (Di Lucia, 2013, p. 87).

As Di Lucia observes, the Governance Interactions, i.e. the set of governance mechanisms applied in the governance process between the Governing System and the System-to-be-governed, have in general evolved from mainly top-down “interventions” of governmental actors in the beginning of the EU’s biofuel policy in 2003, e.g. in the form of tax incentives, to the implementation of more inclusive modes of governance “interplays” (Di Lucia, 2013, p. 85). These more inclusive modes of governance comprise consumer information campaigns, the consultation of NGOs during the governance process and the creation of regulatory bodies including private actors and stakeholders. Di Lucia gives the example of the International Roundtable on Sustainable Biofuels⁸. These modes of governance have been a means to include business actors as well as actors from civil society to be more actively involved in the governance process of issues surrounding biofuels. Still, Di Lucia argues that the Governance System of biofuels remained geographically focused on the EU and that there are little transnational or international Governing Interactions with countries outside the EU (Di Lucia, 2013, pp. 85–86).

Following his analysis, Di Lucia proposes two main strategies for achieving better governability of biofuels in the EU. The first strategy involves improving the governing capacity of the system, the second strategy focuses on reducing the specific governance needs of sustainable biofuels (Di Lucia, 2013, pp. 86–87). The actual governance capacity of the Governing System must be appropriate to the challenges of the governance needs for achieving successful governing results. To increase the governance capacity of the Governing System, several steps are proposed. First, the conflicting positions among actors around the sustainability of biofuels have to be approached and alleviated (Di Lucia, 2013, p. 85). Second, it is proposed to enhance international collaboration and communication between actors within the field of biofuels from different countries. To achieve this, it is regarded as necessary to “establish governing interactions at international level, both bilaterally and multilaterally” (Di Lucia, 2013, p. 87).

The second strategy for increasing the governability of biofuels, to reduce the governance needs, is regarded as even more complicated than the first one, even though there are several options to achieve this aim. One way to arrive at a reduction in governance needs of biofuels that Di Lucia mentions would be to limit international trade in biofuels and feedstock for biofuels, a strategy that would be, as he grants, hardly viable in a globalised world economy

⁸ The body that is currently known as the “International Roundtable on Sustainable Biomaterials” has in the meantime been renamed and has been called the “International Roundtable on Sustainable Biofuels” before March 2013.

(Di Lucia, 2013, p. 87). A second option would be to increase the development and application of new technologies that are more beneficial for the environment as opposed to conventional biofuels. However, this is also regarded as an option bringing about many uncertainties and new risks (Di Lucia, 2013, p. 87). As a third option to reduce the governing needs of the System-to-be-governed, Di Lucia mentions that the governance demands which the Governing System faces in relation to biofuels should be adjusted to the real possibilities concerning the governance of global biofuels. He argues that “[s]etting overly ambitious targets without considering governance capacity and limitations could result in disappointing outcomes and unwanted effects” (Di Lucia, 2013, p. 87).

In his article, Di Lucia gives a thorough analysis of the developments in the governability of biofuels during the period 2003-2012 and he enriches his analysis with insights into the state of the governance mechanisms applied within the EU in relation to the sustainability of biofuels.

6.4.5 Transnational hybrid governance

Ponte and Daugbjerg have analysed the international governance structures that have emerged surrounding the sustainability of biofuels. They refer to these governance structures as “transnational hybrid governance”. While Di Lucia argues for the need of more international cooperation in his article on the governability of biofuels, Ponte and Daugbjerg have analysed the international governance structures that have emerged so far in the field of biofuels. The aim of international collaboration on a governmental level that Di Lucia envisages is however quite different from the reality of the system of “transnational hybrid governance” that Ponte and Daugbjerg have analysed. Although they identify international structures for the regulation of the sustainability of biofuels, these structures are based on relatively weak mechanisms of regulation which rely on private certifiers of biofuel sustainability. For several reasons, these private certifiers are less likely to succeed when it comes to the implementation of specific policy aims like for example those connected to social sustainability than Di Lucia’s vision of bilateral or international regulations would aim to be.

In their paper, Ponte and Daugbjerg focus on the specific impacts that the introduction of the EU’s system for the certification of the sustainability of biofuels has had on the way the sustainability of biofuels is governed on a global scale, regarding both environmental and social sustainability. The EU’s system of certification has contributed to the establishment of, as the authors describe them, “new hybrid governance forms where public and private come together in complex configurations that include civil society, business” as well as other new kinds of private actors (Ponte and Daugbjerg, 2015, p. 96).

At the core of the article's argument lies the idea of a double hybridity that can be observed within the governance of biofuels in the EU. Furthermore, these two kinds of hybridity are characterised by their transnational nature since many of the rule making decisions take place in a way that is neither international nor globalised but nevertheless involves actors from different national contexts (Ponte and Daugbjerg, 2015, p. 99).

The first hybridity is identified in the interaction between the private and public actors involved in the regulatory mechanisms since the EU's system for the certification of the sustainability of biofuels relies completely on private certifying institutions while these private certifiers are at the same time heavily dependent on the EU's regulations. Their economic viability rests on the EU's establishment of blending targets for biofuels and on the implementation of advantages for certified biofuels so that the producers and retailers have incentives to pay for certifications (Ponte and Daugbjerg, 2015, p. 97). Furthermore, the certification of the sustainability of biofuels has to take place within the country of origin of the specific biofuels so that in effect, "the EU needs private certification schemes to extend its authority and capacity to implement the environmental sustainability criteria beyond its territorial borders" while the private certifiers receive their "legitimacy as a market-based instrument of sustainability governance" through these rules (Ponte and Daugbjerg, 2015, p. 104). The orchestration of these private certification schemes has proven to be a relatively efficient tool for the regulation of biofuels since the only other option to regulate biofuels sustainability in areas beyond the EU's territorial power, bilateral agreements, has not yet been made use of (Ponte and Daugbjerg, 2015, p. 109). However, this system has also provided "opportunities for forum shopping and adverse competition" which added to the complexity that made biofuels an issue with a high degree of "conflicts among actors" and the ensuing difficulty to govern effectively (Ponte and Daugbjerg, 2015, p. 109). The term "experimentalist governance" is used by the authors in this context to describe the idea that through "functional rather than structural architectures" and "openness to periodical revision", the establishment of new forms of transnational governance might "be better able to overcome the path dependency and institutional inertia that plague international regimes" although this might also entail the risk of creating opportunities for forum shopping and even "may actually undermine private sustainability initiatives" (Ponte and Daugbjerg, 2015, p. 101).

The second hybridity in the transnational governance of biofuels is identified by the authors in the coexistence of the EU's system for the certification of the sustainability of biofuels with the WTO trade rules. The importance of the WTO rules for the EU's biofuel

sustainability certification schemes stems from the fact that the EU is heavily dependent on biofuel imports to satisfy the demand for biofuels created by the mandatory blending targets of its Renewable Energy Directive (RED) and the Fuel Quality Directive (FQD) (Ponte and Daugbjerg, 2015, p. 105). The free trade rules of the WTO are assumed to be the main reason why the EU didn't include binding criteria for social sustainability in its rules for the sustainability of biofuels in 2009 since this might have constituted a violation of these international trade rules (Ponte and Daugbjerg, 2015, p. 98). Although there has been an initiative within the European Parliament to include "social sustainability criteria relating to land rights, worker's rights, and food security" in the original sustainability criteria, the Commission's view that such rules would violate WTO law was maintained eventually. Instead, the EU intentionally aimed to design a system of private certification schemes that would serve the purpose of implementing criteria of social sustainability on a private level. The concerns about social sustainability of biofuels were still high but WTO law prohibited the direct implementation of social sustainability criteria (Ponte and Daugbjerg, 2015, p. 107). Whether the indirect recognition of social sustainability criteria by the EU in the form of private certification schemes might also constitute a violation of WTO law is still subject to debate. However, a legal challenge seems unlikely since the issue of "labour conditions" is a sensitive matter that many developing countries usually want to avoid to draw attention to (Ponte and Daugbjerg, 2015, p. 108).

Currently, the Commission must only publish reports on the impact of its biofuel policy on social sustainability. However, the European Court of Auditors found that the information provided is often insufficient (ECA, 2016, p. 23).

