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Verfasser:

Gernot Schuster

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1. Introduction

The year 2008 marked the beginning of the Kyoto Protocol's commitment period, widely unnoticed by the major public. As negotiations for its successor are going on busily this work tries to spot light on the question if there are other ways to combat climate change then those of the UNFCCC and the Kyoto Protocol. To make a good comparison the countries compared should have the same potential, so it was obvious to compare the United States of America as the world-famous "laggard" in climate change policies with the European Union that is supposed to be a leader in combating climate change. The underlying scientific question is in what ways the participation in negotiating a treaty system is having influence on participants and (later) non-participants because after reading literature about international regimes I supposed that regimes have an influence also on states that do not directly participate in the regime, to speak, have obligations under the regime.

The work unfolds like this: first it gives a short introduction to regime theory to have a base for then elaborating what findings it offers so far on effectiveness respectively on compliance.

Then the work describes the international climate change regime that encompasses the UNFCCC and the Kyoto Protocol so that we can understand what obligations belong to what treaty.

The next two chapters can be said to explain the United States of America and European Unions efforts in the area of climate change: the position taken in the multilateral negotiations, the overall policies and then the explicit measures in the specific sectors. At the end of each chapter a short summary is given to make later comparison easier, what is to be done in the last but one chapter. Last but not least the final chapter summons up the findings of this work.

2. Theoretical Approach

For the purpose of this work it was decided to use the international regimes theory because it gave central inputs to the understanding of international cooperation. The first subchapter gives a small introduction to international regimes theory showing also the problems of this approach. Then we will concentrate on regime effectiveness leading us to concepts of compliance, what is essential for putting this work into its theoretical place.

2.1 Regime-Theory, A Short Introduction

Stephen Krasner's definition is commonly used to define regimes, although there is still no agreement in the literature about the definition. He articulated that:

> "Regimes can be defined as sets of implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area of international relations. Principles are beliefs of fact, causation, and rectitude. Norms are standards of behaviour defined in terms of rights and obligations. Rules are specific prescriptions or proscriptions for action. Decision-making procedures are prevailing practices for making and implementing collective choice."[1]

Unsurprisingly every main stream approach to international relations theory, Realism, Neoliberalism and Cognitivism, has contributed to the understanding of regimes affect behaviour and outcomes. As we will see every one of them starts from a different assumption in explaining what the central variable of regime formation and existence is.

For realists regime formation is explained through their main assumptions – anarchic international system and power. States are mainly concerned about relative gains, meaning their position versus other states in the system. Thus an agreement cannot be signed that leaves them in a worse situation relative to others. Realists explain the fact that regimes are common in three ways:

[1] Krasner (1992), page 1

- Hegemonic stability theory: a hegemon invests the resources to support the regime and possesses the power to compel others to participate and perhaps contribute to the regime's maintenance.
- Focus on distributional issues: cheating is no longer a problem when possible outcomes are optimal, distributional issues and power comes to the fore.
- Relative gains: As states are interested in security, there is a variety of sensitivity to relative losses over time and across issue areas. In this context cooperation is more likely in economic areas than in military ones.[2]

Neoliberals acknowledge the assumption of the anarchic structure of the international system but assume that states are concerned primarily with absolute gains. Therefore states will evaluate their profits rather than comparing it to that of others so that the main concern for them is whether they get the best deal possible. For this evaluation regimes can be useful for reassuring them. Drawing on insights of Game Theory, Neoliberals differentiated between prisoner's dilemma, coordination situations and assurance games, and found that especially in the last regimes can be useful by providing information. [3]

Another model of regime formation was invented by Oran Young who created the institutional bargaining model. He argues that states focus more on the bargaining process itself then on distributive issues, and through this behaviour cooperation is more likely. [4]

Although Neoliberals gave important insights on how cooperation is facilitated by regimes, a number of shortcomings remain, for example the fear of cheating is often underestimated and they do not address the sociological dimension of regimes. [5]

The cognitivist approach is fundamentally different from the ones above because they understand that the actors' behaviour is not merely shaped by material interests but by their role in society. Following Hasenclever et al. cognitivists can be divided into weak and strong cognitivist. For weak cognitivists the interest is to explore the influence of ideas on actors. Thus regimes are assumed to be the effect of an idea

