



Titel der Diplomarbeit:

The Power of State Institutions in Environmental Politics

**The Role of the Environmental Protection Agency in the U.S.
Agrofuels Project**

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I dedicate this Master Thesis to my family in Austria and the United States, which supported me all my life in good as well as in difficult times.

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1. Introduction

On Tuesday 31 January 2006 the U.S. President George W. Bush announced in his state of the union address to Congress that *“By applying the talent and technology of America, this country can dramatically improve our environment, move beyond a petroleum-based economy, and make our dependence on Middle Eastern oil a thing of the past,”*(Bush, 2006).

These three issues share a common denominator, which is the high consumption rate of fossil fuels, mainly of conventional gasoline in order to keep the U.S. economy competitive and the population mobile. In the U.S. these two factors are interdependent, which means that without a mobile population the U.S. economy is less competitive, and without a competitive economy the U.S. population is also less mobile. However, this interdependency led to another problem that was the initial trigger for the creation of this thesis in hand. This trigger was the emergence of environmental concerns that are linked with the production of CO₂ emissions from the industry and transportation sectors in the U.S. Those environmental concerns emerged in context with an uprising global awareness about the negative effects of GHG-emissions on local air quality measures and the global climate. The creation of the Kyoto Protocol in 1997 by the United Nations Framework Convention on Climate Change (UNFCCC) attempts to reduce the GHG emissions in order to prevent a temperature rise that is caused by an effect called ‘Green House Gas Effect’. Although the U.S. Clinton Administration was a vital actor in the creation of the treaty, the U.S. Congress under the following Bush Administration refused the treaty’s ratification in order to protect the U.S. economy from the financial burdens the treaty would have brought.

But although the U.S. did not ratify the Kyoto Protocol, the U.S. Administration and single States within the U.S. forged individual plans to improve their environmental measures. One strategy that created promising expectations was the use of renewable fuels in the transportation sector. The use of so-called agrofuels became a prominent strategy not only in the U.S., but also in the European Union. The terminology “agrofuels” refers to a linkage between agriculture and fuels, to communicate information about the transformation or generation of agricultural commodities and/or products into fuels. The possibility to use agricultural products as

fuel seemed like a suitable solution for governments to reduce GHG emissions from the transportation sector. Additionally the use of domestic products would support domestic farmers and renewable fuel producers. White and Dasgupta state that 'agrofuel projects' were seen as a global long-term strategy for employment and economic growth in the upstream and downstream agro-industries (White/Dasgupta, 2010: p.593). In that sense McMichael critically uses the terminology "*Agro-Fuels Project*" to describes global efforts to use agrofuels as a solution to the energy- and Climate Change crisis (McMichael, 2008: p.14).

For the European Union this picture is only partly true, as a vast share of agrofuels comes from Brazil, which produces sugarcane-based ethanol and soybean based biodiesel. In the U.S. the agricultural sector supported the idea to enforce the use of agrofuels, especially corn-based ethanol as solution against the U.S. addiction to foreign oil and as strategy against decreasing air quality and Climate Change. In 2005 the Bush Administration supported the proposition of the uprising renewable fuels industry to create a renewable fuels program in context with a new U.S. energy strategy. This strategy was issued in Congress and is known as the Energy Policy Act of 2005 (EPAAct of 2005). The EPAAct of 2005 includes such a renewable fuels program and directed the U.S. Environmental Protection Agency (EPA) to create suitable standards and regulations in order to meet the will of Congress.

The title in hand examines the role of the EPA as a regulatory and political entity in the creation of the U.S. Agrofuel Project with the focus on the so-called Renewable Fuels Standard Program (RFS Program). This thesis is predicated on the theoretical framework of Actor Centered Institutionalism (ACI) utilizing instruments of policy research, network analysis and game theory to identify the reasons why and how the EPA created the matters of the final RFS1 Program, and what interactions were taking place between the powers of the collective and corporate actors in its creation process.

This thesis will, where applicable, illustrate the social phenomena in which the RFS was selected and legitimized. The analysis includes quantitative data provided by numerous institutions like the U.S. Department of Agriculture (USDA), the Food and Agriculture Organization (FAO), the Renewable Fuel Association (RFA) or the Energy Information Agency (EIA). Additionally, the analysis includes qualitative

methods by incorporating primary and secondary literature and four expert interviews.

The primary literature includes governmental documents of several congressional hearings concerning the final creation of the Energy Policy Act of 2005. The canon of secondary literature includes reviews of the primary literature as well as articles and books focusing on the problems identified through the problem-oriented research. The interview partners are presented in the Annex in chapter 7.3. (p.141).

1.1. Research question

The research question of this thesis is “*What was the Role of the Environmental Protection Agency in the creation process of the U.S. Agrofuels Project.*” This question includes an analysis of the creation process of the RFS-Program with a focus on the EPA. As the EPA is the entity where influential forces concerning the environment are culminated in promulgated laws, regulations, policies, and guidance, it is crucial to explore EPA’s role in the Agrofuels Project in order to identify political, economic and social concerns and proposed solutions linked with agrofuels. This thesis specifically focuses on the EPA’s role to the RFS1, as the creation of the RFS1 Program was the first agrofuels regulation implemented solely by the EPA. The elaboration of the research question implies a broad spectrum of questions that are crucial to answer in order to proceed to the final conclusion about the EPA’s Role in the U.S. Agrofuels Project.

As the EPA is the main addressor for environmental issues in the U.S., initial sub questions will address the emergence of the political protection of environmental interests in the U.S. and EPA’s tasks and capacities to do so. Then follows a focus on the U.S. Agrofuels Project, asking: What were the influential factors that lead the EPA as a regulatory entity committed to the U.S. President, the Senate and to its own mandate to enact and enforce the current RFS-Program? Which actors and what preferences and orientations were included in the creation process of the RFS-Program? What were the constellations among involved actors the EPA had to deal with, and what were their modes of interaction that lead to the RFS-Program as policy solution.

These questions attempt to clarify the role of the EPA in the U.S. Agrofuels Project in such way as they look, if the EPA supported interests of traditional capitalistic modes of production, profit accumulation and lifestyle, or if the EPA acted according to its own commitment to safeguard human health and the environment. The main part of this paper engages with the actions and constellations the EPA was confronted in the creation process of RFS-Program. By doing so this thesis tries to identify specific interests, constellations and actions set by actors involved or affected by the creation and implementation of the U.S. Agrofuels Project.

1.2. Research approach and restrictions

Although this thesis is written with the intention to emphasize environmental politics in the U.S., the final results will not directly answer questions concerning the environment or social impacts due environmental policies. This thesis concerns the creation of one single regulation that was also enacted because of arguments concerning the environment but also because of industrial and economic issues. The final results of this thesis aim to practically answer why, how and by whom this single regulation concerning the use of agrofuels in the U.S. was created and legitimized. In that sense, the thesis in hand is neither a biological analysis including specific environmental research nor a theoretical discussion about political or social impacts on the U.S. political system or its population.

1.3. The thesis' structure

Apart from chapters 1. to 1.3., which introduce and explain this thesis in hand, its structure contains three basic parts. First, chapter 2.1. represents the 'Theoretical Part', introducing 'Actor Centered Institutionalism', which was developed by Fritz Scharpf and Renate Mayntz as applicable framework approach in order to examine policy decisions and their legitimation within a complex interaction environment. Second, chapters 3.1. to 3.5. build the 'Descriptive Part', which aims to present the Environmental Protection Agency (EPA) and its creation in the realm of U.S. environmental politics. Furthermore, the part includes a brief overview of the science of agrofuels presenting available technologies and comparing agrofuel projects from other countries. Third, chapters 4.1 to 4.6 compose the "Analysis Part", which is the

final application of Scharpf and Mayntz theoretical approach on the creation of the U.S. Agrofuels Project. The methodology of ACI is used to determine the institutional setting of the creation of the so-called Renewable Fuels Standard Program (RFS-Program) focusing on the role of EPA and the dominant actors that cooperated with the Agency. The results of the ACI analysis and therefore the role of the EPA is then summarized and presented in chapter 5. 'Summary and Conclusion'. The results of the analysis are assumed to answer the research question of this thesis as well as to contribute an illustration of how environmental politics in the U.S. can be influenced. Finally chapters 6. and 7. are the annex and index of literature used for this thesis.

2. Institutions and their decisions to regulate policy problems

Federal Agencies such as the EPA have an important role in the United States (U.S.). They cooperate with policy makers on Capitol Hill, interact with the civil society and are responsible to realize, monitor and enforce rules, guidelines and standards that regulate the political, economic and social system of the U.S.

The creation process of the RFS Program included different actors representing the State, the economy and civil society. The thesis statement that the EPA followed interests of profit oriented agribusiness builds on Fritz Scharpf's and Renate Mayntz theoretical approach of Actor Centered Institutionalism, which assumes that "*social phenomena are to be explained as the outcome of interactions among intentional actors, but that these interactions are structured and the outcomes shaped, by the characteristics of the institutional settings within they occur*" (Scharpf, 1997: p.1).

2.1. Mayntz and Scharpf's theoretical framework of "Actor Centered Institutionalism"

The theoretical framework of this thesis is based on what Scharpf calls "*Actor-Centered Institutionalism*" (ACI). This terminology evolved from a broad scientific discussion among sociologists, economists and political scientists concerning questions within the policy research field ranging around the basic interest of 'why certain public policies emerged rather than others'. A major presumption of ACI is that an analysis of structures without reference to actors is as handicapped as an analysis of actors behavior without reference to structures (Mayntz & Scharpf, 1995: p.46). Neither sociological nor economic views alone provide sufficient methods to answer these questions concerning public policy decisions. Scharpf and Mayntz therefore progressed and linked aspects of these two social science branches by combining actor-centered and institution-centered research approaches into one integrated framework showing that this is a better "[...] *fit between theoretical*

perspectives and the observed reality of political interaction” (Scharpf, 1997: p.36).¹ This heuristic approach offered research possibilities for problems concerning governance and self-organization particular in fields related to state interventions.² Scharpf points out that ACI is not a theory, but a theoretical framework that is “*most closely related to a neo-institutionalist paradigm that concentrates its criticism of mainstream theories on the neglect of the consequences of political processes and their organizations, which influence the aggregation of individual behavior into collective effects.*” (cf. Evans et. al., 1985 in Van Lieshout, 2008b: p.10). This paradigm is part of a distinction between various neo-institutionalist paradigms in the mindset of the social science theory of ‘new institutionalism’ (see Fig.1).³

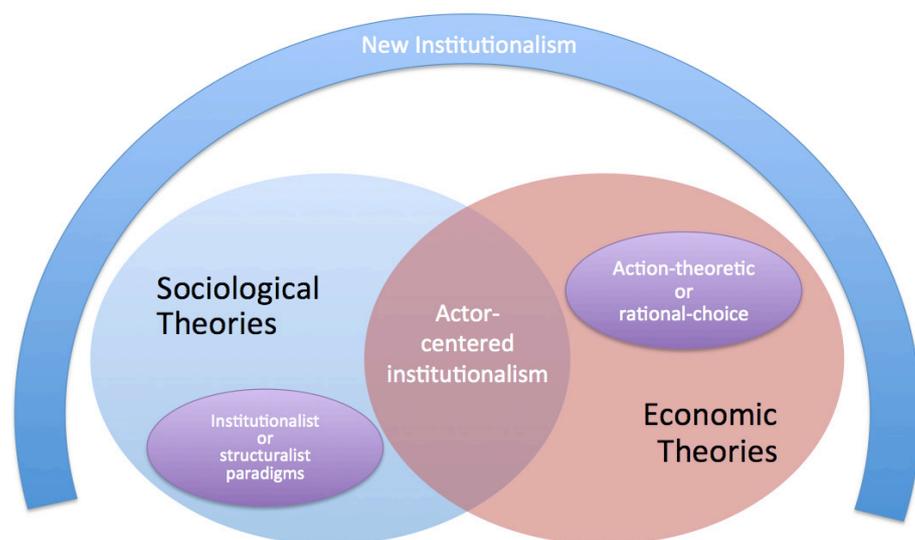


Fig.1: Theoretical embedment of ACI, own visualization based on (Mayntz & Scharpf, 1995).

Van Lieshout summarizes the distinctive link between Scharpf’s ACI approach and Evans’ neo-institutionalist paradigm and emphasizes four differences. *First*, ACI does not confine itself to political institutions. *Second*, ACI works with a narrow definition of institutions. *Third*, ACI analyzes institutions as dependent and independent variables. *Fourth*, ACI does not ascribe a determining influence to institutions, but sees

¹ This framework included “*action-theoretic or rational choice and institutionalist or structuralist paradigms*” (Scharpf, 1997: p.36).

² Mayntz and Scharpf rather affiliate the possibilities provided by ACI as a heuristic research approach (Mayntz/Scharpf, 1995: p.39). It therefore can be seen as an attempt to use different theory instruments to look at certain things from a different angle point in order to solve certain policy problems.

³ Hall and Taylor applied three different analytical approaches to this terminology: “historical institutionalism, rational choice institutionalism and sociological institutionalism” (Hall/Taylor, 1996: p.936). Schmidt complements this distinctive view on new institutionalism understanding it as “*socially constituted, historically evolving, and/or interest-based rules of interaction that represent incentives, opportunities, and/or constraints for individual and collective actors.*” (Schmidt, 2003 in Mayntz/Streeck 2003: p.319).

institutional factors as building a – stimulating, enabling or restricting – context of action (Van Lieshout, 2008b: p.10).

ACI combines action theoretic or rational choice and institutionalist or structuralist paradigms, from two branches of studies, respectively economics and sociology to understand and explain public policies or real world solutions or outcomes. These synergies contain aspects of network analysis and game theory instruments to identify dominant actors, and emphasize their role of strategic interactions in ascribing policy choices (Scharpf, 1997: p.5). ACI's goal is not to determine a policy's proposition as good or bad. It is more the capacity of the policy systems to reach positive and legitimate choices that is in Scharpf's interest (Scharpf, 1997: p.15).⁴ Within this theoretical framework, the work of Scharpf and Mayntz goes deeper into the question about the ability to regulate modern societies and concerns the aspects of regulatory structures. Mayntz and Scharpf are looking at the relation between state control (state-regulation) and social self-organizing (self-regulation) systems within quasi-government sectors (ebd. pp.13-19).⁵ To further explore the internal characteristics of such sectors – for example the U.S. renewable fuels sector – Mayntz and Scharpf undertake a functional distinction between a “*governance structure*” and an “*industry structure*” in order to determine the regulative structure (ebd. p.16) (see Fig.2).⁶

⁴ Within the context of 'legitimacy' Scharpf points out that the theory “*concerns not regime legitimacy, but rather the legitimacy of specific structures and procedures through which policy is being produced.*” (Scharpf, 1997: p.14).

⁵ Mayntz and Scharpf base their interest of concerns around political-administrative control of interventions and endogenous developmental trends linked with change-resistances in areas of social regulation (Mayntz/Scharpf, 1995: p.11).

⁶ The 'governance structure' is composed of non-governmental corporative actors, like institutions or organizations, and is determined by their constellations. Along with the governance structure exists an 'industry structure'. The 'industry structure' is represented by public and private performers and reflects the degree of networking, the intensity of competition, the form of performance funding and its utilization. - This can be achieved by rules/guidelines, sanctions, incentives or information and persuade strategies (ebd. p.17).

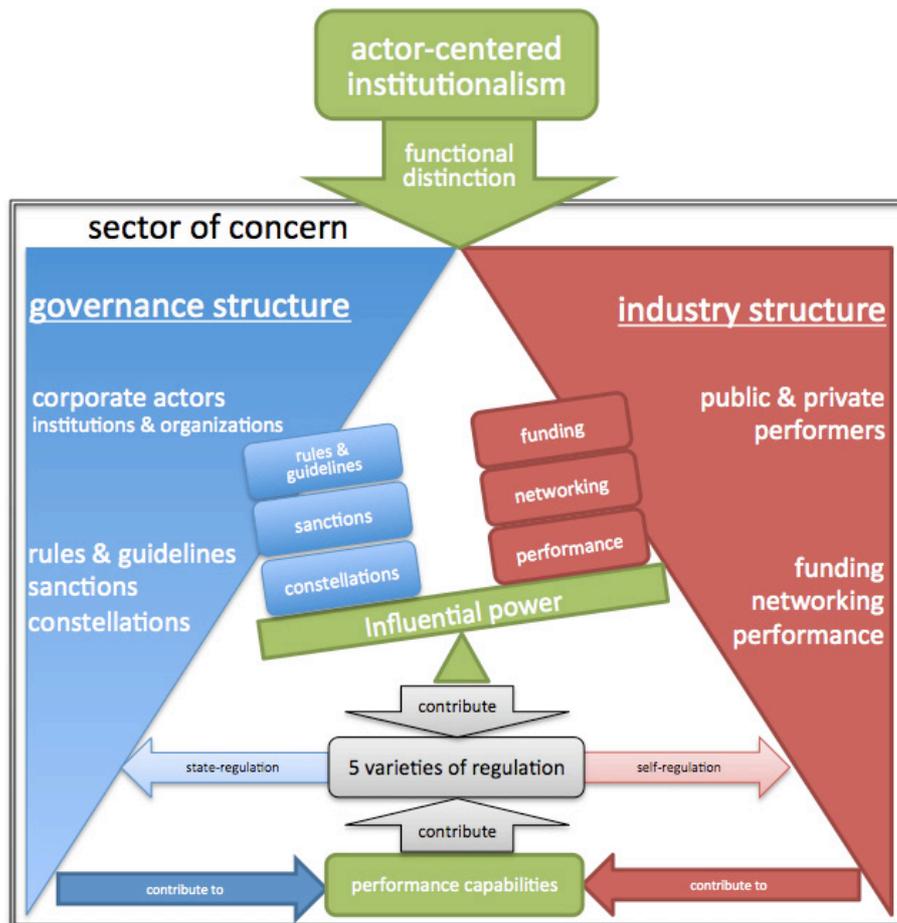


Fig.2: Functional distinction, own visualization based on (Mayntz & Scharpf, 1995).

These two structures are integrated and make their internal actors either regulation subjects or regulation objects – or even both.⁷ The regulative structure ranges between state-regulation and self-regulation. Mayntz and Scharpf identify five variations between those two extremes (see Fig.3).⁸

⁷ Scharpf explicitly points out a dependency between these two structures giving the governance structure the ability to influence the industry structure. (ibid. p.19).

⁸ Mayntz and Scharpf explain that the relation between the two structures can function like a game, whereas one side responds either in a cooperative or non-cooperative way towards the other side.

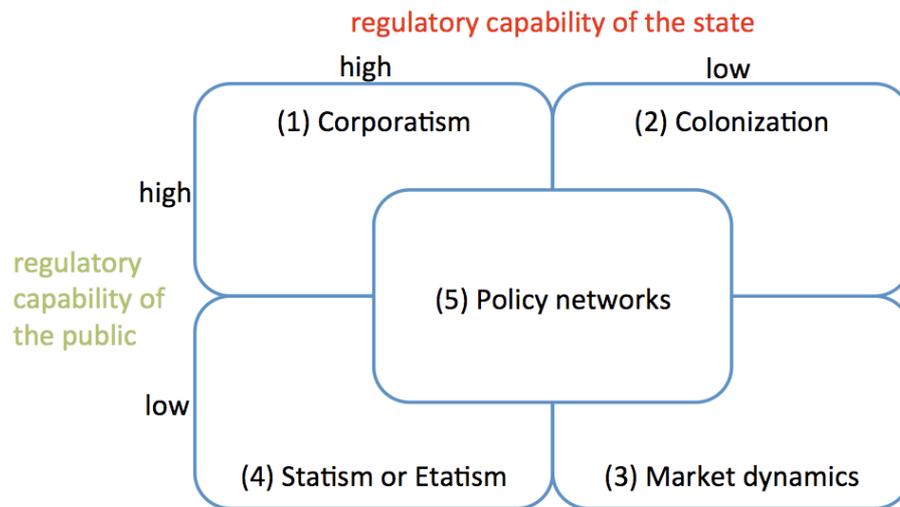


Fig.3: Variations of regulation-systems (Mayntz & Scharpf, 1995: p.25).

The most interesting variation in context with this thesis are ‘policy networks’ that are in the center of these systems, indicating a more or less equal representation of both regulation structures – state and public regulation. The authors argue that the actors-constellation is the most important trigger to determine which regulative structure remains dominant. Since the 1970s western-industrialized democracies and their economic sectors and politics were more and more influenced by neoliberal ideologies. Those democracies experienced increasing liberalization and privatization. In that sense Mayntz and Scharpf further point out that within sectors that employed a high degree of self-regulation the creation of common rules and sanctions remained problematic. This thesis will show that the U.S. agrofuels market was also relatively liberal, as the initial development of the support for an U.S. Agrofuels Project was mainly market driven. Stakeholders face different consumer and producer interests⁹, distribution of scarce resources¹⁰ and power centralizing tendencies¹¹ (Mayntz/Scharpf, 1995: pp.21-22).¹² Therefore the authors conclude that in sectors with a strong representation of self-regulation, common solutions for public policies are possible, but only on a very small scale (ebd. p.26).

Evans et al. connected ACI with a political science variation of ‘new-institutionalism’ narrowing the understanding of institutions to political relevant behaviors of

⁹ In this sense especially consumer interest reveal to be highly heterogeneous and hard to be met on a broader scale (ebd. p.21).

¹⁰ Here it seems that powerful members gain more benefits than others (Schimank, 1995 in Mayntz/Scharpf, 1995: p.21).

¹¹ Mayntz and Scharpf argue that power starts to centralize around cartels or other similar forms of organizations, if self-regulation is very strong and easy to implement (Mayntz/Scharpf, 1995: p.22).

¹² The authors argue that standardization and self-enforcing agreements apply to be useful instruments to increase the capabilities of self-regulating sectors (Werle, 1993 in Mayntz/Scharpf, 1995: p.21).

individuals and power relations in political decisions. (Evans et al, 1985 in Mayntz/Scharpf, 1995: p.42). Therefore institutions are not seen as formal institutions – like ‘old institutionalism’ uses the terminology – but as aspects of regulation. (Mayntz/Scharpf, 1995: p.45). To implement those aspects of regulation within ACI, Mayntz and Scharpf identify that the relation between corporative actors functions with a “*multiple level perspective*”, in which the institutional setting forms the acting of organizations, which again forms the institutional setting for their members (see Fig.4) (Mayntz/Scharpf, 1995: p.44).¹³

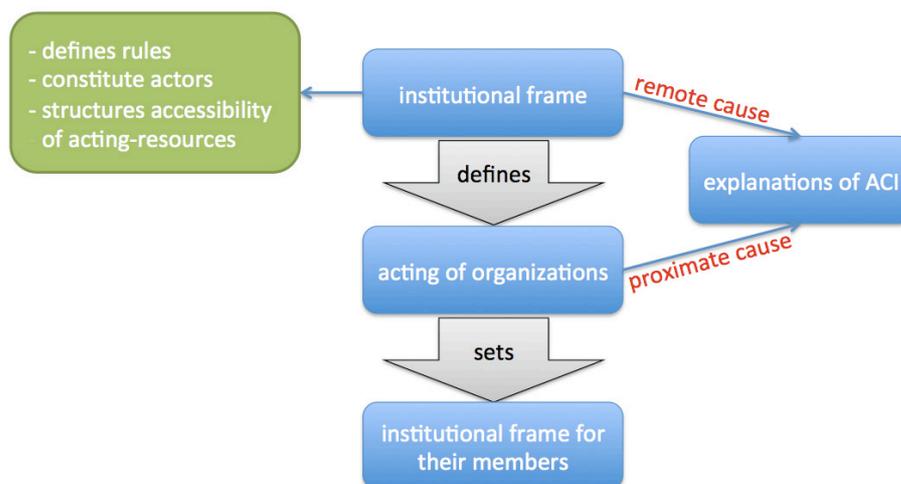


Fig.4: Multiple level perspective, own visualization (Mayntz & Scharpf, 1995).

The institutional setting for the U.S. Agrofuels Project is highly influenced by the U.S. political system and the legislative procedure federal agencies have to follow in order to set standards and create regulations.

2.1.1. The methodology of ACI

Scharpf and Mayntz have designed a practical pattern to examine policy problems and the interactions among policy actors to find an applicable policy solution. First ACI uses a problem-oriented analysis to identify the policy problem (Ch. 2.1.1.1. p.16). Second, ACI proceeds with an interaction-oriented analysis (Ch. 2.1.1.2. p.16) looking at involved actors, their orientations and preferences, as well as at the different constellations that triggered the actors’ modes of interaction in the creation of the final policy outcome.

¹³ Coleman describes corporate actors as being capable of acting (“*handlungsfähig*”), formal organized people majority, which have centralized resources and decide hierarchically or “*majoritär*” about their utilization. (Coleman, 1974 in Mayntz/Scharpf, 1995: p.49). Mayntz and Scharpf argue that corporate actors attract more interest because quasi-state actors are mostly highly organized.

2.1.1.1. Problem-oriented analysis

As the name of “problem-oriented” analysis already indicates, this analysis approach focuses on problems that cause policy solutions, potential policy suggestions and their impacts on the wider policy environment (Scharpf, 1997: p.11). To make this analysis most applicable to many different policy research approaches, it includes sources from different academic branches like economics, sociology, criminology, natural science, psychology, and many more. This provides ACI with universal possibilities for any research field and any real problem that has to be solved by a public policy. What is important is that the problem identified is real, well described and applicable to a State’s political capacities to find and create a policy solution. Internet laws for example prove to be more difficult to be applicable to the requirements stated above. The regulation of the use of agrofuels is applicable for States as a policy problem than can be solved by the political system and institutions of the U.S. However, for this thesis the problem-oriented analysis will show that within one declared policy problem it is possible to identify multiple aspects from different branches, which is summarized as a “*multi facetted problem*” (Chapter 4.1.2. p.61).

2.1.1.2. Interaction-oriented analysis

The “interaction-oriented analysis” starts once a policy problem and a potential policy solution were identified. Scharpf declares this analysis approach as a classical field for political scientists and political sociologists. Basically it is a general expectation that the government is responsible to implement the very best policy solution for the policy problem. In comparative studies concerning strategies to fight stagflation Scharpf has shown that countries choose different solutions although the problem was the same. Scharpf questions this general expectation and argues that political scientists should be interested in the fact that because policy decisions are not made by a single actor, many other well designed policy proposals never become effective (Scharpf, 1997: p.11). Following Scharpf, ACI requires multiple actors addressing specific problems or interests for the “*common good*” – like the protection of the

environment or national security – and working within the policy creation process.¹⁴ What Scharpf therefore submits within his work is that the “*powers of the collectivity*” are more likely to achieve solutions for the ‘common good’ rather than individuals acting within their own interests or the ability of market exchange achieving the very solutions (Scharpf, 1997: p.1). To successfully incorporate multiple interests of multiple actors, Scharpf and Mayntz use aspects of game theory to create an applicable pattern for the analysis. The focus of the interaction-oriented analysis is therefore on the interactions among multiple policy actors.

2.1.1.2.1. Actors orientations and capabilities

Scharpf points out that actors possess certain orientations (specific perceptions and preferences) and capabilities (Scharpf, 1997: p.43). He highlights two actor-orientations in order to examine behaviors and to interpret relations between corporate actors. First he explains ‘acting-orientations’, relating it as the trigger for members to act. These actions are the “*proximate cause*” for certain behaviors, whereas the institutional setting is seen as the “*remote cause*” (see Fig.4 p.15) (ibd. p.46). Based on the ‘acting-orientations’, corporate actors can set their limits for institutional regulations. Within a specific sector, actions are then set through interactions within certain constellations and action-options. Those factors – orientation/preference, constellation and action-options – determine an actor’s choice of action. Secondly they introduce ‘interaction-orientations’, which give the possibility to interpret relations between corporate actors.¹⁵ Coordination becomes the keyword between corporate actors within negotiation systems/networks. Scharpf distinguished between individual and composite actors. (ibd. p.61). This thesis will show that coordination is also one of the main factors in the creation of the Agrofuels Project.

2.1.1.2.2. Actors constellations

The first aspect Scharpf highlights in terms of constellation is the conceptualization of the plurality of actors involved in policy interactions (Scharpf, 1997: p.44). This is

¹⁴ Tietenberg explains a common good as a public good, meaning “These resources exhibit consumption indivisibilities and, additionally are fully accessible to all.” He visualizes public goods with a charming landscape, clean air, clean water or biological diversity (Tietenberg, 1988: 49).

¹⁵ Another question that arises within this context is under which circumstances corporate actors tend to act. This question is linked with their interests and goals. They can either be general preferences, long-term orientations or situational motives (Mayntz/Scharpf, 1995: 55).

what Mayntz and Scharpf mean with the “*crucial link between substantive policy analysis and interaction-oriented policy research*” (Scharpf, 1997: p.45). In order to avoid an exponential rise of complexity, the game theoretic representation within ACI can describe and compare diverse constellations at a very high level of abstraction. This helps to discover empirical regularities that would usually remain hidden. In order to convert policy problems to actor constellations, ACI wants to analyze how particular actors with specific orientations and capabilities will or will not include social interests in their own action orientations. (cf. Scharpf, 1997: p.72 in Van Lieshout, 2008a: p.25). These interests are finally meant to be implemented in public policies.

As these policy solutions are produced by multiple actors, of which each has its own orientations and capabilities, game theory, because of its explanatory power for constellations and modes of integration, again becomes important.¹⁶ Game theory offers the possibility to characterize different levels and types of conflicts among involved actors (ebd. p.45). These levels and types are included in different matrices. A basic distinction of these matrices is along “*non-cooperative*”, “*cooperative*”, “*voting*”, or “*hierarchical*” games/actor constellations (ebd. p.45).

But constellations only have limited visualization possibilities over time as policy problems can evolve if actors change their orientations or capabilities. The actual resulting interactions then can also vary between different modes of interactions.

2.1.1.2.3. Modes of Interaction

As the constellations describe the level of potential conflicts, the modes of interaction determine how these conflicts will be resolved (Scharpf, 1997: p.72) Scharpf distinguishes between four basic modes of interaction. (1) unilateral action, (2) negotiated agreements, (3) majority vote and (4) “*hierarchical determination*” (ebd. 46). These modes are shaped by institutional rules regulating their use, but also by the large institutional setting within which the interaction takes place (ebd. p.46)¹⁷. Here Scharpf points out, that there may be a limited variety of institutional arrangements that minimally permit a specific mode of interaction to be employed

¹⁶ Whereas Scharpf defines constellation “*as the players involved, their strategy options, the outcome associated with strategy combinations, and the preferences of the players over these outcomes*” (Scharpf, 1997: p.44) game theory simply describes it as “*one specific way in which the players are assumed to interact with one another*” in a variety of game settings. (ebd. p.45).

¹⁷ Like the procedures according to which issues can be brought to a vote (Scharpf, 1997: p.46).

(Scharpf, 1997: p.46 in Van Lieshout, 2008b: p.27). Scharpf further states that “*It is assumed that modes of interaction differ in their demands on the institutional capacity for conflict resolution and that institutional structures differ in their capacities to support different modes of interaction*” (see Fig.5) (Scharpf, 1997: p.47).

	<i>Institutional Setting</i>			
	Anarchic Field	Network	Association	Organization
Unilateral action	X	X	X	X
Negotiated agreement	(X)	X	X	X
Majority vote	-	-	X	X
Hierarchical direction	-	-	-	X

Fig.5: Modes of Interaction (Scharpf, 1997: p.47).

This means, that these modes of interaction will change their policy problem solving characters and capacities if the institutional setting changes. For example, the game theory example of the ‘Prisoner’s Dilemma’ initially included no communication between the two accused criminals. If this circumstance is changed, and communication is allowed, this would apply to a change of the interaction mode. In this regard, this thesis will also show that the creation of the final RFS1 also experienced a change in its mode of interaction. Initially the Project was discussed in congressional hearings, offering the involved actors to communicate their interests directly and very open to policy makers. The rulemaking procedure of the final RFS regulation then limited that communication possibility as will be shown later in this thesis.

3. The EPA in context of U.S. Environmental Politics

This chapter attempts to provide the reader with some basic knowledge about U.S. Environmental Politics, its origins and what triggered the creation of the U.S. Environmental Protection Agency (EPA). The chapter will further take a closer look at the EPA and examine its regulatory and scientific tasks, as well as its political potential. The Agency's regulatory and scientific tasks are crucial for the application of the following ACI analysis, as they represent an important fact of the unit of the analysis (Scharpf, 1997: p.43). The political potential of the Agency to influence policy decisions is also an important aspect of the Agency, which represents certain developments aside the regulatory protocol. Expert interviews provided the necessary information in order to emphasize the political potential of the Agency, which will provide a complementary view on the results of the ACI analysis in chapter 4. (p.47).

3.1. The Prehistory of U.S. Environmental Affairs

The History of environmental affairs in the U.S. is as old as the U.S. itself. Since the beginning of colonial times trees were often seen as an obstacle to settlement or as free commodity for private usage. Because land was so cheap, easily available and difficult to be controlled by the authorities, agricultural methods were highly exploitive with no regards to soil conservation or other environmental consequences (Petulla, 1980: 25).