6.4.6 Impacts on policies concerning developing countries

It was largely due to the EU's quickly increasing need to import biofuels that an international market for biofuels was developed so fast. This need resulted from the demand for biofuels created by the EU's mandatory blending targets implemented in the member states. Many developing countries perceived biofuels as an opportunity to invest in this energy technology that would enable them to make use of their climatic and economic advantages, i.e. warm climate and the availability of cheap labour, to produce biofuels as a commodity for export to the EU. In addition, European investors have been involved in land acquisitions in many developing countries with the aim to make financial profit from the production of biofuels for the EU's market.

The economic and social impacts of the EU's biofuel policy on developing countries have been analysed in a report which the AETS Consortium, a private international consulting company with experience in the field of development and economic policies, has drafted for the European Commission in 2013. In this report, there are different perspectives considered that describe how the EU's biofuel policy has already had impacts on developing countries, including several kinds of economic, environmental and social impacts (AETS Consortium, 2013, p. 1).

One of the fundamental assumptions that this report makes about biofuels is that if they are "managed correctly, [they] can contribute to rural development and economic growth" (AETS Consortium, 2013, p. 7). This is believed to be especially true for developing countries where changes in agriculture could potentially have a great impact on societies and the economy. However, there could be significant differences in the scale of impacts between different countries depending on their ability to ensure sufficient food supply for their societies. It is mentioned in this report that the food crisis in the "Sub-Saharan Africa (SSA) region" had been related to a number of factors that led to rising food prices like "low and declining productivity of agriculture, coupled with exceptionally unfavourable weather conditions and rising international oil prices" while the impact of increased demand for biofuels is regarded by the authors of this report to be less significant for the rise of food prices in these regions than other factors (AETS Consortium, 2013, pp. 1, 103).

While biofuels are regarded to be potentially beneficial for developing countries, if managed correctly, they are equally assumed to be one of many factors that will add to the rising pressure on food prices as well as to the interests of investors to increase their activities of land acquisitions in developing countries (AETS Consortium, 2013, p. 1). At the same time, the increased domestic use of locally and sustainably produced biofuels, e.g. from agricultural waste and residues in specific regions in developing countries, is one of the policy recommendations the FAO and related organisations still make with regard to the further implementation of the technology of biofuels in developing countries (FAO and USAID, 2015, p. 76). Depending on the kind of biofuel and on the individual situation of the producing country, there are believed to be several kinds of benefits that might arise from local biofuel production and consumption in developing countries, mainly regarding the increased energy access in specific rural areas:

Where energy access (in particular for remote rural areas) is low and where deforestation for firewood and charcoal is high, biofuels locally produced for local

use could become an alternative with positive environmental and social impacts.
(AETS Consortium 2013, p.106)

Furthermore, there are believed to be potential benefits of “economic growth and long-term improvements in food-security” (AETS Consortium, 2013, p. 38).

These recommendations however always include the caveat that many individual factors of several local conditions must be considered for the use of biofuels to be environmentally and socially sustainable as well as economically beneficial for rural communities. The use of specifically grown crops for the use as biofuels “remains controversial depending on the biomass source” (FAO and USAID, 2015, p. 24). Large-scale production of biofuels for export is believed to be highly problematic regarding environmental and social impacts like land grabbing. The concept of the availability of idle or marginal types of land is perceived to be potentially misleading since in most cases those types of land are already being used in informal and unrecognised ways and are important for the environment (AETS Consortium, 2013, pp. 107–108). Therefore, the authors recommend a case by case approach to the classification of land as idle or unused land before declaring it as available for the growth of biofuel feedstock (AETS Consortium, 2013, p. 108).

7 Analysis and Discussion

This section analyses the developments that have been described in the research section through the perspectives of the theoretical foundations, i.e. historical institutionalism, constructivism and the concept of global governance, to identify the relations between the politics of biofuel in the EU and mechanisms of GEG.

The research question that has been formulated for this thesis focuses on the relation between the EU’s politics of biofuel and GEG: *In how far has the development of the politics of biofuel in the EU been related to processes of change in global energy governance over the last twenty years?* To provide an answer to this question, it is first necessary to clarify the importance of biofuels for GEG since it depends on the specific context in which thematic area issues surrounding biofuels are primarily located.

The research section has shown that, while the policy option of biofuels in the EU has in its early stages in the 1980s and 1990s mainly been regarded from the perspectives of energy security and agricultural development, it soon became clear that environmental questions connected to biofuels gained importance. This was on the one hand because of the way the European Commission legitimised its extensive biofuel programme starting in 2003, i.e.

through the idea of reducing GHG emissions. On the other hand, environmental problems caused by biofuels became more and more visible and prominent in the discussions around biofuels after the global food price crisis around 2008. Nevertheless, biofuels are essentially an energy issue and are often organisationally located in energy departments. Moreover, biofuels in transport are sometimes regarded as an early example of the broader challenge to “decouple emissions growth from energy consumption in the economy” (Kay and Ackrill, 2012). Therefore, the connections between developments within GEG and developments of the EU’s biofuel policy can be regarded as an early stage of the process that needs to take place when it comes to the challenge to reorganise the structures of decision making and rulemaking in the field of global energy so that technological and social innovations can take shape within the shift towards a decarbonised global economy.

7.1 The Dynamics of the Regulation of Biofuels

The research section of this thesis on the origins and the developments of the EU’s biofuel policy has shown that there are several ways in which the changes within the different stages of the EU’s biofuel policy can be described. In the literature, there are equally different approaches. Several interpretations of this process focus primarily on the internal dynamics within the EU, others analyse its impacts on a global scale.

Humalisto has shown in his analysis of the internal developments in the EU’s biofuel policy that the fundamental principles of the way the European Commission treats biofuels have been relatively consistent over the last two decades (Humalisto, 2013). Di Lucia states that many of the sustainability issues that the EU’s politics of biofuel faces could have been foreseen because of the already existing “scientific knowledge and experience with classical agriculture” and that these issues “would have been easier to address and govern in 2003” (Di Lucia, 2013, p. 88). The complex issues surrounding biofuels are not regarded by Di Lucia as inherently opposed to a high degree of governability of biofuels. He argues that only when the issues of sustainability are linked to the policy aims of biofuels and the system of biofuel production and consumption is spread around the globe, the governability of biofuels decreases substantially.

Other perspectives on the dynamics of the EU’s politics of biofuel focus on the economic and technological potential of this technology. In their paper on the governance of the emerging biofuels economy in the USA and the EU, Kay and Ackrill highlight the important impacts of market mechanisms on biofuel policies (Kay and Ackrill, 2012). However, when it comes to the promotion of advanced biofuel technologies, market forces alone are insufficient for the governance of “complex innovation regimes” because they are categorised by intrinsic “long-

term issues of direction, of uncertainty and institutional change” (Weber, 2005, p. 100). Therefore, Kay and Ackrill stress the fact that policy makers need to show an especially high degree of dedication to their biofuel policies to create a stable and reliable market environment. The IEA gives similar policy advice in its report “Tracking Clean Energy Progress 2014”:

Long-term, stable policy frameworks that reduce the risks associated with advanced biofuels projects are needed to trigger further investments into commercial-scale advanced biofuel plants. This can be, for instance, in the form of a dedicated advanced biofuel quota or a premium paid for each litre of advanced biofuel blended to the fuel pool. (IEA, 2014b, p. 44)

Additionally, the IEA states that out of all the countries that have introduced biofuel programmes, i.e. over 50 at the time of the report, only the USA and the member states of the EU have implemented sustainability criteria, and that in comparison between these two systems, the EU’s sustainability criteria were “broader and more detailed” (IEA, 2014b, p. 44). This is in line with the assumption that the EU’s sustainability criteria attempt to have an effective influence on the way global biofuels are produced. It can be argued that this influence has primarily taken place through the means of the promotion of sustainable biofuels on an international level and by the implication that the certification of the sustainability of specific forms of biofuel production enhances a stable market environment for the biofuels industry within the EU.