[2] For the purpose to keep this chapter short I used an essay by Brahm (2005), who summarizes Hasenclever et al.
[3] Brahm (2005)
[4] Brahm (2005)
[5] Brahm (2005)

gaining prominence. Strong cognitivists assert that the international system is fundamentally a social one and that this structure constructs actors' identities. For example, the varied pull of compliance of regimes is explained through exploring legitimacy or persuasion. In this view regimes are a source of self-understanding of the world. [6]

Despite these various differences in understanding of regimes, they are now understood as institutional arrangements that allow for participation by broad range of actors. Also over time regime analysis spread from regime formation to regime attributes, regime consequences, regime dynamics.[7]
The shortfalls of regime theory are however numerous, for the first there is a lack of standardization with regard to the definitions of terms, selection of variables, operationalization of hypotheses – for example there is still no agreement on the term of regime itself.[8] For the second most studies are constrained by the absence of a truly comparative mode of analysis.[9]

From a regulationist's point of view there are even more critical points of regime theory. Maybe the most important ones are that it follows methodological individualism, models states as rational, use-maximizing actor and seeing the international political system as anarchic where world economy and international division of labor has no place and the state itself remains as untheorized black box. Furthermore the regime analysts reduce the complexity of their object of investigation, especially those using game theory as approach to regimes. By presuming the necessity of cooperation it becomes a one-dimensional, positive process and central element of regimes.[10]

Having mentioned the problems of regime theory, and keeping in mind that a theoretical discussion about regime theory is not the target of this work, we now turn to the theoretical input of regime theory on compliance, because we will further on focus on Policies and Measures concerning Climate Change of the United States of America and the European Union. As the definition of regimes is not uncontested, the

[6] Brahm (2005)
[7] Breitmeier (2006), page 24
[8] Breitmeier (2006), page 10, also Hasenclever (1997), page 10
[9] Breitmeier (2006), page 10-11
[10] Missbach (2006), page 136-137

same can be said for the understanding of compliance: For Young "compliance can be said to occur when the actual behaviour of a given subject conforms to prescribed behaviour, and non-compliance or violation occurs when actual behaviour departs significantly from prescribed behaviour"[11]. Simmons sees compliance as "a noun that denotes a particular type of *behaviour, action* or *policy* within a specific regulatory or situational context."[12] This does not refer to the willingness of actors to comply, actions and behaviour matter, not attributes or motives. The observer should assess compliance from external perspective by making systematic use of indicators of internal estimates of compliance. However, within regime theory compliance is mostly seen as a matter of regime effectiveness, thus it seems to be logic to explain what is said about regime effectiveness so and then later on return to compliance-approaches.

2.2 Compliance and Effectiveness of International Regimes

So what insights can we get of this approaches for the current work, how do the three approaches explain why states comply with international regulations? One of the first who concentrated on effects of international environmental institutions was Robert Keohane. He underlines the importance to keep in mind that policies might have changed as a result of shift in domestic politics or scientific discoveries not occasioned by international action. Another important statement in his early work is that institutions can play at best a marginal role when states refuse to cooperate and that environmental politics are replete with symbolic action, even in international institutions.[13]

Authors explore actual and nominal national measures for environmental protection by asking questions like what laws are passed, what new policies are adopted, the extent of their enforcement and what funds are invested.
Following Keohane there are four types of national policy efforts:

- avoiding international obligations by failing to sign treaty commitments
- accepting commitments but fail to live up to them

[11] Young (1979), after Breitmeier (2006), page 65
[12] Breitmeier (2006), page 65
[13] Keohane (1993) page 18

- accepting commitments and achieve compliance
- going significantly further than explicit obligations require[14]

When states fall into the first two categories they are labelled laggards. That means that they have relatively meager environmental measures and avoid internationals agreements involving more stringent measures. Rich laggards may respond to political embarrassment or pressure from their own scientists or publics.
In the second two categories we find states labelled as leaders: these are states that have already developed stringent and forward-looking measures. They willingly sign and comply with treaty commitments and often go further than these commitments require. „Domestic pressure, advanced policies, disproportionate damage all give leaders higher levels of concern and capacity than others“[15]
On the international level there are three fundamental conditions to be met for effective management of environmental problems. Keohane introduced them in his text 1993[16] and also put these conditions forth in his 1996[17] work. He labels them as the „3 Cs“: concern, contracting, capacity. Concern means the interest of potential funders, recipients, and governments in preserving the environment. One of these stakeholders has to take initiative so that things will change. Contracting means that the arrangements have to entail solving difficult negotiating problems like distributional and informational issues. Capacity is crucial two, in ways that international organizations are usually not authorized to enforce rules within sovereign states. Thus the capacity of the bureaucracies of national governments is important to fulfil the obligations. In this circumstances capacity means not only the administrative capacity but also that of NGOs and domestic political institutions to translate concern about environmental effects into policy.[18]
One work worth mentioning is that of Abram and Antonia Handler Chayes called “On Compliance”. Among other findings they suggest that “In common experience, people, whether as a result of socialisation or otherwise, accept that they are obliged to obey the law.”[19] They argue that states do the same as the fundamental norm of international law is pacta sunt servanda. When a state has formally assented to a