During the American Civil War, the industrialized North illustrated how industry and city triumphed over agriculture and slavery (EPA, 2011f). The following era was characterized by the emergence of big rail companies that started to build the first connections between the Mississippi and California (CPRR, 2011). With the rapid increase of mobility and the emergence of the first big industrial manufactures, a fast growing interest group evolved in Washington D.C. addressing their interests for cheap resources and labor to their political leaders. This represents the first steps of the importance of mobility. Since then, history has shown that in the U.S. mobility became a crucial requirement for industrialized countries to grow economically.

The U.S. Agrofuels Project in that sense can also be interpreted as a further step for the continuation of this mobility requirement in industrialized countries. With the rise of industrialization the fast increasing production of coal and oil as well as the expanded demand for other natural resources such as timber caused additional pollution stressing the soil, rivers, the atmosphere and the wildlife (EPA, 2011f). The unsolicited management of these natural resources was legitimized through their seemingly infinite availability and profit promising benefits. Environmental interests had to wait until the dawn of the twentieth century, when President Theodor Roosevelt made an historic approach by supporting the establishment of almost 170 million acres of land to be protected as National Parks (Petulla, 2002: p.35). It was his close personal relation to nature and the American landscape that triggered him to preserve the American “Way of Living” (cf. Petulla, 2002). A fact that relativized his efforts was that he was more concerned about economic aspect of conservation for future generations (ebd. p.26).

Until the 1970s in the U.S. environmental politics were a summarization of single regulations concerning regional or local problems like regulations for timber harvesting or the protection of drinking water dwells (EPA, 2011f). In 1935 President Franklin Roosevelt enacted a number of ‘natural resource measures’ in context with his “New Deal”. After World War Two, the public image of nature as an open storehouse for human needs changed, when birthrates and suburban settlement started to increase rapidly, leading to penetrate the value of efficiency and commerce with esthetics and biology (EPA, 2011e). This process was summarized with the term “Ecology”. With ongoing growth, cities experienced ecological degradation, meaning increased pollution and nuclear incidents. This raised awareness for food production as well as for soil and water contamination.

3.2. U.S. Environmental Politics

In the United States of America environmental politics experienced its first institutional climax with the implementation of the National Environmental Protection Act (NEPA) and the Clean Air Act amendments of 1970 that introduced what is referred to as the so-called “Environmental Decade”. NEPA imposed environmental responsibilities on all agencies of the federal government (Findley/Farber, 2000: p.21). Within this decade, the U.S. Congress passed a series of important

environmental acts and amendments that constituted a clear trend towards more protection of nature and prosecution of violators of the environmental acts and their implementing regulations. The emergence of environmental politics in the U.S. evolved from an environmental movement that urged politicians and industrial leaders to deal with concerns of environmental degradation and pollution to what is today a robust set of laws and regulations implemented by a well-respected administrative agency.

Initially, environmental stakeholders faced the problem of how to represent environmental concerns in the political arena. In contrast to many European States, the U.S. political system never had a Green Party that represented environmental concerns directly in Parliament. Neither the Republican nor the Democratic Party is clearly representing the environment as their main concern, but if in comparison, the Democratic Party seems to be more supportive of environmental regulations (Schreus, 2002: p.8).

Therefore, the US-environmental movement relied on different entrance points to politics and decision-making processes in order to address their concerns and to politically participate in environmental law making. Carter and Eikland address that in the U.S. political culture, lobbying is a very powerful tool for stakeholders to address interests and to influence policy outcomes. Lobby groups can address either the White House or the executive branch, Congress or the States-governments (cf. Carter, 2007 and Eikeland, 1993). The choice of which political institution should be addressed, depends not only on the environmental issue, but also on the political level environmental issues are to be decided.

For example, the decision for the U.S. to sign the Kyoto Protocol was made by the White House, whereas its ratification was decided by Congress. In that sense, lobbyists have to know whom to address at what level of the political procedure. In addition to these classical institutions, the creation of the EPA offered an additional entrance point for environmental interests regarding regulations, threats to, or preservation of the EPA's congressional mandate to protect human health and the environment.

The environmental movement in the U.S. also addresses other institutions and concerns outside the U.S. political system. Environmental issues like acid rain, the depletion of the ozone layer or Climate Change are transnational concerns, which

involve and depend on the political participation of all affected countries. It is therefore also in the interest of the U.S. to cooperate in international relations regarding the environment. International organizations like the, United Nations Environmental Program, (UNEP) the International Panel on Climate Change (IPCC) or other NGOs like Environmental Defense Fund (EDF), the Natural Resources Defense Council (NRDC), and the World Resources Institute (WRI) also became influential factors in U.S. environmental discourse.

Especially the NGO sector experienced a significant increase of influential power on politics as their amount of members started to grow rapidly. These entities are influential to the environmental discourse because they represent an important share of the civil society. These organizations are also highly organized, nationally and international and have sufficient resources to highlight and communicate their interests to politicians and to public. Additionally, in many cases environmental stakeholders filed lawsuits that also had a political effect on certain regulations and standards. These facts are relevant, as they illustrate that true involvement in U.S. politics is also possible by the people and therefore also by environmental stakeholders.

The Montreal Protocol on substances that deplete the ozone layer is the first example of an international effort to create global environmental policy. The U.S. as one of the biggest producer and consumers of ozone depleting chemicals substances were a key player in advocating for international action to deal with ozone layer depletion (Schreurs, 2002: p.117). Schreurs shows in a comparison between Germany, Japan and the U.S. that the strength of environmental movements in each country did play an influential role on their government's acceptability of specific forms and interpretations of knowledge that lead to the signing and ratification of the Montreal Protocol.

In the U.S., data provided by NASA suggested that an ozone hole could form over populated areas in the northern hemisphere. This information set a new momentum for U.S. President George H.W. Bush, moving up the phase out date of certain CFCs by the end of 1995 (ebd. p.141). Additionally the industries that were using CFCs in their products experienced significant cut in their profits as consumers chose products devoid of CFCs. The possibility to substitute CFCs with other propellant gases or mechanical pumps offered the industry option(s) to conform its interests

with the concerns of environmental stakeholders. This example shows that in U.S. environmental politics three factors are crucial for a successful introduction or change of a regulation.

First the public opinion must oppose a certain environmental circumstance or regulation and organize a representation in order to communicate this opposition. Second, the demand of the public must be scientifically approved by any regulatory or scientific entity such as the EPA. The third requirement is a suitable substitute or initial product in order to avoid economic disadvantages for the affected industries.

If these three requirements are met, environmental regulations can develop in the U.S. This thesis will show that in the creation of the U.S. Agrofuels Project, agrofuels were also used to substitute a toxic additive of conventional gasoline, named 'Methyl Tertiary Butyl Ether' (MTBE). This substitution was also a main reason why the U.S. Agrofuels Project succeeded in its implementation.

3.2.1. The Emergence of an Environmental Awareness and the creation of the EPA

The emergence of environmental politics was due to the rising awareness of politicians that environmental concerns became political ammunition that helps to win elections. This awareness conceived from the emergence of a global environmental movement throughout the 1960s that represented strong demands from the civil society to politicians and industrialists to preserve and protect the environment. Schreus identified the emergence of this environmental movement as a part of a profound transformation of societal attitudes regarding pollution and environmental preservation (Schreus, 2002: p.32).

This transformation was pushed by a growing number of authors such as Rachel Carson, Barry Commoner or Paul Ehrlich who published best selling books and articles broadcasting the awareness of environmental threats.¹⁸ They addressed agricultural chemicals, nuclear technologies and growing populations as pressures for the environment. Hay identified this rising awareness as a contribution to what he

¹⁸ Carson concerns in his book "Silent Spring (1964)" the use of pesticides and other agricultural chemicals that have negative effect on wildlife. Commoner deals in his book "The Closing Circle (1971)" with tests of nuclear devices and other similar technologies that pose a threat to the environment. Ehrlich talks in his book "The Population Bomb (1968)" about pressures from a growing population.

calls a “*pre-rational impulse*” (Hay, 2002: p.3). Hay states that this pre-rational impulse is based on a deep-felt consternation of the destruction of nature in the name of transcendent human progression in the second half of the twentieth century (ebd. p.3).

This new awareness of nature and its dissemination through educational campaigns, best-selling books and journal articles paved the way for the emergence of environmental organizations like the Natural Resource Defense Council (NRDC), the Environmental Defense Fund (EDF), Friends of the Earth (FoE), and Greenpeace (Schreus, 2002: p.33). These organizations saw their memberships growing significantly during that time, which gave these organizations more influential powers.

Through their increased influence within the civil society and within politics through lobbying Congress and the White House these organizations were able to form and redefine the thinking about environmental problems. Grossman argues that next to the preservation and protection of nature, modern environmentalism is characterized by the additional wish to undo the damage done to the environment (Grossman, 1994: p.xi).

The emergence of the EPA institutionalized this extended environmental awareness in the U.S. that emphasized not only the public interest on the protection of the environment but also on the prosecution of its polluters and more stringent regulations for the exploitation of natural resources. (EPA, 2011e).

In 1964 and 1965 President Lyndon Johnson addresses the U.S. Congress to pass legislation that concerns a “new conservation”. He wrote that: “*Our conservation must be not just the classic conservation of protection and development, but a creative conservation of restoration and innovation. Its concern is not with nature alone, but with the total relation between man and the world around him. Its object is not just man’s welfare but the dignity of man’s spirit*” (Johnson, 1965: 2087 in Scott et. al, 2006: p.15).

The real institutional revolution of environmentalism in the U.S. was due to President Nixon, who like his predecessor also shared a focus on environmental concerns. In 1969 Nixon supported the establishment of two entities that primary addressed environmental concerns. First, the U.S. Congress established the “Environmental Quality Council”, which is meant to assist, advise and report to the U.S. President.

(Cornell University Law School, 2011).¹⁹ Secondly, Nixon complementarily supported the installation of a 'Citizens' Advisory Committee on Environmental Quality' to incorporate public inputs to environmental concerns (EPA, 2011e). Political opponents of Nixon denounced his efforts as political ceremonies with no profound interest in environmental issues (ebd.).

In order to further reinforce his commitment to the environment and to counter his critics, Nixon supported the decision of the U.S. Congress to pass the National Environmental Policy Act of 1969 (NEPA), focusing on the protection of earth, air, land and water by creating and maintaining "*conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.*" (CEQ, 2011). Through NEPA all projects done by the federal agencies that affected the environment had to be reported as "Environmental Impact Statements" to the State governments (EPA, 2011e). The Act further foresaw a 'Council on Environmental Quality' within the U.S. President's Cabinet. The Council still exists today and advises the president in policy decisions. It further is responsible to gather information and keep an overview of national environmental issues to provide the U.S. Congress with an annual Environmental Quality Report (ebd.).

Nixon further declared the 70s as the "*Environmental Decade*" and pushed for the implementation of regulations to improve water treatment facilities, national air quality standards and more stringent guidelines to lower motor vehicle emissions (ebd.) Nixon also proposed a tax on lead additives in gasoline in order to tighten safeguards on the seaborne transportation of oil, and he approved a National Contingency Plan for the treatment of petroleum spills (ebd.). The most significant development during the Nixon Administration was the creation of the Environmental Protection Agency on December 2nd, 1970 (EPA, 2011a). The creation of the Agency further institutionalized Nixon's efforts to protect the environment, but it also showed that he understood to follow the demand of the public.

¹⁹ It is further meant to gather timely and authoritative information, review and appraise the various programs and activities, develop and recommend national policies, conduct investigations, document and define changes in the environment and to report annually to the U.S. President (Cornell University Law School, 2011).

3.3. The Environmental Protection Agency as a Scientific and Regulatory Entity

In order to fulfill its mandate, EPA executes its programs through partnerships, educational programs, and the provision of grants. However, much of EPA's mission/mandate is accomplished through the promulgation and implementation of regulations, which serve to achieve the broad based laws created by Congress and executed by the President. For added illustration the chapter will refer to regulations concerning the U.S. Agrofuels Project as the RFS program is used throughout this thesis to spread light on the question of EPA's role in the creation of the U.S. Agrofuels Project.

Three sections will introduce the EPA and its tasks to fulfill its mandate. The first section of this chapter is dedicated to the explanation of EPA's mandate, which explains the purpose of EPA and defines the tasks of the Agency. The mandate further can be seen as the compass of the Agency to which it orientates its advices and to set minimal standard for its actions. The second section concerns the scientific aspects of the Agency, which underlines every regulatory decision EPA makes. Finally section three focuses on the regulatory protocol EPA has to follow, in order to create and enforce standards and regulations. Although without the force of law, EPA also issues guidance and policies that serve to bolster compliance with environmental regulations and laws and can thereby reduce EPA's resources on inspections and enforcement.

3.3.1. The mandate of the U.S. Environmental Protection Agency

The EPA was implemented in 1970 as a consequence of increasing knowledge about environmental detriments and a fast growing public awareness and resistance to these problems. President Nixon therefore aimed to "*consolidate in one agency a variety of federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection*" (EPA, 2011a). To manifest and accomplish the purpose of the EPA, Congress provided the Agency with a binding mandate "to

protect human health and the environment" (EPA, 2011c).²⁰ In working to fulfill this mandate, EPA focuses on several programs, including the protection of the air, surface water, soil, and ground water. To be more precise, EPA proposes and implements regulations, policies, and guidance to ensure that air emissions, water discharges, and disposal of hazardous waste in the environment do not pose any harm to human health and/or the environment. For example, the U.S. Agrofuels Project, was correctly placed under the purview of EPA's regulation of conventional fuels and under the "Transportation and Air Quality" section of the EPA since the production of agrofuels has implications for the regulations of water and wastewater management, soil erosion and, displacement of natural grasses, which are also under the umbrella of EPA's competences (Whitman, 2011). In order to accomplish the protection of human health and the environment in the best and most efficient way, EPA works together with its state counterparts, citizen groups, tribal governments and other federal agencies.²¹ EPA's mandate is very often the reason for lawsuits, if environmental stakeholders believe that EPA's action is conflictual with either the goals of an Act or if certain regulations do not prevent a threat to human health or the environment.

In its effort to protect human health and the environment, there can be dissension between EPA's representatives and politicians as decisions are debated and individuals and entities seek to make their interests most important, at times without regard to the protection of the environment. This is the case for example if industrial lobby groups address exploitive interests to Congress that do not consider long-term detrimental effects on the environment. EPA's mandate obliges the Agency to report its concerns to Congress and provide scientific data and advice. EPA's reports and advice are not binding, but will be heard and considered. Congressmen and women

²⁰ The EPA has to ensure that "(1) all Americans are protected from significant risks to human health and the environment where they live, learn and work; (2) national efforts to reduce environmental risk are based on the best available scientific information; (3) federal laws protecting human health and the environment are enforced fairly and effectively; (4) environmental protection is an integral consideration in U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and these factors are similarly considered in establishing environmental policy; (5) all parts of society -- communities, individuals, businesses, and state, local and tribal governments -- have access to accurate information sufficient to effectively participate in managing human health and environmental risks; (6) environmental protection contributes to making our communities and ecosystems diverse, sustainable and economically productive; and (7) the United States plays a leadership role in working with other nations to protect the global environment" (EPA, 2011c).

²¹ EPA also has close relationship to other Departments like EIA, USDA or with tribal governments (Native Americans) concerning human health and environmental protection on "Indian land" in the U.S.

make their decisions and give support to an issue depending on their preference between environmental and economic importance and what is most important for his or her constituency. At the same time the EPA is also urged to find a compromise to protect the environment but also to allow economic growth (Whitman, 2011). The following negotiations attempt to find applicable decisions, but sometimes they appear to be controversial. The case of the declaration that carbon dioxide is a detrimental threat for human health and the environment is a suitable illustration for such a conflict between EPA's mandate and the belief of Congress (Whitman, 2011).

These specific aspects and implementations about EPA's mandate are closely examined in Chapter 3.2., where the political competences of the Agency are the main focus.

3.3.2. The scientific task of EPA

Science is a powerful tool that is used in order to legitimize EPA's actions that aim to protect human health and the environment. To have a broad canon of knowledge, EPA actively does research in Air; Climate Change; Ecosystems; Health; Land, Waste & Cleanup; Pesticides; Substances & Toxics; Sustainable Practices; and Water (EPA, 2011h). The results are published, as it is mandatory for the EPA to be fully transparent. In terms of EPA's political advice, science and research, data always underlines any communication between the Agency and Capitol Hill. To provide this transparency, the Agency has installed the online and free accessible database 'Health and Environmental Research Online' (HERO).

To date, this database includes more than 300.000 scientific articles and is further linked with the 'Integrated Risk Information System (IRIS)'. This second database provides additional and complementary references and data that critically support EPA's policy making for chemical regulations (EPA, 2011h). As science is a crucial and determining factor for the decision making advice of the EPA, the scientific staff of EPA with their expertise play an important role in Committee discussions on Capitol Hill or the White House with the Council of Environment and Quality (CEQ). The EPA therefore is very interested to have the best-qualified staff to provide and further communicate research results to decision makers (Whitman, 2011).

In context with the creation of the U.S. Agrofuels Project, the Agency cooperated with the Energy Information Agency (EIA), the United States Department of Agriculture

(USDA), environmental stakeholders and representatives from potentially regulated entities (EPA, 2010: 42238).²² For the Agency it was beneficial to have its own scientific and policy-making experts, as they facilitated internal consultations and coordination between the scientific and legal aspects of the Agrofuels Project. The Agency further was not dependent on external experts, which saved time and financial resources. To ensure that EPA employees some of the best minds in the field of science and technology, EPA endeavors to competitively compensate its staff in order to attract and keep staff that is dependable to provide the advice that will enable EPA to meet its mandate.

In addition to science concerning human health and the environment, EPA's mission also includes considerations about natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade (EPA, 2011c). In that sense, Governor Whitman emphasized the importance of cost benefit analysis (Whitman, 2011). In the case of agrofuels in the US, the EPA stated that the impact on food prices as well as necessary subsidies and market interventions to assure economic competitiveness with fossil fuels were the most important parts of the cost benefit analysis prior to the creation of the RFS Program (EPA, 2011i).

Especially the possibility for increasing food prices fueled attention in the media and scientific discussion. As the EPA is obliged to keep full transparency, the Agency published a Regulatory Impact Analysis Statement (RIAS) for each RFS Program, in which the Agency laid out several scientific implications and possible impacts on the environment and the economy.^{23 24}

²² The EIA also undertook price and cost-benefit analysis for the U.S. Agrofuels Project.

²³ The RIAS for the RFS1 concerned on impacts for the production of GHG-emissions, air quality, estimated costs for fuels, the agricultural sector and small business flexibility (EPA, 2007: p.4).

²⁴ In its RIAS for the RFS1, the EPA stated that: "*FASOM estimates only a modest increase in U.S. household food costs. Annual wholesale U.S. food costs are estimated to increase by approximately \$7 per person with the RFS renewable volumes and by about \$12 per person annually with the EIA renewable volumes by 2012*" (EPA, 2007: p.333). The link between increased production of agrofuels and rising global food prices was intensely discussed between ecologist, economists and social scientists. However, one common conclusion was that it is too simplistic to directly link the rapid increase in the agrofuels production with "*leaving the world's poorest inhabitants hungry*" (WorldWatch Institute, 2007: p.135). The authors emphasize that food, which shares the same commodity like agrofuels will experience price increases (WorldWatch Institute, 2007: p.135). In his article 'Corn Prices Near Record High' Leibtag concluded that the assumed impact on prices of corn based products shows to be insignificant, as retail food prices remained much less volatile than farm-level prices (Leibtag, 2008: p.12). But although corn prices significantly increased until 2009 (see Fig.6 p.48) the ethanol production experienced a steady expansion. But at the same time if agrofuels are produced in a small-scale production infrastructure they also provide additional income sources for farmers and create new "green" jobs for the local population (WorldWatch Institute, 2007: 135). The case of the U.S. Agrofuels Project shows that

In this regard, the RFA reported that since the implementation of the RFS1 in 2007, 238,541 jobs across all sectors in the economy were created in the U.S. due to the increased ethanol production (RFA, 2008: p.13). In the same manner, jobs throughout all sectors increased to 400,000 jobs after the amendment of the RFS1 in 2009. (RFA, 2010: p.4).

However, the recent decision in Congress to abrogate tax incentives for ethanol producers could have a diminishing effect for the ethanol sector, as smaller businesses, financially rely on these subsidies and the State support for continuing ethanol demand (Krauss, 2011). A closer insight of the cost benefit analysis of the U.S. Agrofuels Project is provided in Chapter 4.1.2. (p.61).

The Agency has several funding programs like the 'National Center for Environmental Research' (NCER) or the 'Science To Achieve Results Program' (STAR), which provide grants for research institutions in the U.S.

In comparison, the European Commission divides its political and scientific competences in two Directorate Generals (DG). The DG-Environment represents the political and legal competences of the European Commission for environmental concerns. Its purpose is to support the development of a greener and more sufficient economy and contributes to preserve, protect and improve the quality of the environment. The DG-Environment receives annually approximately 400 million Euros to promote and support the implementation of environmental legislation and the integration of environmental protection requirements into the definition and implementation of other EU policies and activities. (EU Commission, 2011: p.5.) On the other side the DG-Research & Innovation provides the scientific research data for all DGs within the European Commission. This happens through so called "Framework Programs" (FP) which provide funding for research projects within a predetermined period. Currently the seventh FP provides 50,521 billion Euros for research projects between 2007 to 2013 (DG-Research & Innovation, 2011a). The money will be spent on grants to European and international research actors. A major goal is to co-finance research, technological development and demonstration projects (EU Commission, 2007: p.6). 1,890 billion Euros were dedicated for 285

the ethanol industry is experiencing a transformation from initially more locally and farmer owned ethanol production facilities to corporate owned ethanol producers. Between 2001 and 2011 the number of corporate ethanol producers increased from 40 to 176, whereas the number of farmer and locally owned ethanol producing facilities increased from 34 to 36 facilities (see Fig.23 p.89).

research projects concerning the Environment including Climate Change (EU Commission – Cordis, 2011. & EU Commission – Cordis, 2011a) (cf. Chapter 3.3 p.27).

For the year 2012 EPA has planned to reduce funding for research on the impacts of the production of agrofuels. EPA states that to date only minor scientific gaps need to be filled, which do not require significant increases in research funding (EPA, 2011k: p.50). Congress therefore provides the EPA with 6 million US-Dollars of additional funding for 2012 to reduce GHG pollution from transportation sources (ebd. p.ii). At the same time, EPA plans to invest 83,1 million US-Dollars in Clean Air research and 20,8 million US-Dollars for Global Change research. These two research funds are part of a new research program called “*Air, Climate and Energy Program*” (ACE Program). The program aims to provide the underlying research to support the Agency’s implementation of the Clean Air Act and it’s implemented mandatory scientific reviews for policy makers (ebd. p.147). As the Agrofuels Project is concerning air pollution this research program is most likely to consider the balance between CO₂-footprint of U.S. agrofuels and their GHG reducing potential as gasoline additive.

Additionally the EPA plays a crucial role for the U.S. in international environmental agreements. The Agency supports the Government with scientific expertise and when necessary participates directly at negotiations. As an appointee of the President, the EPA Administrator can represent the U.S. and participate in negotiations in an international forum (Whitman, 2011).

3.3.3. EPA’s regulatory task

EPA’s regulatory competences are based on the laws that are written by the U.S. Congress. It is the law that is enacted by Congress that provides the goals and framework for the regulation that EPA subsequently promulgates, implements and prosecutes. Once an Act empowered the Agency to proceed with its regulatory competences, the Office of Congressional and Intergovernmental Relations (OCIR) serves as EPA’s principal and merging point of contact with Congress. The OCIR develops and implements the legislative agenda for the Agency, including legislative initiatives and proposals. Additionally the OCIR leads EPA in the review of legislation; coordinates EPA's formal positions and technical assistance to Congress. It also

monitors all EPA-relevant legislative actions, like standards, regulations or reports (EPA, 2011g).

EPA was appointed to set specific legal actions as it has the necessary scientific background and a more profound insight in environmental concerns than Capitol Hill (Whitman, 2011). After the enactment of an Act, the creation of a regulation includes at least three steps before the regulation can be promulgated and implemented.

The first step is to propose a regulation. EPA and its agency researchers usually make those propositions in form of a “*Notice of Proposed Rulemaking*” (EPA, 2011b). This notice then is registered and published on “*Regulations.gov*” and accessible for comments within a specific time period (EPA, 2011b).

Step two involves considerations of comments and issuing a final rule. This is done by the OCIR. Finally, step three includes the regulations codification in the ‘Code of Federal Regulations’ (CFR). Once a regulation is codified and printed it is fully implemented (EPA, 2011b). Very often it happens that EPA’s standards or regulations are criticized and accused for not being sufficiently protective towards the environment. In such a case EPA has to testify in Court, and adapt changes if necessary or provide the necessary evidence to support its position.

The creation of the U.S. Agrofuels Project builds on two regulatory procedures, which involved the EPA. The first was the Renewable Fuels Program, which was implemented under the requirements of the Clean Air Act of 1990 and the Energy Policy Act of 2005. The second was the RFS1 which was meant to be implemented by the EPA as will of Congress expressed in the EPA Act of 2005. The CAA and EPA Act of 2005 therefore empowered the EPA to conduct research in the field of agrofuels in order to propose a regulation that would achieve the requirements in the Bill. In that sense the congressional hearings concerning matters of the EPA Act of 2005 and the creation process of the RFS1 have the highest explanatory power for the illustration of the EPA’s role in the creation of the Agrofuels Project.

Summarizing, EPA’s function as scientific entity is important for Congress and the White House. The scientific results are the base for any advice of the Agency. The financial comparison between the EU’s FP 7 and EPA’s research investments show that a clear comparison is difficult, as time tables and research plans differ. The EU provides 1,8 billion Euros for seven years to conduct environmental research, whereas the EPA invests 846 million US-Dollars for 2011 only for “Science &

Technology”. But at the same time it must be considered that many research projects are joint projects between multiple countries including the U.S. and the European Union.

EPA’s regulatory competences are indeed crucial for environmental Politics in the U.S., and every standard, regulation or testimony is always based on hard scientific facts. Without its scientific section the EPA would not have the required expertise to independently set required actions. Although research investments in agrofuels decreases, the scientific data available on the EPA homepage shows that most critical arguments concerning the impact of the production of agrofuels to society and the environment were considered in the Regulatory Impact Analysis papers (EPA, 2011k & l).

The conclusions in the reports differ from the information received from the interview partners that contributed to this thesis. Governor Whitman for example emphasized that agrofuels dislocate corn markets globally. In the U.S., their production undermines some of the natural grasses, causing loss of soil and less drought resistance in many parts of the country (Whitman, 2011). The reports focused more on water pollution due to chemicals like nitrogen fertilizers. Their impacts could harm waters inside and outside the U.S. Two prominent examples are the Mississippi basin and the Gulf of Mexico (EPA, 2009: p.964). This again emphasizes the importance of EPA’s mandate on the international level. The RFS2 Program therefore foresees a significant increase of third generation agrofuels, which are supposed to be less detrimental to water resources. This transition to third generation agrofuels is a current process, which includes a close cooperation between the EPA, ethanol producers and gasoline blenders. The dislocation issue of natural grasses remains unsolved.

However, this projection of long term focus synchronizes with the mandate of EPA, which shows that every scientific and regulatory action EPA undertakes must always fall into the framework of its mandate and is monitored by the civil society.

3.4. The Environmental Protection Agency as a Political Entity

The main concern of this chapter is the Agency’s political potential to influence U.S. environmental politics and policies in the political arenas of the United States such as

the White House or Congress.²⁵ This elaboration is important, as knowledge about the influential potential of the EPA contributes to identify and understand certain interests, constellations and modes of interaction in the creation of the RFS program.

This thesis will use the terminology “*political competences*” to describe the influential potential of the Agency. The influential potential is understood in the context where the EPA can unilaterally influence political decisions at any given stage of the decision making process within these political arenas mentioned above. In this context, it is important to distinguish if EPA is facing environmental concerns that are new and not yet enacted by a Bill or if EPA has to change or amend existing regulations. The elaboration of EPA as a political entity is done with three interviews, respectively with a former EPA Administrator, a current EPA employee and a former EPA adviser who currently works as an environmental law Professor. The interviews were expert interviews of each 20 questions with a specific focus on U.S. environmental politics, EPA as a political, scientific and regulatory entity, the creation of the RFS Program and the applicable constellations.

EPA can influence environmental Politics on three different levels. First, EPA can influence the way environmental issues are seen and understood before they become matters of policy discussions. This influence is done in joint research projects with other Agencies, Departments or research institutions. If the EPA is aware of an environmental threat just like the pollution of drinking water, it has a high interest in informing the public. Second, EPA can participate in the actual policy discussions and the creation process of a Bill. As discussed in the prior chapter, EPA actively participates in congressional hearings as scientific adviser or to testify on specific issues or regulations. Third EPA can influence how an existing environmental legislation is interpreted. This influential power depends on the available scientific data and knowledge.

The elaboration of the creation of the U.S. Agrofuels Project will show that the positive opinion on agrofuels in the public discourse was also because of a lack of information about the environmental implications and consequences of the agrofuels production chain. The political competences of the EPA vary and depend not only on which level EPA tries to influence policy decisions, but also on the matter of the

²⁵ Usually a political arena describes not a physical place where politicians operate, but rather ways and places where politics are communicated and lived. Those ways and places are for example, the media, public places like streets, internet forums.

environmental problem. EPA's mandate requires that in its promulgation of regulations EPA considers the impact to other areas of interest (for example the economy) to the Executive Branch²⁶. Although EPA may have scientific data that indicate negative environmental consequences could occur without proper regulations, the impact of these considerations and the Presidents priorities could sway EPA's internal decision and ultimately it's public declaration (Raghu, 2011).

Basically the political importance of environmental concerns depends on how serious, well understood and important the environmental problems are for members of the society who have voices and the President. Governor Whitman stated in her interview that the actions EPA takes are most likely in common with the priorities of the U.S. President (Whitman, 2011). Additionally, if the public does not recognize an environment threat as a matter of public or personal concern, chances for a broad public demand to adapt regulations are minimal (Dumas, 2011).

Furthermore, the majority of the society will measure the problem in comparison with other national interests like economic growth or national security, and reassess its options before taking a position. The Presidents priorities are most likely to be similar with the public majorities demands, as the President's political survival correlates with the support from the majority public.

3.4.1. The forefront of policy decisions

To analyze and identify the political competences of EPA on the first level, the Role of the EPA Administrator is crucial. Governor Whitman²⁷ emphasized the importance for EPA to promulgate regulations to achieve its mandate given by the U.S. Congress within the constriction that the Administrator of EPA is not appointed to decide a policy direction for the United States since he or she is not an elected official. He or she was rather appointed by the U.S. President to advise and craft the U.S. Administration's policy decision as the very best solution for environmental problems (Whitman, 2011).

²⁶ The executive branch usually is understood as the White House and its executive offices.

²⁷ Christine Todd Whitman is a former Governor of New Jersey between 1994 and 2001 and current President of the Whitman Strategy Group. She was appointed Administrator for the EPA by George W. Bush in 2001 and served in this position until 2003. As a former Governor and Administrator of EPA she understands the internal functioning of EPA and the political game at Capitol Hill and at the White House, which EPA is exposed to. Her expertise on these elements provided this thesis with the necessary insight of the general political, scientific and regulatory competences.

Governor Whitman therefore pointed to the commitment of the EPA's Administrator to directly advise the U.S. President and the Council of Environmental Quality (CEQ) in environmental concerns. This direct communication channel offers the possibility to participate in the conception of the Presidents priorities. The more aligned a President's priorities are with the EPA Administrator's advice, the less obstacles EPA has later to set regulations. With this direct opportunity to dialog with the President on issues concerning the environment, Governor Whitman further stated that the Administration with the "*bully pulpit*" offers the best opportunities to place environmental concerns, as the President has an enormous ability to influence ongoing discussions (Whitman, 2011).²⁸

The bully pulpit provides an additional possibility for the EPA Administrator to disseminate information and raise support for a position in order to avert any controversy. This opportunity enhances the possibility of EPA and the President's priorities presented initially through the lens of the Administration, garner support, and lessen oppositions.

3.4.2. The creation of a Bill

On the second level Governor Whitman pointed to EPA's importance and consideration on Capitol Hill. EPA's staff is permanently involved in Committee discussions and provides Congress with scientific information and advice for issues that are intrinsic to EPA's mandate. If EPA can convince Congress with its argumentation, its contribution will have a deeper impact on the applicable legislation that follows. EPA therefore relies on accurate scientific information and advocacies that are able to use this information to interact with politicians and argue for EPA's positions in the furtherance of its mandate.

In despite of EPA's influential capacities, Findley and Farber argue that the powers of Congress in constitutional law are limited to powers of delegation like the power to regulate interstate commerce, the power to tax and spend, the power to enter into treaties and the power to regulate the use of public lands (Findley/Farber, 2000: p.46). The U.S. Agrofuels Project seems to be applicable to most of these congressional powers. As this thesis will show in chapter 4.2. (p.65) the EPAct of

²⁸ Following Governor Whitman the term "*bully pulpit*" refers to White House (Whitman, 2011).

2005 and the RFS Program aim to promote and support the production and sales of renewable fuels within the U.S. Also Congress delegated the EPA to implement suitable regulations for the use of agrofuels and monitor compliance of the participants. And the U.S. imposed a tariff on ethanol imports in order to protect the national market from cheaper Brazilian ethanol.