7.2 Global Energy Governance and the Institutionalisation of Biofuels

The main question this thesis is concerned with is framed around the relation between the politics of biofuel in the EU and the developments in the structures of GEG. It has already been noted in previous chapters that the ways in which global energy governance takes place are characterised by a relatively low degree of formality and institutionalisation. In chapter 3.2 it has been pointed out that GEG in its current form is dispersed around many different institutional arrangements with overlapping competences.

As the research section revealed, there has been a trend to create new institutional structures on the international level to deal with specific problems posed by the global trade in biofuels. The processes that led to the creation of these institutional structures show several tendencies that have been predicted by historical institutionalism, as this section argues. First, there are clear tendencies towards institutional layering. This further increases the fragmentation of GEG. Second, there is a strong path dependence in the field of global trade

institutions relevant for the possibilities to shape the global trade in biofuels. Third, the reaction to new challenges happened largely through incremental reform, leaving the foundational assumptions intact while adding new layers. This situation led, fourth, to a situation characterised by policy incoherence where partly competing policy aims must be combined.

7.2.1 Institutional layering

It is notable that in 2007, at a relatively early stage of the EU's biofuel policy, the EU took part in two initiatives governing the global trade in biofuels. First, the Tripartite Task Force on biofuels was created in 2007 with the aim of bringing together specialised experts on the standardisation of biofuels from the governments of the USA, Brazil and the European Commission, in order to reduce technical and regulatory incompatibilities and thereby to increase options for trade between these countries. Second, the International Biofuels Forum (IBF) was created, an international institution dedicated to the promotion and standardisation of biofuels with the idea of bringing together the major biofuel producers and consumers with participation of the European Commission, the USA and Brazil as well as China, India and South Africa. The IBF was created to connect the major biofuel producing and consuming countries, to ameliorate information sharing between them and to enhance the standardisation of biofuels to promote global trade in biofuels (IEA, 2014a).

At the time of the creation of these two institutions, the EU still actively pursued its role as a global leader in the fight against climate change as well as in the field of the promotion of renewable energy technologies. The fact that the European Commission took part in the creation of these international institutions underscores the intention of the EC to be at the forefront of the developments in the field of renewable energy governance, in this case of the governance of biofuels. This increased the ability of the EU to set the international agenda in this area and to take part in the creation of international institutions.

Additionally, the creation of dedicated international institutions concerned with the issues of information sharing on the topic of biofuels and the standardisation of biofuels is one of the factors that represents the institutional layering in the field of GEG. Instead of making use of already existing international fora to deal with the upcoming new issues connected to the international trade in biofuels, the creation of dedicated institutions seems to serve the purpose of protecting the interests of the powerful nations in this area, since these institutions are formed by the major biofuel producing and consuming countries.

Within GEG, many other institutions in the field of the regulation of biomaterials and energy have been created over the past years. The Global Bio-Energy Partnership (GBEP) was

created in 2006 as a result of the Gleneagles Summit of the G8+5 including Brazil, China, India, Mexico and South Africa. In 2009, the International Renewable Energy Agency (IRENA) was created after a process of creation that stretched back to 2004. While proponents celebrate the establishment of this dedicated international institution as a signal for the advancement of renewable energy, some also hint to the fact that the International Energy Agency (IEA) already has sections dedicated to renewable energy, among which is a section that deals with bioenergy. However, membership of the IEA is limited to OECD countries which makes the IRENA a more universal institution. Still, the effects of institutional layering are clearly visible in the field of global biofuels and of GEG. The creation of private institutions like the “International Roundtable on Biomaterials” adds to the institutional landscape since they are also concerned with matters of standardisation of biofuels and certification of the sustainability of biofuels.

7.2.2 Path dependence

The concept of path dependence, developed in historical institutionalism, can be observed on three stages in the EU’s biofuel policy. First, path dependence occurred in the creation of the EU’s biofuel policy. When it came to the original formulation of the biofuel policy, the EU implemented a policy that was intended to support both European agricultural actors and the implementation of a climate friendly form of production of renewable energy to increase energy security. Considering the institutional framework of that time, the focus was more on the internal developments of the EU and less on international implications of the production of biofuels. As has been laid out in the hermeneutic analysis of EU documents, the preparatory statements of the EU’s biofuel policy show that certain environmental concerns have been voiced regularly at a relatively early stage in the EU’s biofuel policy. Existing institutional arrangements didn’t effectively include these early remarks in a way that would have effectively prevented the negative environmental consequences. This might be explained by the EU’s institutional focus on the internal agricultural development rather than the best way of producing sustainable biofuels on a global scale.

Second, path dependence occurred in the adaptation of the EU’s biofuel policy according to the rules of international trade. The EU needed to tackle several sustainability issues that arose out of the implementation of its biofuel policy and can be described as the result of unintended consequences of specific institutional arrangements. After the implementation of the EU’s biofuel policy, many international environmental and social problems, especially food price spikes, were regarded as being aggravated by the EU’s promotion of domestic biofuel consumption. When the EU was faced with the task to deal with the pressure from several actors

which criticised the negative environmental consequences of its biofuel policy, the measures adopted by the EU reflect the path dependence of existing institutional arrangements on the level of international trade institutions, as Fioretos has shown for the GATT (Fioretos, 2011, p. 380). The introduction of sustainability criteria for biofuels was designed to be in line with WTO rules. As has been shown, the EU introduced a system of private certifying institutions with the idea that they would be able to address issues of social and economic sustainability which would not have been possible to be addressed directly in a unilateral way by the EU under international trade law. This shows that the institutional arrangements in international trade law, most of all the WTO rules, are designed in such a way that the EU needed to find an alternative approach to deal with certain trade issues of social and economic sustainability by applying new forms of environmental governance rather than aiming to change the whole institutional arrangement. This can equally be regarded as a form of “unintended consequences” of the World Trade Organization (WTO) agreement (Fioretos, 2011, p. 381).

Third, at an earlier stage, the regulation of the international trade in biofuels has shown to be influenced by the path dependence of the established international trade institutions. The European Commission’s policy aim of protection of the EU’s agricultural industry proved to be challenged on several stages by the influence of the existing system of global trade institutions. This gave rise to the global trade in biofuels and agricultural products for the production of biofuels. In general, the sharp rise in global trade has been a long-term trend since the 1950s, which made the idea of “[n]ational economic self-sufficiency” obsolete (Nowotny, 2011, p. 101). The legal issues concerning the biodiesel imports from countries like Argentina and Indonesia show that the interests of the biofuel industry both in the EU and in these third countries have been at stake in the development of a global market for biofuels. The EC’s main attempts to support the EU’s biofuel industry in this regard have been based on the concept of implementing trade barriers in the form of anti-dumping duties for a few countries which posed an economic threat to the biofuel industry in the EU. Although this may have been a short-term possibility to avoid the most adverse effects of this global competition and the legal cases are not yet closed, the path dependence of international trade institutions seems to be in contrast with such developments.

7.2.3 Incremental reform

The EU reacted to pressure and criticism stemming from the potential negative environmental consequences of its biofuel policy by applying new forms of environmental governance including private actors. However, it did so in a piecemeal way, changing only the

prospect for incentives for crop-based biofuels from non-sustainable sources on the one hand and delegating to a range of private certifying institutions the task of certifying the environmental sustainability of biofuels on the other hand. The environmental sustainability of other agricultural products stemming from the same raw materials is not to be assessed in the same way. Furthermore, the other foreseen measures to tackle sustainability issues, i.e. bilateral agreements or the establishment of national certification schemes, have not been designed in such a way that they became effective. This shows a tendency of the institutional design towards incremental reform as opposed to larger adaptations.

The economic interests of powerful economic actors which are dependent on the benefits of the existing institutional design are one of the factors limiting the potential range of reforms undertaken by the EU. The benefits and subsidies once granted are the basis for many economic operators which they relied upon when they made investments in these technologies. Proponents of biofuels regard it as necessary for the EU to show a certain commitment to its biofuel policy so that these economic investments which were based on expectations about the EU's biofuel policy aren't unduly devalued. Therefore, the proposed cap for first generation biofuels with a constant "fading out" period is currently one of the main controversies in the EU's politics of biofuel.