[14] Keohane (1993) page16
[15] Keohane (1993) page 13, 17 [Haas, 4]
[16] Keohane (1993)
[17] Keohane (1996)
[18] Keohane (1996), page 9-12
[19] Chayes et al (1993), page 185

provision that is contained in an agreement it entails a legal obligation to obey and the provision becomes a guide to action.[20] Another strong evidence for the sense of an obligation to comply with treaties is the care that states take in negotiating and entering into them.[21] From this articulated finding for me the question arose if it is possible that states comply to a treaty that they have taken time in negotiating but did not approve formally?

One very influential work on regime effectiveness was edited by Oran Young who worked on effectiveness of international environmental regimes and found that "Effective Regimes cause changes in the behaviour of actors, in the interests of actors, or in the policies and performance of institutions in ways that contribute to positive management of the targeted problem"[22] Effectiveness is understood as a "matter of contributions that institutions make to solving the problems that motivate actors to invest the time and energy needed to create them"[23] Despite regarding the concept of effectiveness as elusive because it could mean a number of different things, he states that the meanings require difficult normative, scientific and historical judgements. It is important to distinguish between different approaches for the concept of effects.

The Problem Solving Approach is centred on the degree to which a regime eliminates or alleviates the problem that prompts its creation.[24] A legal approach focuses on the degree to which contractual obligations are met.[25] An efficiency criterion is incorporated in the legal definition within an economic approach, whereas in the normative approach principles such as fairness, justice and participation are incorporated. Last is the approach favoured by Young, the Political Approach. Here regimes are treated as directed at particular international problems. These are conceived as functions of specific constellations of actors, interests and institutions that Young calls behavioural complexes.[26] Compliance is not granted a privileged

[20] Chayes et al (1993), page 185
[21] Chayes et al (1993), page 186
[22] Young (1999), page 11
[23] Young (1999), page 3
[24] Young (1999), page 4
[25] Young (1999), page 4
[26] Young (1999), page 5

conceptual position: “Activities that move the system in the right direction, even if they fall short of full compliance, are signs of effectiveness.”[27]

Young differentiates regime effects into three dimensions: effects within/outside behavioural complexes, direct/indirect effects and good and bad effects. Effects within the behavioural complex change the behaviour of states regarding the problem that motivated the regime’s creation. Outside effects are commonly unforeseen and generally unintended consequences flowing from the operation of institutional arrangements.[28] Direct effects have a short causal chain and concentrate on the behaviour involving compliance with regime rules and participation in programmatic activities. The essential point according to Young is to identify behavioural responses that can be linked directly to the operation of a regime but are not easily captured in data to relate the abatement of the initial problem or compliance with regime rules. Indirect Effects on the other side have a longer causal chain and refer to responses that are causally connected to a regime’s rules or activities, for example impact of regimes on environmental policies, either within regime’s issue area or in other areas.[29] Last but not least all regime effects will fall somewhere on the continuum running from helping to solve a problem at one extreme to making it worse at the other.[30]

Measuring effects is very important for this kind of studies, and Young divides the methods used for this complex and demanding task into two distinct types. In a natural or quasi-experiment the situations are broadly comparable except for the presence or absence of a regime. Using a thought experiment, also known as method of counterfactuals, the analyst tries to reconstruct the flow of events as it would have unfolded in the absence of some key factors.[31]

Young then identifies five behavioural models of how regimes might have an effect on states. It is worthwhile noticing that some behaviour can be product of several distinct mechanisms operating together.