In their book Findley and Farber argue that member states of the World Trade Organization (WTO) and the General Agreement on Tariffs and Trade (GATT) are basically acting illegal if national regulations are discriminatory against imports. However, Article XX of the GATT authorizes protectionist regulations when necessary for certain crucial governmental interests. The exemptions apply to imports exclusions in order to prevent harm to the environment relating to the production of those imported goods (Findley/Farber, 2000: p.59). The U.S. Agrofuels Project was also introduced as an activity to reduce toxic components from conventional fuels and GHG emissions from vehicle tailpipes. Furthermore, as chapter 3.5. (p.44) will show, foreign agrofuel projects like the Brazilian case are characterized by their extractive modes of production (cf. Holt-Giménez/Shattuck, 2009). If the U.S. Congress recognizes this characterization, it could also be used as argument to legitimize imports tariffs for foreign ethanol.

3.4.3. After the enactment of a Bill

The third level, once a policy is decided by the Administration and passed the Congress, the political competences of EPA become more limited. A crucial question that arises is what happens if a congressional policy decision is detrimental to the environment and conflicting with EPA's mandate? If EPA believes that either a particular law or piece of legislation is detrimental to the environment or if EPA believes that a particular law or regulation would be more protective of human health and the environment, EPA has to testify and explain its position to Congress (Whitman, 2011). It is therefore in the best interest of EPA to pick the issues that it is willing to fight for (Whitman, 2011). If this attempt to influence legislation fails, the only option EPA has is entitled in its mission and states that it has to ensure that: "*all parts of society – communities, individuals, businesses, and state, local and tribal governments – have access to accurate information [...]*" (EPA, 2011c).

This provision of information offers possibilities and provides the basis for citizens, industry groups or NGOs to file lawsuits, if a conflict between a policy decision and EPA's mandate is detected. The Agency then has to respond and justify why it is not taking action and the converse is also true. (Whitman, 2011). The possibility to sue EPA provides certain securities for EPA's mandate as in Congress different interests often try to influence the political and regulatory competences of the Agency. The case of Agrofuels and the RFS-Program is a good illustration that implies such a conflict. It has been posited, that the ethanol production in the U.S. is causing environmental problems like increasing draughts and loss of biodiversity. According to Governor Whitman it further implies an even higher CO₂ footprint than initially expected (Whitman, 2011). But although the Administration, Congress and the EPA are aware of these arguments and positions, to date no significant change has been made to the RFS Program that would directly respond to these apparent problems. Considering the fact of the increase footprint that is expected of the RFS Program, the first obvious question one may ask is why the EPA has not objected to the RFS Program? But at this point the more interesting and profound question concerning the political competences of EPA is: *'What are the possibilities the EPA has to officially declare a law or piece of legislation as detrimental to the environment?'* The declaration that an already enacted Bill stands in conflict to EPA's mandate is highly political and in most cases such an annunciation by the EPA implies serious consequences for other political aspects of the Government, especially the economy. In the case of Agrofuels, a fast growing agricultural industry could be harmed by the declaration that the production of Agrofuels in the U.S. is detrimental to the environment. Such a declaration could additionally threaten the supply of ethanol, which is also used as oxygenate in gasoline in order to reduce enhance octane level and to reduce toxic emissions from the fuel. However, as more studies prove the detrimental aspects of the U.S. Agrofuels production to the environment, there is no mentionable change in the RFS Program to date than concern the negative effects on human health and the environment.

At this point, when such a controversy becomes obvious it is important to look who in the U.S. political system is responsible to act. The U.S. system offers several possibilities for political, administrative and civil actors to take action. The problem is that not every possibility will lead to a fruitful outcome for the protection of human health and the environment. EPA itself has no legal possibility to unilaterally change

legislation. EPA's legal or rulemaking terrain begins once a Bill has been enacted, and EPA is thereafter empowered to promulgate and implement regulations to accomplish the broad goals of the Act. A Bill or the enacted Act is a legislative document, based on a political decision that sets a broad direction on how a specific problem, like the protection of Air or Water, should be solved. The more specific and detailed "how factors" are found in the regulations and are in the domain of the specialized Agency, the EPA. It is the EPA's purpose to have the expertise to find the very best measurements, standards and enforcement and compliance tools via its regulations policies, and guidance to fulfill the requirements of the Act. In this highly political phase, after the law has been enacted, EPA has actual power in terms of decision making, enforcing and monitoring, as it reviews and considers comments of citizens and stakeholders.

These measurements and standards, which are embedded within the regulations and are implemented by the EPA apply to what Scharpf calls a "policy solution" as the decisions EPA makes are the actual solutions to solve the problems identified by Congress. But even the EPA itself functions within a certain framework that limits its possibilities to promulgate regulations that are responsive to environmental concerns. This framework is EPA's mission, which implies that it is EPA's purpose to ensure that: *"environmental protection is an integral consideration in U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and these factors are similarly considered in establishing environmental policy"* (EPA, 2011c). These considerations can have an effect on EPA's decision on how to value the environmental detriment. If an environmental regulation threatens businesses, jobs and economic growth its implementation will be more questioned. Governor Whitman exemplified this argument with the Agency's regulation of arsenic levels in water in the South West. Without regards to cost, water companies had to reduce the amount of arsenic in their product in order to provide their customers with water. Companies that could not afford the necessary changes simply went out of business. The customers that relied on their water system, could either choose between selling their home and move away, buy bottled water, which is very cost intensive, or to sink their own wells, which many people chose to do. Unfortunately arsenic also occurs naturally in water. The water that the people got from their own wells had even higher levels of arsenic than

what they were getting before from the water companies. The end result was worse than what the Agency was trying to protect them from (Whitman, 2011).

Her example provides a good insight of how the EPA has to consider factors like economic consequences in their decisions. It also shows how economic consequences can shape behaviors and therefore emphasizes the importance of these considerations to “[...] *do the most to protect public health and the environment while still balancing the need to allow people let’s say stay in their homes or be able to earn their living.*” (Whitman, 2011).

The agrofuels project proves to be also highly influenced by most of the considerations EPA has to make in order to set a regulation. A major argument by the Bush Administration for the expanded use of corn-based ethanol was to financially support corn farmers and U.S. agribusinesses. Especially farm-owned facilities depend on economic incentives in order to stay in business and to create incomes for their families. In despite, this thesis will also show that this argument has a limited value, as the renewable fuels sector also experienced a structural change after 2005.

Governor Whitman further stated that the interest of the EPA relies particularly on how science and policy intersect (Whitman, 2011). This intersection takes place in the above-mentioned political arenas of the United States and varies from case to case. Depending on which party holds the majority seats in the two chambers of Congress environmental concerns are differently prioritized. Historically, it could be argued that the Democratic Party has been more environmentally supportive and the Republican Party has been more supportive to the industry.

This also has an effect on the financial possibilities of the EPA, and therefore limits their capacities to provide decision makers with necessary scientific data. The U.S. President nominates the Administrator of EPA as well as the ten regional administrators, but as with all federal appropriation, it is the U.S. Congress that provides the financial resources for EPA to operate. The budget appropriated to the EPA could vary depending on which party has the majority seats in the Congress.²⁹

²⁹ Since November 2010 the House of Representatives has a majority of Republican Representatives. In the Senate the Democrats have a slight majority because of two independent Senators (Senate, 2011). This constellations and the current economic situation in the U.S. have shown that environmental concerns are currently obscured with regards to its level of importance on Capitol Hill and therefore EPA’s possibilities to regulate could be limited. A recent example is

In 2005 the 109th U.S. Congress had a republican majority of 55 percent in the U.S. Senate and 53 percent in the House of Representatives (GPO, 2011). In 2007 the 110th U.S. Congress experienced a change, with a democratic majority of 50,5 percent in the U.S. Senate and a democratic majority of 54,3 percent in the House (GPO, 2011). In this regard Governor Whitman's statement would suggest that the congressional decision to enact the EPA Act of 2005 with its implemented RFP was to some extent connected to the interests of certain industries, such like energy or oil companies. At this point it seems most plausible to assume that agribusinesses and therefore the agro- and renewable fuels industries would be biggest gainers of the implementation of a RFP that contains high renewable fuels blending volumes. The creation of the RFS1 in 2007 followed under a democratic Congress. The ACI analysis will reveal if this change of political power had any consequences to the physical policy outcome of the RFS.

To briefly summarize, the visibility of EPA as a political entity, its political competences are seen on three levels: (1) In the conception of the Presidents priorities, (2) in the creation of a Bill at Capitol Hill and (3) in providing information that can be used for lawsuits. These three levels also contribute to what Scharpf calls "problem- and interaction oriented analysis". The problem oriented analysis concerns the causes of policy problems, with the potential policy solutions and their likely effects on the initial problem (Scharpf, 1997: p.11). In the case of U.S. Agrofuels the initial problem under scrutiny is a multi-facetted problem, based on the U.S.

the regulation of Green House Gases under the Clean Air Act in context with power plants. This controversial issue is highly debated in the House of Representatives, as Republicans "simply don't believe in Green House Gases" (Whitman, 2011). The political success of EPA in Congress therefore depends very much on what Congress believes. As the Republicans have the majority in the House of Representatives they can pass legislation to stop EPA regulating Green House Gases emissions from power plants, in a way that it could be a financial burden for the energy sector. So far EPA has delayed regulation to reassess implications for economic growth, energy costs and employment (Broder, 2011). A final regulation is expected to be implemented by May 2012. But as soon as this happens, EPA can be brought to court, if the regulation is seen to be in conflict with EPA's mandate. The court then could decide that Congress, in limiting EPA's protection possibilities had overstepped its powers and that this legislation was unconstitutional (Whitman, 2011). A decision like this would be based on the fact that industrial Green House Gases are a detrimental to the environment and a threat for human health. This understanding was enforced by the current EPA Administrator Lisa Jackson in the forefront of the 2009 United Nations Climate Change Conference (COP-15) in Copenhagen, when she officially declared that carbon dioxide is a dangerous pollutant (Fund, 2011). Lisa Jackson's declaration about carbon dioxide as detrimental to the environment was historical and clear commitment of the Obama administration after the Senate failed to pass a cap and trade treaty for carbon dioxide before the COP-15 summit (Fund, 2011). This example therefore confronts the environmental commitment of the democratic Administration with the industry committed republican majority in the House of Representatives, and illustrates the basic positions of the two political parties in U.S. Environmental Politics.

dependency on oil. The multi-faceted problem will be closely elaborated in chapter 4.1.1 (p.51). The first part of the policy solution was meant to be achieved by the inclusion of the RFP in the EPA Act of 2005, which was enacted under the Bush Administration and a republican majority in the U.S. Congress. The second part of the policy solution was the final creation of the RFS1 Program by the EPA, which also occurred under the Bush Administration, but with a democratic majority in the U.S. Congress. The interaction oriented analysis will critically review the decision of the EPA to create the RFS Program as the best policy solution for the multi-faceted problem and determine if the change of the political majority in the U.S. Congress made any difference to the final policy outcome of the creation of the U.S. Agrofuels Project.

3.5. Agrofuels and Environmental Politics

Agrofuel projects reveal to be a highly controversial aspect of the Climate Change debate. Agrofuels initially were seen from an economic standpoint to be used as a substitute for expensive oil during the oil crisis in the 1970s. Brazil for example initiated a sugarcane based ethanol program called "*Programa Nacional do Álcool – Pró-Álcool*" in 1975 to reduce its dependency on foreign oil (cf. Andrietta et al., 2007). But with the significant fall of oil prices during 1985 and 1990 the production costs of ethanol increased and made agrofuels less attractive as fuel (ebd.).

Agrofuels regained its importance in the new millennium with the rising awareness of an effect called "Green-House-Gas-Effect" which was identified as the main cause for the raise in global temperatures due to increased emissions of Green-House-Gases (GHG-emissions) from the production of fossil energy sources. The Intergovernmental Panel on Climate Change (IPCC) released its fourth Synthesis Report (AR4) in 2007, showing that Energy supply (25,9 percent), Agriculture (13,5 percent) and Transport (13,1 percent) were responsible for 52,5 percent of global GHG-emissions between 1970 and 2004 (IPCC – AR4, 2007: Figure 2.1). Agrofuel projects create a nexus between the three sectors. With regards to energy supply, agrofuels are presented as a solution to the energy crisis. As it is the agricultural sector that will most likely produce the first and second generations of agrofuels, the agricultural sector is vital in the achievement of agrofuels used as an energy source for transportation, thereby reducing CO₂-emissions from automobile tail pipes.

(Preamble, RFS 2010). The AR4 further identified that 56,6 percent of total GHG-emissions was CO₂ from fossil fuel use (ebd.). The AR4 intends to communicate, that the rise of temperature causing our global climate to change is anthropogenic.

With this discovery, supporters of agrofuels began to promote it as a fuel emitting less CO₂ than fossil fuels when combusted. Environmental stakeholder initially supported the idea to substitute fossil fuels with agricultural commodities but what was missing in the first wave of promotion was the incorporation of the production chain of agrofuels called “Indirect Land Use Change” (ILUC). With the inclusion of ILUC in recent years, studies showed a more controversial picture of agrofuels as a sustainable solution to reduce CO₂ production and replace fossil fuels.

Many critical studies linked the agrofuel boom to soil erosion, water depletion, deforestation, loss of biodiversity and as a major trigger for global food price increases, leading to social problems in countries of the global south (Holt-Giménez/Shattuck, 2009; León-Sicard, 2009; Pimentel, 2009). An interesting view on ‘agrofuel projects’ is provided by Holt-Giménez and Shattuck, linking environmental concerns with economic and social aspects. In their work they argue that agrofuels actually cause more social and environmental problems than they solve. They identify agrofuels as an *“Extractive Industry” [...] attracting industry and finance because they offer opportunities for new profit centers in agrarian value chains, and because their publicity subsidized expansion allows monopolies to further consolidate control over both our food and our fuel systems.*” (Holt-Giménez/Shattuck, 2009: p.181).

Holt and Shattuck further state that extractive industries operate globally, facing stricter regulations and more control concerning sustainable modes of production in the global north. It is therefore important for Extractive Industries to comply with all applicable regulations in order to ensure political support and positive public relations. As the global south operates in an environment with less regulations and control, extractive industries find an ‘El Dorado’ to harvest commodities that are essential for the global north³⁰ (cf. ebd. p.181). Environmental Stakeholders like Greenpeace or Friends of the Earth often address in the media, that the methods agrofuel producers use in countries of the global south are mostly destructive to their

³⁰ Commodities like corn, sugarcane or soy that are used to produce agrofuels are essential resources in the agrofuel industry.

ecosystems and cause loss of biodiversity and very often social problems for indigenous people.

Nevertheless, the “Green New Deal” and the emergence of “Green Capitalism” in the realm of the Climate Change discourse at the early beginning of the 21st century provided political support. Governments all over the world supported the agrofuels-boom by implementing quotes and regulations to blend more agrofuels with conventional fuels. Two popular programs were initiated and recently extended by the European Union and the United States of America.³¹ Urgent questions that arise from these decisions are, *who, why and how* within the U.S. was the implementation of quotes and regulations for agrofuels forged?

³¹ The EU-strategy includes a ten percent blend of renewable fuels until 2020. The U.S. wants 36 billion gallons renewable fuels to be blended into gasoline by 2022 (EU-Commission, 2011).

4. The EPA in the creation process of the U.S. Agrofuels Project

The first step to analyze EPA's role in the agrofuel project is to understand the nature of this regulatory entity and in which legal and political context it functions. This elaboration of the EPA was done in chapter 3.3.3 (p.33). Taking this step ahead what becomes more interesting in terms of ACI and the EPA is a specific policy – including EPA in its creation process – that was enacted to solve a specific problem. Scharpf therefore introduces a problem-oriented research analysis concerning causes of policy problems, with the potential solutions and their likely effects on the initial problem and its policy environment (Scharpf, 1997: p.11). In context of this thesis, the problem at hand shows to be multi-faceted. The increase of ethanol demand is based on several interlinking arguments like depleting oil, national security, economic uncertainties, air quality and matters of the Climate Change discourse. The argument related to oil applies to the rise of oil prices since 2004 as well as to increasing oil imports (see Fig.6 and Fig.7).

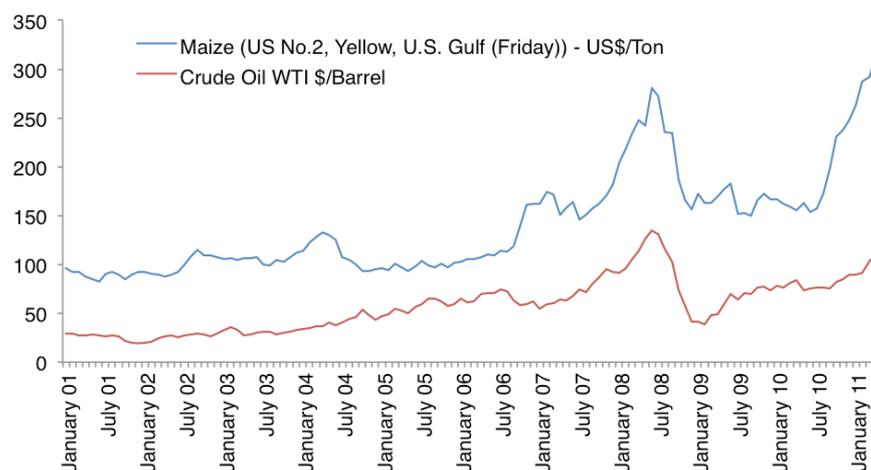


Fig.6: Price indices for U.S. Maize & Crude Oil (WTI) 2001-2010 (FAO, 2011a & EIA, 2011b).

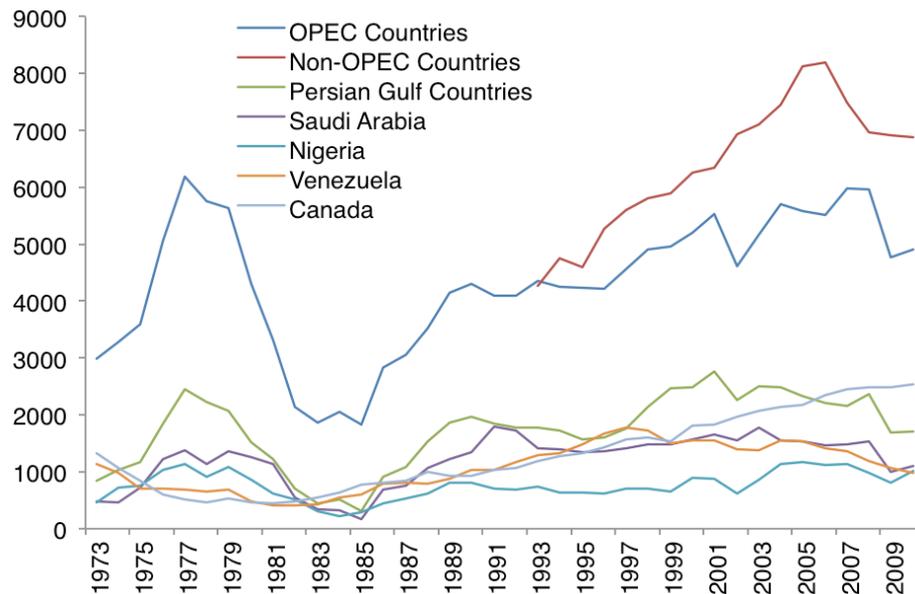


Fig.7: U.S. Imports of crude oil and petroleum products by country - thousand barrels per day, (EIA, 2011).

National security is closely linked with the United States' dependency on foreign oil as investments in oil imports might support countries that offer less transparency in terms of financial streams for groups that are opposing U.S. interests. The possibility of economic recovery due to ethanol production was a driving argument for the Bush Administration as it is for many Senators in the U.S. Congress today. Rising production capacities and increased profitability in context with higher ethanol demand is seen as an opportunity and important contribution to the U.S. economy. The issue of air quality and Climate Change was – and to a certain extent still is – a major argument for the Bush Administration to reduce CO₂ from tail pipe emissions. The EPA Act of 2005 in combination with the RFS Program were meant to offer a suitable and effective solution for these four problems. At this level, Scharpf continues with a second research approach – interaction-oriented policy research – to analyze the adoption and implementation of policy solutions by the government or other unitary policymaker (Scharpf, 1997: p.11).³² To elaborate the Role of EPA in the Agrofuel Project in the U.S., this thesis will first take a closer look on the four factors stated above as the 'multi-faceted problem' to provide the reader with a better understanding of the environment around the increase demand and support for ethanol production as a solution.

³² Scharpf highlights that researchers should be aware and become interested in the fact that in many well-designed structures/framework policy proposals are not enacted. He points out that the final policies are not produced by a unitary actor, but result from a strategic interaction among several actors that pursue different interests based on their understanding of the nature of the problem to be solved.

Within the institutional setting after a problem has been identified, the next step is to identify the orientation of the involved policy actors and their capabilities, their appropriate constellation and the modes of interaction that determine the policy outcome (ebd. p.44) (see Fig.8). The elaboration of these three elements should provide sufficient information to successfully answer the question about the Role of EPA in the U.S. Agrofuel project.

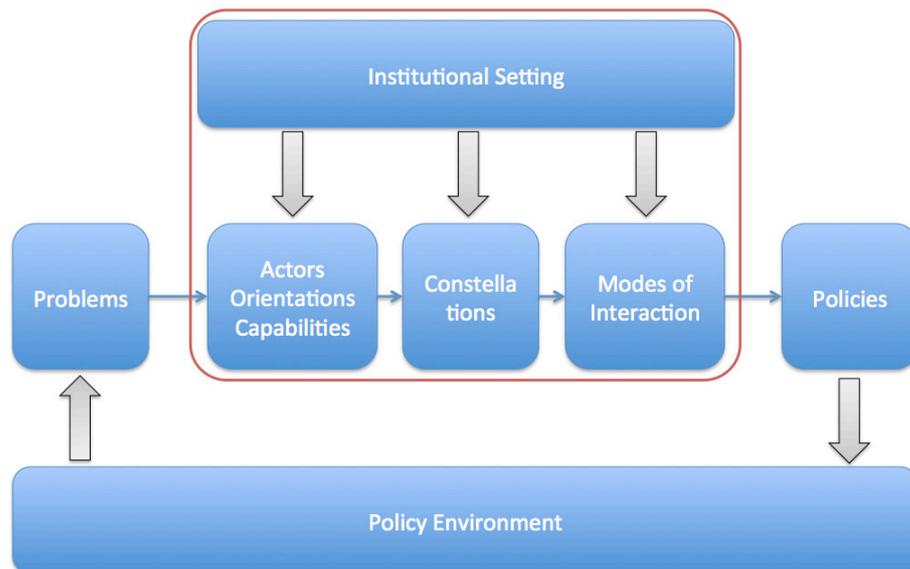


Fig.8: The domain of interaction-oriented policy research (Scharpf, 1997: p.44)

4.1. What factors triggered negotiations?

The United States of America share a common historic demand for fossil fuels with all other industrialized and emerging economies. Sovacool indicates that the American lifestyle is based on high energy consumption and closely related to high mobility culture and economic and industrial structures (cf. Sovacool, 2009). In the past, fossil resources seemed to be more abundant and accessible, energy efficient and relatively inexpensive. The emergence of an environmental awareness as well as the fact that fossil resources are limited created several political debates and discourses about the increasing costs of fossil fuel and its detriment to the environment. This political debate criticized the U.S. energy politics and the habit of limitless use of fossil resources (cf. Chapter 3.2. p.21).

The EAct of 2005 addressed much of this criticism about maintaining such a high-energy lifestyle. In Title IX – Research and Development’ Section 902 clearly directed the Secretary of the EPA to conduct a balanced set of programs of energy research with the general goals of: “(1) increasing the efficiency of all energy intensive sectors

through conservation and improved technologies; (2) promoting diversity of energy supply; (3) decreasing the dependence of the United States on foreign energy supplies; (4) improving the energy security of the United States; and (5) decreasing the environmental impact of energy-related activities”(EPAAct: 2005: p.856). Additionally, within its ‘Annual Energy Outlook Report for 2005’ (AEO05) the EIA incorporated a strong uncertainty clause concerning economic growth by including three development cases named (1) reference case; (2) low growth; and (3) high growth (EIA, 2005: p.73).

However, the EIA estimated a continuation of the strong economic growth, measured by GDP, of annually 3,1 percent until 2025 (ebd. p.72). With increasing economic growth, the AEO05 also projected an increase of energy consumption of approximately 35,6 percent from 2003 to 2025 (ebd. p.75). The increase of energy demand for transportation is estimated to increase to 47,6 percent by 2025 (ebd. p.82).³³ The RFA incorporated in its ‘Ethanol Industry Outlook Report for 2005’ (EIOR05) that in 2004 the U.S. ethanol production experienced its highest production increase by 23,3 percent (EIOR05, 2004: p.2). Furthermore, this increase is expected to grow, as the RFA emphasized the importance of the ‘American Jobs Creation Act’, which creates tax incentives for ethanol (ebd. p.7). Taking these factors into account, the demand for ethanol was expected to increase by the government, as well as by the industries, precipitating further dialogue about the available energy options and what solution would be best for the national security, the economy and the environment. The United States through its legislative body (the United States Congress) decided that one applicable approach to these related problems was the enactment of legislation with a directive to an Administrative Agency (the EPA) to promulgate and implement regulations as a response—the EPAAct of 2005 with its implemented requirement to create an RFS Program (cf. Chapter 4.2. p.65).

Scharpf’s problem-oriented research concerns causes of policy problems, with the potential policy solutions, and their likely effects on the initial problems and on their wider policy environment (Scharpf, 1997: p.11). As the policy problem analysis for the RFS Program will show, the policy solution was based not only on problematic triggers like oil dependency, economic uncertainties (distribution problems) and

³³ Own calculation. Petroleum is expected to have the biggest share of this increase of approximately 50 percent. 80 percent of this increase share is expected to be in fuel for transportation (EIA, 2005: p.75).

environmental threats (externality problem), but also on an opportunity momentum due legislation that supported increased investments in renewable energy sources. The problem oriented research approach of Scharpf and Mayntz therefore has to be adopted by expanding the analysis criteria with opportunities that also can lead to rulemaking negotiations.

4.1.1. The Multi-Faceted Problem

At the time of the enactment of the EPO Act of 2005, most of the U.S. energy demand came from fossil resources. Fossil resources proved to be most efficient in terms of availability, energy efficiency and cost considerations. As crude oil or petroleum is a crucial fossil resource, the long known challenge of reducing oil dependency as well as economic uncertainties and environmental threats are the basic roots for what this thesis calls a 'Multi-Faceted Problem'. This chapter will show that the U.S. dependency on oil is significant and leads to three interlinked problems: (1) a high U.S. dependency on foreign oil, which often comes from political unstable states leading to concerns about national security; (2) economic uncertainties because of high volatile energy commodity prices, which affect sectors of the U.S. economy; and (3) the scientific concerns associated with the production and use of crude oil that presents a detriment to human health and the environment.

4.1.1.1. Dependency on foreign oil and national security

On January 30, 1974, Richard Nixon as the first U.S. President addressed to Congress his dedication to reduce the oil dependency of the United States. *"At the end of this decade, in the year 1980, the United States will not be dependent on any other country for the energy we need to provide our jobs, to heat our homes, and to keep our transportation moving"* (Nixon, 1974). In 1980, 31 percent of the U.S. oil consumption was facilitated with oil imports (EIA, 2011a).³⁴ Since then, the issue of reducing the U.S. dependency on foreign oil, was addressed by numerous U.S. presidencies. Grossman argues that since Nixon, every U.S. president suggested different strategies like reducing energy demand, increasing domestic production or to switch to other sources of energy (cf. Grossman, 2009). As the following analysis

³⁴ Own calculation, based on data provided by the EIA.

will show, by 2005 no U.S. President has practically succeeded in this particular task. Data from the EIA shows that from 1970 to 2005 oil net imports increased 664,74 percent (EIA, 2009: p.141).³⁵

The EIA data shows that since 1970 Petroleum was by far the highest share as primary energy source (ebd. p.9). From 1970 to 2005 this share decreased from 44 percent to 40 percent, showing that oil did not lose its importance in the U.S. energy mix (ebd. p.9).³⁶ This is a strong indication that since the oil shocks of the 1970s the U.S. did not change its energy strategy. A crucial question that arises, is what were the driving factors that lead the U.S. to increase oil imports rather than switching to domestic production or different energy sources?

To begin, it is helpful to have a picture about the domestic oil situation and problem. Known oil reserves decreased by 44,2 percent from 1970 to 2005 (EIA, 2010b). Similarly, the U.S. oil production also decreased by 46,2 percent, while the U.S. oil consumption increased 41,5 percent (EIA, 2009: pp.315-325).³⁷ This increase in consumption represents a characteristic of the U.S. lifestyle, showing its profound connection to fossil fuels in particular petroleum. This characteristic manifested itself in long tradition of the industrial use of crude oil as energy source, transportation fuel and basic component for petrochemicals. In its 'Annual Energy Outlook for 2005' the EIA projected that petroleum consumption would increase 39,1 percent by 2025 compared to 2003 (EIA, 2005: p.75).³⁸ About 80 percent of this increase was expected to be in fuel for transportation and the remainder in the industrial, commercial and electricity generation sectors (ebd. p.75). Because of this profound embedment, it was possible for the U.S. oil industry to create a well-accepted monopoly including opaque price and quantity regulations. Furthermore, this embedment made consumers, industries and manufactures that relied on energy highly dependent on crude oil producers. The types and sectors that were dependent on crude oil was crucial information for decision makers during the negotiation and decision making processes in order to create an agrofuels project that represents well a petroleum substitute that was applicable to the current energy consuming habits.

³⁵ Own calculation, based on data provided by the EIA. The net imports were calculated by subtracting oil exports (EIA, 2011d) from oil imports (EIA, 2011a).

³⁶ Own calculation, based on data provided by the EIA.

³⁷ Own calculation, based on data provided by the EIA.

³⁸ Own calculation, based on data provided by the EIA.

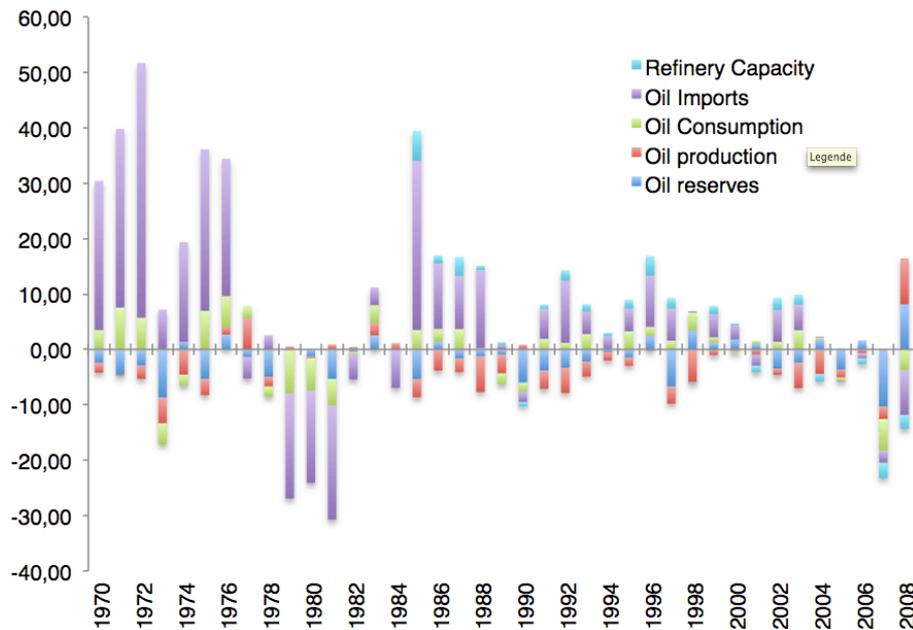


Fig.9: Annual percentage change of U.S. oil consumption, production, imports, proved reserves and refinery utilization (EIA, 2009; EIA, 2010b; EIA, 2011).

Figure 9 illustrates these developments in annual percentage changes, showing that until 2003 the U.S. clearly had a profound dependency not only on oil, but also on foreign oil.

Correlations		U.S. Oil Consumption	U.S. Oil Imports
U.S. Oil Consumption	Correlation by Pearson	1	,754**
	Significance (1-sided)		,000
	N	39	39
U.S. Oil Imports	Correlation by Pearson	,754**	1
	Significance (1-sided)	,000	
	N	39	39

** The correlation is significant at 0,01 (1-sided).

Fig.10: Bivariate Correlation between U.S. Oil Consumption and U.S. Oil imports 1970 - 2005 (EIA, 2011a & EIA, 2009: p.325).

Figure 10 is a quantitative correlation analysis that aims to show a statistical significance between the developments of U.S. oil consumption and U.S. oil imports between 1970 and 2005. The correlation of ,754 further confirms assumptions about the U.S. energy strategy, to supply rising oil demand with oil imports. The EIA further projected, that the OPEC share of total gross imports would increase from 42,1 percent in 2003 to above 60 percent in 2025 (EIA, 2005: p.74).