Another factor that limits the EU's potential for reforms is the EU's intent to demonstrate its commitment to the support of renewable energy technologies and to the fight against climate change, both on an internal and on an international level. This factor was stronger articulated in the time before the financial crisis but it still plays a role in the Commission's legitimisation of its biofuel policy. The ways in which this factor impacts the EU's biofuel policy are dependent upon the way the sustainability of biofuels is understood. One argument might stress the EU's need to stick to the technological path it has taken by supporting first generation biofuels for as long as possible since this might demonstrate a serious commitment to new technologies of renewable energy. Another line of thought with the same goal of showing the EU's commitment to the support of renewable energy technologies might imply a stronger and quicker support of the next generation of biofuels since they promise to be more beneficial for the environment and for the fight against climate change.

The international fora and institutions that have been created with participation of the EU to deal with issues surrounding biofuels have equally been expressions of incremental ways of reform. The IBF and the Tripartite Task Force are ways to tackle some trade related issues concerning biofuels. The GBEP represents another way to increase international cooperation in

the promotion of renewable energy technologies in the field of bioenergy. While these institutions all represent steps on the way to regulate the new policy field of biofuels, none of them is equipped with the competences to regulate the entirety of the sustainability problems of global biofuel production but are seem to have overlapping competencies.

7.2.4 Policy incoherence

As described by historical institutionalism, the processes of institutional layering and of incremental reform lead to policy incoherence. The EU's efforts to introduce a system of sustainability certification which would include an ILUC factor while promoting the use of biofuels, mostly of biodiesel, in the member states can be described as one level of policy incoherence. At the same time, the EU's system of private certifying institutions leads to a situation which may cause policy incoherence on the level of the farmers and producers of biofuels.

The introduction of the sustainability criteria can be interpreted as a way of the EU to react to the pressure from environmental groups, parts of the civil society and the public media to limit the environmental damage caused by the production of biofuels for use in the EU. However, the EU's supporting mechanisms for first generation biofuels persisted, as long as they were able to meet the sustainability criteria. Therefore, the incentives for the existing biofuels industry within the EU became twofold. The intention to support European farmers by promoting the use of agricultural products from the EU persisted but now the farmers had to comply with the new sustainability criteria. The original intention to include an ILUC factor in the evaluation of the sustainability of biofuels was heavily contested. The effects of ILUC were still subject to debate and there was a lot of uncertainty around its real impacts. Proponents of the EU's biofuel industry argued that an ILUC factor would make the EU's biofuel industry less competitive on an international level compared to other biofuel producers. As a result of this constant insecurity, the EC's efforts for research around the effects of ILUC were intensified (Valin, Peters and van der Berg, 2015).

Policy incoherence also happens on the level of the biofuel producers. The idea to implement a system of multiple recognised private certifying institutions for the sustainability of biofuels increases the complexity of the system since there are different certifying schemes with different rules and procedures. The certifying institutions were encouraged to include sustainability factors of social and economic sustainability that were not covered by the EU's mandatory sustainability criteria. At the same time, countries that produce biofuels for

exportation may aim for different markets like the EU as well as the USA and their own domestic market, causing the need to follow the policy developments in each of those markets.

7.3 Global Energy Governance, Complexity and Governance Gaps

As pointed out, global energy governance takes place in a relatively fragmented political space with complex institutional arrangements (see chapter 3.2). At the same time, it is one part of the international system which is characterised by a relatively large number of perceived governance gaps. There are large global challenges in the field of energy, the ongoing shift from fossil to renewable sources of energy, the reduction of GHG emissions from energy use and the protection of environmental habitats as well as the challenge to satisfy rising demands for energy in developing countries and to reduce energy poverty. None of the institutions active in GEG has the competencies to tackle all of these issues. Instead, several different actors including states, international organisations, NGOs and private actors share the task to deal with them. From a constructivist perspective, global policy making is characterised by a reciprocal process that creates the meanings of the policy issues as well as the identities of the actors through the means of interaction between each other (see chapter 4.2).

The policy issues around biofuels have been changing over the past two decades. As the expert interviews have indicated, the EU's biofuel policy has brought an extremely high degree of complexity to the governance of global energy issues that appears to be of a new order at this political level. Mainly the sustainability issues emanating from biofuels, i.e. the problem of ILUC from biofuels for transport and the connected issues of erosion and depletion of carbon rich soils, have created large uncertainties about the implications of biofuels and the future direction of the different national and regional biofuel policies. This created the political need to manage complex sustainability issues which have become connected to the global biofuel markets.

The management of the environmental and social issues caused by biofuels in foreign countries has happened largely in the form of market governance, i.e. mainly through the reorientation of the demand incentives of the EU's blending targets for biofuels (Di Lucia, 2010). While the EU was not able to directly regulate sustainability issues in the biofuel producing countries due to free trade rules, the EU's ongoing biofuel policy was still a major cause for sustainability problems in biofuel producing countries. As the research section of this thesis showed, the common assumption was that the EU's biofuel policy was a large factor which created demand for biofuels in a globalised market environment and was therefore regarded to be partly responsible for aggravating environmental problems in developing

countries. This perception increased the pressure on the EU to find effective ways to deal with these sustainability issues to regain credibility for its environmental policy aims concerning biofuels.

The attempt to create a system of private certifying institutions for the sustainability of biofuels is based on the idea of a market based system which aims to increase the sustainability of biofuels through private economic institutions enacting public rules while operating within the boundaries of the international trade rules of the WTO. This has led to increasingly complex regulatory structures that transgress national borders and rely on the co-regulation of public and private actors (Ponte and Daugbjerg, 2015). At the same time, the introduction of these new regulatory mechanisms can be interpreted as a way of the EU to set the stage for new ways of dealing with global sustainability issues and governance gaps emanating from renewable energy technologies. Insofar, it can be argued that the EU demonstrated leadership in the establishment and development of new experimental mechanisms of GEG.

7.3.1 Private actors

While the overall influence of the EU's biofuel policy on the mechanisms of GEG may seem small, it has introduced a tendency towards the inclusion of private actors in the governance process that has been observed in the literature (Romppanen, 2013; Ponte and Daugbjerg, 2015). This trend towards the inclusion of private actors has frequently been regarded as a larger trend within global governance (Rosenau and Czempiel, 1992; Reinicke, 1998). In the case of GEG, the inclusion of private actors has several implications for the processes and mechanisms that are taking place.

First, some argue that the overall adaptability of the system is meant to be raised through the inclusion of private actors. Smaller non-state actors are thought to be able to react to changes in the environmental conditions more quickly than states or international organisations. At the same time they are not bound by the same institutional structures and obligations (Jørgensen, 2012). This seems to be exemplified by the European Commission's idea that private actors might be able to introduce economic and social sustainability criteria in biofuel producing countries that the EU could not set up directly under WTO law.

Second, even though this may seem counterintuitive, under certain circumstances the legitimacy of the political processes may suffer through the inclusion of private actors, especially when the procedures delegated to private actors are not transparent and when it is eventually unclear who is to be held accountable for actions of the private actors. This is one of the points of criticism the European Court of Auditors mentioned in its report on the system of

sustainability certification of biofuels in the EU. The recognition procedure for the certifying institutions and the subsequent supervision of these institutions is found to be unreliable (ECA, 2016, p. 74f). To ameliorate these problems in the current system of sustainability certification of biofuels in the EU, the ECA recommended that the recognised certifying institutions should report to the Commission on their activities once a year with special regard to sustainability issues. These certifying institutions should also set up transparency websites where they should regularly report on their activities (ECA, 2016, p. 78).

Third, although the delegation of certification activities to private actors means that the regulatory pressure on EU agencies remains relatively low, the overall complexity of the system is further increased (Romppanen, 2013, p. 352). This increase in complexity makes it harder for actors within the system like farmers and biofuel producers to work with the system they operate in as well as for public media and civil society to observe the ongoing processes. At the same time, the Commission still has the task to recognise and oversee the private certifying institutions, as the report of the ECA reaffirms. In a manner of “co-regulation”, the public actor works in the field of “norm-setting” while the private actor fulfils the task of “norm-implementation” (Romppanen, 2013, p. 352).