When regimes are seen as Utility Modifiers, actors appear to be self-interested utility maximizers whose behaviour will be guided by institutional arrangements to the

[27] Young (1999), page 6
[28] Young (1999) page 11
[29] Young (1999), page 13-14
[30] Young (1999), page 14-15
[31] Young (1999), page 17-18

extent that they alter the costs and benefits individual actors attach to well defined options. In this model identity, role premises and impact of social norms are not interesting.[32]

For most of the literature regimes are seen as Enhancers of Cooperation. The assumption rests on unitary actors and utilitarian premises. Furthermore it directs attention to collective action problems as important obstacles to the achievement of sustained cooperation. Behaviour can be affected through a number of ways, for example by mitigating the collective action problems that stand as barriers to the realization of joint gains otherwise available to parties engaged in interactive decision making.[33]

When regimes are seen as Bestowers of Authority, regime's rules and other provisions of regimes are regarded as legitimate or authoritative and therefore compliance occurs without engaging in detailed calculations of the benefits and costs of doing so.[34]

The essential point when regimes take the role of Learning Facilitators is that they are actively involved in changing factual information, prevailing discourses, values and, in the process, alter the motive forces that give rise to the behaviour of individual and collective entities active in the issue areas covered by this institutions.[35]

The approach of regimes as Role Definers follows Alexander Wendt's input on regimes and takes a look at the way in which institutions operate to define roles and allocate them among participants.[36]

Last but not least regimes can be seen as Agents of Internal Realignment where the assumption of unitary actors active in behavioural complexes in relaxed. Regimes affect the behaviour by creating new constituencies or shifting the balance among factions or subgroups vying for influence within individual states or other actors.[37]

[32] Young (1999), page 22
[33] Young (1999), 23
[34] Young (1999), 23-24
[35] Young (1999), 25
[36] Young (1999), 25
[37] Young (1999), 26

The most recent study on International Regimes is that of Breitmeier who more or less synthesizes other scientific work to create the theoretical background for his "International Regimes Database". He differentiates between effectiveness research, where the target is the capacity of political institutions to solve commonly perceived problems, and compliance research, that examines the extent to which subjects comply with rules addressed to them.[38]

Before going deeper into Breitmeier's findings about compliance it seems to be better to see what he says about the effectiveness of regimes for reasons of stringency as we have discussed approaches to effectiveness so far.
Breitmeier articulates that the research on effectiveness focused on efforts to measure consequences arising from the function of regimes, which he summons up under different spheres.
In the sphere of legal effectiveness, regime bodies are in operation and generate authoritative decisions, and important members have taken steps needed to translate international commitments into domestic obligations.[39] Within the realm of behavioural effectiveness we come closer to matters of compliance: here on the one hand the overall judgement regarding conformance with regime requirements and prohibition on part of all subjects and on the other hand the measure of individual conformance with norms and rules on part of most important subjects are the main topics for inquiries.[40]
The third sphere is that of changes in cognitive settings, meaning improvements in knowledge of problem's nature, information about available options for addressing the problem.[41]

Breitmeier's last sphere distinguishes between goal attainment, which is understood as the process in meeting goals articulated in formal agreement and problem solving, that refers to changes in the nature of the problem identified during the process of regime formation.[42]

[38] Breitmeier (2006), page 65
[39] Breitmeier (2006), page 30
[40] Breitmeier (2006), page 30
[41] Breitmeier (2006), page 31
[42] Breitmeier (2006), page 31

The central question of regime effectiveness is if the observed impacts are caused by international institutions or by external forces like exercise of power or the introduction of new technologies. In many cases both components contributed.

At this point we can make the connection to compliance, because effective regulation needs mutual believe in cooperation, this requires a high compliance rate for any given regulation. Two conditions are important for high compliance rates, those seldom prevail outside the institutional framework of developed nation-states:

1.) established monopoly of legitimate force
2.) national identity that produces consent on the part of those who are targets of regulations, even if they consider the rules in question inconvenient.[43]

In his work, Breitmeier understands compliance as a two dimensional phenomenon, for the first dimension, the substantive dimension, the relationship between obligations and actual behaviour is important, in the second dimension, the procedural dimension, the treatment of accusation of noncompliance is important.[44]

The compliance with rules and regulations does not require existence of political hierarchy and a legitimate monopoly on the use of force and thus a national context. Levels of compliance are determined by mechanisms like legitimacy, legalization, responsiveness and use of horizontal coercion.[45]

The core assumption of legalization is that a legal system is more legitimate than a specific rule or regulation thus it is possible to assume that the more an international institution is legalized, the more likely compliance becomes. In this process two features that are closely interlinked with each other are central: Juridification and Internalization.