The top five countries providing the U.S. with crude oil in 2005 were Canada, Mexico, Saudi Arabia, Venezuela and Nigeria (cf. Table 5.4 – EIA, 2009: p.135). Three of

these countries are members of the 'Organization of Petroleum Exporting Countries' (OPEC). OPEC Countries alone provided 44,4 percent of total U.S. oil net imports (cf. Table 5.7 – EIA, 2009: p.141). Following the EIA, in 2005 imported petroleum products caused 77 percent of the U.S. trade deficit (EPA, 2006: p.13). In the U.S., financial streams to OPEC countries were much criticized by the civil society and politicians argued that most of these countries are either autocratic kingdoms or dictatorships (cf. Woolsey/Korin, 2008). The determination of the U.S. government to balance beliefs concerning national security, but at the same time investing such large amounts of money illustrates not only the importance of oil for the U.S. economy. But also the political will to support the interests of oil companies to expand their production areas. Additionally most political leaderships in OPEC countries are lacking the political and financial transparency and show an active aversion towards the U.S. and the western industrialized lifestyle (Woolsey/Korin, 2008: 36).³⁹

Pursuant to the EPLA of 2005 'Title III – Oil and Gas', Section 301 (4) addresses the protection of national security regarding the permanent authority to operate the strategic petroleum reserves and other energy programs (EPLA, 2005: 684). Senator Domenici addressed these concerns in Senate as Chairman of the Senate Committee on Energy and Natural Resources.⁴⁰ He emphasized the risks linked with the Middle East conflicts and the U.S. oil addiction (Congressional Record, 2005: S6672). U.S. officials therefore pay much attention to these countries ensuring that the U.S. has options for its energy needs and further to avoid financial support for terroristic groups (Dumas, 2011). The root of these concerns is embedded in the military conflicts between U.S. and the Middle East Region. In his 'Acceptance Speech' at the Republican National Convention on 18 August 1988 President George H.W. Bush for the first time in history officially identified the U.S. dependency on

³⁹ Especially Saudi Arabia is considered by U.S. officials to be a fruitful ground for terrorist organizations to receive financial and human resources. For example, in July 2009 alone, the Saudi Arabian Ministry of Justice convicted 289 Saudis to be Al-Qaeda militants, which shows that although the Saudi Arabian government officially opposes any terroristic activities, these organizations remain very active in that region. (Embassy Riyadh, 2009). Similar security concerns exist for Venezuela, as President Hugo Chavez and his administration is considered to be aversive towards U.S. interests. Woolsey and Korin state that in 2008 Hugo Chavez was using petro-dollars to manifest his political power and to create a joint "*anti-U.S. bloc*" in the region (Woolsey/Korin, 2008: p.35).

⁴⁰ Senator Pete Domenici was an American Republican Senator from New Mexico (1973 - 2009). From 2003 to 2007 he served as Chairman of the Senate Committee on Energy and Natural Resources (BDUSC, 2011).

foreign oil as a threat for the security of the United States (Bush, 1988). After the 'First Gulf War' in 1991, the image of the U.S. within the region changed.⁴¹ As the U.S. is depended on stable circumstances in the Middle East to ensure oil production and exports to the U.S., its strategy was to remain in Bahrain, Kuwait, Oman, Qatar and the United Arab Emirates (Austvik, 1993: p.135). The formal legitimization of the U.S. was to further support regional governments in security issues (ebd. p.135).

In that sense, the presence of the U.S. in the Middle East became crucial for its perceived security of the whole region. However, religious motivated groups across the Middle East identified colonial and imperial interests in the U.S. strategy.⁴² The response of these groups was organized terrorist attacks on U.S. military and civilian targets. Since then, terrorism and religious motivated regimes became the biggest threat for the U.S. since the collapse of the USSR and the end of the Cold War. The second military intervention in Iraq is still ongoing, as the country has not yet managed to provide safe circumstances for its population and economy without foreign troops. Officially the U.S. government has never declared oil as the main reason to invade Iraq a second time, but the Bush administration has admitted, that the safeguard of the oil shipments and prices were important factors. In his 2007 State of the Union Address he concluded that: *"For too long, our nation has been dependent on foreign oil. And this dependence leaves us more vulnerable to hostile regimes and to terrorists who could cause huge disruptions of oil shipments and raise the price of oil and do great harm to our economy"* (The Washington Post, 2007). Although Bush emphasized the importance to reduce the dependency on foreign oil, it was under his presidency that the United States declared war or militarily intervened, respectively in Iraq and Afghanistan, in a region where the U.S. obtained much of its oil imports.

It can be summarized, that since the 1970 the U.S. faced an increasing dependency on foreign oil, as the production of its domestic reserves and oil production

⁴¹ A dispute about production quantities, prices and oil sources led to a military conflict between Iraq and Kuwait in 1990. Due to the UN-Resolution 660 the U.S. and other nations intervned and ended the occupation of Kuwait through Iraq and managed stabilize the oil flow from the Middle East. This was the first time that because of crude oil a military conflicted occurred and interventions became necessary.

⁴² A popular example was the Saudi "Osama Bin Laden", who founded the religious motivated terroristic organization "Al-Qaeda" in 1988 and declared the holy war "Dschihad" against the United States after their interventions in Iraq in 1991 (Wright, 2007: p.506).It was Bin Laden's personal belief that the U.S. had intentions to start a religious and resource motivated crusade against the Islamic world (Wright, 2007). Bin Laden based his conclusion on the fact that the U.S. did not withdraw their troops from Saudi Arabia after the First Gulf War (Wright, 2007:).

decreased and the consumption of oil significantly increase until 2005. This led to a profound distribution problem, which became a policy issue itself through the creation of the EPCA of 2005. Disputes among oil producing countries in the Middle East about production quantities and reserves distribution led to military conflicts and the first Iraq war (the Second Gulf war) was an example of the U.S. military intervention to stabilize the Middle East region and ensure oil imports. The U.S. military presence after the Second Gulf War and its obvious interest in oil caused a lot of opposition from political and religious groups in the region. Some of these groups responded with terrorist attacks against U.S. military and civilian targets. A climax was reached on September 11, 2001 with the attacks in New York and Washington, which resulted in the two Wars in Afghanistan and Iraq. As it seems, religious motivated terrorism filled the security vacuum after the cold war and became the highest threat for the national security of the U.S., financial streams to OPEC countries were highly criticized within the U.S.

4.1.1.2. Economic Uncertainties

In the forefront of the creation of the RFS Program the volatility of energy and commodity prices, in specific crude oil, gasoline and diesel was an important trigger for negotiation about a U.S. Agrofuels Project. The principal aspect was that rising prices caused U.S. officials to think about other energy sources in order to decrease energy costs for example, in the transportation and manufacturing sectors. As the chapter will show, the economic situation in the U.S. prior to the creation of the RFS Program was characterized by a stable economic growth, but rising energy prices. Based on these surprisingly rapid price increases the EIA decided to reconsider projections about the economic development of the U.S. However these reconsiderations also fueled arguments for renewable energy sources, such as ethanol as substitute or additive for gasoline.

In order to reveal the roots for these economic uncertainties, it is important to have an overview of the energy sector prior to the creation of the RFS Program. To begin with, Figure 11 shows that the prices of oil, gasoline and diesel were increasing rapidly until 2005.

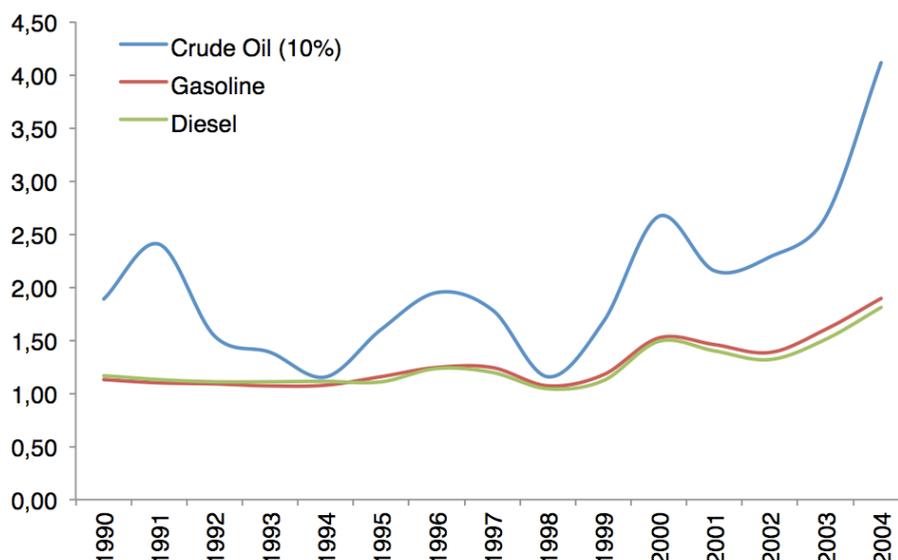


Fig.11: Price developments of Crude Oil (10%); Gasoline; and Diesel 1990 - 2004 in the U.S. (EIA, 2011).

The significant steep increase of crude oil prices since 2000 supported assumptions that gasoline and diesel prices will follow the crude oil development. These increases were problematic in multiple ways. First of all, as history has shown, high crude oil prices seem to have negative effects on economic growth in oil importing countries. Second, oil imports are expected to increase, at least in the short term, as the increase potentials of domestic production capacities are limited (due to limited domestic reserves) and even higher oil prices from mid- and long-term projections imply even higher costs in the future. Third, high fuel costs negatively affect mobility, which is an important pillar of the American lifestyle. Increased fuel costs therefore have a high political potential during elections, as it is assumable that voters will pass their personal frustration about high fuel prices on to their voting decision. Annual U.S. retail gasoline prices for example increased 61,1 percent from 1999 to 2004 (EIA, 2011e).

In its 'Annual Energy Outlook for 2005' the EIA emphasized the substantial variability in world oil prices ranging from 25 US-Dollars to 48 US-Dollars by 2025 (EIA, 2005: p.74).⁴³ The EIA stated that these prices were higher than expected and linked this increase to the limited ability of non-OPEC producers to expand their production despite increasing demand and high utilization rates (ebd. p.74). Additionally the EIA projected in its AEO05 an increase of energy demand for transportation of

⁴³ The EIA used four cases of different price developments to project future market developments. Within their four cases, the lowest world oil price would decline from 35 US-Dollars in 2004 to 21 US-Dollars in 2009, whereas the highest oil price was expected to increase to 48 US-Dollars by 2025 (EIA, 2005: p.74).

approximately 47,6 percent by 2025 (ebd. p.82).⁴⁴ Motor gasoline use is expected to increase 1,7 percent annually until 2025. As demand for oil products is expected to increase steadily while its domestic production is expected to decrease, prices for gasoline and diesel are expected to rise. The higher prices for gasoline were expected to decrease the demand for gasoline. But a decrease of gasoline demand would be conflictive with the interest of profit-oriented oil companies. Therefore the question arises if oil companies could benefit from alternative fuels. In that sense, the EIA also projected that higher oil prices and increased demand of energy would encourage greater market penetration of alternative energy supplies (ebd. p.74).

Based on the assumptions on the AEO05 the EIA estimated that alternative fuels will displace 2,2 percent of light-duty vehicle fuel consumption by 2025 (ebd. p.82). The ACI analysis will show if oil companies benefited from the creation of the US. Agrofuels Project.

4.1.1.3. The Rise of Agrofuels

The higher goal of agrofuels projects in context with “green economies” is that agrofuels will become a substitute or complimentary good for fossils fuels. Currently, agrofuels are distinguished or categorized into three generations.

The first generation contains agrofuels from feedstock like sugar, corn, soy or jatropa. Thereby the edible part of the plant is processed to receive either ethanol or diesel. The second generation developed technologies that allow the processing of any sort of starch into fuel. This expands the spectrum of sources to include the non-edible parts of plants that can be processed for fuels. Additionally crop seed producers like Syngenta, Monsanto, Dupont, DOW, Bayer or BASF invest in research technologies to develop genetically modified crops that contain higher levels of cellulose and lower levels of lignin (Lorch, 2008: p.120). The third generation is based on basin bred alga that doesn't rely on cultivable land, recycles required water, has a significant higher productivity and can be refined into different sorts of fuels including kerosene (Pienkos et al., 2011).

Today, only the first- and second-generations of agrofuels are available and viable for conventional purposes. The U.S. Agrofuels Project also uses the terminology

⁴⁴ Own calculation, based on information provided by the EIA.

“renewable fuels” which basically means the same thing. The only difference is that fuels of the third generation don’t necessarily require agricultural commodities to be produced. In that sense the terminology agrofuels could lead to a misunderstanding. However for the elaboration of the RFS1 the two terminologies apply to the same meaning, fuels produced out of agricultural commodities.

The technology for using fermented agricultural commodities as fuel dates back to 1824 when U.S. inventor Samuel Morey created the first combustion engine running on ethanol and turpentine (Ethanol History, 2011). Henry Ford adapted this technology to his first “Model T” automobile in 1908 running on petrol, kerosene or ethanol (ebd.). It was Fords conviction that alcohol will be the fuel of the future until 1919 when the prohibition era in the United States made it illegal to produce, transport and sell alcohol. The use of ethanol was only allowed when blended with gasoline. This restricted and retarded ambitions for ethanol as fuel, but opened the fast striking triumph precession for gasoline. Since the 1900s, U.S. ethanol was only used as an additive for gasoline to raise the octane number and increase engine efficiency.

4.1.1.4. Detriment to Human Health and the Environment

Prior to the creation of the RFS Program the political discourse about agrofuels emphasized their positive effect on the environment, by reducing GHG emissions from vehicle tail pipes. The Intergovernmental Panel on Climate Change (IPCC) released its fourth Synthesis Report (AR4) in 2007, showing that Energy supply (25,9 percent), Agriculture (13,5 percent) and Transport (13,1 percent) were responsible for 52,5 percent of global GHG-emissions between 1970 and 2004 (IPCC, 2007: Figure 2.1).

The placement of agrofuels in environmental politics focused on the Climate Change discourse and agrofuels gained importance with the rising awareness about the “Green-House-Gas-Effect”, which was identified as the main cause for the raise in global temperatures due to increased emissions of Green-House-Gases (GHG-emissions). The AR4 identified that 56,6 percent of total GHG-emissions was CO₂ from fossil fuel use (IPCC, 2007). The IPCC concludes that the rise of temperature causing our global climate to change is anthropogenic. Based on this, supporters of

agrofuels began to promote ethanol as a fuel emitting less CO₂ than conventional gasoline or diesel when combusted. In the U.S. the most prominent supporter of ethanol was and still is the Renewable Fuels Association (RFA). Environmental stakeholders initially supported the idea to substitute fossil fuels with agricultural commodities but what was missing in the first wave of promotion was the incorporation of the production chain of agrofuels called “Indirect Land Use Change” (ILUC).

However, prior to the creation of the RFS, the implications of ILUC did not yet play a crucial role, as scientific data was not then available. The unavailability of data led to a profound lack of crucial information concerning the whole spectrum of environmental implications linked with the implementation of the U.S. Agrofuels Project including its production chain. In more recent years, numerous studies have proved a more controversial picture of agrofuels as an environmental sustainable fuel substitute. As Holt-Giménez and Shattuck and other authors indicated, the agrofuel projects are considered to utilize capitalistic modes of production, focusing rather on profit accumulation and maximization than on environmental sustainability (cf. Holt-Giménez/Shattuck, 2009). In this regard most studies linked the production of agrofuels to soil erosion, water depletion, deforestation, loss of biodiversity and as a contributing trigger for global food price increases, leading to social problems in countries of the global south (cf. Holt-Giménez/Shattuck, 2009; León-Sicard, 2009; Pimentel, 2009). As more research and data was available, the RFS as a solution to the multifaceted concerns became more controversial among academia and environmental stakeholders. However, time has not slowed the discourse, which has expanded to illuminate collateral benefits of the RFS Program.

One common benefit was the practical ban of toxic additives in conventional gasoline. Since 1979, ‘methyl tertiary butyl ether’ or ‘MTBE’ and other oxygenates like ethanol were used as octane boosters in gasoline to decrease emissions of ozone-forming compounds and carbon monoxide (Yacobucci, et al, 2006: p.1). The CAA of 1990 established an oxygen content of two percent in gasoline, which triggered the fuel industry to increase investments in their MTBE production and distribution capacities (EPAAct, 2005: p.1076). During the 1990s, the use of MTBE in gasoline became controversial because of numerous incidents of ground and drinking water contaminations from leaking fuel storage facilities across the U.S. (Yacobucci et. al., 2006: p.2).

4.1.2. An Economic Opportunity

The commitment to reduce the U.S. dependency on foreign oil paved the way for more emphasis on agrofuels as a possible substitute and simultaneously created new opportunities for certain sectors of the U.S. economy. Investments in renewable energy sources have been seen as an opportunity for newly emerging green companies. As the wholesale price of ethanol started to rise in 2002 after a long stagnation period in the 1990s, ethanol and corn subsidies became the main focus for policy makers, as they financially supported the corn and ethanol production. The continuation or even expansion of subsidies was an important incentive for affected businesses and industries. The RFA supported the expansion of ethanol subsidies by emphasizing the positive effects on small rural producers and local communities. Next to farmers, gasoline blenders and refiners showed vital interest for ethanol, as the EPA Act of 2005 was expected to ban the use of toxic MTBEs in conventional gasoline. In this regard, the main goal of the U.S. Administration was to make agrofuels commercially viable through more advanced technologies. In the forefront of the creation of the RFS Program it is therefore interesting to further elaborate the driving factor of subsidies and their impacts on different entities and/or sectors that made the U.S. Agrofuels Project an economic opportunity.

A closer look at the U.S. Agrofuels project demonstrates an elaboration of ethanol-linked subsidies as the first crucial step. This implies subsidies for the basic commodities such as corn, tax incentives for needed production machines, direct payments for research and development, tax incentives for ethanol production quantities, and direct payments for applicable vehicles. To begin, the basic component, the Environmental Working Group (EWG) published data on their website showing that between 1995 and 2005 American tax payers subsidized approximately 56 billion US-Dollars for corn (EWG, 2011). Their data also shows that in 2005, when the EPA Act of 2005 was enacted, corn subsidies peaked at 10,14 billion US-Dollars (EWG, 2011).⁴⁵ Following the International Institute for Sustainable Development corn subsidies translated into 42 to 55 percent of the wholesale market prices of ethanol (Sautter et al., 2007: p.26). This shows that prior to 2005 the ethanol production was highly depended on corn subsidies. Additionally, the U.S.

⁴⁵ Within this amount of money, the RFS Program foresaw direct spending of 728 Million US-Dollars until 2010 requiring 7,5 billion gallons to be blended into conventional gasoline by 2012 (CBO, 2005 & EPA, 2011).

Administration and individual States established a series of different ethanol subsidies for producers, refiners, farmers and other involved businesses like research institutions. In that sense, 'Minnesota Ethanol Program' is a representative example, as it sought to expand the use of ethanol in Minnesota from 10 to 20 percent by 2005 (RFA, 2005: p.4). The dominant argument at that point was that it is more beneficial to the U.S. economy to subsidize domestic production than sending tax money to foreign countries. The market-driven increase of ethanol usage by single States and gasoline producers lead to an ethanol boom in the forefront of the EPAAct of 2005.

Tyner discusses the politics of corn subsidies and argues that "*today's boom is in a sense an unintended consequence of a fixed ethanol subsidy that was keyed to \$20-per barrel crude oil, combined with a surge in crude oil prices*" (Tyner, 2008: p.646). Basically, the subsidization of ethanol started in 1978 with the Energy tax Act of 1978, which put a 0,40 US-Dollar tax exemption on ever gallon ethanol in gasoline. Figure 12 (p.120) illustrates the historic development of ethanol subsidies until 2005. More recently and in regard to the creation of the RFS Program, the Bush Administration in 2004 enacted the 'American Jobs Creation Act', which implied a new excise tax credit system for all ethanol blends and biodiesel (Sautter et al., 2007: p.26). The Act installed a 'Volumetric Ethanol Excise Tax Credit' (VEETC) providing a 0,51 US-Dollar per gallon excise tax credit for each gallon of ethanol blended with conventional gasoline (ebd. p.26). These tax incentives were set to remain until 2010 and to financially support corn and ethanol producers. In order to protect the U.S. ethanol production from less expensive foreign ethanol imports, the U.S. placed an import tariff of 0,54 US-Dollar plus a 2,5 percent tax for every gallon imported into the U.S. The tariff was set to remain until 2007 and to mainly protect the U.S. from Brazilian sugar cane based ethanol, which was less expensive and had a higher energy content than corn based ethanol. (ebd. p.26).

Finally, the EPAAct of 2005 included several additional tax incentives for the production of agrofuels. The EPAAct of 2005 further addresses the energy efficiency and environmental performance of vehicles, as fuel prices were increasing and CO₂ emissions from tail pipes were downgrading air quality. With the inclusion of the Energy Tax Incentive Act (ETIA) in Title XIII, the EPAAct of 2005 included an extension of agricultural subsidies and grants to promote the production of agrofuels.

Sautter et al. criticized that these additional tax incentives and subsidies did not replace already given subsidies, but rather were additional to the total amount of money provided to the renewable fuels industry (ebd. p.27). A closer examination of the EAct of 2005 will be provided in chapter 4.2.1(p.65).

Due to these subsidies and the resulting expectation of a higher corn demand two developments occurred. First the U.S. agrofuels sector became interesting for private investors and politicians. Especially the 'corn-belt states' showed vital interests in remaining agricultural subsidies.⁴⁶ For the financial investors the agrofuels boom of 2005 represented a temporary profit accumulation opportunity, which was financially profitable but also considered as a beneficial 'green asset' for the investors portfolios. Second, corn prices increased its volatility, putting pressure on small farmers and fueled the discourse concerning food prices. However, corn and ethanol producers were highly dependent on the continuation of agricultural subsidies, as the profitability of the ethanol production was not yet possible due to high production costs and a lower energy output compared to fossil fuels. The increasing numbers of agricultural lobbyists and lobby investments on Capitol Hill also illustrate the importance of the maintenance of these agricultural subsidies.

It can be summarized that the economic aspect of the U.S. Agrofuels Project is based on a very simple but important thought given by U.S. policy makers in the creation of the U.S. Agrofuels Project. It was the assumption that if the State supports the production of agrofuels, domestic farmers and locally owned ethanol refineries will experience an increasing demand of their commodities and therefore generate additional profits. This support was meant to be provided through an extension and expansion of agricultural subsidies including direct payments and tax incentives. As the U.S. Agrofuels Project is mostly based on corn-based ethanol, corn farmers and gasoline refiners were mostly thought to benefit from the various subsidy programs. Additionally subsidization of the production of ethanol was considered to have a 'multiplier effect' on the up- and downstream sectors of the industry. Policymakers expected higher demand for fertilizers, more harvesting machines and operating personal, new refining facilities and additional technicians and workers. Also, Research and Development companies were expected to benefit

⁴⁶ During the current crisis in 2007 President George W. Bush addressed the importance of corn subsidies to support American farmers and products (Dumas, 2011). With the emergence of the financial and economic crisis agricultural subsidies became a well-accepted instrument to avoid unemployment and economic losses.

from the subsidies and would hire additional researchers to develop more efficient crops and methods to eliminate the environmental disadvantages. In that sense, EPA officials focused on the subsidization of the development of agrofuels from non-edible resources like cellulosic materials. Additionally gas pump stations were also considered to benefit, as different blends of gasoline and agrofuels offer additional sales options for gas stations. Also the use of more ethanol would save money, as less foreign oil would be required. In its EIOR05 the RFA put those estimations in numbers, stating that the ethanol production of 2004 created approximately 147.000 jobs in all sectors of the U.S. economy and was expected to significantly increase this number. (RFA, 2005: p.13).

4.2. Forming the Solution

This chapter presents the U.S. Agrofuels Project and the creation of the first RFS Standard as the final solution of the negotiations that were triggered by the 'Multifaceted Problem' and the economic opportunity identified in the previous chapter 4.1. In the case of the creation of the U.S. Agrofuels Project, the U.S. Congress made the decision that the EPA is the agency that would have the authority and jurisdiction to promulgate rules to implement and enforce the Energy Policy Act of 2005. The U.S. Administrative rulemaking process⁴⁷ is preceded by an Act of Congress that provides for an implementing agency that promulgates regulations to carry out the intent of Congress.

The U.S. Agrofuels Project as it is understood within this thesis contains three crucial steps. The first step is the enactment of the EAct of 2005 and the decision of Congress to create a Renewable Fuel Program. The second step is the application of the "Default Standard of 2006", which is also part of the EAct of 2005, but applies only to the following year after the enactment of the EAct of 2005. The third step is the creation of the Renewable Fuel Standard Program for 2007 (RFS1) by the EPA. Whereas Congress provided most of the requirements for step one and two, the RFS1 was the first annual standard that was created solely under the authority of the EPA.

⁴⁷ As chapter 3.3.3 (p.33) explains there are several steps and procedures that are involved in the construction of the rulemaking process and hence the passage and creation of a final rule.

4.2.1. The U.S. Agrofuels Project

The terminology ‘U.S. Agrofuels Project’ refers to the ‘Renewable Fuel Program’ implemented in ‘Title XV (‘Ethanol and Motor Fuels’) of the Energy Policy Act of 2005 (EPAAct of 2005 or the Act). Within this title, the Sections ‘1501 – Renewable content of Gasoline’ through ‘1516 – Sugar Ethanol Loan Guarantee Program’ are amendments and extensions of Section 211 of the Clean Air Act of 1990 (CAA) and contain the necessary elements for the creation and implementation of the U.S. Agrofuels Project within one year after the enactment of the EPAAct of 2005.⁴⁸ In General, the EPAAct of 2005 has three elements that require: (1) blending specific volumes of gasoline and renewable fuels (including cellulosic ethanol); (2) eliminating ‘Oxygen Content Requirements’ for reformulated gasoline; and (3) a trading and credit program for the participants of the RFS. In addition to these requirements the Act defines participants and delineates exemptions of the RFS, provides financial resources for additional research (to improve fuel technologies), and amends, expands and/or creates additional subsidies linked with the production of agrofuels.⁴⁹ This chapter will further analyze these elements and present information that help to identify the Actors, their orientations and constellations as well as their modes of interaction.

4.2.1.1. The Renewable Fuel Program in the EPAAct of 2005

Section 1501 of the EPAAct of 2005 clarifies the terminology ‘renewable fuel’ and defines several included sources such as ‘cellulosic biomass ethanol’ or ‘waste derived ethanol’ (EPAAct, 2005: 1067). Within the Act a ‘renewable fuel’ is a motor vehicle fuel that: *“(aa) is produced from grain starch, oil seeds, vegetable, animal, or fish materials including fats, greases, and oils, sugarcane, sugar beets, sugar components, tobacco, potatoes, or other biomass; [...]”* (EPAAct, 2005: 1068).⁵⁰ The Act was signed on August 8, 2005, and foresaw that not later than one year after its enactment that the Administrator would promulgate regulations to ensure that

⁴⁸ The amendments of the Clean Air Act apply to 1990 – 42 U.S.C. §§ pp.7401-7671q.

⁴⁹ See chapter 4.1.2 (p.61) for a detailed discussion about agrofuel linked subsidies.

⁵⁰ “[...] or (bb) is natural gas produced from a biogas source, [...], or other places where decaying organic material is found; or (cc) is used to replace or reduce the quantity of fossil fuel present in a fuel mixture used to operate a motor vehicle” (EPAAct, 2005: p.1068).

gasoline sold or introduced into commerce in the U.S. contains the applicable volume of renewable fuel. The Act directed the Administrator of the EPA to calculate, publish and enforce the applicable volume for each year until 2012 (EPAAct, 2005: 1070).⁵¹ As mentioned above, ‘volume’ is the first crucial element of EPAAct. Section 1501 (a)(2)(B) (‘Applicable Volumes’) contains volume suggestions for the years 2006 through 2012 (EPAAct, 2005: 1069). Figure 13 shows the volumes raising from 4,0 billion gallons in 2006 to 7,5 billion gallons in 2012.

“Calendar Year”	Applicable volume of renewable fuel (in billion of gallons)
2006	4,0
2007	4,7
2008	5,4
2009	6,1
2010	6,8
2011	7,4
2012	7,5

Fig.13: Applicable volumes of renewable fuel (EPAAct, 2005: p.1069).

These volumes are suggestive benchmarks for the EPA in its standard setting procedure for the following RFS. Pursuant to Section 1501(3)(B)(ii)(I) of the Act, the RFP applies to “refineries, blenders and importers” of gasoline of the 48 contiguous States of the U.S. (EPAAct, 2005: p.1070). Alaska, Hawaii and other noncontiguous territories, as well as “small refiners” are exempted from the Renewable Fuel Program, but have an ‘Opt-In’ to voluntarily participate in the RFS program.⁵² The second crucial element of the EPAAct of 2005 included a practical elimination of the oxygen content requirement for reformulated gasoline.⁵³ The elimination of the oxygen content in RFGs can also be interpreted as a ban on MTBEs. Ethanol is an applicable substitute for MTBEs. As an oxygenate compound, it is also an octane

⁵¹ The calculation has to be done not later than November 30 of each calendar year until 2012 (EPAAct, 2005: p.1070).

⁵² For the EPAAct of 2005, a small refinery is a refinery which “the average aggregate daily crude oil throughput for a calendar year does not exceed 75.000 barrels” (cf. EPAAct, 2005: p.1068). The exemption from the RFS is set until 2010 for small refiners and refineries, and indefinitely for the noncontiguous U.S. territories and States (EPAAct, 2005: p.1068). However, if any refiner, territory or State wants to Opt-In, they have to announce their participation at least one year before the participating year (ebd. p.1074).

⁵³ Section 1504 of the EPAAct of 2005 amends Section 211(k) of the CAA of 1990 and adds more stringent requirements concerning emissions reductions from reformulated gasoline (RFG).

booster, which is economically feasible for refiners. To make this elimination attractive to ethanol producers and gasoline blenders, the Act created a production incentive of 10 cents per gallon on the first 15 million gallons of ethanol produced each year (EPAAct, 2005: p.1055).

The incentive created an added financial and economic bonus that could change an actor's orientation. If the use of ethanol is financially attractive for producers and blenders, their acceptance to a ban of MTBE's is more likely. As third crucial element, the Act foresees the creation of a credit-trading program that aims to support the common accomplishment of the RFP.⁵⁴ Participants can generate credits and sell them to other participants in order to reach the applicable volume target set by the EPA. This credit program is a crucial part of the U.S. Agrofuels Project, as it offers additional economic benefits to its participants.⁵⁵ It gives agrofuel producers the possibility to transfer or sell credits, which are gained from surpluses of their agrofuels production. Similarly, refineries can purchase and use these credits, if their emission reducing capacities would not meet the required standards. In this sense the credit trading system supports agrofuels producers and ease refiner compliance with the RFS purchase requirements (cf. SECO, 2011).

To further increase the applicability of the RFP to the ethanol industry, the EPAAct of 2005 expanded the definition of a small ethanol producer. Pursuant to Section 1345 (biodiesel) and Section 1347 (ethanol), refineries that produced up to 60 million gallons per year were defined as applicable participants to the RFS (EPAAct, 2005: pp.1054-1056). This indicates an adaptation for the actors' constellations. Stakeholders that represent small ethanol producers like the RFA, have clarity the applicability of the EPAAct 2005 and the implementing regulations, including the RFP to its members.

Another important feature of the RFP is its commitment to research and development. Pursuant to the Act, the program requires twelve studies or surveys to be conducted jointly or individually by the Administrator of the EPA, the Secretary of Energy or Agriculture, the Administrator of the EIA, the Federal Trade Commission and the Biomass Research and Development Technical Advisory Committee (see

⁵⁴ It should be noted that a market orientation approach of credit and trading is not new to EPA and specifically to the CAA.

⁵⁵ This again represents an economic incentive that could influence the actors' orientation to become innovative and therefore increase their profitability. Actors that are innovative could achieve their required volumes and have additional quantities to trade for a profit.

Fig.14 p.121). The most urgent goals of these research projects is to elaborate possible effects on the fuel market, as well as the fast development of better technologies to produce cellulosic ethanol.

4.2.1.2. The Default Standard of 2006

In case the Administrator of the EPA fails to establish an applicable standard for the year 2006, the EAct of 2005 sets a “Default Standard” of 4 billion gallons of renewable fuel in gasoline sold or dispensed to consumers in the U.S. (EAct, 2005: p.1069).⁵⁶ In addition to the Default Standard, the Act also provides for production volumes until 2012. In December 2005, the EPA published a ‘Regulatory Announcement’ concerning the precession of the RFS under EPA’s responsibility (cf. EPA, 2005). The main concern of the Agency was that the “*EPA does not believe that it can meet the August 2006 statutory deadline*” (EPA, 2005: p.2). Within the announcement, the EPA explained why it decided to establish only a limited set of regulations in order to interpret and clarify the statutory default provision for 2006 (cf. ebd. p.2). Its explanation was that first, the time between the enactment of the EAct of 2005 in August 2005 and the beginning of the RFS Program in January 2006 left too little time for the Agency to establish a standard applicable not only to the EAct of 2005, but also to the mandate of the EPA (ebd. p.2).

The EAct of 2005 requires the Agency (EPA) to base its RFS calculations on annual information provided by the Administrator of the EIA.⁵⁷ In the final rule for 2006, the EPA stated that because of missing data on gasoline and renewable fuel volumes for 2006 the calculation of a possible carryover deficit is not doable until early 2007 (Federal Register, 2005: p.77333). Usually, the statutory provisions of the EAct of 2005 require that the RFS for each year has to be published not later than November 30, of the previous year. The carryover mechanism itself was implemented in the RFP to take away any burden if the required volume blend were not met. The decision to delay the calculation for the carryover deficit opens an additional time window for participants to set actions to meet the requirements. Second, the Default Standard lacks self-explanatory provisions to clearly identify the

⁵⁶ The 4 billion gallons of renewable fuels apply to 2,78 percent of the gasoline volume projected to be sold or introduced into commerce in the U.S. in 2006 (EAct, 2005: p.1070).