7.3.2 Scientific consultation

The interviews with seven experts from the field of biofuels have shown that the perceptions of issues surrounding biofuels have changed significantly during the last two decades. The initial promise of carbon neutral energy in transport was soon replaced by concerns about environmental problems and competition with food products. At the same time, the idea that biofuels would enhance energy security on a national level was only present on a very small scale during the whole period. This idea is still present but in the context of sustainability largely confined to the area of local energy production in developing countries under certain circumstances. In this perspective, the technology of biofuels is sometimes still regarded as a facilitator for the promotion of sustainable energy and energy security on a global scale.

Concerning the past developments in the EU’s biofuel policy the most commonly voiced attribution to biofuels was the idea that they were meant to be a renewable form of energy in transport in conjunction with the assumption that the main goal of the EU’s biofuel policy was to support the European agricultural sector. At the same time, the international implications of the EU’s biofuel policy still seem to be a matter of large controversy among the different actors within the EU’s biofuel policy. The common lines of division between economic and

environmental interest groups seem to apply in this area. While economic interest groups, both within the EU and on an international level, argue that biofuels produce economic and environmental benefits, environmental interest groups criticise the environmental drawbacks of the current form of large-scale biofuel production.

In this highly-contested area, the European Commission consulted international research institutions in order to deal with the conflicting issues. The concept of ILUC was present at a relatively early stage. The Commission's initial approach to include an ILUC factor in the sustainability criteria failed because of the opposition of economic interest groups based on the assumption that calculations dealing with ILUC are highly uncertain. Thus, the Commission intensified research into the subject of ILUC and in 2013, the IIASA was one of the institutions charged with the task to model impacts of ILUC caused by the different kinds of biofuel feedstocks used as biofuels in the EU.

Due to the complexity of the concept of ILUC, scientific advisory is based on models and scenarios of the global markets for agricultural land, food and feed. Effects of ILUC can only be modelled and estimated, therefore they cannot be proven. This makes the concept still prone to scepticism and opposition. Furthermore, it is argued that other factors that influence the global agricultural markets and cause environmental problems like the production of food based on palm oil produced under the same unsustainable circumstances as some feedstock for biofuels are not subject to the same rules. As a response to this criticism, economic operators have introduced institutions like the International Roundtable on Sustainable Biomaterials and the International Roundtable on Sustainable Palm Oil. These institutions are meant to work out voluntary guidelines for economic operators willing to comply with them. Yet, there are usually no mechanisms for enforcement of these guidelines. The scientific estimations of the effects of ILUC have shown to be a persistently complex issue. This increased insecurity and led to conflict among policy actors with competing interest.

7.3.3 The EU as a leader in global energy governance?

In the past, the EU has frequently positioned itself to as a leader in the fight against climate change as well as in the promotion of renewable energy technologies. This role was also connected to the initial promotion of biofuels. On an international level, the EU took part in the creation of institutions concerned with the standardisation and harmonisation of biofuels with the aim of enhancing global trade in bioliquids.

After the environmental problems with the politics of biofuel emerged, the EU implemented the most comprehensive framework to assess the sustainability of biofuels. This

can be interpreted as an attempt of the EU to demonstrate commitment and add credibility to its role as a leader in the transition towards an energy system based on renewable sources of energy. Yet, there remain severe gaps in the framework for the assessment of the sustainability of biofuels. The research section has shown that these gaps have been identified by academics, the ECA as well as environmental NGOs. Such governance gaps undermine the credibility and the legitimisation of the EU's politics of biofuels. Therefore, it can be argued that the EU should keep working towards closing these gaps to make an effective contribution to its position as a global leader in the governance of global sustainability issues emanating from renewable energy technologies.

Furthermore, leadership in global governance needs to be based on the capacity to make substantial decisions on the questions in focus (see Figure 6 on page 22). The complexity of the sustainability issues involved creates a high degree of uncertainty and makes such substantial decision making increasingly hard to reach. Considering the results of the research section, it can be argued that the EU aimed to regain the power for substantial decision making in the globalised politics of biofuel in two ways. First, it showed commitment to the adaptation of its sustainability criteria to include effects of ILUC. Second, it introduced experimental mechanisms for the direct regulation of the sustainability of biofuels in the biofuel exporting countries. Both of these measures can be seen as a way to regain the ability to effectively govern the sustainability of biofuels, in the first case by better understanding the sustainability issues in question through intensified research, in the second case by experimenting with new ways of regulation that are more effective than traditional ways of governance.

8 Summary and Conclusions

8.1 Summary

This thesis explored the interrelation between the politics of biofuel in the EU and mechanisms of global energy governance. The rising amount of biofuels produced and traded globally during the last two decades has been the result of global political decisions by major economies, mainly the USA, the EU and Brazil which are at the same time the major biofuel producers and consumers. These countries have shaped the global market for biofuels and created international institutions with the aim to facilitate global trade of biofuels. One of the effects was that more and more countries had the incentive to invest in the development of biofuel programmes. Countries like Argentina, Indonesia and Mozambique as well as other developing countries started the production of biofuels with for export to the EU.

To grasp the interrelation between the processes of GEG and the developments of the EU's politics of biofuel over the last two decades, this thesis applied a mix of methods, i.e. literature reviews, expert interviews and a hermeneutic analysis of official documents. In a first step, the state of the literature on global governance and in particular on GEG was reviewed in to explore the concepts and arguments prevalent in this academic discourse. The concept of global governance was found to be used in multiple contexts with the common denominator of the focus on new forms of rulemaking and rule enforcing in global political issues including private actors as well as traditional actors like states and international organisations. GEG was found to be characterised by a high degree of fragmentation and a relatively low degree of formality. In this field of low formality, governance processes are found to be largely based on power relations reflecting the interests of large and powerful states. An important mechanism in this field of governance are therefore assumed to be international conferences between those states. In GEG, the G7 (formerly G8) regularly plays an important role for political impulses and declarations of the intentions of leading industrialised states. It was mentioned that a large part of GEG takes place within the gaps between the different institutions and actors active in this field. Leadership in this fragmented area is therefore of great importance for states with vested interests in their energy security as well as in the fight against global climate change.

In the theoretical section of this thesis, the influence of the theoretical traditions of historical institutionalism and constructivism in the subfield of International Relations were combined with the concept of global governance. Historical institutionalism helped to explain the developments of institutional arrangements over time with a focus on the founding moments which tend to lock in arrangements of power constellations and create path dependence. It has been observed that this regularly leads to unintended consequences and governance gaps. The continuation of historical interest constellations in the form of institutions tend to create these governance gaps. The theoretical tradition of constructivism in International Relations focuses on the concepts of meaning, identity and interaction. Parallels with the concept of global governance emerged in the idea that governance is based on a shared understanding of values and interaction. This idea also came up in the concept of leadership in GEG in the form of the conference mechanism. Meanings and identities are formed in the process of interaction. In the same way, the understanding of technologies and of their possible advantages and threats are constructed. Additionally, it has been argued that constructivism can describe governance gaps as knowledge gaps in a similar way as historical institutionalism since institutional

arrangements tend to reproduce specific views and perspectives on policy issues concerned by governance gaps.

Following the theoretical section, the research question of this thesis was formulated. The main research question focused on the beforementioned “interrelation” between the fields of interest, i.e. GEG and the politics of biofuel in the EU. This question explicitly focused on the multidirectional flows of influence instead of one way of influence. In the literature on global governance it is commonly assumed that that many ways of complex interrelations exist in global politics which are potentially influencing each other.

In the research section of this thesis the origins of the EU’s biofuel policy and their development over the last two decades were explored. The literature review on the origins of the EU’s biofuel policy revealed that the origins of the EU’s current politics of biofuel are rooted in the late 1980s and early 1990s. Humalisto showed that during the conception of the politics for biofuel in the EU, the idea of a reduction of the dependence on oil imports was linked to the interests of agricultural actors within the EU. At the same time, there have already been incentives directed at a global market for biofuels. Franco *et al.* have shown that the assumptions on the availability of marginal land in developing countries played a major role in the idea that the international trade in biofuels would benefit economic actors in developing countries.