Juridification refers to the processes that ensure that rules and regulations fulfil criteria like clarity, pertinence, stringency, adaptability, high degree of consistency both intrinsically and in relation to other laws. Three elements of these processes are important: obligation, precision, delegation. In international governance this requires not only the basis of bargaining but also a process of arguing against the background of commonly accepted legal norms. One major instrument for establishing this

[43] Breitmeier (2006), page 63
[44] Breitmeier (2006), page 65
[45] Breitmeier (2006), page 70

argumentative procedure is to delegate authority to third parties for example courts, arbitrators, administrative organizations.[46]

Internalization asserts that norms operating above and beyond national societies can attain full legal status only when those to whom they are addressed internalize them. It means that rules and norms of conduct, developed outside of the jurisdiction of individual states directly affect the behaviour of their addresses.[47]

As reservations about the normative validity is a significant source of noncompliance, Breitmeier follows the findings of Habermas and Dworkin that the regulations and rules should emerge from legitimate norm-forming processes and be applied in a way that demonstrates rational linkage to their goals and to certain general principles of fairness or justice. Thus all subjects of rules and regulations and also those affected by them should be included in the decision-making process.[48]

Zürn[49] argues that effective regulations beyond nation-state encapsulate two separate processes that can generate adequate levels of compliance:

1.) focus on softer paths to compliance based on national consent, including capacity building, legitimacy building, voluntary internalization of law[50]
2.) to the extent that coercive sanctions are used as a legitimate means of generating compliance, they need not be applied only in a hierarchical context but can also be used in an institutionalized horizontal setting[51]

Another important feature for effective regimes, as cognitivists suggest, is that they encourage states and other actors to pool their scientific resources in order to enhance understanding of cause-effect relationships and of consequences of different policy options. This process plays a role in the creation of scientific knowledge, monitoring of implementation and verification of compliance. Breitmeier's findings support theoretical arguments about the role of knowledge in addressing collective action problems and underline that the growth of knowledge resulting from a regime's programmatic activities does not translate automatically into greater success in the realm of problem solving.[52]

[46] Breitmeier (2006), page 79-82
[47] Breitmeier (2006), page 82
[48] Breimeier (2006), page 91 - 96
[49] Zürn (2004), after Breitmeier (2006), page 64
[50] Breitmeier (2006), page 64
[51] Breitmeier (2006), page 64
[52] Breitmeier (2006), page 191-224

Breitmeier finally articulates three sources of behaviour that the work on the Database illuminated that do not easily fit into mainstream accounts:

- "Actors often choose options that conform to the percepts of a knowledge system or a discourse that has come to dominate thinking about a particular issue."[53]
- perception of legitimacy matters
- standard operation procedures play a significant role; following rules becomes second nature for most participants[54]

He enunciates that within the operation of compliance mechanism, goal attainment and problem solving, the actor's behaviour is not always driven by conventional utilitarian or benefit-cost calculation. The main difference is made by juridification and the development of legitimacy.[55]

2.3 Putting this work into its theoretical place

By taking the definition of regimes of Krasner, the UNFCCC and its Protocol fit perfectly into the definition of an international regime, as they contain principles, rules and norms for the participating states. For comparing the actions concerning climate change of the United States of America and the European Union, I will follow the logic of Chayes and Chayes, that states normally comply with international rules that they were negotiating. This assumption is again underlined by Breitmeier's finding that for many states following rules becomes the second nature. Thus I am interested in the question if an international treaty has an impact beyond their participating states, here represented by the United States that have not adopted the Kyoto Protocol but, as we will see later, have strongly participated and shaped the treaty itself. The European Union helps to compare the findings with the behaviour of a participant, as it is party of the Kyoto Protocol and the UNFCCC, in contrast to the United States, that is only party to the UNFCCC. So if we can find evidence that the United States have regulations and programmes that are comparable to the Kyoto Protocol's provision, one could argue that the treaty obligations are not only accepted legitimate by its members but also by non-participants.