⁵⁷ The Administrator of the EIA is obliged to provide the Administrator of the EPA information about the estimated volume of gasoline sold or introduced into commerce in the U.S. not later than October 31 of each calendar year (EAct, 2005: p.1070).

responsible parties and their compliance method (EPA, 2005: p.2). Third, the Agency stated that it depends on input from various stakeholders in order to provide certainty to the parties involved and to prepare a smooth transition to the long term RFS program (ebd. p.2).

However, the EPA published on December 30, 2005, a final rule in the Federal Register that interpreted and clarified the implications of the Default Standard of the EAct of 2005 (Federal Register, 2005: p.77325). This publication was open for interested parties to comment.⁵⁸ On August 29, 2006, the EPA Office of Transportation and Air Quality published a 'Draft Regulatory Impact Analysis' for the Renewable Fuel Program to facilitate the exchange of technical information and to inform the public of technical developments (EPA, 2006). That 'Draft Regulatory Impact Analysis' was the main scientific basis for the creation of the RFS1 – 2007. After the creation of the 'Draft Regulatory Impact Analysis' in 2006 followed the NPRM for the RFS1 with a comment period for stakeholders from various affected fields and interested civilians. The Agency considered various comments and finally created the final rule for 2007.

4.2.1.3. The EPA and The Renewable Fuel Standard Program for 2007 – RFS1

The RFS1 was published on May 7, 2007, and became effective on September 1, 2007. The RFS1 confirmed the applicable volumes of renewable fuel from the EAct of 2005 (see Fig.13 p.67). For the following years until 2012 the EPA projected slight changes to the applicable standard percentages, as more recent data recommended an increase to the percentage in comparison to the NPRM (EPA, 2007a: p.23912). Following the RFS1 paper, the EPA cooperated with refiners, renewable fuel producers and distributors to develop "*a program that is simple, flexible and enforceable*" (ebd. p.23902).⁵⁹ The EPA also included the results of its impact analyses, stating that the transition to renewable fuels will reduce petroleum consumption and GHG emissions and leads to economic incentives (ebd. p.23902).⁶⁰

⁵⁸ At the time this thesis was written, no comment document was available.

⁵⁹ The analysis of the interactions between stakeholders and the EPA is the core of the next chapter concerning the involved actors in the creation of the U.S. Agrofuels Project.

⁶⁰ Concerning the reduction of petroleum, the RFS1 calculates with approximately 0,8 to 1,6 percent reduction of the petroleum that would otherwise have been used by the transportation sector. GHG emissions were expected to decrease between 0,4 to 0,6 percent of the anticipated GHG

The RFS1 paper includes a summary about the goals of the RFS including the reduction of oil dependency, diversification of energy sources and reductions to GHG Emissions. In that sense, the EPA also explicitly emphasized its commitment for the development of cellulosic agrofuels (ebd. p.23903). Based on these projections, the EPA estimates that current agrofuels production quantities will exceed the minimal standards of the RFS1. However, it is the Agency's intention to provide a minimum level of demand to support ongoing investments in renewable fuel production (ebd. p.23903). This subchapter will present in detail, the structure, the compliance mechanisms as well as the expected energy and economic impacts of the RFS1.

The EPA conducted a joint study with the Oakridge National Laboratory to analyze the impacts of reduced petroleum imports on energy security. The results of this analysis show that due to the expanded use of agrofuels the availability of corn as feedstock could be negatively influenced. Additionally, the production of corn also depends on the weather, as weather disasters such as drought or storms could harm the harvest. Also, the use of natural gas is expected to increase due to the expanded production of corn-based ethanol, which links the production of renewable fuels to a slight dependency on fossil fuels. In this regard, the EPA also included its final rule for the RFS1 first results of another analysis concerning the reduction of fossil fuels due to the increased use of renewable fuels. The first results show that in order to evaluate the impacts of renewables on fossil fuels a complete lifecycle analysis has to be conducted in advance (ebd. p.23907).

This lifecycle analysis was also conducted in a 'Climate Change Discourse' context. In this regard, the EPA concerned GHG Emissions and fossil fuel consumption. The starting point for EPA was the idea that the use of more agrofuels in the transportation sector would directly replace conventional fuels and therefore avoid higher GHG emission rates due to the lesser GHG production rate of agrofuels. However, in its RFS1 document, the EPA showed that it was aware of the necessity to include a complete lifecycle analysis in order to provide information about the impacts of agrofuels on the environment and the use of fossil fuels. However, for the calculation of equivalent values for advanced renewable fuels the Agency decided in its final rule to base its calculations on an energy content-based approach, rather than using a lifecycle analysis method.

emissions from transportation by 2012. The economy was assumed to benefit in form of a net U.S. farm income increase between 2,6 to 5,4 billion US-Dollars (EPA, 2007a: p.23902).

This thesis will show that the decision to exclude the equivalent values from the lifecycle analysis was controversial for environmental stakeholders and the renewable fuels industry. For the lifecycle analysis the EPA chose the Argonne National Laboratory's GREET model.⁶¹ The analysis basically includes the use of all energy sources associated with the production and transportation of agrofuels.⁶² The results of the analysis were used in a comparison with other lifecycle analyses of conventional fuels in order to receive information to estimate the impacts of agrofuels on the use of conventional fuels and GHG emissions (ebd. p.23907). The results showed that for the RFS case agrofuels are estimated to replace 0,8 percent of conventional fuel in transportation in 2012, and 1,6 percent in the EIA case (ebd. p.23907).⁶³ GHG emissions are estimated to be reduced 0,4 percent in 2012 in the case of RFS case and 0,6 percent in the case of EIA.

However, the EPA also mentioned that these estimations depend on the development of future technologies. The conventional use of cellulosic ethanol for example is assumed to increase reductions of GHG emissions. Also, estimations about increases oil prices by the EIA have the potential to increase the use of corn-based ethanol and therefore replace more conventional fuel (ebd. p.23908).

In its RFS1 document, the EPA also included a section that examined the economic impacts of the agrofuels project. The EPA attempts to estimate the financial and economic impacts of the RFS to the U.S. economy, specifically to the agricultural sector. A main goal of the EPA was to spur the use of U.S. produced agrofuels in transportation through the RFS Program. A basic thought by EPA officials was that the expansion of agrofuels would diversify fuel sources and directly decrease oil dependency, while at same time increase domestic production expenditures for agrofuels (ebd. p.23907). For its economic estimations, EPA included three price development scenarios in its RFS1 estimations: (1) Reference Case; (2) RFS Case; (3) EIA Case.⁶⁴ To estimate the impacts on the agricultural sector, the EPA

⁶¹ At the time the when final rule for the RFS1 was enacted, experts had no consensus on the most appropriate approach for conduction such a lifecycle analysis (EPA, 2007a: p.23907).

⁶² The use of conventional gasoline in trucks that transport agrofuels to the gas stations are for example such implementations of a lifecycle analysis.

⁶³ The RFS1 document equals this percentage with 2,0 – 3,9 billion gallons of petroleum in 2012 (EPA, 2007a: p.23907).

⁶⁴ The description is cited from the RFS1 document from section VII (C) 1. – Description of Cases Modeled (EPA, 2007a: p.23968):

“a. Base Case (2004) – The baseline case was established by modeling fuel volumes for 2004, with data on fuel properties provided to the contractor by EPA. Fuel property data for this base

additionally used the Forest and Agricultural Sector Optimization Model (FASOM) developed by the Texas A&M University (ebd. p.23907).⁶⁵ Based on these two models, the EPA made credible projection of several price developments regarding the agrofuels production in the U.S.

	Reference Case (2004)	RFS Case (2012)	EIA Case (2012)	Unit
<u>Corn</u>	2,32	2,5	2,71	USD/bushel
<u>Corn Based Ethanol</u>	-	1,26	1,32	USD/gallon
<u>Fuel Costs</u>		823	1739	Million USD
<u>Soy Beans</u>	5,26	5,44	5,47	USD/bushel
<u>US Farm Income</u>	-	+2,6	+5,4	Billion USD
<u>US Corn Exports</u>		-573	-1290	Million USD
<u>Annual Houshold Food Costs</u>	-	+7	+12	USD (per capita)

Fig.15: Economic impacts of the RFS1 (EPA, 2007a).

Figure 15 shows all price indications the EPA considered in its economic impact section of the RFS1. Corn as the basic commodity was predicted to increase by 18 cents per bushel by 2012 in the RFS case and 39 cents per bushel in the EIA case

case was built off of 2004 refinery batch reports provided to EPA; however, the base case assumed sulfur standards based on gasoline data in 2004, not with fully phased in Tier 2 gasoline standards at the 30 ppm level. In addition we assumed the phase-in of 15 ppm sulfur standards for highway, nonroad, locomotive and marine diesel fuel. The supply/demand balance for the U.S. was based on gasoline volumes from EIA and the California Air Resources Board (CARB). Our decision to use 2004 rather than 2005 as the baseline year was because of the refinery upset conditions associated with the Gulf Coast hurricanes in 2005” (EPA, 2007a: p.23968).

“b. Reference Case (2012) – The reference case was based on modeling the base case, using 2012 fuel prices, and scaling the 2004 fuel volumes to 2012 based on growth in fuel demand. In addition, we scaled MTBE and ethanol upward, in proportion to gasoline growth, and assumed the RFS program would not be in effect. For example, if the PADD 1 gasoline pool MTBE oxygen was 0.5 wt% in 2004, the reference case assumed it should remain at 0.5 wt%. Finally, we assumed the MSAT 1 standards would remain in place as would the RFG oxygen mandate. We assumed the crude slate quality in 2012 is the same as the baseline case” (EPA, 2007a: p.23968).

“c. Control Cases (2012) – Two control cases were run for 2012. The assumptions for each of the control cases are summarized below Control Case 1 (RFS case): 6.7 billion gallons/yr (BGY) of ethanol in gasoline; it reflects the renewable fuel mandate. We have also assumed that 0.3 billion gallons of biodiesel will be consumed as reflected in Table II.A.1–1. In addition, it is assumed that no MTBE is in gasoline, MSAT1 is in place, the psi waiver for conventional gasoline containing 10 volume percent ethanol is in effect, the RFS is in effect, and there is no RFG oxygenate mandate. Control Case 2 (EIA case): Same as Control Case 1, except the ethanol volume in gasoline is 9.6 BGY” (EPA, 2007a: p.23968).

⁶⁵ The RFS1 document explains the FASOM Model as following: „FASOM is a long-term economic model of the U.S. agriculture sector that attempts to maximize total revenues for producers while meeting the demands of consumers. Using a number of inputs, FASOM estimates which crops, livestock, and processed agricultural products will be produced in the U.S. The cost of these and other inputs are used to determine the price and level of production of commodities (e.g., field crops, livestock, and biofuel products). FASOM does not capture short-term fluctuations (i.e., month-to-month, annual) in prices and production, however, as it is designed to identify long-term trends (i.e., five to ten years).” (EPA, 2007a: p.23986).

from 2,32 US-Dollars from the reference case in 2004 (ebd. p.23907). This price development was due to increased demand of ethanol. The increased corn price is assumed to also lead to an increased corn-based ethanol price of 1,26 US-Dollars per gallon by 2012 in the RFS case and 1,32 US-Dollars in the EIA case (EPA, 2007a: 23906). Similar to the development of ethanol, the EPA expects prices for biodiesel to range between two levels based on its production source.⁶⁶ This is because the general variance of fuel prices, but also because the EPA expects higher input prices such as land prices (EPA, 2007a: 23907).⁶⁷ Additionally federal tax subsidies for agrofuels absorb to a certain extent these price developments (EPA, 2007a: 23906). Another determining factor is also indicated by Figure 6 (p.48), which shows a significant correlation of the volatile price development between U.S. corn and crude oil prices. This correlation also supports EPA's assumption of higher agrofuel costs in the future if crude oil prices continue to increase.

Also the ban of MTBEs is expected to further boost the price development for ethanol. Fuel costs, meaning the production costs and not the market costs are expected to reach 823 million US-Dollars in 2012 in the RFS case and 1,739 billion US-Dollars in the EIA case (ebd. p.23906).⁶⁸ However, due to higher price expectations for corn and agrofuels, the Agency also expects farm incomes to gain annually 2,6 billion US-Dollars by 2012 in the RFS case, and of 5,4 billion US-Dollars in the EIA case (ebd. p.23907).

These price developments and income estimations represent powerful arguments for agribusiness representatives to gain further political support for additional investments to expand the production of agrofuels. It is also a clear signal that the renewable fuels sector is going to experience a significant boost due to the implementation of the EPAct of 2005 and the RFS1 regulation. In contrast, the Agency mentioned concerns about corn export rates. They are expected to decrease because of higher U.S. corn prices. Exports are expected to decrease 573 million US-Dollars in 2012 in the RFS case and 1,29 billion US-Dollars in the EIA case (ebd.

⁶⁶ If producers tend to use soybeans, prices are predicted to range between 1,89 and 2,06 US-Dollars per gallon. If producers use yellow grease or other low cost feedstocks, prices are predicted to range between 1,11 and 1,56 US-Dollars per gallon (EPA, 2007a: p.23906).

⁶⁷ In that sense, soybeans are considered to experience slight price increases to 5,44 US-Dollars per bushel in the RFS case and 5,47 US-Dollar per bushel in the EIA case by 2012 (EPA, 2007a: p.23907).

⁶⁸ The EPA explicitly stated that for the costs, they excluded the effects of the 51 cent/gal federal tax credit (EPA, 2007a: p.23906).

p.23907). This is an important factor, as corn exports represent an important share of the overall U.S. exports. Until 2008, corn accounted for approximately twelve percent of all agricultural exports (USDA, 2009). Following the USDA, the U.S. share of world corn exports averaged at 60 percent during 2003/04 – 2007/08 (USDA, 2009).

The EPA also has concerns for the increase of food prices due to increased price for corn that as a commodity is linked to several food products. In terms of annual household food costs, the EPA estimates relatively modest increases. The RFS1 document does not clearly explain how the EPA calculated these prices. However, the EPA estimates that food costs will increase 7 US-Dollars per capita in 2012 in the RFS case and 12 US-Dollars per capita in the EIA case (EPA, 2007a: p.23907).

The RFS1 document also includes a clarification of the Program's structure. The RFS1 requires the participants, namely refiners, importers and blenders to demonstrate compliance with the requirements of the RFS Program.⁶⁹ In that sense, the EPA decided to accept compliance through the acquisition of unique 'Renewable Identification Numbers (RINs) (ebd. p.23908). These numbers show the quantity and heritage of the agrofuel. Each participant has to show annually a sufficient quantity of those RINs in order demonstrate compliance with their volume obligations (ebd. p.23908). The RIN information is digitally collected and implemented in a database in order to avoid double counting. Additionally, the EPA used the RIN system for the credit-trading program of the EPAct of 2005.

The trading system of the RFS1 responds to several requirements of the EPAct of 2005. First, the usage of RINS permitted renewable fuels that are not blended with gasoline, such as biodiesel, to participate in the RFS Program (ebd. p.23907). Second the credit-trading program shows flexibility and allows parties that have less or no access to agrofuels to apply with the RFS requirements due to the acquisition of RINs (ebd. p.23907). This flexibility provides a smooth transition for participants that do not have the financial capabilities to immediately adapt their production.

In this regard, the EPA also adopted the small refinery and noncontiguous U.S. territory and State exemptions of the EPAct of 2005. Within its RFS1 document, the

⁶⁹ The RFS1 expanded the list of participants to seven industries covering refiner, blenders and importers as appropriate: (1) Petroleum Refiners; (2) Ethyl alcohol manufacturers; (3) Other basic organic chemical manufacturers; (4) Chemical and allied products merchant wholesalers; (5) Petroleum bulk stations and terminals; (6) Petroleum and petroleum products merchant wholesalers; and (7) Other fuel dealers (EPA; 2007a: p.23900).

Agency declared that 15 refineries applied to the small refinery criteria of the EAct of 2005. However, concerning the economic impacts on small entities, the Agency stated that it does not expect any significant effect on these participants. This is due to the expectation that ethanol production quantities will exceed the requirements of the RFS (ebd. p.23909). With the end of the small refinery exemption in 2010, the ethanol overproduction is believed to have made available over one billion gallons in RINs (ebd. p.23989). These factors are assumed to further lower the overall costs of the RFS Program (ebd. p.23989).

Finally, the Agency expects a further increase of the diversity of energy sources due to cellulosic sources. The EAct of 2005 clarified the term of 'cellulosic biomass ethanol and foresaw its inclusion in a RFP under the jurisdiction of the EPA. In 2007, the production of ethanol from cellulosic feedstocks such as wood residues or grasses was more difficult and cost intense than the production of ethanol from starches such as cornstarch (ebd. p.23915). Therefore, the RFS1 has no percentage of cellulosic ethanol in its volume requirement. Furthermore, Figure 16 shows that the RFS projections until 2012 do not require any share of cellulosic agrofuels (ebd. p.23912).

Year	Projected Standard (percent)	Cellulosic Standard (percent)
2008	4,63	Not applicable
2009	5,21	Not applicable
2010	5,80	Not applicable
2011	5,38	Not applicable
2012	5,42	Not applicable
2013+	5,24 min. (non-cellulosic)	0,18 min

Fig.16: RFS Projections for 2008-2013+ (EPA, 2007a).

However, the EPA worked closely together with commenters of the NPRM in order to expand and further clarified the definition of cellulosic sources (ebd. p.23916).⁷⁰ As explained before, these values were based on an energy content based approach and not on a lifecycle analysis. In that sense, the EPA is expected to give cellulosic agrofuels a higher value, considering one gallon of cellulosic agrofuel as 2,5 gallons of renewable fuel. For other renewable sources the EPA considered different

⁷⁰ For example the EPA reached an agreement with stakeholders regarding the applicability of the definition of cellulosic sources based on the thermal energy they used for the production of the agrofuel "Owners who claim their product qualifies as cellulosic biomass ethanol based on the 90 percent fossil fuel displacement through the use of waste materials (i.e., animal wastes, and other waste materials) are required under today's rule to keep records of fuel (waste-derived and fossil fuel) used for thermal energy for verification of their claims" (EPA, 2007a: p.23917).

equivalence values, which are stated in the RFS1 document and shown in Figure 17 (ebd. p.23918).

	Equivalence value (EV); (percent)
Cellulosic biomass ethanol or waste-derived ethanol	2,5
Ethanol from corn, starches, or sugar	1,0
Biodiesel (mono alkyl ester)	1,5
Non-ester renewable diesel and hydrotreated renewable crudes	1,7
Butanol	1,3
Renewable crude-based fuels	1,0

Fig.17: Equivalent Values for some renewable fuels (EPA, 2007a).

These equivalent values are based on an energy based calculation method and include no lifecycle analysis. Although the renewable fuels industry as well as environmental stakeholders demanded the inclusion of a lifecycle analysis, of this particular standard, the Agency chose to follow the fossil fuels industry's suggestion and use an energy content approach. Additionally, the EPA participates in several research programs in order to further improve technologies for the cellulosic agrofuels production (see Fig.15 p.74).

4.3. The dominant Actors in the creation of the U.S. Agrofuels Project

With a presentation of the dominant Actors in the creation of the RFS1 Program, this Chapter will also show the influences and limits of the EPA in the creation of the U.S. Agrofuels Project. Further, this chapter will clarify and present the orientations and capabilities of the Actors in the creation of the U.S. Agrofuels Project through an ACI analysis framework/approach of Scharpf and Mayntz.

Scharpf and Mayntz theoretical approach aims to show why actors in negotiations chose certain decisions in order to pursue their interests and use their capabilities to influence a policy-outcome in the most effective way. As this thesis has shown, the EPA's involvement and role in the creation US Agrofuels Projects has been multi-dimensional and spans the entire process from the political and regulatory to the administrative. However, this thesis will show that in each aspect, EPA's role is different, limited in one context and more expansive in another. This thesis will also illustrate that the process is not segmented but, given the nature of environmental

politics and the structure of the US political system, at times the activities and/or roles of EPA (the political, regulator, and administrative) overlap or merge into concurrent layers of Actors and different Constellations. In order to proceed with the application of Scharpf's framework approach, it is crucial to initially divide the analysis timeframe in two parts. The first part is EPA's involvement prior to the enactment of the EAct of 2005. The second part is EPA's leading role in the creation and establishment of the RFS1 regulation for 2007. The analysis of the second part is the main focus of this chapter, as it provides more profound information about the role of the EPA in the U.S. Agrofuels Project. In order to best identify and evaluate the Role of the EPA, it is crucial to provide information about other involved actors as well, including their orientations, capacities and modes of interaction.

4.3.1. Prior to the enactment of the EAct of 2005

From the review of the literature and conducted interviews, this thesis arrives at the conclusion that during the creation of the U.S. Agrofuels Project, the EPA had its highest political potential prior to the enactment of the EAct of 2005. The U.S. political system provides for the formation of congressional committees (made up of legislatures) that are responsible for the debates and the passage of a Bill into law. During the committee process, politicians, industry stakeholders, and other bodies of concerned citizens, like environmental stakeholders have the possibility to speak freely and address their concerns and interests regarding the potential passage of a Bill. In the instant case, since EAct of 2005 would ultimately be regulated and administered by the EPA, it is customary that the EPA would be asked by the congressional committee to participate in the political phase of the process by sharing its views and expertise about the proposed Bill. In her interview, Governor Whitman confirms the importance of EPA's role, by describing the high degree of respect EPA's view is given in matters of environmental concerns and why. Governor Whitman in her interview stated that Congress always considers the Agency's expertise in concerns that affect EPA's mandate or the Agency itself (cf. Chapter 3.4.2. p.38), i.e., on issues that deal with the protection of human health and the environment. In the development of the U.S. Agrofuels Project, EPA's scientific staff contributed its expertise in numerous hearings before different committees. As set forth in the legislative history, Hon. Jeffrey Holmstead on several occasions represented the EPA before the EAct of 2005 congressional committee and along

with other EPA staffers, they addressed concerns that are applicable with the 'Multifaceted Problem' discussed in chapter 4.1.1 (p.51).

In the forefront of the creation of the EPAct of 2005, Hon. Jeffrey Holmstead, who was the current Assistant Administrator for Air and Radiation at the EPA, represented the Agency in matters of Fuel Programs (GPO, 2004: p.III). He testified and responded in numerous congressional hearings such as the hearing concerning 'The Status of the U.S. Refining Industry' (GPO, 2004).⁷¹ In his testimony Holmstead states that: *"EPA's authority to address many of these issues is limited. We are committed to working with Congress to explore ways to maintain or enhance the environmental benefits of clean fuel programs, while exploring ways to increase the flexibility of the fuels distribution infrastructure, improve fungibility, and provide added gasoline market liquidity. The Administration supported energy bill provisions that would replace the statutory oxygen content requirement for RFG with a renewable fuel standard that includes a flexible, national credit-trading system"* (GPO, 2004: p. 37). In addition to EPA (the main actor of concern for this thesis), the congressional hearing records also identify other actors that were involved in the political discussions on agrofuels. The U.S. Government Printing Office (GPO) provides an easy access to these documents, which makes it possible to reveal the involved actors and their stated position (GPO, 2011). In addition to the 59 Committee members (U.S. Senators), the hearing was attended by eleven persons representing several stakeholders that showed interest in future developments for the oil and refining industry of the U.S.⁷² Although not the main issues for discussion, during the hearing on the Status of the U.S. Refining Industry, the implementation of the RFS Program was raised and the record shows that statements made stated that the oil and refining sectors need new incentives to decrease oil dependency and increase investments from the financial sector.⁷³ Concerning gasoline alternatives, the hearing

⁷¹ The hearing was scheduled for 15 July 2004 and held before the 'Subcommittee on Energy and Air Quality' of the 'Committee on Energy and Commerce' (GPO, 2004).

⁷² Environmental Stakeholders (American Lung Association, Environmental Integrity Project, and National Resources and Environment); the Financial Sector (Goldman Sachs); Government Agencies (EIA, EPA, and the Federal Trade Commission); the Oil Industry (American Petroleum Institute – API, Douglas Distributing, the National Petrochemical and Refiners Association, and Valero Energy Corp.)(GPO, 2004: p.III).

⁷³ The financial sector addresses the importance to implement policies that encourage a reduction in the long-term growth of oil demand (GPO, 2004: p.73). Additionally the Goldman Sachs representative stated that poor historic returns in refining have incentivized both oil companies and investors to invest in other sectors like the technology sector or the health care sector (GPO, 2004: p. 73).

discussed the regulation of different “boutique fuels” and the importance to phase out MTBEs in gasoline.⁷⁴ Additionally, the violation of air pollution regulations was also discussed as an issue and a current problem of the refining industry.⁷⁵ This hearing is an example of the main concerns within the oil and refining industry, and provides first names of the main actors that play a political role by addressing their concerns.⁷⁶

The congressional hearing concerning ‘The Benefits of Tax incentives for producers of renewable Fuels and its Impact on Small Businesses and Farmers’ revealed the main actors from the Renewable Fuel Industry prior to the enactment of the EPAct of 2005. Although no representative from the Agency participated in this specific hearing, it is clear that EPA is regarded and does indeed have a political role in these processes, real and perceived, given the multiple references made about EPA. In addition to the 39 Committee members (U.S. Senators), the hearing was attended by eight witnesses.⁷⁷ A major point within the hearing was the importance of farmers in the country’s energy future, which depends on its oil dependency and negative effects on its population’s health.⁷⁸ The hearing also addressed the current opportunity to implement a consistent renewable fuels policy.⁷⁹ In this regard, the stakeholder addressed the economic possibilities of the renewable fuels industry and demanded a flexible approach in order to facilitate compliance for the participants.⁸⁰

⁷⁴ The API addressed the importance to improve the refining capacities infrastructure within the U.S. and to adopt a comprehensive legislation concerning boutique fuels and a national phase down of MBTE’s (GPO, 2004: p.122).

⁷⁵ The Environmental Integrity Project stated that U.S. refinery capacities increased due to the expansion or restart of existing facilities. In many cases, this increase of refinery capacity also implies a conflict with local communities that did not believe in the refineries’ commitment to comply to legal air quality requirements.

⁷⁶ That means, that it is most likely, that some of these actors will be found again in the elaboration of the RFS1creation.

⁷⁷ The participating witnesses are Environmental Stakeholders (Environmental and Energy Study Institute); a representative from the House (MO-9 Hon. Kenny Hulshof); the Agricultural sector (National Corn Growers Association, and Missouri Soybean Association); as well as from the Renewable Fuels Industry (Renewable Fuels Association – RFA, Golden Triangle Energy L.L.C., The National Biodiesel Board, and the National Vehicle Coalition) (GPO, 2004a: p.III).

⁷⁸ The Environmental and Energy Study Institute underlines the important role of farmers in the country’s energy future. The actor identifies renewable fuels as a win-win situation as it help to reduce oil dependency and decreases GHG emissions, which causes health problems for the population like asthma (GPO, 2004a: pp.54-55). The actor therefore strongly supports the enactment of a RFS Program, as it supports rural America, and phases out MTBEs which pollute the groundwater nationwide (GPO, 2004a: p.59).

⁷⁹ Hon. Hulshof speaks as farmer addressing the increasing oil dependency of the U.S. (GPO, 2004a: p.4). In that sense he supports the enactment of a RFS, which he believes will boost the use and acceptance of ethanol and biodiesel (GPO, 2004a: p.5). He also emphasizes the opportunity of the current policy vacuum, to support the production and use of renewable fuels (GPO, 2004a: p.5).

⁸⁰ The National Corn Growers Association emphasizes the growth capacities of the ethanol sector implying jobs and replacement capacities of conventional gasoline. Additionally the actor stated that Archer Daniels Midland is not the big player in the industry, but rather the farmers across the

Additionally, stakeholders suggested revisions to the current tax credit legislation in order to improve the situation for farmer owned corporations.⁸¹ This second example represents issues that concerned stakeholders of the renewable fuels industry.⁸²

On February 16, 2005, the Subcommittee on Energy and Air Quality of the Committee on Energy and Commerce held a hearing about the Energy Policy Act of 2005. Fifty-eight Senators and Representatives as well as thirty-one Stakeholders from various industries and branches participated in the congressional hearing. Prof Dumas in his interview stated that based on how the U.S. political system functions, it is important to look at the composition of the committee members in congressional hearings (Dumas, 2011). He further said that Senators and Representatives have specific interests and orientations to participate in specific congressional hearings (Dumas, 2011). First of all, it is personal interest to ensure re-election, but what triggers a Senator's or Representative's choice to participate even more, is the interests of his or her State.⁸³ In that sense, the composition of the committees and the members' statements can also provide information about vital interests of local industries. In the case of the EAct of 2005, six members from California, five members from Texas four members from Florida, three members from Illinois, three members from New York, three members from Ohio and three members from Pennsylvania represent the majority of participating State representatives in the Committee on Energy and Commerce of the House of Representatives (GPO, 2005). Interesting is, that almost all representatives supported the enactment of the EAct of 2005. With the focal point on renewable fuels, most committee members were concerned with the non-use or continued use of MTBEs. Questions and concerns

Corn Belt (GPO, 2004a: p.45). Therefore the actor strongly supports current renewable programs and emphasizes negotiation with the oil industry for more flexibility for blenders within the RFS Program (GPO, 2004a: p.46).

⁸¹ The RFA addresses the interest of the ethanol sector to grow as a result of the tax incentive program that stimulates the production and use of renewable fuels (GPO, 2004a: p.9). The RFA also supports the VEETC that is to be implemented in the EAct of 2005 and believes that Congress should correct their Small Ethanol Producer Tax Credit to include farmer owned cooperatives (GPO, 2004a: p.9).

⁸² Like prior hearings, some of the involved actors here will also appear in the elaboration of the creation of the RFS1 Program. In that sense, Figure 18 (p.125) lists all participating stakeholders of all examined congressional hearings in order to provide a good overview of the identification process of the dominant actors.

⁸³ Every State has a more or less specialized industry, which has a high interest to communicate its problems and interests to the political level on Capitol Hill. Texas for instance depends highly on the oil industry. Therefore Texan oil companies financially support campaigns for Senators and Representatives in order to assure that their interests are well represented on Capitol Hill (Dumas, 2011).

about MTBE were mostly addressed to Red Cavaney, the President of the API, Erik D. Olsen, a senior Attorney of the Natural Resources Defense Council and Robert Dinneen, President of the RFA. Committee members from California and Texas asked Mr. Cavaney about the industries knowledge on the detrimental effects of MBTEs and the occurring leakages of storage tanks prior to the enactment of the CAA of 1990 (GPO, 2005: p.431). Mr. Cavaney denied that the oil industry was aware of these facts prior to 1990 (GPO, 2005: p.423). He further argued that the use of MTBE was approved by the EPA, and legally approved and supported by the CAA of 1990. In that sense, he also urged the passage of legislation to protect companies from lawsuits because of their compliance with the CAA (GPO, 2005: p.308).⁸⁴

Mr. Olsen in return responded that the oil industry was well aware that MTBE could contaminate groundwater, but had no interest in completely informing the population as the CAA would further support the use of MTBEs (GPO, 2005: p.431). Mr. Olsen further supported bio-based renewable fuels, but opposed an ethanol mandate. Mr. Dinneen in this regard responded that the reason MTBEs were used in the first place was that the ethanol supply was insufficient to cover the demand from the oil industry.

However, as single States started to phase out their use of MTBEs the ethanol industry experience a market driven expansion of their production, which would support a RFS Standard of approximately 5 billion gallons (GPO, 2005: p.424). The hearing shows, that the oil industry, environmental stakeholder and the renewable fuels industry had a shared vital interest to ban MTBEs and use a biomass-based renewable fuel as gasoline additive substitute. The API, RFA and Natural Resources Defense Council showed to be important actors in concerns of the substitution of MTBEs in gasoline, as all three actors were vital participants and responded to various questions by committee members.

As is evident by EPA's presence and participation in several of such legislative hearings and the further elaboration of the role EPA by other stakeholders and

⁸⁴ Cavaney states that: *"investment, the industry's future, and consumer well-being are, however, being threatened by defective product-liability lawsuits for company's use of an EPA-approved fuel additive, MTBE. [...] Today, companies who have used MTBE to comply with the oxygen requirement are facing multi-million dollar suits brought by personal injury lawyers with claims that gasoline containing the fuel additive was a defective product; yet use of MTBE to meet the oxygen requirement is exactly what Congress mandated 14 years ago. If we are not protected against these suits, one need only look at the asbestos industry to see the disastrous consequences of this breach of faith by government."* (GPO; 2005: p.308).

Senators, even in the absence of EPA on a given day, confirm Governor Whitman's statement that the EPA plays a crucial role in the political process of Bill becoming law if its mandate or regulatory task is at issue. The Agency's statements are held most reliable as compared to statements made by other actors because of its expertise in the areas of science and environmental law. By contrast, one of the view critiques on EPA came from the Environmental Integrity Project, which addressed the Agency's lack of moving forward on non-compliance cases of oil refineries that violated the clean air regulations of the Clean Air Act (GPO, 2004: p.129).