The hermeneutic analysis of different EU documents showed that the initial policy recommendations around biofuels were largely linked to the then prominent topic of agricultural surplus within the EU. Potential conflicts with food products and uncertainties about the effects on GHG emissions were already voiced in early policy recommendations, especially regarding the international production of biofuels. However, these recommendations were largely neglected during the globalising phase of the EU’s biofuel policy. In the official documents, biofuels were initially linked to environmental benefits and later increasingly to energy security. Incompatibilities between the idea to regulate the global sustainability of biofuels and the WTO trade rules were mentioned at several stages in the EU’s politics of biofuel but they became most prominent during the introduction of sustainability criteria in the RED of 2009. Because of the limitations of the WTO trade rules, the EU aimed to introduce a form of experimental governance including private certifying institutions in the certification of the sustainability of biofuels. The Commission even proposed to encouraging the introduction of sustainability criteria in other biofuel producing countries.

The contested concept of ILUC has been thoroughly examined by the Commission and in 2015 the first ILUC directive was published. Still, the Commission keeps being concerned with the estimation of the degree in which ILUC effects the sustainability of biofuels. During the phase of “continuing adaptation” the negative environmental consequences of biofuels caused by ILUC were meant to be tackled by a gradual fading out of biofuels based on agricultural products. Advanced biofuels from different sustainable sources like waste should take their place, according to the European Commission. These advanced biofuels are still believed to be of relevance for the future transport energy mix.

Yet, a report of the ECA has shown that the EU’s system of sustainability certifications is in some ways unreliable since it is not periodically reviewed by the Commission and since in many cases there is no proof for the sustainable origin of waste products (ECA, 2016). Concerning the trade related aspects of biofuels, the ECJ has declared the import tariffs set up by the Commission for biodiesel from Argentina and Indonesia as illegal. These import tariffs were a means of the European Commission to protect the EU’s biofuel industry from adverse international competition. Although the legal dispute is still open, international trade law seems to be in contrast with these tariffs. It can be argued that the global governance of energy issues is constrained by the path dependence of international institutions like the WTO.

The expert interviews with seven experts from the field of biofuels coming from different backgrounds, i.e. ministries, economic interest groups, an environmental NGO and two international institutions actively contributing to the research and governmental advice on biofuels have shown that the perceptions of the developments in the EU’s politics of biofuel are diverse and partially conflicting. The main issues of conflict arise from the diverging views on the question if biofuels from agricultural products can be produced sustainably and if their production can be governed effectively. The question of enhanced energy security played only a minor role in the perception of the interviewed experts and was mainly present in the context of local production of sustainably grown biofuels in the development context. The EU’s system of private certifying institutions was in general perceived as an effort of the EU to regulate the global sustainability of biofuels. However, the system was mostly regarded as complex since the numerous certification schemes might show differences in their criteria and procedures. Furthermore, the recognition of new certification schemes was perceived as relatively slow and the effectiveness of the EU’s system of private certification of the sustainability of biofuels was questioned by many experts since they regarded the overall process as being not sufficiently transparent. Still, advanced biofuels were perceived to potentially be of relevance in future

scenarios for the application of renewable energy in certain specialised sectors like maritime shipping, aviation or local energy production in areas where they can be produced sustainably.

The subsequent literature review on the global repercussions of the politics of biofuel in the EU showed that the emergence of new private actors in the governance of the global sustainability of biofuels has been one of the most important factors noticed on several levels. While there have also been new international arrangements based on traditional institutional designs like the Tripartite Task Force of 2007 created by the USA, the EU and Brazil as well as the IBF and the GBEP bringing together more countries active in the production and consumption of biofuels, the emergence of non-state actors has received more attention in the literature since the effects are regarded to be of greater importance. The different examples of the newly created international roundtables on biomaterials are seen to be shaping a new form of self-regulation of private economic actors active in this field. Di Lucia finds that the inclusion of private actors has happened within the EU through the implementation of new modes of governance and that this was necessary since there emerged a dead-lock policy situation around the conflicting issue of ILUC (Di Lucia, 2013). Still, actors from third countries are only rarely included in these new modes of governance. Di Lucia proposes to increase bilateral and multilateral interactions with these foreign actors to increase the EU's ability to govern effectively. Ponte and Daugbjerg (2015) have shown that the EU's system of private certifying institutions can be described as a new form of transnational hybrid governance where private actors are used to apply the rules set up by public bodies. This form of experimentalist governance within the field of transnational governance is on the one hand thought to be able to overcome certain issues concerning path dependence of institutional regimes, on the other hand this system might create opportunities for forum shopping. The system of private certifying institutions is regarded by the authors as a relatively effective new mode of governance to regulate the global production of biofuels directly in the countries of origin of the biomaterials used for biofuel production. Private certification of social sustainability of biofuels might however still contrast with WTO rules. Other issues of sustainability remain unresolved like the regulation of land acquisitions by European Investors in developing countries for biofuels production.

The analysis of the developments within the EU's politics of biofuel shows two observations. First, the EU aimed at showing commitment to its biofuel policy to stick to its image as a global leader in the development and promotion of renewable energy technologies. Second, the EU adapted its biofuel policy to meet the rising challenges of environmental as

well as social sustainability while staying within the constraints of the WTO system. The initial challenge of the EU's politics of biofuel has been to combine the policy aims of creating new opportunities for agricultural actors, enhancing the environmental performance of transport fuels and increasing energy security within the EU. Again, this task became ever more complex with the challenges arising from the conflicts around the issue of ILUC. From the perspective of historical institutionalism, the processes surrounding the developments within the EU's politics of biofuel can be described by the term "institutional layering". The creation of new international institutions dealing with specific issues concerning biofuels adds to this factor as much as the creation of a system of multiple private certifying institutions for the sustainability of biofuels. The need for this kind of institutional layering arises out of the path dependence of international trade institutions like the GATT and the WTO as well as the institutional structures within the EU which didn't react on early warnings about environmental and social risks of increased biofuel production and the subsequent global trade in biofuels. The necessary adaptations of the EU's biofuel policy came in the form of incremental reform considering the need to account for the investments made by large economic actors as well as the EU's aim to signal commitment to its role as a leader in the governance of renewable energy technologies. The factors of institutional layering, caused by path dependence, and incremental reform instead of fundamental changes in the EU's biofuel policy led to policy incoherence. While biofuels for use in the EU were initially meant to be mainly produced within the EU, the international trade in biofuels made them less competitive. Trade barriers like the EU's anti-dumping tariffs on biodiesel from Argentina and Indonesia have only been a temporary fix for the international pressure on the European biofuel industry. The sustainability criteria are meant to be a factor of increasing the sustainability of biofuels. Still, it seems that the largest opponents to the introduction of an ILUC factor to the sustainability criteria are European biofuel producers since this would make their products even less competitive. Additionally, the proposed accelerated shift to advanced biofuels is seen to be in contrast with the current state of technology.

The inclusion of private actors in the governance of the sustainability of biofuels is regarded as a reaction to the increasing complexity of the issues surrounding biofuels. Smaller private actors are thought to be better able to adapt to changes in the environment. It was found to be of importance to increase the transparency of these processes to ensure the accountability which is necessary to enhance the overall legitimacy of the processes and reduce the perceived complexity of the system. Biofuels are still found to be regarded as a possible option to enhance

the global application of renewable energy technologies in certain sectors but the issues surrounding the global trade in biofuels are increasingly complex and keep being contested, mainly because of the complexities surrounding the concept of ILUC. Even scientific models covering this subject have shown to be constantly contested. It might be a consequence of this constant insecurity that international roundtables started setting their own guidelines for sustainability, but these guidelines are often weak because they are not enforceable.

The EU's claimed role as a leader in the governance of the global sustainability of renewable energy sources, in this case biofuels, is frequently regarded as flawed because of the strong connection of the current politics of biofuel to the agro-industry and oil companies. At the same time, the introduction of new ways of global regulation of the sustainability of biofuels is perceived as a step in the right direction, even though the innovative form of global governance including private certifying institutions equally entails problems and shortcomings that need to be fixed.

8.2 Further Research Needs

This thesis represents a first attempt to analyse the historical processes of shaping influences within the mechanisms of global energy governance. Research on mechanisms of GEG is urgently needed. These mechanisms play a vital role in the global transition towards renewable energy sources but at the same time they are found to be fragmented, constantly changing and poorly understood.