[53] Breitmeier (2006), page 235
[54] Breitmeier (2006), page 235
[55] Breitmeier (2006), page 233

3. International Treaties concerning Climate Change

The Kyoto Protocol is well known in public, but an international treaty like that does not emerge from one day to the other. Thus one of the aims of this chapter is to give an introduction to the process that led to the United Nations Framework Convention on Climate Change that then built the frame for further negotiations leading to the Kyoto Protocol and future Treaties. In this chapter the author does not line out the positions taken by the European Union and the United States of America in the negotiation process, this is done in the specific sections, but he will give a small insight in the actor-constellation. Besides describing the process the chapter also outlines the regulations of the Convention, the Protocol and the Marrakesh Accords as they are important for comparing the actions taken by the European Union and the United States of America.

3.1 From the First Conferences on Climate Change to the Kyoto Protocol

Science of Climate Change reaches back to Svante Arrhenius, a scientist from Sweden, who in 1896 discovered the principal of greenhouse effect.[56] It took some centuries that science itself found out that the effect of greenhouse gases could be negative to the environment, and thus in 1979 the first World Climate Conference took place in Geneva. At this time the audience was consisting mainly of scientists and there was only little political interest in the outcome of the conference. The Conference concluded that the concentration of CO2 had increased at about 15 percent compared to pre-industrial ages.[57] The next deliberations on the impact of greenhouse gases took place in Villach in the year 1985, organized by WMO, UNEP and ICSU. This meeting marks the end of the solemnly scientific phase, and the participants agreed that warming was the consequence of the increasing concentration of greenhouse gases in the atmosphere. It was proposed to prepare an

[56] Oberthür et al (2000), page 27
[57] Brambilla (2004), page 29

international Convention to curtail the emission of greenhouse gases, thus climate change reached the political agenda for the first time.[58]

The first real international conference with political participation was conducted in Toronto in June 1988 under the headline “The Changing Atmosphere”. At its end the delegates postulated that the industrialized countries should decrease their greenhouse gas output at 25% to 2005.[59]

One of the results of the Toronto conference was that the Intergovernmental Panel on Climate Change was established by UNEP and WMO in 1988.[60] The IPCC provides reports containing information on scientific evidence and reflects viewpoints of the scientific community. It works through a two stage review process by experts and governments and publishes reports on regular basis. The IPCC is able to provide scientific technical and socio-economic information in a policy neutral way to decisions makers due to its intergovernmental nature. By accepting the IPCC reports and approving the Summary for Policymakers, governments acknowledge the legitimacy of the scientific content.[61]

All members of the United Nations Organization and WMO are also members of the IPCC. The IPCC itself has three working groups:

Working Group 1: The Science of Climate Change

Working Group 2: Impacts, Adaption and Vulnerability

Working Group 3: Mitigation of Climate Change[62]

The second World Climate Conference took again place in Geneva in 1990. It was a political meeting that discussed steps to solve the problem posed by climate change.[63] The first IPCC Assessment Report played a decisive role in this deliberation and the final declaration recommended the elaboration of a Framework Convention.[64] This recommendation was followed by the 45th United Nations General Assembly that established the process for negotiating the Framework Convention on Climate Change by deploying an Intergovernmental Negotiating Committee, INC. The task of the INC was to work on a Treaty-Text ready to be signed at the United

[58] Brambilla (2004), page 30
[59] Brambilla (2004), page 30
[60] Oberthür et al (2000), page 28
[61] IPCC
[62] Oberthür et al (2000), page 28
[63] Brambilla (2004), page 32
[64] Brambilla (2004), page 32

Nations Conference on Environment and Development taking place in Rio de Janeiro in 1992.[65]

3.2 From the United Nations Framework Convention on Climate Change to the Kyoto Protocoll

The INC only had 18 months to write the text for the Convention, and met in February 1991 for the first time. Already in this negotiation process different positions emerged, the United States wanted a vague arrangement in contrary to the European Union that opted for concrete rules.[66]

The treaty was adopted in New York on 8 May 1992 and opened for signature at the United Nations Conference on Environment and Development in Rio de Janeiro. It came into effect on 29 May 1994.[67]

The main objective of the UNFCCC is "to achieve stabilization of greenhouse gas concentrations in the atmosphere at a low enough level to prevent dangerous anthropogenic interference with the climate system".[68]

One important principle of the Convention is that of Art. 3 that underlines that states have "common but differentiated responsibilities".[69] The Convention has different obligations for parties depending on the category they fall in. Annex I parties are industrialized countries that agreed to reduce their emissions to 1990 levels in the year 2000. These parties have particular reporting responsibilities about policies and measures as well the impact of their actions. To this group belong forty countries and the European Union.[70] Annex II countries have to provide new and additional financial resources for developing countries with regard to climate change and represent a sub-group of Annex I countries. Art. 4 also states that the Annex II countries shall provide financial resources for implementing measures that