However, it can be summarized that the EPA - as a participating actor in the forefront of the EPAAct of 2005 - played a minimal political role in the creation of the EPAAct of 2005. As Jeffrey Holmstead stated, EPA's authority is limited to address political concerns. However, the influential power of the Agency's scientific expertise should not be underestimated, as most congressman and industry stakeholders rely on the Agency's information in their decision making processes. The reality based in the political construct of the U.S. political system places the power of the enactment/creation of laws with the U.S. Congress and limits the political potential of the EPA (cf. Chapter 3.4: p.35).⁸⁵ So far this subchapter presented first names of actors from various industries and the EPA to show their interests and or impact in either the refining and oil industry or/and the renewable fuels industry as the U.S. Congress debated the passage of the EPAAct of 2005.

4.3.2. EPA's leading Role for the RFS1

As the EPA has the regulatory leadership at this stage of the U.S. Agrofuels Project, this part of the analysis represents the heart of the thesis' ACI analysis approach. In his work Scharpf presents his theoretical framework approach of ACI, explaining that in order to identify the involved actors, it is necessary first to reveal the set of interactions, which represents the unit of the following analysis (Scharpf, 1997: p.43). Taking this into account, the unit of analysis for this subchapter applies to the regulatory and scientific tasks of the EPA, explained in chapters 3.3 and 3.4 (pp.27-44). After the enactment of the EPAAct of 2005, the EPA was obliged to develop and

⁸⁵ As chapter 3.3. (p.27) has shown, the political potential of the EPA lays in its mandate. By being completely transparent and provide any information necessary regarding the regulation at stake, the Agency has capabilities to provide formation for law suits if regulations implemented by the Agency are conflictive with its mandate (cf. Chapter 3.4. p.35).

implement an enforceable regulation, i.e., the U.S. Agrofuels Project. As this thesis in hand examines the role of the EPA in the U.S. Agrofuels Project, it is important to emphasize that with the enactment of the EPA Act of 2005 the U.S. Congress gave EPA the jurisdiction to execute the legislators will as embodied in the Act. This is the case for the creation of the RFS1 of 2007, as the default Standard for 2006 was an implementation of the EPA Act of 2005. This means, the official rule-making role of the EPA started with the creation of the RFS1 for 2007. However, as any regulation concerning agrofuels highly depend on scientific information, the access to such information played a crucial role for any aspect of the U.S. Agrofuels Project prior to 2007. The acquisition of scientific information requires access to research and development. The EPA as regulatory and scientific entity had an advantageous position, as it has sufficient financial capacities, well trained scientific staff, as well as privileged access to information of other public institutions like the EIA or the USDA. In that sense, money and advanced technological capabilities played crucial roles in the determination of what a U.S. Agrofuels Project would look like. Or at least the Agency can confirm or falsify scientific arguments from other stakeholders. In congressional discussions, the Agency provided mostly scientific information, as it is not the Agency's task to create legislation but rather has directed subsequently by the U.S. Congress, it is the EPA's role to promulgate and implement the regulations pursuant to the enabling act.

In that sense and subsequent to the enactment of the EPA Act of 2005, the EPA initiated the rulemaking process of the RFS1 with a "Notice of Proposed Rulemaking" (NPRM). After the publication of the NPRM the EPA offered a comment period to affected parties, civilians and other stakeholders.⁸⁶ Commenters had the option of submitting his or her comments in the form of letters or as statements in a public hearing, which was held on October 13, 2006, in Chicago, Illinois (EPA, 2006a: p.55552). The Office for Congressional and Intergovernmental Relations (OCIR) of the EPA then incorporated the considered and selected comments and issued the final rule for 2007. After the enactment of the RFS1, the EPA published a 'RFS1 Summary and Analysis Document' (RFS1-SAD) including all comments the Agency

⁸⁶ The regulatory role of the Agency is further explained in chapter 3.3.3. (p.33). It is important to note that the commentators and their contributions will be closely examined in the following chapters concerning the Actors, their preferences and orientations in context of the ACI analysis.

received concerning the RFS1 regulation.⁸⁷ This document is the core source of the following ACI approach and is online available on the EPA webpage (EPA, 2007a).⁸⁸

In that sense and in addition to the U.S. Congress, the EPA, the EIA the USDA and all commenters of the RFS1-SAD are considered as actors, as their comments most likely have influenced the outcome of the final rule. Following the document, 73 commenters were involved in the negotiation process for the RFS1 (see. Fig.19 pp.126-127). The role of the EPA in this regard was to receive the comments, read and consider them and reply on how each comment influenced the final RFS1 rule. The EPA received 527 comments, which either were supportive, opposing or alternative suggestion to the RFS1 Program. A thorough consideration of all actors and their orientations, and capabilities would present a too complex ACI analysis within the scope of this thesis and therefore this thesis focuses on the dominant actors and the enormous role of the EPA in the regulatory phase of the U.S. Agrofuel project. In that sense a simplification of the identification process will illuminate the dominant actors. This thesis therefore applies the ACI approach of Scharpf and Mayntz and includes a quantitative presentation, which compares the actors' participation activity based on the amount of comments they submitted. The idea behind this first approach is that more active actors present a dominant character and show a higher interest in the regulation. Figure 20 shows the top 20 commenters that submitted the most comments.⁸⁹

⁸⁷ In order to determine the role of the EPA it is important to know that the comments EPA received from stakeholders were not mandatory adjustments to the rule, but rather unbinding recommendations and critic points that the Agency could consider before publishing the final rule.

⁸⁸ For the EPO Act of 2005 and the Default Standard for 2006 such documents are not available, which makes it impossible to assess if all actors involved in the creation of the U.S. Agrofuels Project were named and considered in the summary and analysis document for the RFS1. This is additionally a disadvantage, as initial thoughts expressed in comments on the EPO Act of 2005 or the Default Standard for 2006 may include additional explanatory information. However, Governor Whitman stated in her interview that EPA staff plays a crucial role on Capitol Hill as they provide scientific expertise in several rule-making committees. This was certainly also the case for the creation of the EPO Act of 2005. At the time when the proposed rulemaking of the RFS1 was published, comments and the contributions of EPA staff on Capitol Hill could have already been incorporated in the NPRM, which makes it impossible to distinguish what information came from EPA and what information came from Stakeholders.

⁸⁹ Instead of Private Citizens BlueFire Ethanol should be on place 20 as comments from private citizens were from various citizens and not from one single actor.

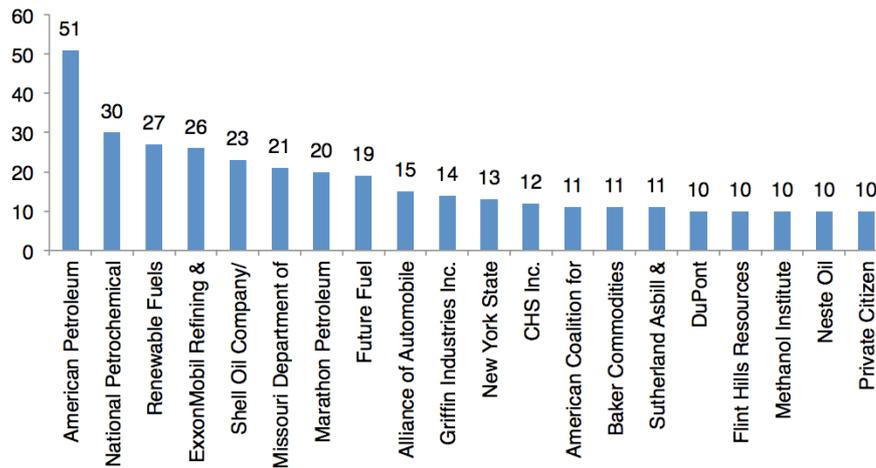


Fig.20: Amount of comments by actor, own visualization (EPA, 2007a).

Complementary, the quantitative presentation included the top ten commenters of each chapter. In most cases the actors' names were the same. In this regard, the following list represents the top ten dominant actors: (1) American Petroleum Institute; (2) National Petrochemical and Refiners Association; (3) Renewable Fuels Association; (4) ExxonMobil Refining & Supply Co.; (5) Shell Oil Company/Motiva Enterprises (6) Missouri Department of Natural Resources; (7) Marathon Petroleum Company; (8) Future Fuel; (9) Alliance of Automobile Manufacturers (10) Griffin Industries Inc.. Because these actors represent different interests, Figure 21 separated all actors based on their activities.

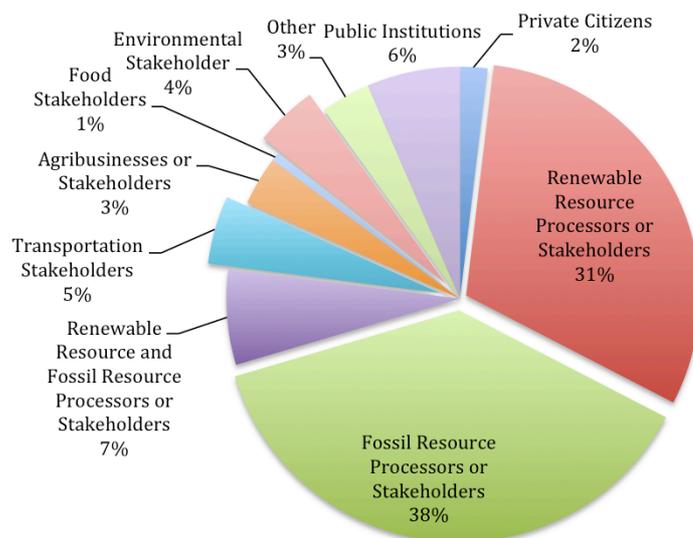


Fig.21: Share of comments by actor-category, own visualization (EPA, 2007a).

In that sense, the quantitative presentation created ten categories and assigned the actors: (1) Private Citizens; (2) Renewable Resource Processors or Stakeholders; (3) Fossil Resources Processors or Stakeholders; (4) Renewable Resource and Fossil Resource Processors or Stakeholders; (5) Transportation Stakeholders; (6)

Agribusiness Stakeholders; (7) Food Stakeholders; (8) Environmental Stakeholders; (9) Public Institutions; and (10) Other Stakeholders.

Figure 22 also shows the share of comments for each actor's group. The figure is divided in three almost equal thirds. The biggest share of comments was submitted by 'Fossil Fuel Resource Processors or Stakeholders' (Fossil Fuel Industry). The second third was submitted by 'Renewable Resource Processors or Stakeholders' (Renewable Fuels Industry). The remaining groups share the comments of the last third. This conclusion underlines the list of the top ten dominant actors, showing that 69 percent of comments came from two groups of actors. The fossil fuels industry had five actors submitting 150 comments. The renewable fuels industry had three actors and submitted 60 comments. The remaining two actors are assignable to Public Institutions, which had one actor (number 6) submitting 21 comments, and to the Transportation Sector, which had also one stakeholder (number 9) submitting 15 comments among the top ten commenters.

However, this quantitative presentation alone has limited explanatory power. In order to identify the importance of the comments and their influential potential to the Agency, it is necessary to undertake a qualitative examination on the RFS1-SAD. This qualitative examination identifies what issues were addressed and which positions the dominant actors took. The examination will help to identify the dominant actors orientations and capabilities and will further pave the way to show how and why the EPA responded.

4.4. What were the orientations and capabilities of the dominant actors and EPA in the creation of the RFS1?

The commenting phase of the NPRM represents a possibility for stakeholders to address concerns and interests. In its regulatory duties the EPA must balance the stakeholders concerns and interests with that of the U.S. Congress, the President and scientific evidence, which potentially have a higher influence on the final outcome of the RFS1. In numerous comments the dominant actors show a high interest to express their concerns in either a public hearing or through written statement-letters addressed to EPA.

Following Scharpf, actors are characterized by their orientations (specific perceptions and preferences) and capabilities (Scharpf, 1997: p.51). As chapter 2.1.1.2.1 (p.17) explained, an actor's orientation is described as the proximate cause to take action. It represents the trigger for certain behavior in negotiations and explains choices for relations between corporate actors (see Fig.4 p.15). The presentation of the actors identifies the actors' orientation and help to shed light on their proximate cause to take action. Figure 21 (p.87) shows that the EPA has to deal with two industries: (1) the Fossil Fuel Industry; (2) and Renewable Fuels Industry. The most dominant actors from these two industries are the 'American Petroleum Institute' (API), and the 'Renewable Fuels Association' (RFA). These two actors are corporate actors, representing the interest of numerous companies.⁹⁰ Their orientation, therefore depends on the perceptions and interests of their members and shareholders as well as on their possibilities in negotiations with the EPA. To better understand their motivation, it is necessary to examine the chapters and comments of the RFS1-SAD in order to identify what the dominant actors proposed. The RFS1-SAD has eleven chapters, reflecting the commenters' interests and general orientations.⁹¹ Additionally, the RFS1-SAD includes the responses from the Agency, reflecting its orientations and showing how the comments influenced the final rule.

⁹⁰ On their webpage the American Petroleum Institute for example is an advocacy for more than 400 corporate members from all segments of the American oil and natural gas industry (API, 2011). Also the Renewable Fuels Association is an advocacy for numerous companies in the ethanol industry.

⁹¹ The chapters of the RFS1-SAD are: (1) General; (2) Renewable Fuel Standard; (3) Types of Renewable Fuels; (4) Exemptions for Obligated Parties; (5) Compliance Program and Renewable Identification Number (RINs); (6) Costs; (7) Compliance Requirements (Registration, Reporting, Recordkeeping); (8) Impacts on Fossil Fuel Consumption and Greenhouse Gases; (9) Renewable Fuel Production and Use; (10) Environmental Impacts; (11) Other (EPA, 2007a: p.vii). The first chapter has been excluded from the analysis, as it represents a brief introduction and summary of the other chapters.

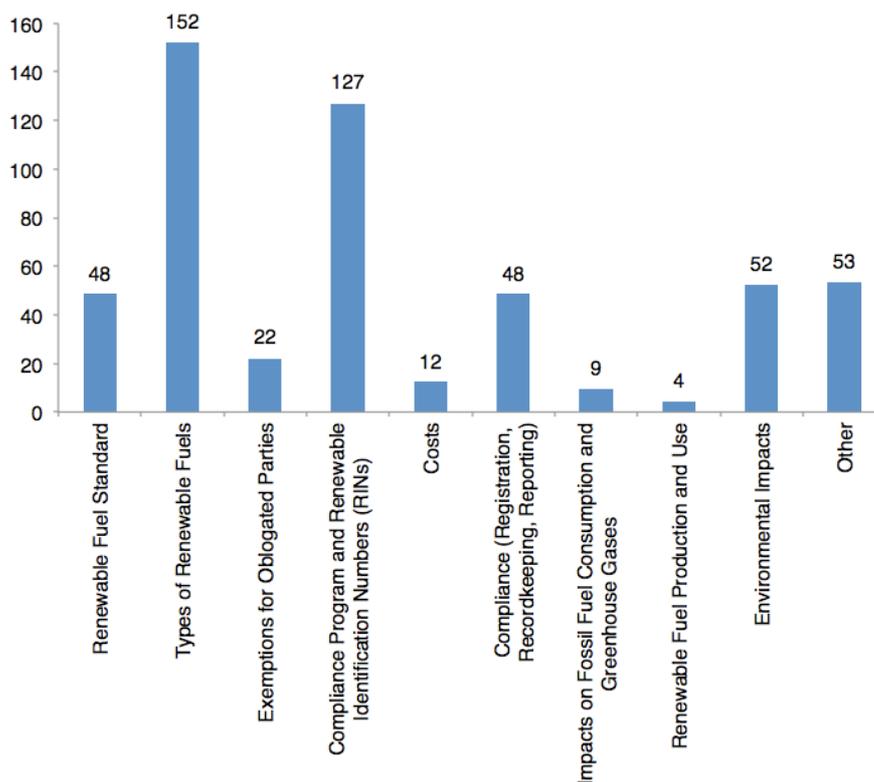


Fig.22: Amount of Comments for each chapter of the RFS1-SAD, own visualization (EPA, 2007a).

Figure 22 shows that chapter 3 ‘Types of Renewable Fuels’ and chapter 5 ‘Compliance Program and Renewable Identification Numbers (RINs)’ allocated by far the most attention from all commenters.

Concerning chapter 3, the Fossil Fuel Industry supports the RFS Program and shows a high interest in clarity about what applies as a Renewable Fuel. Especially the calculation methodology for renewable fuels raised most interest among actors. The Agency has to decide whether it uses an energy content-based standard or a lifecycle analysis approach to determine factors like an equivalent value for renewable fuels or to calculate the displacement of petroleum or GHG emissions due to the use of renewable fuels. 16 actors submitted comments to the confrontation between the ‘Lifecycle Approach vs. Energy Content Approach’ (EPA, 2007a: 3-26).⁹² The fossil fuel industry represented by ExxonMobil, API and Shell/Motiva supported the energy content approach arguing that the lifecycle calculations are too variable to be reliable (ebd. p.3-27). The Alliance of Automobile Manufacturers (Alliance) complains that a lifecycle or greenhouse gas basis for determining

⁹² Alliance of Automobile Manufacturers; American Petroleum Institute; Baker Commodities; Biodiesel Industries of Greater Dallas Forth Worth; DuPont; Environmental Defense Fund; ExxonMobil Refining & Supply Co.; Future Fuel; Griffin Industries Inc.; Imperium Renewables; National Biodiesel Board; National Wildlife Federation; Natural Resources Defense Council; Organic Fuels; Shell Oil Company/Motiva Enterprises; Union of Concerned Scientists (EPA, 2007a: 3-27).

equivalent values was inconsistent with the RFS program's purpose (ebd. p.3-27). The Alliance therefore also supports an approach that considers the volume or energy displaced by the renewable fuel as the currently most reasonable (ebd. p.3-27). The renewable fuels industry supported the lifecycle approach, arguing that a method based on the energy content would not accurately reflect a fuel's true displacement of fossil fuels. Environmental Stakeholders tended to support the lifecycle approach as well. EDF further suggested that the EPA should consider focusing on GHG displacement rather than CO₂ displacement and to distinguish between fuels produced using natural gas versus those, which use coal for its production (ebd. p.3-28).

The EPA basically agreed with the renewable fuels industry and the environmental stakeholders that the lifecycle approach would provide the most appropriate means of reflecting the relative benefits of one renewable fuel in comparison to another (ebd. p.3-28). However, the Agency decided to not cover the whole RFS1 with a lifecycle based calculation standard, but to continue collaboration with stakeholders in order to further evaluate and update tools and assumptions associated with lifecycle analysis. At the current time, the Agency agreed with the fossil fuel industry stating that "*There currently exists no organized, comprehensive dialogue among stakeholders about the appropriate tools and assumptions behind any lifecycle analysis*" (ebd. p.3-29).

However, as the RFS1 shows, the EPA decided to not lose track of the lifecycle analysis approach, and included such an analysis to calculate GHG emission reductions due to renewable fuels in the transportation sector. It seems like the Agency attempted to meet orientations of all actors. For the calculation of equivalent values, which imply economic considerations as they determine the value of renewable fuels, the Agency agreed with the argumentation of the fossil fuels industry. However, a general conclusion that the renewable fuels industry prioritizes environmental measures over economic measures would not be accurate if it was only based on the industries decision to support lifecycle analysis. Renewable fuels producers gain additional credit accumulation possibilities due to the incorporation of fossil fuel replacement measurements from several renewable fuel production stations. This means that renewable fuel producers had to professionalize every production step. This requires additional investments and therefore implies new investment possibilities for agribusiness or other profit-oriented investors. The

creation of the RFS Program, the ban of MTBE as oxygenate and rising corn prices, fueled the ethanol boom, which the industry was experiencing since 2005. This boom attracted bigger corporations to invest in the agrofuels production.

From 2005 onward, the renewable fuels industry experienced a significant shift from locally owned producing facilities to corporate owned producing facilities, which reflects a structural change the renewable fuels industry was experiencing at that time. This structural change is illustrated in Figure 23 by the RFA in 2007.

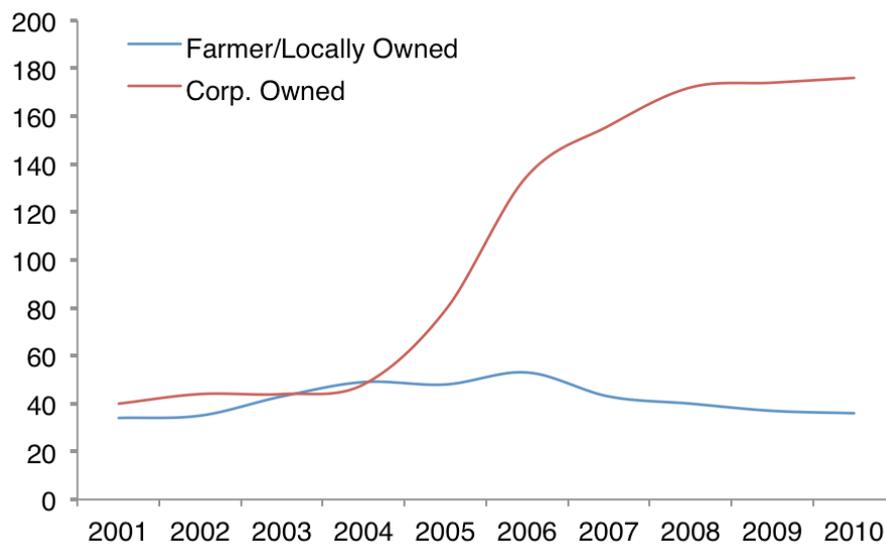


Fig.23: Own visualization of the amount of farm/locally owned facilities and corporate owned facilities based on data provided by the RFS, 2000-2011.

In that year, 78,39 percent of ethanol producing facilities were corporate owned (RFA, 2007: pp.10-12).⁹³ The top ten ethanol producers in 2007 were all corporate owned and profit oriented facilities.⁹⁴ This shows that although the renewable fuels industry supported the environmentally friendlier considered lifecycle analysis for the calculation of equivalent values for renewable fuels, economic and profit oriented interests also played a crucial role in their decision to comment the NPRM. And exactly the support of the lifecycle analysis approach was because of economic interests, as this thesis will show in chapter 4.5. (p.97).

⁹³ The percentage is an own illustration based on the statistical data from the 2007 Outlook Report of the RFA. In order to get this percentage this thesis distinguished between farmer/locally owned and corporate owned facilities. The RFA Outlook reports mark every facility that is farmer/locally owned with a star. Only for 2007 the RFA did not continue the marking. But based on the Outlook Reports for 2005 and 2008 it was possible to track the missing marking.

⁹⁴ (1) POET; (2) Archer Daniels Midland; (3) VeraSun Energy Corporation; (4) US BioEnergy Corp.; (5) Hawkeye Renewables, LLC; (6) Aventine Renewable Energy, LLC; (7) Abengoa Bioenergy Corp.; (8) The Andersons Albion Ethanol LLC; (9) Global Ethanol/Midwest Grain Processors; (10) White Energy (RFA, 2007: pp.10-12).

Chapter 5 ‘Compliance Program and Renewable Identification Numbers (RINs)’ was the second topic that received significantly high attention. The mechanism to use RINs as compliance mechanisms is accepted by all dominant actors (EPA, 2007a: p.5-1). Environmental stakeholders, as well as the fossil fuels industry and the renewable fuels industry support the proposed regulation. RINs prove to be easy to control and facilitate trade (ebd. p.5-1). Within the chapter the ‘Extra-Value for RINs’ and the level of the ‘RIN Rollover Cap’ received the most comments. Concerning the extra value for RINs, opposing commenters expressed concerns that the proposed provision allowing extra value RINs to remain with renewable fuel producers could manipulate the RIN market, as renewable fuel producers could withhold extra value RINs from the marketplace and therefore increase demand for renewable fuels (ebd. p.5-14). These concerns originated from the fossil fuel industry, which submitted 10 of 12 comments.⁹⁵ DuPont, which in this thesis is considered as an agribusiness, supports the Agency’s approach allowing extra value RINs to remain with renewable fuel producers. The company stated that it believes that *“it is important to allow the market to most efficiently allocate appropriate incentives to both biofuels producers and consumers to facilitate expansion of the biofuels market.”* (ebd. p.5-15). As the final rule of the RFS1 has shown, the Agency left the responsibility to create and assign RINs to batches of renewable fuels solely to renewable fuel producers and renewable fuel importers (EPA, 2007b: p.23938). However, the Agency decided to treat general RINs and extra value RINs identically, which make a distinction unnecessary. An exemption is cellulosic ethanol, which has a higher equivalent value. In that case, the Agency decided to maintain the ability of producers to retain extra value RINs (EPA, 2007a: p.5-16). Another issue that received a lot of attention was the level of the RIN ‘Rollover Cap’. The rollover cap assures, that RINs that were produced but not used within one year, don’t lose their value in the next year. A bigger cap provides the participants of the RFS more possibilities to rely on already allocated RINs. A smaller cap, urges participants to allocate new RINs for the following year. The fossil fuels industry supported an approach, which would increase

⁹⁵ The industry is represented by (1) API; (2) BP Products North America; (3) ExxonMobil; (4) Flint Hills Resources; (5) Independent Fuel Terminal Operators Association; (6) Marathon Petroleum Company; (7) National Petrochemical and Refiners Association; (8) Neste Oil; (9) Shell/Motiva; and (10) the Society of Independent Gasoline Marketers of America and National Association of Convenience Stores (EPA, 2007a: p.5-15).

the capacity of a possible rollover cap.⁹⁶ The main argument of the API was “*that a cap that is too small [...] could result in severe economic consequences because RIN markets will be unable to match supply and demand*” (ebd. p.5-39). The renewable fuels industry supported an approach that would decrease the rollover cap. The RFA argued that for 2008 to 2012 the NPRM estimated production is below the 20 percent cap (ebd. p-5-40). The Agency however decided to maintain a 20 percent cap as it provides the appropriate balance between its credit producing function and protection against potential renewable fuel supply shortfalls (ebd. p.5-41). Furthermore, a near 20 percent cap would generate enough demand for RINs in order to assure financial profitability for renewable fuel producers (ebd. p.5-41), which shows that economic interests were the main driver of the definition calculation of RINs as well. Either the fossil fuels industry supported a bigger cap in order to reduce costs for following years or the renewable fuels industry that had an interest to decrease the cap to sell more RINs. The Agency chose to maintain the rollover cap at 20 percent, which represents an intermediate solution between the demands of the fossil fuels industry and the renewable fuels industry.

Having analyzed the two chapters of the RFS1-SAD, which attracted most attention from the dominant actors; following results were revealed. First, the dominant actors’ triggers for participation in the creation process are clearly influenced by economic factors. This economic influence is seen in two interests. First dominant actors represent profit-oriented businesses, which demand clarity and certainty about the RFS Program. Second, dominant actors also demand clarity about how to comply best to be financially effective in regard of the credit trading scheme and the TAX-credits. The only exemption are environmental stakeholders, which opposed the use of MTBEs due to drinking water pollution problems and attempted to use lifecycle analysis in order to have the most efficient method to calculate petroleum substitution and impacts on GHG emission due to the production and use of renewable fuels. As environmental factors like soil erosion, water depletion or displacement of indigenous plants due to the agrofuels production were not mentioned at all, it is this thesis’ assumption that at the given time environmental stakeholders did indeed act in the

⁹⁶ The fossil fuels industry is represented by (1) API; (2) BP Products North America; (3) ExxonMobil; (4) Independent Fuel Terminal Operators Association; (5) Marathon Petroleum Company; (6) National Petrochemical and Refiners Association; (7) Shell/Motiva (EPA, 2007a: p.5-40).

best interest for the environment, but lacked of complete knowledge about the negative effects of the agrofuels production.

However, the basic mindset of the environmental stakeholder clearly distinguishes them from profit-oriented motivated entities and/or individuals. The EPA's orientation is to evaluate every comment based on their scientific knowledge and understanding. However, it seems that the economic aspect of the RFS1 plays a crucial role in the final decision making of the Agency. As the EPA's final rule incorporated suggestions of all dominant actors, the analysis of the dominant actors and their orientation shows no significant correlation with the decision making of the Agency. This means that based on the orientations of the dominant actors, the EPA shows not yet a general preference towards a specific industry or specific actor.

The second characterization factor is an actor's capabilities, which Scharpf defines as "action resources" (Scharpf, 1997: p.51). These resources include personal properties, physical resources, technological capabilities and privileged access to information (ebd. p.43). In policy research, Scharpf defines the action resources as contingent, as the specifics and the regulatory environment of every individual rule determine how important and influential these capabilities can be (ebd. p.51). The enactment of the final RFS1 rule follows a strict protocol, which opens only limited space for dominant actors to influence the rule. This limits the influential potential of the dominant actors' action resources. A closer look at the most active actor of each industry categorization from the quantitative simplification shows that except for private citizens, public institutions and environmental stakeholders every dominant actor is either a profit oriented company or a stakeholder of profit oriented businesses.⁹⁷ It is this thesis' position that these actors have sufficient action resources to demonstrate and communicate their interests. To illustrate this position this thesis examines the fossil fuel industry and renewable fuels industry as these two industries include the most active actors. Oil companies like ExxonMobil, BP Products North America or Shell/Motiva are multi-billion dollar corporations, which demonstrate their action resources by having their own research facilities including laboratories, scientific staff and marketing sections to promote their involvement in alternative energy sources like renewable fuels.

⁹⁷ The most active actors of each industry categorization which pursue profits are: (1) RFA; (2) API; (3) CHS Inc.; (4) Alliance of Automobile Manufacturers; (5) DuPont; (6) Tyson Food Inc.; (7) Sutherland Asbill & Brennan.

Agribusinesses and Renewable Resource Processors like Archer Daniels Midland, Valero Energy, or Flint Hills Resources also demonstrate their action resources on their webpages by showing research and development programs for more efficient agrofuels. They also invest in campaigns to create higher public awareness about agrofuels. Additionally, these companies showed their capabilities through significant agrofuel production expansions. Stakeholders of these industries also demonstrate the financial ability to support and address their industries concerns to policy makers. According to their webpage, API represents 480 corporate members of the fossil fuels industry. The members range from big oil producers over machine suppliers to small local oil suppliers and distributors (API, 2011). API also offers educational programs for its members and has its own research and development department offering statistical data studies concerning the oil business (ebd.). Representing the renewable fuels industry the RFA also represents 208 members ranging from agrofuels producers over universities to local farmer organizations (ebd.). The RFA also provides statistical data and publishes annual Industry Outlook Reports.⁹⁸ On its webpage the RFA also presents scientific information around the ethanol industry. As a major source, the RFA cites itself, indicating that it is also conducting research and development programs. Although all these information about the API, the RFA and their corporate members are rather broad and not detailed, they support the thesis' position that these actors have sufficient personal properties, physical resources, technological capabilities and privileged access to information, in order to optimize their influential potential in negotiations and the ultimate outcome.

Briefly summarized, the fact that most actors supported the implementations of the RFS1 is interesting. Considering the Multifaceted Problem, it would seem that fossil fuel processors and stakeholders would oppose any regulation that would shift from the consumption of their products. The volume regulations of the RFS1 however applied rather as fuel additive measure than as a full fuel substitute, and therefore posed no serious threat to oil companies. The use of ethanol as oxygenate instead of MTBEs further supports this argument.⁹⁹ The support from the renewable fuel industry was predictable, as the regulation attempts to increase the use of agrofuels. Most interesting is the relatively low participation of environmental stakeholders.

⁹⁸ The EPA cites these Reports numerous times in their publications.

⁹⁹ The substitution of MTBE's was also favorable for environmental stakeholders, as the ethanol production had no water polluting history and emits less GHG emissions.

From 527 comments only 23 were submitted by environmental stakeholders. One explanation could be that at the time the RFS1 was created the scientific knowledge about the detrimental aspects of agrofuels like, soil erosion and water depletion were not yet sufficiently known and communicated. Another explanation could be, that most of the conflictive points were already discussed prior to the creation of the RFS1.

The EPA shows to have two-folded orientations and capabilities. On the one hand the EPOA of 2005 provides the major orientations of the Agency. The increase use of agrofuels was therefore the main goal for the Agency. Additionally, the regulatory task of the Agency provides its capabilities. The science department of the EPA provided profound facts about the production of renewable fuels as well as expertise about its environmental implications and economic effects on the energy and agricultural sectors. The scientific information, which was presented in numerous congressional hearings and impact analysis reports was elaborated due to a close collaboration between the EPA, the EIA, the USDA and other public institutions like the CEQ of the White House.

The chapter also showed the main dominant actors that participated in the RFS1 creation. Some of them like the API or the RFA already participated in the forefront of the RFS1 creation as the congressional hearings records showed. The majority of the dominant actors were from two industries, (1) the fossil fuels industry, and (2) the renewable fuels industry. Environmental stakeholders did also participate, but based in the quantitative and qualitative presentation of the RFS1-SAD, their participation was not yet significant. However, it could also be the case, that very conflictive comments were simply not included in the EFS1-SAD by the Agency. This information remains unknown, as no complete documentation about all comments is available.

4.5. Which Actor's Constellations and Modes of Interaction did EPA face during the creation of the RFS-Program?

The identification of the actor's constellations, is the crucial link between problem oriented policy research and interaction-oriented policy research (Scharpf, 1997: p.69). Scharpf describes actor constellations as the set of actors that are involved in

the policy interaction, their capabilities, their perceptions and payoffs and the degree to which their payoff aspirations are compatible or incompatible to one another (ebd. p.72). Concerning the U.S. Agrofuels Project, the research has shown, that the initial policy problems that triggered the creation of the enactment of the EAct of 2005 were problems of distribution and externalities (cf. chapter 4.1. p.49). EPA's contributions in the hearings concerning these problems were, if required, on an advisory base about scientific matters.