One of the most interesting questions concerning the role of the EU's politics of biofuel in the field of GEG that remains to be answered is: *What has been the cause for the EU's neglect of dealing with negative environmental consequences in advance of the implementation of its biofuel policy?* Although the information on certain environmental issues has been available relatively early, the reactions to this information have been slow. The answer to this question might prove useful in future attempts to avoid unnecessary environmental damage that could have been foreseen during the implementation and application of new technological ways of energy production.

Further unresolved questions arise from the initial policy aim of the European Commission (EC) to produce biofuels mainly within the EU, even though global trade has been at the core of the EC's policy in other areas. The aim of increased self-sufficiency in the field of biofuels has been thwarted by the rise in global trade of biofuels. Still, support by the EC for the EU's biofuel industry has remained strong throughout the development of the EU's biofuel policy. One interesting question in this regard would be: *What factors have been the main cause*

of the initial choice for the EC's policy direction to aim for the local production of biofuels within the EU, while largely neglecting the aspects of global trade in biofuels? There are several implications of this question. It might have been the EC's intention to support the EU's agricultural actors or to reduce the dependence on foreign energy imports. It might have been the aim of the EC to create a more sustainable way of producing and consuming biofuels with short transportation routes, local supply and with the ability to influence the production methods more directly. Answers to this question may contribute to a more nuanced understanding of the role of global trade in energy governance. They might also give more in-depth insights into the understanding of the EC as an actor in GEG.

8.3 Conclusions

The aim of this thesis was to explore the interrelations between the politics of biofuel in the EU and mechanisms of GEG. The current state of research on mechanisms of global energy governance is relatively limited. Existing research commonly finds that it is a highly complex and fragmented policy field. The argument presented in this thesis was that the politics of biofuel in the EU has contributed to a new layer of complexity and fragmentation within the field of GEG while at the same time enforcing the EU's role as a global leader in the governance of sustainability issues connected to renewable energy technologies.

It was mostly due to the debates around the concept of ILUC that a large degree of uncertainty and complexity has been added to the governance of sustainability issues stemming from the global trade in biofuels. The available structures of global energy governance were relatively weak and fragmented. They have been unable to provide mechanisms to effectively counter these complex sustainability problems. Therefore, the EU has reacted to this situation through the introduction of new modes of "transnational hybrid governance" (Ponte and Daugbjerg, 2015). Private certifying institutions were endowed with the task to enact the EU's sustainability criteria in foreign biofuel producing countries directly on the level of the biofuel producers. In comparison, classical mechanisms like bilateral agreements and international institutions played only a marginal role in the regulation of the sustainability of biofuel production. It is however frequently noted that the transparency of the system of private certifying institutions needs to be increased to ensure its accountability which is a fundamental aspect of its legitimacy. In this regard, the dynamic development of the politics of biofuel in the EU is related to the larger trend of the inclusion of private actors in global energy governance and its collateral challenges.

The EU's biofuel policy has initially largely been discussed as a policy option which would help to reduce the EU's dependence on oil imports while supporting the European agricultural industries. The public legitimacy of the EU's biofuel policy was based on the argument of environmental protection and support of renewable energy in transport. Only later it became entangled with issues of global sustainability. The attempt to reach three policy aims at once, namely to tackle climate change by reducing GHG emissions from transport, to support agricultural interests within the EU and to reduce the dependence on energy imports has already been setting the stage for biofuels as a complex policy issue with a diverse structure of actors (Humalisto, 2015). The task to include the governance of the global effects of ILUC in the sustainability criteria for biofuels has further increased the complexity of biofuels as a policy issue and has been a cause for persisting conflict within the actor constellations (Di Lucia, 2013). These conflicts are based on the contradicting perceptions of the effects of ILUC and the debated nature of this scientific concept. The challenge to overcome this internal policy deadlock between actors associated with the EU's biofuel policy is one of the main tasks the European Commission has faced during the past years. This policy deadlock is still present and needs to be resolved to address the still pressing sustainability issues connected to biofuels. Otherwise, existing governance gaps may persist or new ones might be created.

Governance gaps are still a fundamental characteristic of global governance, in particular of GEG. The emergence of governance gaps became increasingly visible in the regulation of the global sustainability of biofuels. Mechanisms of GEG frequently rely on relatively informal mechanisms of governance, e.g. conferences between states, to be able to address some of these governance gaps.

The concept of leadership in governance is especially important in such relatively informal and fragmented areas of global governance. The EU has demonstrated leadership in the governance of global issues concerning biofuels in two ways. First, it has contributed to the global governance of biofuels by taking part in the creation of international institutions like the Tripartite Task Force, the IBF and the GBEP. Second, the EU has shown dedication to its biofuel policy by implementing a new mode of governance to regulate the global sustainability of biofuel production through the inclusion of private certifying institutions in its system of the certification of the sustainability of biofuels.

When the constraints of the WTO trade rules are taken into account, the failure of the current sustainability criteria to amount for factors of social and economic sustainability can be interpreted as an effect of the path dependence of the current international trade institutions. It

is noted on several stages that the EU's attempts to regulate the global sustainability of biofuels still need to be adapted and enhanced to increase the environmental sustainability of biofuels and to find better ways to ensure the social and economic sustainability of biofuel production. The WTO trade rules are perceived as one of the major barriers in this regard. This illustrates the large role this level of global governance plays in GEG.

The introduction and implementation of the EU's system of biofuel certification can be interpreted as a demonstration of the EU's commitment to its role as a leader in the governance of issues of global sustainability related to renewable energy technologies. In the context of the current state of GEG, the EU's politics of biofuel is both dependent on the existing institutional structures and influencing them by experimenting with new mechanisms of global governance.

Di Lucia regards the efforts to introduce sustainable biofuels as a "test case in attempts to create sustainable systems" in the context of "energy agriculture transport and economic systems deeply rooted in unsustainable patterns" (Di Lucia, 2013, p. 88). Lessons learned from the case of biofuels in the EU might prove to be useful in future research on the governance of the global application of new forms of renewable energy technologies.

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Appendix

List of interviews

The following table provides information about the interviews that were conducted for this thesis.

Interview partner	Institution	Date	Place	Language
Anonymous	IIASA	Feb.2016	Laxenburg	English
Anonymous	BMLFUW	Oct.2016	Vienna	German
Anonymous	BMFWF	Oct.2016	via phone	German
Anonymous	WKO	Nov.2016	Vienna	German
Anonymous	LKO	Dec.2016	Vienna	German
Anonymous	VCÖ	Dec.2016	Vienna	German
Anonymous	FAO	Jan.2017	via Skype	English

Interview guidelines

Since most of the interviews were held in German, this section first provides the German version of the interview guidelines. It was used in the interviews with experts from national ministries and experts active in the field of interest representation.

Subsequently, the English version of the interview guidelines is added. These guidelines have been drafted for the analysis of the perceptions and experiences of experts active in international organisations providing scientific advice, models and projections on the EU's politics of biofuel.

Interviewleitfaden

Vielen Dank, dass Sie sich die Zeit nehmen, die folgenden Fragen zu beantworten. Das Thema meiner Arbeit lautet “Politics of Biofuel in the EU and Mechanisms of Global Energy Governance”. Im Rahmen dieser Arbeit untersuche ich die Rolle, die die Biokraftstoffpolitik der EU bei der Etablierung von Strukturen der internationalen Energiepolitik gespielt hat. Zu diesem Zweck betrachte ich die Art und Weise, wie sich die Perspektiven auf die Biotreibstoffpolitik der EU entwickelt haben, wobei die Wahrnehmung der globalen Auswirkungen der Biokraftstoffpolitik der EU im Zentrum steht.