[65] Brambilla (2004), page 32
[66] Brambilla (2004), page 34
[67] Oberthür et al (2000), page 63
[68] UNFCCC, Art 2
[69] Pallemaerts et al (2006), page 29
[70] Oberthür et al (2000), page 66

encompass[71] technology transfer. The group consists of OECD members without countries with economies in transition.[72] Developing countries are not included in Annex I or II. They do not have immediate restrictions but can voluntarily become Annex I countries when they are sufficiently developed. Unless developed countries supply enough funding and technology, the developing countries are not expected to implement their commitments. Dealing with poverty has a bigger priority than economic and social development. [73]

Despite the regulations mentioned above for Annex I and Annex II countries, the Framework convention stipulates common responsibilities for all of its parties that are the formulation, implementation and regular upgrading of a program, the development and periodic upgrading of national inventories and the communication of national inventories to the COP.[74] The European Union and the United States belong to the Annex I countries and thus are obliged to reduce their emissions to 1990 levels in 2000. Both have specific reporting obligations about policies and measures as well as about the impacts of these actions.

The UNFCCC contains regulations concerning research and systematic observation[75] and education, training and public awareness.[76] These Articles are vague and leave space for interpretation what is to be undertaken in fulfillment.

The Convention allows Joint Implementation, meaning that two Annex I parties can together realize their obligations. The underlying idea of this system is to reduce the costs of emission reductions by financing actions in another country and then get emission credits. This system was disputed but finally taken into the Convention.[77]

Another regulation that is especially important for the European Union is that the UNFCCC allows burden sharing within a group of states. That means that the emissions of countries are counted together and the reduction obligations are divided between this states.[78]

[71] UNFCCC, Art 4
[72] Oberthür et al (2000), page 67
[73] Oberthür et al (2000), page 68
[74] Pallemaerts et al (2006), page 32
[75] UNFCCC Art 5
[76] UNFCCC Art 6
[77] Oberthür et al (2000), page 68
[78] Brambilla (2004), page 51

The Convention also established three convention bodies:

- The Conference of the Parties (COP): the supreme body and also the decision making authority of the Convention
- The Secretariat: prepares COPs and meetings of subsidiary bodies, receives and controls national reports.
- Subsidiary Body for Scientific and Technological Advice (SBSTA): provides COP with scientific, technological and methodological matters.
- Subsidiary Body for Implementation: gives COP advice on the implementation of the Convention[79]

As being an international treaty, the Convention also contains regulations concerning financing, what is done through the Global Environmental Facility, Dispute Settlement, adoption and amendments to the Convention and the Annexes.[80]

The text does not contain explicit reduction targets but just limitations, also no explicit time frame, so it can be said to be very vague. Another interesting fact is that it sees the primacy of economic and trade imperatives over the implementation of its own provisions.[81] However, it can be seen as first step in regulating emissions of Greenhouse Gases.

3.3 From the UNFCCC to the Kyoto Protocol

Some significant issues were left unclear after the signing of the UNFCCC and so the INC got the task to prepare the COP 1 which was about to take place in Bonn. In the six summits process was hardly made, that was in part due to the new United States president, but also that there was no clear leadership, as the European Union could not find a position on an energy-tax which should have been the heart of an European climate change policy. In the forefront of the Berlin summit it became clear that there was no chance in adopting a protocol, and that the best outcome of COP1 would be a mandate for further negotiations.[82]

[79] Brambilla (2004), page 55-58; Oberthür et al (2000), page 69
[80] Oberthür et al (2000), page 70-71
[81] Pallemaerts et al (2006), page 31
[82] Oberthür et al (2000), page 75-77

This expectation should prove right and only in the last days of COP 1 in Berlin the mandate was given to build an Ad Hoc Working Group – the Ad Hoc Group on the Berlin Mandate (AGBM). The Working Group was open for all Parties and its aim was to elaborate a protocol or another binding treaty ready for signing at COP 3 in Kyoto.[83]

The AGBM met eight times even besides COP 2 that examined the progress and determined the way for the last three summits before COP 3 in Kyoto. During the negotiations the known cleavages emerged again, so it seems that it was a good strategy to assign Japan with COP 3 because it would be interested in a good outcome as the conference host.[84]

At the beginning of the meeting in Kyoto a lot of questions were still not solved. The intensive deliberations were going on for two weeks, and the Protocol itself was adopted in the night of the last day.