Nevertheless, the qualitative presentation of the congressional hearings as well as the quantitative simplification of the commenting phase for the RFS1-SAD have revealed that the implementation of a renewable fuels program is based on market developments that triggered corporative negotiations among the involved and affected actors. However, at this point it is important to bear in mind, that the explanatory power of the EPA's role in interaction oriented policy research concerning the RFS1 is limited, as its RFS1 involvement is a requirement of the EAct of 2005. Additionally the regulatory procedure of proposing a rule, receiving responses and publishing a final rule is a requirement of the political and legal system of the U.S. and therefore limit the courses of action for the involved actors. The limitation is given because the commenting phase allows actors to either speak at a hearing or to submit a written comment. These comments are then non-binding suggestions, which represent the real limitation. On the other side, industry representatives and other stakeholders are well aware of EPA's regulatory authority. Most of the participants have interacted with the Agency in the congressional hearings concerning the EAct of 2005 and know how the EPA functions from other environmental policies such as clean water or hazardous waste regulations.

However, even within this clear structured environment, stakeholders have a possibility to show their orientations and capabilities. A closer look on these orientations and capabilities will help to discover how these dominant actors included social interests in their own actions and orientations. Scharpf points out that an actor constellation is a complex and multidimensional concept with multiple actors, multiple orientations and multiple capabilities. In his approach Scharpf uses game theory instruments to facilitate the illustration under which circumstances an expected policy outcome occurs (Scharpf, 1997: p.73). This means the actor constellation presentation requires a further simplification in order to decrease the complexity of the ACI analysis and to show the level of potential conflict between the actors (ebd.

p.72). In context of the U.S. Agrofuels Project, this simplification concerns the dominant actors and a precise elaboration of their interests and capabilities. Scharpf distinguished between 'Primary Policy Actors' (PPA) and actors that influenced the choices of these PPAs (ebd. p.71).

To further reduce complexity of the illustration of the actor's constellation, this thesis will limit the presentation to three representative PPAs in addition to the EPA and elaborate their constellations. Note that the EPA is also an applicable PPA representing the government and national interests. However when this thesis speaks of PPAs it refers to the other actors involved in the ACI analysis regarding the creation of the RFS1. As the role of EPA is the main concern of this thesis, an interview with a non-political career level Environmental Protection Specialist in the Office of Transportation and Air Quality was conducted in order to elaborate the EPA's constellation in the most precise way.¹⁰⁰ The second policy actor is API, representing private interests and the capabilities of the fossil fuels industry. The third primary policy actor is the RFA, representing private interests of renewable fuels industry. The fourth actor is EDF representing public interests concerning the detriment of human health and the environment (cf. chapter 4.1.1.3. p.58).

The selection of the PPAs is based on their quantitative as well as on their qualitative contribution in the creation of RFS1. During the commenting phase of the RFS1, the API, the RFA and the EDF submitted the majority of comments from their industries addressing the most discussed topics. The record of the congressional hearing to the EPAct of 2005 also revealed that the API and RFA already were vital actors at this hearing. Furthermore, API and RFA are well-respected stakeholders of their industries representing several hundred participants of the RFS Program. These facts further underline the importance of the API and the RFA as PPAs. The EDF was the most active environmental stakeholder representing public interests in term of detriments to the environment and human health during the RFS1 process. Although environmental stakeholders were numerous present at the EPAct of 2005 congressional hearing, the general participation concerning the creation of an U.S. Agrofuels Project was lower than initially expected.¹⁰¹ The environmental

¹⁰⁰ Because of the specialization of Ms. McCarthy and to respect her obligation of confidentiality on certain aspects concerning the Agency, she agreed to respond to chosen question in written form. Her Statements as well as the initial Questions are attached in the Annex of this thesis.

¹⁰¹ For example, during the congressional hearing concerning the EPAct of 2005, only two people concerned fuel problems. First, Mr. Hamilton from the Sierra Club addressed the importance to

stakeholders that participated during the EPA's 2005 congressional hearing had multiple focal points; for example, the protection of rivers, the U.S. contribution on global Climate Change strategies, or the improvement of the U.S. energy efficiency (cf. GPO, 2005).

Environmental stakeholders participated more on agrofuels during the creation of the RFS1. Because of the higher degree of attention placed on the creation of the RFS1, this thesis chose the most active environmental stakeholder from the RFS1-SAD as primary policy actor. But as indicated in the prior chapter, the evidence from the research, as presented by this thesis, shows that environmental stakeholders are most likely to have the least influential power on the Agency. This thesis still decided to include an environmental stakeholder as primary policy actor, because environmental politics is this thesis' general topical embedment. In that sense the analysis of the environmental stakeholders is rather a comparison between their orientations and perceptions and the decision making of the EPA.

It is therefore important to start with the elaboration of EPA's constellation. The EPA as federal Agency has sufficient financial and human resources in order to fulfill its congress given mandate. The EPA included the costs for the creation implementation and promulgation of the RFS in its 2007 Budget under Goal 1 – Clean Air and Global Climate Change (EPA, 2006b: p.1-2). The financial capacity of the EPA in 2007 was 932 million US-Dollars. From this amount of money, the EPA assigned 596 million US-Dollars to improve outdoor air, 110 million US-Dollars for the reduction of GHG intensity and 118 million US-Dollars for enhanced science and research (ibid. p.1-1).

The competence of the EPA is divided by Divisions and Sections in order to provide the most effective and efficient use of its resources and hence the best outcome/results. The EPA's 'Transportation & Air Quality' section for example conducted and elaborated the scientific and regulatory aspects, whereas the OCIR created the language of the NPRM and the final rule for the RFS Program. In the creation of the RFS1 and according to Ms. McCarthy's interview, EPA staff works

improve auto-fuel efficiency standards to reduce oil dependency and increase national security (GPO, 2005: p.408). Second Mr. Olson from the Natural Resource Defense Council supported a biomass-based renewable fuels program, but opposed an ethanol mandate (GPO, 2005: p.424).

closely with other Federal agencies in particular with the Department of Energy and Agriculture (McCarthy, 2011).¹⁰²

In case of the U.S. Agrofuels Project, the EPA had to proceed quickly with the creation of the RFS1, as the Default Standard of the EPA Act of 2005 had established a blending volume, which urged the EPA to conduct an impact analysis for the RFS Program as fast as possible in order to have sufficient scientific knowledge for the continuation of the Program. EPA therefore depended on the cooperation with stakeholders and other federal and state agencies to accomplish its goals and deadlines.

The interviews with Governor Whitman and Ms. McCarthy have shown that the cooperation with other federal agencies and stakeholders worked well in case of the U.S. Agrofuels Project. Through this cooperation, EPA had additional access to further scientific information and staff members of other agencies. Ms. McCarthy's interview further showed that the EPA's perceptions about the use of agrofuels are generally characterized by a supportive position towards the use of biomass-based fuels. Ms. McCarthy emphasized that the use of agrofuels is expected to significantly reduce GHG emissions, decrease oil imports and open new markets for advanced biofuels (ebd.). Ms. McCarthy also wrote that in the long term the EPA estimates that the RFS Program will increase net farm income by 13 billion US-Dollars in 2022 (ebd.). These perceptions are applicable to the EPA's mission, which includes that *"environmental protection is an integral consideration in U.S. policies concerning natural resources, human health, economic growth, energy, transportation, agriculture, industry, and international trade, and these factors are similarly considered in establishing environmental policy"* (EPA, 2011c).

For the EPA, between 2005 and 2007, the implementation of an U.S. Agrofuels Project therefore was supported by the fossil fuels industry and renewable fuels industry and not substantially objected by environmental stakeholders. Furthermore, Ms. McCarthy mentioned the possibility of an amendment to the RFS Program through notice and comment rulemaking procedures, which offers the Agency to amend the program, if new scientific evidence is available or if participants or other stakeholders have severe objections about the current RFS-Program (McCarthy,

¹⁰² In her interview, Ms. McCarthy used estimations from RFS2 projections for 2022. However, the referred perception of the RFS2 is the same as for the RFS1, as the EPA has expanded the goals and prolonged the program from the RFS1 to the RFS2 (cf. McCarthy, 2011).

2011). This offers some flexibility to the Agency and stakeholders of the U.S. Agrofuels Project. The flexibility for the EPA is also shown in the relatively open and transparent rulemaking procedure, where every actor has the possibility to participate, which again creates a political environment between the Agency and the participating actors. This is also visible in the congressional hearings, when staff members of the Agency respond to questions from industry stakeholders. Having a possibility to personally interact with representatives of the rulemaking institution facilitates the communication of concerns and help to eliminate misunderstandings very effectively. Governor Whitman stated that open communications and transparency are in the best interest of the EPA, because if misunderstandings remain, they could lead to lawsuits, which could create several obstacles for the program.

For the constellation of the EPA, it is the Agency's rulemaking authority, access to advanced scientific information and its committed interest to execute the enabling Act of the U.S. Congress, which is set to advance the protection of human health and the environment that were the main reasons for the Agency to pursue a high level of coordination in negotiations about the essential goals of the U.S. Agrofuels Project and the final form of the RFS1. The possibility to easily amend the RFS in the following years also provides the Agency with additional flexibility, and therefore expands its action choices. The worst-case scenario for the Agency therefore would be a lawsuit against the RFS regulation.

The second constellation to elaborate is the constellation of the API. The API as a rational industry stakeholder has the authority to speak on behalf of its members, which gives the institute arguing power about the industry's support and compliance to the RFS1. The API homepage does not provide specific information about the financial situation of the API. However, as mentioned before, the Institute represents 480 corporate members, has its own research and development section and its own certification program (API, 2011). Most of the API's members are profit-oriented corporations, which allocate profits of several billion US-Dollars annually.¹⁰³ This

¹⁰³ Additionally some of these companies also financially supported politicians in Congress or in election campaigns. The Federal Election Commission of the U.S. lists all contributions made to presidential candidates. Big corporations like Valero or ExxonMobil officially supported financially the Bush/Chaney campaign in 2004 (FEC, 2011). For example Rex Tillerson, the President of ExxonMobil personally donated 4000 US-Dollars for the Bush-Chaney '04 Compliance Committee Inc. between 2003 and 2004 (FEC, 2011a).

thesis takes this as an indicator that the institute, as a main industry stakeholder, does have sufficient financial capabilities to communicate and pursue its interest in terms of the U.S. Agrofuels Project. One interest was the establishment of a coalition with other actors from other industries in order to realize a U.S. Agrofuels Project. In the congressional hearing concerning the EPO Act of 2005, Mr. Dinneen the President of the RFA stated that the RFA is *“proud to be part of a unique coalition that includes the API in support of a fuels package [...]”* (GPO, 2005: p.315).

This coalition is certainly driven by the interest of the fossil fuels industry to find a suitable substitute for MTBE's as the fossil fuels industry faces lawsuits because of groundwater contamination of MTBE storage leakages. The coalition shows an active interest to object to the use of highly toxic gasoline additives. In order to assure sufficient supply of ethanol the API supports the creation of the RFS1 and the use of advanced agrofuels. Additionally, the use of renewable fuels in conventional gasoline reduces emissions of GHGs. This GHG reducing effect is expected to be even higher with advanced agrofuels like cellulosic ethanol. However, support for the fossil fuels industry's GHG reduction balance is evident by the EPA's decision not to calculate the equivalent values for these advanced agrofuels based on lifecycle analysis but rather on an energy content approach (cf. chapter 4.2. p.65).

In that sense, the best physical outcome for the API would be a RFS that assures enough ethanol available for refiners to efficiently substitute MTBEs. The annual reports of the RFA have shown that ethanol imports increased steadily until 2007. This is an indication that the fossil fuels industry uses ethanol imports to fill supply shortages from domestic ethanol producers. It remains open if the fossil fuels industry prefers domestic or foreign ethanol. Based on price developments, the import of foreign ethanol could have dampening effects on the occurring ethanol price race. This could be in the interest of profit oriented oil companies and refineries.

However, the worst case for the fossil fuels industry would be a RFS that would not assure sufficient supply of ethanol in the U.S. no matter if the supply is assured through domestic production or imports. Additionally, the inclusion a complete lifecycle analysis for the equivalent values of advanced agrofuels would further decrease the value of these fuels and would lead to higher expenditures by refiners.

The third policy actor's constellation is the RFA's constellation. Like the API, the RFA is a rational well-accepted industry stakeholder, which participated in numerous

congressional hearings and has an interest in communicating and coordinating supportive strategies on behalf of the renewable fuels industry's interests. The RFA represents 203 corporate members and other renewable fuels stakeholders, of which most members are profit-oriented companies. Like the API, the RFA provides no data about their financial resources. However, as the association is a well-accepted industry representative of a financially strong industry, this thesis acknowledges that the RFA has sufficient financial resources in order to communicate and negotiate best results on behalf of the renewable fuels industry's interest. In the annual reports of the RFA, the association explains its perceptions, stating that renewable fuels, especially ethanol has the potential to significantly increase farm income, create 'green-jobs' and contribute to the reduction of GHG emissions as ethanol is an applicable substitute of MTBEs.

In this regard, the RFA actively promoted a close cooperation with fuel producers and refiners in order to prematurely establish ethanol as the main gasoline additive substitute in a single state RFG programs. The establishment of a federal RFS would further increase the demand of agrofuels, which is the highest interest of the RFA.

The RFA's best outcome is a RFS, which requires the renewable fuels industry to expand its current production capacity, as the industry had undertaken large investments in additional production facilities. A RFS that is below the current production capacity would still provide certainty about the use of renewable fuels as additive, but investments in further production capacities could witness a decline as most profit oriented companies base their investments decisions on short and mid-term projections. Therefore, the RFA demands a RFS Program with a sufficient high blending volume in order to attract further capacity building investments. The increase of domestic production capacity is also crucial for the renewable fuels industry as ethanol imports especially from Brazil also entered the ethanol market and fueled the ethanol price volatility.¹⁰⁴ Additionally, the RFS Program did not foresee advanced agrofuels to be incorporated in the RFS volumes until 2012, which also limits innovative research projects in the short term. In that sense, the best physical outcome for the RFA would be an RFS that sets a challenging volume, which attracts further investments for domestic production capacity expansions.

¹⁰⁴ The initial goal of 5 billion gallons for the RFS program was therefore no challenge for the renewable fuels industry, as production capacity projections from the RFA for 2007 predicted actual production of 5493,4 million gallons and 6129,5 million gallons under construction/expansion (RFA, 2007: p.3).

Ethanol imports can fill quantity gaps in the short term, but it is not in the renewable fuels industry's interest to compete against cheaper Brazilian ethanol.

The worse outcome would therefore be that the RFS sets no certainty providing volume target and leaves the renewable fuels industry depending on the market developments, which includes highly volatile ethanol prices. In that case, ethanol imports could, although penalized with an import tariff enter the market and lead to a loss of competitiveness of domestic producers due to cheaper foreign ethanol.

The fourth constellation to elaborate is the EDF's constellation. EDF is a national independent organization with a long tradition of environmental campaigning in legislative procedures (EDF, 2011a). Following its annual report for 2006, EDF had 71,8 million US-Dollars, from which 54 percent were so-called "*Major gifts*", 22 percent "*Foundation grants*" and 14 percent "*Membership*" (EDF, 2011b: p.28). 60,2 million US-Dollars were used on program und supporting services concerning global warming, health, land, water, wildlife and oceans (EDF, 2006: p.28). In that year, EDF represented more than 500.000 members and had a full time employed staff of 294 people. EDF is a well-accepted environmental stakeholder, which aims to collaborate with industry stakeholders and policy makers in order to elaborate market-oriented solutions that protect environmental rights of all people (cf. EDF, 2006: p.1). For the RFS1, one main point of the EDF was that the EPA should considerate to focus on GHG displacement rather than CO₂ displacement and to distinguish between fuels produced using natural gas versus those which use coal for its production (EPA, 2007a: p.3-28). As the Agency expressed its intention to base their calculation on lifecycle analysis, a distinction between coal and gas based production procedures should be included. The Agency chose the Argonne National Laboratory's GREET model, which includes the use of all energy sources associated with the production and transportation of agrofuels (cf. chapter 4.2. p.65). For the EDF the best outcome would be a RFS that is completely based on a lifecycle analysis with stringent source categories and calculation standards for the production procedure of agrofuels. The worse outcome would be a RFS that bases its agrofuel values on energy content approaches.

In order to apply these constellations to game theory matrices, Scharpf explains and distinguishes the possible games between pure coordination and pure conflict (Scharpf, 1997: p.73). He further states that in real world interactions, "mixed-motive

game” is most applicable (Scharpf, 1997: p.73). Scharpf points out that four archetypal constellations are best known among social scientists: (1) Assurance; (2) Battle of Sexes; (3) Prisoner’s Dilemma; and (4) Chicken (cf. Scharpf, 1997: p.75). Applying the multifaceted problem of the U.S. Agrofuels Project to these four constellations, the presentation of the actor’s orientations has shown that the circumstance under which the RFS1 regulation was finalized differs from the game theory games presented by Scharpf.

To elaborate, in Scharpf’s description he assumes that all actors had no possibility of prior communications. In case of the RFS1 creation, all PPAs had that possibility starting at the congressional hearings. Their communication and prior coordination were also illustrated by RFA and the API, forged coalition to support ethanol as gasoline additive. Second, all actors of the congressional hearings and the commenters to the RFS1–SAD prefer the implementation of a RFS regulation. The differences between the actors are their preferred best physical outcomes for the RFS1. Third, the creation of the RFS Program was purported by the EPA Act of 2005, which means that the EPA did not negotiate about the implementation of the RFS1, but rather on the contents of the regulation.¹⁰⁵

Figure 25 shows the applied game theory approach between the EPA and the PPAs.

¹⁰⁵ However this centralization of the EPA’s task does not mean that an actor could not have stopped the whole creation process. As governor Whitman stated, stakeholders can react with law-suits on certain regulations, if they believe that the Agency did not set the regulations right.

Primary Policy Actor (PPA)

		Primary Policy Actor (PPA)	
		C	D
EPA	C	<p>3</p> <p>The PPA agrees to the suggestion of the EPA</p>	<p>4</p> <p>The PPA can convince the EPA to change its position</p>
	D	<p>3</p> <p>The EPA agrees to the suggestion of the PPA</p>	<p>3</p> <p>The EPA agrees to the suggestion of the PPA</p>
	C	<p>3</p> <p>The PPA agrees to the suggestion of the EPA</p>	<p>2</p> <p>The PPA does not change its position</p>
	D	<p>4</p> <p>The EPA can convince the PPA to change its position</p>	<p>2</p> <p>The EPA does not change its position</p>

Fig.24: Own visualization of a game theory matrix application of the RFS1 creation process.

As previously stated and for emphasis, the constellation matrix in Figure 25 is based on the examples provided by Scharpf, but adapted to the orientations and capabilities of the actors and to the circumstances of the RFS1 creation process. Within the matrix the EPA and the PPAs can either ‘cooperate’ (C) or ‘defect’ (D). In the creation of the RFS1 the EPA cooperates if the Agency’s initial suggestions in the NPRM either match the actor’s interest communicated in a RFS1-SAD comment, or if the Agency changes its suggestion in terms of the actor’s comment. The EPA defects if its initial suggestion in the NPRM does not match the primary policy actor’s interest and if the EPA has no intention to change its position. For the PPAs, cooperation is the case if an actor agrees with the EPA’s initial suggestion in the NPRM or if an actor changes its position to match the EPA’s suggestions. Defect is the case, if an actor does not agree with the EPA’s initial suggestion and has no intention to change its position. Although these definitions sound absolute or drastic, it is important to bear in mind that at this stage of the creation process no actor had the intention to retreat from the creation process or try to let the RSF creation fail. Within the matrix, “1” represents the worst physical outcome, which is a lawsuit against the EPA and

the RFS regulation. This for example could be the case if EDF would have new information about the production of agrofuels that show that the renewable fuel causes severe damage to human health and/or the environment. “2” means that the RFS1 is realized, but the PPAs do not agree to the regulation and attempt to either not comply or look for an alternative solution. For the EPA this scenario would ultimately mean that it has to enforce its compliance mechanisms. “3” means that both the EPA and the other PPAs accept the terms of the RFS1, but also agreed to change their positions on certain issues, like the choice of the calculation base for the equivalent values for cellulosic ethanol. “4” is the best physical outcome, which means that all interests of the PPAs and/or the EPA were realized.

4.6. Which Modes of Interaction did EPA face during the creation of the RFS-Program?

Based on the elaborated constellation from the prior chapter, this chapter aims to identify the modes of interaction the PPAs chose in order to address their interests and for successful incorporate in the RFS1. Scharpf emphasizes the importance of the PPA’s ‘interaction orientations’ (Scharpf, 1997: p.84). The elaboration of the actors’ interaction orientation will reveal further information about their motives why and how certain strategies were chosen. Scharpf distinguishes between five orientations: (1) Individualism; (2) Solidarity; (3) Competition; (4) Altruism; (5) Hostility (Scharpf, 1997: pp.85-86).

Basically profit-oriented actors want to maximize their own profit accumulation. In a simple open market situation this mostly means that one actor’s gain is another actor’s loss. For the U.S. Agrofuels Project this simplistic view applies to the gain of ethanol producers and the loss of MTBE producers. Ethanol producer support this market development, as they can increase their profit accumulation due to higher sales and tax incentives. Furthermore most ethanol producers prior to 2007 had limited production capacities but experienced a significant ethanol demand increase. This favorable market situation allowed renewable fuel producers to reduce competition to only very specific factors like commodity auctions or facility

expansions.¹⁰⁶ As MTBE is a byproduct from the petroleum production, which is highly toxic and the reason for numerous lawsuits, the fossil fuels industry does not necessarily feel this market development as a loss. This is an important factor, as it shows that from an economic point of view the two profit-oriented industries had no necessary need to compete against each other. At that time the participating environmental stakeholders showed no specific objection on the initial implementation of an U.S. Agrofuels Project.¹⁰⁷ They also supported the ban of MTBEs and the forecasted air quality improvements due to GHG emission reductions.

The EPA's interaction orientation was driven by its congressional given obligation to implement a RFS Program by 2007. This time depended obligation means that the PPAs had the best chances to successfully incorporate their interests if they would comply and work together with the Agency. Taking these circumstances into account, the interaction orientation of solidarity seems most applicable for the explanation about the PPAs' chosen modes of interaction and courses of action. Following Scharpf, solidarity means that a gain for alter or a gain for ego will be equally valued (Scharpf, 1997: p.85).

However, the presentation of the final RFS1 has shown that not all PPA's gained equally from the regulation. In that sense it seems that next to solidarity individual orientations also played a role. This can be illustrated by the coalition between the API and the RFA. Both actors based on their own orientations supported the creation of the RFS Program. In order to have a stronger position for the implementation of a RFS in the congressional hearings, their choice of action was to cooperate. This cooperation aimed to support correlating interests like general use of agrofuels as additive and the ban of MTBEs.

On other issues like the introduction and support of higher blends like E85, the API suggested to collect more data to better characterize the emissions implications

¹⁰⁶ The reports of the RFA have shown that since 2005 the ethanol sector experienced a significant shift from farm and locally owned facilities to corporate owned facilities. The capacity data provided within the RFA reports show, that the biggest facilities and the highest expansion plans came from profit oriented renewable fuels producers (RFA, 2001-2011). Taking this into account, it is this thesis' assumption that competition within the U.S. renewable fuels industry remains limited as long as demand remains high.

¹⁰⁷ Their arguments concerned specific issues within the RFS Program. Only Mr. Olson from the Natural Resources Defense Council expressed concerns about a pure ethanol mandate during the congressional hearing on the EPAct of 2005 (GPO, 2005: p.424).

associated with fueling vehicles with higher blend like E85 (EPA, 2007a: p.10-18). The RFA in contrast supports a fast introduction of E85 and flexible fuel vehicles as can be seen in their efforts to expand the E85 infrastructure throughout the U.S. (RFA, 2011). This illustration shows that although the PPAs seem to cooperate, every actor also still pursued individual interests. Such double layers of interaction orientations also show that depending on the issue the PPAs can switch their orientation.

In context of the RFS1 creation, however, the Solidarity orientation has the highest applicability, as at that time all PPAs preferred to cooperate. Considering the actors' constellation demonstrated in the game theory matrix from the prior chapter (see Fig.24 p.107) and the dominant actors' interaction orientation the following modes of interaction lead to the creation of the RFS1 and determined the role of the EPA.

The constellation between the API and the EPA at the time of the creation of the RFS1 is characterized by the general will to cooperate from both actors. As this thesis has shown in this chapter, even if cooperation is the overall orientation, the API's interaction orientation is not totally defined by 'Solidarity' as it still tried to cover specific interests within the final RFS1 regulation. Within the game theory matrix in Figure 24 (p.107) the API's interactions apply most to the EPA-C / PPA-D cell. For the EPA the general will of the API to accept and support the RFS1 was a crucial factor, as the API has sufficient capabilities to file lawsuits against the RFS and EPA. However, a lawsuit could also be in favor for EPA, because a ruling by the court in EPA's favor could further strengthen EPA's position. On the other side, the API had a particular interest to support the RFS, because even if the regulation would not be in the complete interest of the API, the fossil fuels industry has limited possibilities deny compliance and switch to other resources.¹⁰⁸ However for the creation of the RFS1 the EPA had limited time resources as the Default Standard of the EPA Act of 2005 was already implemented and required the Agency to promulgate and implement the next regulation. Further research like the elaboration of an applicable life cycle analysis approach for every aspect of the RFS would have required much more time than was available. This circumstance was beneficial for the API as it extended the time period until the RFS would have more stringent criteria. The RFS1 therefore applies as the very best physical outcome for the API and the fossil fuels industry.

¹⁰⁸ So far this thesis is not aware of the existence of a suitable substitute for oil or petroleum products.

Also, the constellation between the RFA and the EPA at the time of the creation of the RFS1 is characterized by the general will to cooperate. For the RFA the implementation of the RFS is also a huge success for the U.S. ethanol sector, which is represented by the RFA. Following the RFA, the blending volumes of the RFS until 2012 are easily covered by the renewable fuels sector. The RFA preferred higher volumes, but in order to assure a smooth transition for gasoline producers and suppliers the volumes were set at an amount that was considered suitable by Congress and the Agency. In return, the Agency supported the protection of the domestic ethanol production from ethanol imports. In that sense, the RFA's interactions apply most with the EPA-C / PPA-C cell in the game theory matrix illustrated in Figure 24 (p.107). The RFS1 therefore applies as the second best solution for the RFA and the agrofuels industry.

At the time of the creation of the RFS1 - bearing in mind that environmental stakeholders generally were not yet aware of all implications of the agrofuels' production chain - the constellation between the EDF and the EPA is also characterized by the will of the EDF to cooperate with the Agency. An important factor was the common denominator of all actors to reduce and finally ban the use of MTBE's. In that sense the EDF and other environmental stakeholders supported the creation of the RFS1. The EDF's suggestion to conduct a lifecycle analysis was also adopted by the Agency, but with time being a crucial factor for the EPA, the lifecycle approach of the Agency was watered down, as at that time the scientific community had not yet agreed to one standard analysis. Also the RFS includes aspects like the equivalent values for advanced renewable fuels that are not covered by the life cycle analysis approach. However, for the EDF to withdraw from the creation process was not an option, as the implementation of the RFS was already set by the EPAAct of 2005. In that sense its participation in the creation process was the best solution in order to be aware of the implications of the regulation and how and why these implications were chosen. Taking these interaction possibilities into account, the constellation between the EDF and the EPA is most applicable to the EPA-D / PPA-C cell within the game theory matrix in Figure 24 (p.107). The RFS1 therefore is the second best solution for the EDF and other environmental stakeholders that participated either in the congressional hearing on the EPAAct of 2005 or the RFS1 creation. However, at this point it is important to bear in mind that the second best

physical outcome for environmental stakeholders was based on the lack of knowledge about the detrimental effects of the profit-oriented agrofuels production.

For the EPA the mode of interaction shows the characteristics of what Scharpf defines as “*hierarchical direction*” (Scharpf, 1997, p.171). Scharpf refers to Simon and March to define hierarchical direction as “*a mode of interaction in which ego is able to specify alter’s choices or, more precisely, some of alter’s decision premises*” (Simon 1957; March/Simon 1985 in Scharpf, 1997: p.172). In the case of the creation of the U.S. Agrofuels Project in particular the RFS1 regulation the U.S. political system applies to this mode of interaction. As the interviews with Governor Whitman and Prof. Dumas have shown, it was the will of the U.S. Congress to create a Renewable Fuels Program. EPA as the specialized Agency followed its mandate and implemented an applicable regulation including norms and standards. Various stakeholders were invited to participate at the congressional hearings and in the final creation of the RFS1. But the U.S. system does not include the stakeholders’ suggestions or opinions and does not state whether or not the Act or the specific regulations depends on the stakeholders’ participation. However, it is not accurate to identify the U.S. Congress or the EPA as completely dictating entities. The congressional hearings and the RFS1-SAD have shown that the stakeholders’ contributions were seriously taken into account and many matters of the RFS originated from stakeholders’ comments and suggestions. Scharpf states that in substantive policy analysis this mode of interaction appears to be most desirable as it reduces transaction costs of concerted actions and policy coordination (Scharpf, 1997: p.172). Concerning the reduction of transaction costs, the case of the U.S. Agrofuels Project is not applicable to Scharpf’s explanation. It seems accurate that at the level of congressional hearings and the commenting phase of the RFS1 transaction costs were relatively low. This was due to two circumstances. First, Congress already has the possibility to form the legislation at its will, and does not require the approval of stakeholders or the public, except that the congressional members must think of their constituencies and the possibility for reelection, especially in an election season. Second, all PPAs had the common denominator to create the RFS and preferred to cooperate in solidarity manner. In that sense additional hearings and negotiations were not required. However, as chapter 3.1. (p.20) has stated, in the U.S., the policy creation process actually begins one step earlier, with industry representatives trying to convince congressmen to support their

interests and initiatives, the lobbying process. Scharpf does not consider in his work cost intensive lobbying as a part of the policy creation process. But in the U.S. lobbying is an important part of the political system and one of the most powerful tools in order to get Congressmen and women to support an initiative and to overrule other stakeholders' interests in congressional hearings and votes. The Figure 25 (p.128) and Figure 26 (p.128) illustrate the number of lobbyists and the financial capacities that were used in the forefront of the creation of the U.S. Agrofuels Project.

5. Summary and Conclusion

This thesis aims to elaborate the role of the Environmental Protection Agency (EPA) in the U.S. Agrofuels Project with a special focus on the creation of the Renewable Fuels Standard Program. The U.S. Agrofuels Project is basically divided into two phases. The first phase concerns the implementation of the Renewable Fuels Program (RFP) into the Energy Policy Act of 2005 (EPAAct of 2005). The second phase followed the enactment of the EPAAct of 2005 and issued the creation of the RFS-Program. The EPA was designated as the Federal Agency to promulgate and implementation regulations for the administration and enforcement of the RFS-Program. The transition between these two phases represent what Scharpf and Mayntz describe as 'change of mode of interaction', as the participation in congressional hearings and the commenting phase of the NPRM address different policy making entities with different perceptions, capabilities and political powers. In her interview, Governor Whitman stated that a republican Congress would support industry interests. The creation of the RFP in the EPAAct of 2005 when Congress had a Republican majority validates Governor Whitman's statement since historically the Republican Party is known to support industry and big businesses.

Although the political balance in Congress changed in 2007 from a Republican majority to a Democratic majority, there was not a change in the course for the implementation of the RFS1. The prior legislators had already set the political course of action for the RFP and therefore the new Congress with its own political agenda had no significant influence on the final RFS1 creation. Regardless of which political party had the majority in Congress, in 2007, the RFS1 was implemented. With this thesis' focus on the role of EPA in the U.S. Agrofuels Project, the creation of the RFS1 Program, is the program most suitable for the analysis as it is the first U.S. Agrofuels Project implemented solely by the EPA. At this point it may be suitable to conjecture that the EPA's role was simply to follow the will of Congress. However, as this thesis has shown such an assumption would not be sufficient to explain the importance of EPA's participation at the many congressional hearings and the weight given to EPA by both Congress and the primary policy actors.

It is also important to note that EPA at all times is fully aware of its various roles both political and regulatory and understands its responsibility to the U.S Congress and its

loyalty to the President. Furthermore, the different benefits for the primary policy actors and the criticism that occurred in recent years concerning environmental deficits like soil erosion, water depletion and economic incentives for extractive industries would not have a clear path forward without the expertise of EPA at the helm of the various discussions and differing positions. What can be said so far about the RFS1 as 'best policy solution' is that the RFS1 was for some actors the very best solution whereas for other it was not. Concerning economic factors like the profitability of oil companies or agribusinesses the RFS1 certainly can be interpreted as very best or second best solution, as the RFS1 provided certainty about the increase demand for agrofuels and therefore also for additional profits.

For environmental stakeholders the RFS1 at first was also an acceptable solution, but with further information about the detrimental implication of the agrofuels production the RFS1 certainly lost its attractiveness for environmental stakeholders in the following years. In addition to the 'change of mode of interaction' the goal of the ACI approach is to look at how actors include social interests in their action orientations. In that sense, the fossil fuels industry and the renewable fuels industry could argue that due to higher profits new jobs were created, which is an applicable social interest. The RFA when further and calculated the number of jobs created, stating that since the implementation of the RFS1 in 2007, 238.541 jobs across all sectors in the economy were created.¹⁰⁹ An offering of this statistic places objectivity to its position and further substantiates the RFA's position. It is important to expand and understand the different sets of social interests, which include environmental factors like impacts to clean air, clean water (waters of the United States, ground water and surface water) and fruit able soil. This thesis has provided arguments that demonstrate the impact mitigation to some of these factors, like the ban of MTBE, which caused air, water and soil quality to increase and has also provided insights about the extractive characteristics of agrofuels projects in other countries.