Das Interview ist in zwei Themenbereiche gegliedert:

1. Die Tätigkeitsfelder Ihrer Institution im Bereich der Biokraftstoffe
2. Die Europäische Biokraftstoffpolitik und Fragen der Energiepolitik

I. Die Tätigkeitsfelder Ihrer Institution im Bereich der Biokraftstoffe

1. In welcher Form haben Sie sich in Ihrer beruflichen Tätigkeit bisher mit der Thematik der Biokraftstoffe beschäftigt?
2. Wie würden Sie die Tätigkeitsfelder Ihrer Institution in Bezug auf Biokraftstoffe beschreiben?
3. Inwiefern hat sich die Tätigkeit Ihrer Institution in Bezug auf Biokraftstoffe in den letzten Jahren geändert?
 - a. Wie hat die Tätigkeit zu Beginn der Biotreibstoffpolitik ausgesehen?
 - b. Was hat sich mit der Einführung der Nachhaltigkeitskriterien geändert?
 - c. Kennen Sie (private oder öffentliche) Institutionen, im Bereich der Zertifizierung von Biokraftstoffen? Inwiefern arbeitet Ihre Institution mit diesen Institutionen zusammen?
4. Welchen Einfluss hatte Ihres Erachtens die mediale Berichterstattung zu den Umweltauswirkungen von Biokraftstoffen in den vergangenen Jahren auf die Biokraftstoffpolitik der EU?
 - a. Gibt es Ihrer Wahrnehmung nach Bestrebungen, die Nachhaltigkeit von Biokraftstoffen effektiv zu gewährleisten?

II. Die Europäische Biokraftstoffpolitik und Fragen der Energiepolitik

1. Welche Ziele verfolgt die Europäische Union mit ihrer Biokraftstoffpolitik Ihres Erachtens?
2. Wie betrachten Sie die Möglichkeiten der Biokraftstoffpolitik in Bezug auf das Ziel, nachhaltige Energie im Verkehrssektor zu etablieren?
 - a. Hat sich in den letzten Jahren etwas an Ihrer Einschätzung diesbezüglich geändert? Falls ja, warum?
 - b. Wie wirken sich Biokraftstoffe Ihres Erachtens auf die Treibhausgasemissionen aus?
3. Inwiefern betrachten Sie Biokraftstoffe als Möglichkeit, wirtschaftliche Entwicklungen im Agrarbereich zu unterstützen?
 - a. Ist die Landwirtschaft in der EU auf Biokraftstoffe angewiesen?

- b. Inwiefern sind ländliche Regionen in Entwicklungsländern davon betroffen?
- 4. Inwiefern betrachten Sie Biokraftstoffe als Möglichkeit, die Abhängigkeit von Importen im Energiebereich zu reduzieren?
 - a. Wie bewerten Sie die aktuelle Situation des Handels mit Biokraftstoffen und mit Rohstoffen zur Erzeugung von Biokraftstoffen?
- 5. Kennen Sie internationale Organisationen, die sich mit der Thematik des globalen Handels mit Biokraftstoffen auseinandersetzen?
 - a. Wie hat sich dieser Bereich Ihrer Erfahrung nach entwickelt?
 - b. Inwiefern hat die EU Ihres Erachtens diesen Bereich geprägt?
- 6. Wie bewerten Sie aktuelle Entwicklungen im Bereich der Biokraftstoffe in der EU?
 - a. Wie bewerten Sie die Kritik am aktuellen System der Zertifizierung der Nachhaltigkeit von Biokraftstoffen?
 - b. Wie bewerten Sie die Vorschläge der EU, Biokraftstoffe der ersten Generation weniger stark zu fördern?
- 7. Wie bewerten Sie die Entwicklung von neuen Biokraftstofftechnologien?
 - a. Inwiefern wird die Entwicklung dieser Technologien Ihres Erachtens von der Europäischen Union gefördert?
 - b. Inwiefern sehen Sie Potenziale für die zukünftige Entwicklung in den Technologien der 2. Generation von Biokraftstoffen?
 - c. Welche Rolle werden Biokraftstoffe Ihres Erachtens in der zukünftigen Energiepolitik spielen?

Ich bin am Ende meines Interviewleitfadens angelangt. Haben Sie noch etwas, das Sie dem Gesagten hinzufügen möchten bzw. andere Anmerkungen?

Vielen Dank für das Interview!

Interview guidelines

Thank you very much for taking the time to answer the following questions. The topic of my thesis is “Politics of Biofuel in the EU and Mechanisms of Global Energy Governance”. In this thesis, I am investigating the role of the EU’s biofuels programme in the development of structures and procedures in global energy governance. In order to do this, I am looking at the way the perspectives on EU biofuels developed over the last two decades, with a specific focus on the changing perceptions of political actors on the global effects and consequences of the EU biofuels programme.

Do you have any questions?

The two issue areas of this interview are:

1. Your research on the issue of global and European biofuel policies
2. The EU’s biofuel policy

I. Your research on the issue of global and European biofuel policies

- What are the topics you have been concerned with in the field of biofuels?
 - How do you estimate the global effects from current global biofuel policies, for example on global food prices?
 - How would you describe the problems regarding the availability of arable land for biofuel production?
 - What kind of insights are possible on ILUC from biofuels in your opinion? What are the limitations of the current models?
 - How would you describe the diverging positions in the debate on issues surrounding ILUC from EU biofuels?
 - According to your perception, how does ILUC influence the overall feasibility of the EU’s biofuel programme?
 - In what way have advanced biofuels been considered in your work?
 - What effects might the currently low oil price have for the mid-term development of conventional biofuel programmes in your opinion?

II. The EU’s biofuel policy

- How would you describe the main aims of the EU’s biofuel policy at its outset?
 - How do you judge the overall development of the EU’s biofuel policy from its beginning in 2003?
 - At which point did ILUC become an issue in the EU’s biofuel policy?
 - Do you regard regional self-sufficiency as a possible solution to the problems caused by ILUC?
 - How do you judge the EU’s efforts to reduce negative impacts of ILUC by introducing a set of sustainability criteria? Have they been effective?
 - According to your experience, how did the views of stakeholders on EU biofuels change in the last years?
 - How do you regard the role of international roundtables in the global management of biofuels?

- How would you describe the future role of biofuels in the field of energy policies on different scales?

This is the end of the interview guidelines. Do you want to add anything to what has been said?

Thank you very much for the interview!

Abstract

This thesis explores the interrelation between the politics of biofuel in the EU and mechanisms of global energy governance. Current perspectives from the literature are put in relation to the historical development of the EU's politics of biofuel and its impacts on global biofuel production over the last two decades. The scientific concept of global governance in conjunction with aspects from the theories of historical institutionalism and constructivism in International Relations serve as the theoretical lens for the analysis of the origins and the developments of the EU's biofuel policy. A literature review on the global repercussions of the EU's politics of biofuel combined with a hermeneutic analysis of EU documents as well as interviews with experts show that the politics of biofuel in the EU introduced new modes of governance including private actors and a new level of complexity to global energy governance. The constructivist analysis argues that the EU's role as a leader in the governance of the transnational sustainability issues connected to the global production of renewable energy was partly strengthened by the implementation of new governance mechanisms.

Zusammenfassung

Diese Arbeit untersucht die wechselseitigen Einflüsse zwischen der Biokraftstoffpolitik der EU und Mechanismen von Global Energy Governance. Aktuelle Perspektiven aus der Literatur werden mit historischen Entwicklungen der Biokraftstoffpolitik der EU und deren Auswirkungen auf die globale Biokraftstoffproduktion in den letzten zwei Jahrzehnten in Verbindung gebracht. Das wissenschaftliche Konzept von Global Governance wird dabei zusammen mit Aspekten der Theorien des Historischen Institutionalismus sowie des Konstruktivismus aus den Internationalen Beziehungen als theoretische Grundlage für die Analyse der Ursprünge und Entwicklungen der Biokraftstoffpolitik der EU herangezogen. Eine Literaturanalyse zu den globalen Auswirkungen der Biokraftstoffpolitik der EU, eine hermeneutischen Analyse offizieller EU Dokumente sowie Interviews mit ExpertInnen zeigen, dass die Biokraftstoffpolitik der EU einerseits neue Mechanismen der Regulierung unter Einbeziehung privater Akteure sowie andererseits ein erhöhtes Maß an Komplexität im Bereich der Global Energy Governance eingeführt hat. Aus der konstruktivistischen Analyse geht hervor, dass die Rolle der EU als leitender Akteur in der Regulierung transnationaler Nachhaltigkeitsprobleme bei der globalen Produktion von erneuerbarer Energie durch die Implementierung neuer Governancemechanismen teilweise gestärkt wurde.