Although in 2007, the full awareness of all environmental implications were not yet known, current examples from other Agrofuel Project indicate that the environmental footprint of the U.S. Agrofuels Project is neither sustainable nor environmental friendly. It should also be noted that the U.S. represents a different political setting for the creation of an agrofuels project. The displacement of natural grasses, the

¹⁰⁹ For this thesis it was not possible to proof the accuracy of this statement.

professionalization of the agrofuels production political legitimization of the use of agrofuels are applicable to extractive modes of production, and will most likely accomplish the profitability of agrofuels.¹¹⁰ Considering the varied interests that are involved in the U.S. Agrofuels Project, including political, regulatory, and environmental concerns, as well as the economy, with foreign trade as an important factor, the elaboration of the EPA and its role demonstrate the enormity of EPA as an actor and its orientation. As is mandated by the U.S. Congress, it is EPA that has the responsibility for the protection of human health and the environment and with this role EPA must consider the economy when it makes decisions. Therefore, to examine more closely the public policy creation and the political process of the RFS, it is essential to identify EPA's orientations and interests that triggered the Agency's policy choices.

For the identification of the EPA's role, this thesis used the theoretical framework approach of Actor-Centered Institutionalism (ACI), which was developed by Fritz Scharpf and Renate Mayntz during the 1980s and further expanded in the 1990s. ACI asserts that it fills a research gap between sociological- and economic theories by trying to understand and explain the choice and legitimation of public policies. Scharpf and Mayntz set a focal point on the linkage between the given political structure and the action choices of actors that are involved in the policy creation. Their main argument is that this approach helps to better understand complex decisions and choices for public policies that emerge from political systems that experience increasing interdependence within themselves and to actors, which increases its interaction within the political arena.

A clear example of such a public policy is the U.S. Agrofuels Project. The ACI analysis states that complex circumstances are simplified through game theory methods that centralize the researchers focus on the essential aspects of the policy creation process, which in the end are representative of the physical policy outcome. Scharpf in that sense limits the explanatory power of his theoretical framework approach as he argues that in real world negotiation, complexity cannot be simplified in such easy ways. He also argues that in order to apply his and Mayntz heuristic theoretical approach, it is necessary to have as much information as possible about the identified primary policy actors, which Fig.20 (p.86) has demonstrated in Chapter

¹¹⁰ The professionalization of the agrofuels productions applies to methods like the use of more efficient machines, the expansion of acres or the usage of improved crops.

4.3.2. (p.84) by naming the dominant Actors in the U.S. Agrofuels Project. To achieve these requirements, this thesis conducted four interviews with experts from the EPA, academic experts on the regulatory tasks of the Agency and the political system of the U.S. To apply this theoretical framework approach to the role of the EPA in the U.S. Agrofuels Project, this thesis first presented the history and creation of the Agency and illustrated its tasks within the U.S. political system.

As this thesis shows, the EPA was initially established in the 1970s to assist and support Congress and the White house with scientific expertise and guidance for environmental concerns and create suitable regulations for problems regarding the environment. The creation of the EPA was due an increased environmental awareness of the public that emerged not only in the U.S. but globally. This linkage to the public and its interests is also an important aspect for the work of EPA, as the Agency is obliged to be completely transparent with its research, regulatory and administrative work. In order to assure the Agency's relative independence in terms of the protection of human health and the environment, Congress equipped the EPA with a binding mandate for which the Agency can be held responsible if its actions or decisions violate its mandate. In general, the Agency as a scientific and regulatory entity is often required to testify in congressional hearings and reports directly to the U.S. President and the Council of Environmental Quality (CEQ) of the White House. The obligation, which creates direct contact with the Congress and the President, provides the Agency with the possibility to inform politicians and the President about certain environmental developments and ability of the EPA to offer its position on the current status of the environment and how decisions may impact the economy. EPA's valuation and presentation of the information is the Agency exercising its political potential. EPA's political potential is linked with two crucial factors.

The first factor is the political dependence of the EPA's current administrator and its regional administrators. The ten regional administrators and the EPA Administrator are appointed by the president, and therefore in most cases chosen because of their political background and affiliation to a specific political party. Therefore, the U.S. President's priorities have a high influential potential on the EPA's administrator and therefore also upon the Agency as an entity. For the U.S. Agrofuels Project this

relation was illustrated by the attempt to block State programs that aimed to improve fuel efficiency by the responsible Administrator Stephen L. Johnson.¹¹¹

Second, the EPA's scientific tasks require the Agency to be completely transparent in terms of its research and also of its administrative records. This transparency offers a high degree of control and possibilities for involvement in the process for stakeholders and private citizens, which actively use this venue to provide comments to the rule making process and/or file lawsuits against the Agency if such actions seem necessary.¹¹²

These two factors generally determine the EPA's basic orientation when the Agency is assigned to create regulations like the RFS. Additionally, Governor Whitman stated that the Agency highly values scientific evidence and the research departments within the Agency are well accepted among scientific stakeholders. This balance between scientific based orientations and politically directed determination depends on the importance of the issue and the desired position of the President on such issue. Only if a policy decision undermines constitutional rights, violates the mandate of EPA or if Congress oversteps its legislative authority, the Agency can be used by providing sufficient data and information. The example of the U.S. Agrofuels Project therefore illustrates the dependence between the governance structure and the industry structure in order to regulate the use of agrofuels. This thesis has shown that in congressional hearings the industry structure had a higher influential power than the governance structure, if Congress decided to include the interests of the industry, which generally is the case. In the creation of the RFS1 this relation flipped enforcing the EPA to realize the will of Congress.

This thesis then focused on the elaboration of the creation of the U.S. Agrofuels Project. The ACI approach begins with a problem oriented research. In the case of the agrofuels project, the policy problem started with the high dependency of the U.S. on foreign oil. The dependency caused other problems of distribution and externalities, which this thesis summarized as a 'Multi-Faceted Problem'. Various representatives from different sectors like the fossil fuels industry, renewable fuels industry or environmental stakeholders addressed problems and solutions that were

¹¹¹ Johnson had no political background and came from within the Agency where he started as research employee (EPA, 2011m).

¹¹² In that sense Governor Whitman also stated, the EPA has a very high interest to settle such disputes.

linked with the dependency on foreign oil. The most significant problems that occurred or perceived because of the oil dependency were (1) threats of national security, as most oil imports originate from political unstable countries; (2) high oil prices, which placed a burden on the U.S. economy; and (3) the use of oil-based toxic MTBE's as gasoline additive, which resulted in numerous lawsuit against oil companies. This thesis also identified that the creation of the RFS Program resulted from an opportunity momentum for agribusinesses and producers of renewable fuels.¹¹³

Having identified the problems, the ACI approach continued with the interaction oriented research. In that sense, this thesis looked at the EAct of 2005 and several legislative steps and documents that were required by the U.S. legislative process to create the final RFS1 regulation. The legislative histories of these documents provided important information about participating actors. The documents also showed the final physical results of the political interaction in the forefront of the creation of the EAct of 2005 and the RFS1. These results were then further used to ultimately compare suggestions and criticism from various stakeholders and the EPA's choices on those issues. These comparisons were helpful since the results showed EPA's valuation of the actors' contributions. For the creation of the U.S. Agrofuels Project the presentation of the congressional hearings and the RFS1-SAD showed that various industries and stakeholders participated in the process and expressed their interests, positions and suggestions for the creation of the U.S. Agrofuels Project.

In the U.S. Agrofuels Project the complexity resulted from the amount of different actors that participated in the congressional hearings and the commenting phase of the RFS1 regulation. To reduce the complexity of the creation of the RFS1, this thesis did quantitative and qualitative presentation of the documents to identify important single actors and the crucial negotiation topics. The most important matter of the congressional hearings was the substitution of MTBEs through ethanol. The issue was supported by the renewable fuels industry as well as the fossil fuels industry. In 2005 and prior, environmental stakeholders as well as the EPA's scientists lacked certain knowledge about the environmental impacts of the agrofuels

¹¹³ As stated before, their solution was that oil can be replaced by agrofuels, which could be produced domestically. The agrofuels representatives argued that this switch from oil to renewable fuels would increase domestic incomes, create jobs and would contribute to the U.S. efforts to combat Climate Change as agrofuels reduce GHG emissions from tailpipes.

production in quantities that were required to meet the RFS1 goals. Taking this lack of information into account it provides a possible explanation for the limited criticism from environmental stakeholders. However, this thesis has shown evidence that the EPA was aware about the negative effects on the domestic corn availability. The elaboration of the testimonies and the comments showed that at that time the substitution of MTBEs through ethanol was a suitable solution for environmental stakeholders and environmental scientists at EPA.

Another important factor in that sense was that MTBEs are highly toxic and numerous storage leak cases throughout the country caused massive health problems due to drinking water contamination, which results in numerous lawsuits against oil companies. This means that the U.S. Agrofuels Project was based on the general will of all participants to cooperate with Congress and the EPA and to comply with the final policy outcome. However, this thesis has also shown that the RFS1 was the very best solution for the fossil fuels industry, as the program assures sufficient ethanol supply to effectively substitute MTBEs and therefore support oil companies with their MTBE problems. The ban of toxic MTBEs can be interpreted as the social interest of the oil industry, although it also helps oil companies to improve their image because of the MTBE spill lawsuits. For the renewable fuels industry, the RFS1 was the second best solution, as the implied blending volume of 7,5 billion gallons by 2012 is only a limited incentive for the ethanol industry to further expand production capacities and therefore to attract investments.¹¹⁴ The creation of new domestic jobs can be interpreted as the renewable fuel industry's social interest.

For environmental stakeholders the picture is two dimensional. First, environmental stakeholders supported the ban of MTBEs, which represents their social concern. The second dimension, which excludes advanced renewable fuels such as cellulosic ethanol is a loss of their social interests. The exclusion of advanced renewable fuels such as cellulosic ethanol reduces the output value of the RFS1 and therefore prevents further GHG reductions. Additionally, the EPA chose not to apply a complete lifecycle analysis on every aspect of the RFS1, which was also criticized by environmental stakeholders and the renewable fuels industry. A complete lifecycle analysis would have meant that the value of advanced renewable fuels would have

¹¹⁴ The RFS2 of 2010 in that sense followed the demand of the renewable fuels industry and significantly increased the duration of the program, blending volumes and the increased the mandatory portion of cellulosic agrofuels.

been decreased. For environmental stakeholders the complete application of a lifecycle analysis would have revealed a more precise GHG-footprint of agrofuels. Current footprint analyses suggest that agrofuels and their production produce more GHGs than initially thought. For the renewable fuels industry, a complete coverage of the RFS under a lifecycle analysis would have meant that ethanol producers could have produced more RIN's for the same equivalent value as to non-advanced agrofuels and fossil fuels.

Therefore, it is this thesis' conclusion that due to hierarchical direction of the U.S. political system the EPA promulgated a regulation that resulted in an outcome that supports more economic interest and limits the application of environmental facts. At the time of the RFS1, the U.S. Agrofuels Project supported the interest of two major U.S. industries. First, oil companies that faced lawsuits because of their toxic gasoline additives. Second, the interests of the renewable fuels industry that experienced a significant transformation from farm owned facilities to profit oriented corporation. The support of renewable fuels producers also had a multiplier effect on the U.S. agriculture sector by creating additional crop sales and jobs. Simultaneously, renewable fuels stakeholders emphasized the environmental benefits of agrofuels. Further, this thesis concludes that the RFS1 in its 2007 iteration is not the very best solution to deal with all aspects of the multifaceted problem described in this thesis. For example, the blending volumes do not apply as efficient replacement for oil imports in a sustainable manner. Therefore, the contribution capacity of the RFS1 to improve matters of national security is very limited. The economic uncertainties could have had a positive effect in terms of new technological innovations and rural employment. However, the occurrence of the financial and economic crises since 2007 significantly dampened the beneficial effects of the RFS1. The ban of MTBE did result in an environmental improvement, but also did support oil companies in overhauling their image in context of MTBE storage leak lawsuits. Also, the reduction of GHG emissions is reduced if ILUC is considered in lifecycle analysis approaches. However, the development of the RFS Program has shown that some of the criticism this thesis aimed to empirically reconstruct were already addressed by the RFS2 Program of 2010, which includes significant changes to the RFS1, like the inclusion of advanced renewable fuels and more stringent criteria for the production of agrofuels. The examination of the RFS2 would be

valuable expansion to this thesis, but must be the issue for another piece of research.

In that sense this thesis closes its examination of the Role of the EPA in the creation of the U.S. Agrofuels Project with a poetic reinterpretation of Goethe's Faust, rephrasing Mephistopheles' introduction to Faust into:

*“Who art thou, then? – Part of the power not understood,
Which always wills the Good, and always works the Evil”¹¹⁵*

¹¹⁵The correct phrase is: *“Who art thou, then? – Part of the power not understood, Which always wills the Good, and always works the Evil.”* (Goethe, 1872: p.48)

6. Annex

Year	Legislation	Description
1978	Energy Tax legislation	0.40 per gallon of ethanol tax exemption on the \$0.04 gasoline excise tax.
1980	Crude Oil Windfall Profit Tax Act and the Energy Security Act	Promoted energy conservation and domestic fuel development.
1982	Surface Transportation Assistance Act	1982 Transportation Increased tax exemption to \$0.50 per gallon of ethanol and increased the gasoline excise tax to \$0.09 per gallon.
1984	Tax Reform Act	Increased tax exemption to \$0.06 per gallon.
1988	Alternative Motor Fuels Act	Created research and development programs and provided fuel economy credits to automakers.
1990	Omnibus Budget Reconciliation Act	Ethanol tax incentive extended to 2000 but decreased to \$0.54 per gallon of ethanol.
1990	Clean Air Act amendments	Acknowledged contribution of motor fuels to air pollution-oxygen requirements for motor fuels.
1992	Energy Policy Act	Energy Policy ax deductions allowed on vehicles that could run on E85.
1998	Transportation Efficiency Act of the 21 st Century	Ethanol subsidies extended through 2007 but reduced to \$0.51 per gallon of ethanol by 2005.
2004	Jobs Creation Act	Changed the mechanism of the ethanol subsidy to a blender tax credit instead of the previous excise tax exemption. Also extended the ethanol tax exemption to 2010.
2005	Energy Policy Act	Energy Policy established the renewable fuel standard starting at 4 billion gallons in 2006 and rising to 7.5 billion in 2012. Eliminated the oxygen requirement for gasoline, but failed to provide MTBE legal immunity.

Fig.12: All U.S. Ethanol Subsidy Program since 1978 (Tyner, 2008)

Section	Studies implied in the EPO Act of 2005	Who participated initially by the EPO Act of 2005	Studies where the EPO Act of 2005 directly involves the EPA
1501(6) p.1071	Seasonal Variations in Renewable Fuel Use	Administrator of the EIA & EPA	EPA has to promulgate regulations concerning renewable fuel quantities during seasonal variations.
1501(8) p.1072	Study and Waiver for initial Year of Program	Secretary of Energy	
1501(9) p. 1073	Study by Secretary of Energy	Secretary of Energy	
1501(10) p. 1074	Analysis of the ethanol production industry	Federal Trade Commission	
1501 (10) p.1075	Survey and Report of the Renewable Fuel Market	Administrator of the EPA & Secretary of Energy & EIA	EPA jointly conducts a survey to determine market shares of renewable fuels.
1503 (c) p.1079	Consolidation in Reformulated Gasoline Regulation	Administrator of the EPA	EPA jointly revises the reformulated gasoline regulations.
1505 p.1080	Public Health and Environmental Impacts of Fuel and Fuel Additives	Administrator of the EPA	
1506 (3) p.1081	Analysis of Motor Vehicle Fuel Changes - Permeation Effect Study	Administrator of the EPA	
1508 p.1083	Data Collection - Renewable Fuels Survey	Administrator of the EPA	
1509 (a) p.1083	Fuel System Requirements Harmonization Study	Administrator of the EPA & Secretary of Energy	EPA jointly conducts a study of Federal, State, and local requirements concerning motor vehicle fuels.
1511 (d) p.1087	Renewable Fuel Production Research and Developments Grants	Administrator of the EPA	
1514 (a) p.1090	Advanced Biofuel Technologies Program	EPA & Secretary of Agriculture & BRDTAC	EPA jointly establishes a program to develop and demonstrate advanced technologies for the production of alternative transportation fuels.

Fig.14: List of studies and surveys implied in Title XV of the EPO Act of 2005 (EPO Act, 2005: p.1067)

Corporate Actor	Representative	Position
American Lung Association	Early, A. Blakeman	Environmental Consultant
American Petroleum Institute	Cavanaugh, Red	President
Consumer Federation of America	Cooper, Mark	Director of Research
Douglass Distributing	Douglass, Bill	CEO
Energy Information Administration, Department of Energy	Caruso, Guy F.	Administrator,
Environmental and Energy Study Institute	Werner, Carol	Executive Director
Environmental Integrity Project	Schaeffer, Eric	Director
Environmental Protection Agency	Holmstead, Hon. Jeffrey R.	Assistant Administrator for Air and Radiation
Federal Trade Commission	Kovacic, William E.	General Counsel
Golden Triangle Energy, L.L.C.	Hurst, Mr. Charlie	-
Goldman, Sachs & Company	Murti, Arjun Narayama	Managing Director
Missouri Soybean Association	Hurst, Mr. Brooks	-
National Corn Growers Association	Adams, Mr. Duane	-
National Ethanol Vehicle Coalition	Lampert, Phillip	Executive Director
National Petrochemical and Refiners Association	Slaughter, Bob	President
National Resources and Environment, Government	Wells, Jim	Director
Renewable Fuels Association	Dineen, Mr. Bob	President
The National Biodiesel Board	Jobe, Joe	Executive Director
Valero Energy Corporation	Edwards, Gene	Senior Vice President, Supply, Trading and Wholesale

Fig.18: First Actors from the oil industry, renewable fuels industry and environmental stakeholders

Commenter	Abbreviation	Docket ID Number
1 Ad-Hoc Coalition of Small Business Refiners	Small Refiners	OAR-2005-0161-0214
2 Alliance of Automobile Manufacturers	Alliance	OAR-2005-0161-0176
3 American Coalition for Ethanol	ACE	OAR-2005-0161-0218
4 American Farm Bureau Federation ¹	AFBF	OAR-2005-0161-0188
5 American Petroleum Institute	API	OAR-2005-0161-0185
6 American Society for Testing Materials	ASTM	OAR-2005-0161-0235 (hearing)
7 Archer Daniels Midland Company	ADM	OAR-2005-0161-0227
8 Baker Commodities		OAR-2005-0161-0003 through -0006, -0173
9 Biodiesel Coalition of Texas	BCOT	OAR-2005-0161-0186
10 Biodiesel Industries of Greater Dallas Fort Worth	BIGDFW	OAR-2005-0161-0211
11 Biotechnology Industry Organization (Industrial and Environmental Section)	BIO IES	OAR-2005-0161-0199
12 BlueFire Ethanol		OAR-2005-0161-0200,-0224
13 BP Products North America	BP	OAR-2005-0161-0221,-0230
14 CHS Inc.		OAR-2005-0161-0203
15 Chevron		OAR-2005-0161-0193
16 CHOREN Industries		OAR-2005-0161-0195
17 ConocoPhillips		OAR-2005-0161-0194,-0219
18 Countrymark Cooperative	Countrymark	OAR-2005-0161-0225
19 Delta-T Corporation		OAR-2005-0161-0196
20 DuPage County Board		OAR-2005-0161-0166
21 DuPont		OAR-2005-0161-0168
22 Engine Manufacturers Association	EMA	OAR-2005-0161-0177
23 Environmental Defense		OAR-2005-0161-0172,-0223
24 Ethanol Boosting Systems	EBS	OAR-2005-0161-0162
25 Ethanol Feed and Fuel, LLC		OAR-2005-0161-0180
26 Ethanol Products		OAR-2005-0161
27 ExxonMobil Refining & Supply Co.		OAR-2005-0161-0197
28 Flint Hills Resources	FHR	OAR-2005-0161-0222
29 FutureFuel Chemical Company	FutureFuel	OAR-2005-0161-0198
30 Galveston Bay Biodiesel	dba- BioSelect	OAR-2005-0161-0206
31 Gary-Williams Energy Corporation	GWEC	OAR-2005-0161-0207
32 Giant Industries	Giant	OAR-2005-0161-0164
33 Griffin Industries, Inc.	Griffin	OAR-2005-0161-0189
34 Harms Oil Company	Harms	OAR-2005-0161-0220
35 Imperium Renewables, Inc.	IRI	OAR-2005-0161-0178
36 Independent Fuel Terminal Operators Association	IFTOA	OAR-2005-0161-0213
37 KinderMorgan Liquid Terminals	KMLT	OAR-2005-0161-0231
38 Lyondell Chemical Company	Lyondell	OAR-2005-0161-0165

39	Magellan Midstream Partners	Magellan	OAR-2005-0161-0208
40	Marathon Petroleum Company	MPC	OAR-2005-0161-0175
41	Methanol Institute	MI	OAR-2005-0161-0171
42	Missouri Department of Natural Resources	MDNR	OAR-2005-0161-0217
43	National Association of Convenience Stores ²	NACS	OAR-2005-0161-0234
44	National Petrochemical and Refiners Association	NPRA	OAR-2005-0161-0170, -0232
45	National Biodiesel Board	NBB	OAR-2005-0161-0212
46	National Corn Growers Association ¹	NCGA	OAR-2005-0161-0188
47	National Council of Farmer Cooperatives ¹	NCFC	OAR-2005-0161-0188
48	National Renewable Energy Laboratory	NREL	OAR-2005-0161-0179
49	National Restaurant Association	NRA	OAR-2005-0161-0174
50	National Wildlife Federation	NWF	OAR-2005-0161-0209
51	Natural Gas Vehicles for America	NGVA	OAR-2005-0161-0201
52	Natural Resources Defense Council	NRDC	OAR-2005-0161-0229
53	New York State Department of Environmental Conservation	NYDEC	OAR-2005-0161-0169
54	Neste Oil Holding Inc.	Neste	OAR-2005-0161-0191
55	Northeast States for Coordinated Air Use Management	NESCAUM	OAR-2005-0161-0187
56	Organic Fuels		OAR-2005-0161-0190, -0233 (hearing)
57	Private Citizen		OAR-2005-0161-0156
58	Private Citizen		OAR-2005-0161-0158, -0159
59	Private Citizen		OAR-2005-0161-0160
60	Private Citizen		OAR-2005-0161-0236
61	Private Citizen		OAR-2005-0161-0182—0184
62	Private Citizen		OAR-2005-0161-0163
63	Renewable Energy Action Project	REAP	OAR-2005-0161-0204
64	Renewable Fuels Association ,	RFA	OAR-2005-0161-0192-0228 (hearing)
65	Shell Oil Company/Motiva Enterprises		OAR-2005-0161-0215
66	SilvaGas, Inc.		OAR-2005-0161-0161
67	Society of Independent Gasoline Marketers of America ²	SIGMA	OAR-2005-0161-0234
68	Sutherland Asbill & Brennan		OAR-2005-0161-0210
69	Trenton Fuel Works		OAR-2005-0161-0181
70	Tyson Foods, Inc.	Tyson	OAR-2005-0161-0216
71	Union of Concerned Scientists	UCS	OAR-2005-0161-0226
72	Valero Energy Corporation		OAR-2005-0161-0167
73	West Park Associates		OAR-2005-0161-0202

¹ - commented together

² - commented together

Fig.19: Commenters of the Summary and Analysis Document (EPA, 2007a).

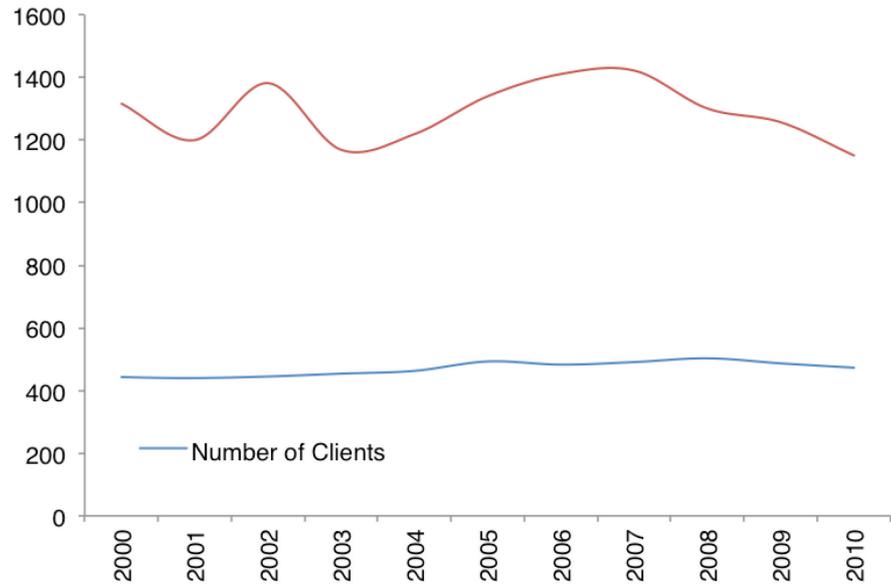


Fig.25: Agro-Lobbying, Number of Clients & Number of Lobbyists (opensecrets.org, 2011).

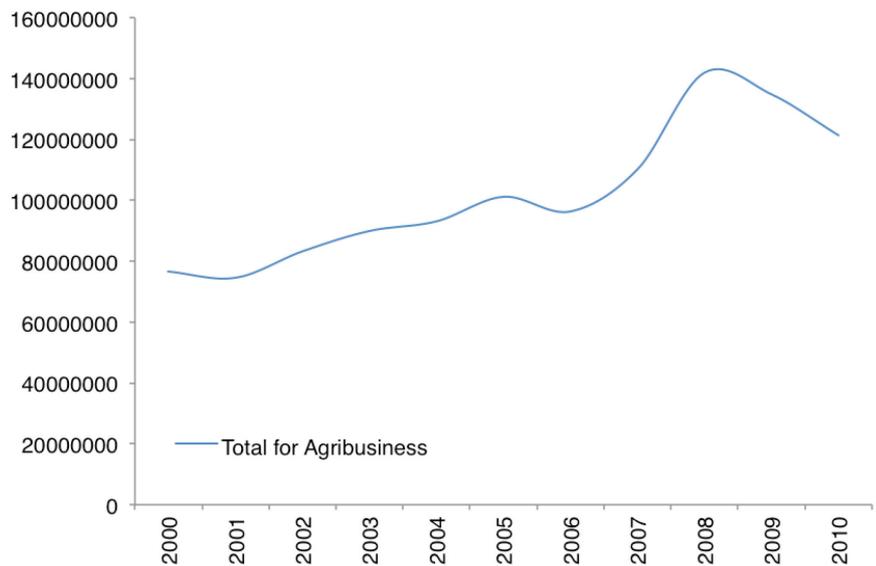


Fig. 26: Agro-Lobbying, Financial Resources (opensecrets.org, 2011)

6.1. Glossary

1.000	One thousand	RFA	Renewable Fuel Association
1,000	One	RFG	Reformulated Gasoline
ACI	Actor Centered Institutionalism	RFS	Renewable Fuel Standard
ACE	Air, Climate and Energy Program	RIAS	Regulatory Impact Analysis Statement
AEO	Annual Energy Outlook Report (EIA)	RIN	Renewable Identification Number
Alliance	Alliance of Automobile Manufacturers	SIGMA	Society of Independent Gasoline Marketers of America
API	American Petroleum Institute	STAR	Science to Achieve Results
BLS	Bureau of Labor Statistics	UNEP	United Nations Environment Program
BRDA	Biomass and Research Development Act [BRDATA – Biomass Research and Development Technical Advisory Committee]	USDA	U.S. Department of Agriculture
CAA	Clean Air Act	WRI	World Resources Institute
CEQ	Council of Environmental Quality		
CFC	Chlorofluorocarbon		
CFR	Code of Federal Regulations		
CIA	Central Intelligence Agency		
COP	Conference of the Parties		
CWA	Clean Water Act		
DG	Directorate General		
DOE	U.S. Department of Energy		
EDF	Environmental Defense Fund		
EIA	Energy Information Agency		
EIOR	Ethanol Industry Outlook Report (RFA)		
EPA	Environmental Protection Agency		
EPAct	Energy Policy Act		
ETIA	Energy Tax Incentives Act		
EU	European Union		
EWG	Environmental Working Group		
FASOM	Forest and Agricultural Sector Optimization Model		
FoE	Friends of the Earth		
GPO	Government Printing Office		
GDP	Gross Domestic Product		
IEA	International Energy Agency		
IPCC	Intergovernmental Panel on Climate Change		
mb/d	million barrels per day		
MTBE	Methyl Tertiary Butyl Ether		
NACS	National Association of Convenience Stores		
NCER	National Center for Environmental Research		
NEPA	National Environmental Policy Act		
NGO	Non Governmental Organization		
NPO	Non Profit Organization		
NPRM	Notice of Proposed Rulemaking		
NRDC	Resource Defense Council		
OCIR	Office for Congressional and Intergovernmental Relations		
OPEC	Organization of Petrol Exporting Countries		
PADD	Petroleum Administration for Defense District		
PPA	Primary Policy Actor		

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7.2. Figures

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7.3. Interview Partners

Dumas. (2011), Professor Lloyd Jeff Dumas is a Professor of Political Economy, Economics and Public Policy at the University of Texas – Dallas. His expertise helped this thesis to understand the importance of Congress and the influence of the U.S. political system on the decision-making processes within the U.S. Agrofuels Project.

Gaba. (2011), Professor Jeff Gaba is a former EPA consultant and current Law Professor at the Southern Methodist University in Dallas, Texas. His area of expertise is environmental law. His expertise offered this thesis a better understanding of legally conflictive situations for the EPA and how the Agency can react if a regulation is conflictive with the EPA's highest congress given mandate to protect human health and the environment.

McCarthy. (2011), Ms. Meg McCarthy, is a non-political career level Environmental Protection Specialist in the Office of Transportation and Air Quality, in the Compliance and Innovative Strategies division. Her expertise on the RFS Program was a vital and necessary factor for this thesis in hand.

Whitman. (2011), Governor Christine Todd Whitman, is the 50th Governor of New Jersey and former Administrator of the Environmental Protection Agency (EPA). Her interview provided the thesis with the crucial understanding of the regulatory tasks of the EPA and its capacities to act as a political actor in policy creating processes.

7.4. Abstract:

The thesis in hand examines the role of the 'U.S. Environmental Protection Agency' (EPA) in the creation of the U.S. Agrofuels Project. It is the thesis goal to identify what that triggered U.S. politics to support the creation of an agrofuels project. As the environmental sustainability of agrofuel projects is questioned by numerous recent studies, the thesis will analyze how and to what extent the EPA as responsible federal agency realized this project in regard of its own congress given mandate. In order to do so, the thesis uses the theoretical framework approach of 'Actor Centered Institutionalism' (ACI) of Scharpf and Mayntz to systematically examine the creation process of the so-called 'Renewable-Fuel Standard Program' (RFS). The utilization of ACI identifies all involved actors, their reasons and strategies of participation. The final result of the thesis will reveal that the fossil fuels industry as well as the agricultural sector had mostly economically driven reason to support agrofuels. Furthermore the thesis will show that the EPA although its intentions are in the best for human health and the protection of the environment, its political and regulatory possibilities are limited.

7.5. Zusammenfassung:

Die vorliegende Diplomarbeit untersucht die Rolle der 'U.S. Umweltschutz Behörde' (EPA) in der Schaffung des U.S. Agrotreibstoff Projekts. Das Ziel der Arbeit ist es herauszufinden was die U.S. Politik dazu bewegt hat die Schaffung eines Agrotreibstoff Projekts zu unterstützen. Da zahlreiche aktuelle Studien die ökologische Nachhaltigkeit von Agrotreibstoffen bezweifeln, untersucht die vorliegende Arbeit wie und in welchem Umfang die EPA als zuständige Bundesoberbehörde das U.S. Agrotreibstoff Projekt in Bezug auf ihr eigenes vom Kongress gegeben Mandates realisiert hat. In diesem Kontext nutzt die Arbeit das theoretische Rahmenkonzept des 'Akteurszentrierten Institutionalismus' (ACI) von Scharpf und Mayntz, um systematisch die Erstellung des so genannte 'Erneuerbare Treibstoff Standard Programm' zu untersuchen. Der Einsatz von ACI identifiziert alle beteiligten Akteure, ihre Gründe und Teilnahmestrategien. Das endgültige Ergebnis der Arbeit wird zeigen, dass die Fossile Brennstoffindustrie sowie der Landwirtschaftssektor meist wirtschaftliche Gründe zur Unterstützung des

Agrotreibstoff Projekts hatten. Darüber hinaus wird die Arbeit zeigen, dass die EPA, obwohl ihre Absichten im besten Interesse der Menschen, ihrer Gesundheit sowie dem Schutz der Umwelt sind, ihre politischen und regulatorischen Möglichkeiten limitiert sind.

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