In the center of the Kyoto Protocol are the commitments of the industrialized countries to reduce their GHG emissions in the period from 2008 to 2012 by 5% of the 1990s levels.[85] The Annex B of the protocol contains explicit limitation target for each UNFCCC Annex I country: this is 92% of base year emissions for the whole European Union and 93% for the United States. [86]

The Protocol contains new regulations and mechanisms that the countries can use to fulfill their commitments. The six Greenhouse Gases Carbon Dioxide (CO_2) Methane (CH_4) Nitrous Oxide (N_2O) Hydrofluorocarbons (HFCs) Perfluorocarbons (PFCs) and Sulphur hexafluoride (SF_6) are summoned up in a basket so that there is no obligation for each of these gases but on the sum of it.[87]

To meet their obligations Annex I parties can use the so-called Kyoto mechanisms, Joint Implementation (JI), the Clean Development Mechanism and also emission trading. Joint Implementation allows transferring and acquiring of emission reduction units resulting from projects aimed at reducing emissions from other Annex I

[83] Oberthür et al (2000), page 80
[84] Oberthür et al (2000), page 91
[85] Oberthür et al (2000), page135
[86] Kyoto Protocol, Annex B
[87] Kyoto Protocol, Annex A

parties.[88] This is a classical economic approach, as the action undertaken in other countries might be cheaper than in the own country.[89]

The Clean Development Mechanism allows Annex I parties to finance projects in Non-Annex I countries and therefore getting emission credits. Emission credits of this mechanisms are called Certified emission reductions and can be obtained form the year 200 up to the first commitment period and then be used to achieve compliance.[90] From an environmental point of view this mechanism is not neutral as there is no corresponding reduction of the amount assigned to another party.[91]

Maybe the most important item of the Protocol is the emission trading system that it introduces. It is a so called cap-and-trade system, where emission credits that are not used by one state can be transferred or sold to another state which so can fulfill his obligations. At the end of the Kyoto meeting many questions concerning this mechanism were unsolved like when it should begin, who should be participating, what amount of the obligations can be fulfilled by purchased emission credits and last but not least there were no rules set out for controlling and enforcement of this scheme.[92]

Burden Sharing is another important provision of the Kyoto Protocol. It allows regional economic integration organizations to become contracting party jointly with member states. This principle is well lined out in the Protocol and is used by the European Union.[93]

The Protocol contains a double threshold for getting into effect what is very unusual for an international agreement. 55 parties have to ratify the treaty with including Annex I parties accounting for more than 55% of GHG emissions.[94] The principle of common but differentiated responsibilities of the UNFCCC was again refreshed by the protocol, although it was opposed by the United States of America, which wanted responsibilities for at least some of the developing countries. Besides the new mechanisms the Protocol contains explicit rules for monitoring and keeping records

[88] Kyoto Protocol, Art. 6
[89] Oberthür et al (2000), page 203-216
[90] Kyoto Protocol, Art. 12
[91] Pallemaerts et al (2006), page 39
[92] Oberthür et al (2000), page 243-252
[93] Pallemaerts et al (2006), page 39-41
[94] Pallemaerts et al (2006), page 41

of the emissions and trades. Parties have to report their emissions by submitting annual emission inventories and national reports at regular intervals.

For helping states adapting to climate change the protocol established an Adaption Fund, which is financed mainly with a share of proceeds from CDM project activities.[95]

Although the Protocol can be seen as a big step in environmental politics, some of its provisions had to be further elaborated in the following COPs, mainly in Marrakesh in 2001 with the so-called Marrakesh Accords. The Protocol was adopted in Japan on 11 December, it entered into force on 16 February 2005.[96]

3.4 From the Kyoto Protocol to recent years

As we have seen some crucial questions remained unsolved at Kyoto, thus observers expected that these were finalized in Buenos Aires at COP4. During the meeting it became clear that further would be needed to solve the problems and so the delegates agreed on the two years "Buenos Aires Plan of Action" that contained a menu of options and an agenda for further negotiations.[97] Two years later at COP 6 in The Hague no agreement could be achieved and thus the president of the COP suspended the meeting without agreement. The meeting was resumed in July 2001 in Bonn termed COP 6 "bis" and marked a crucial test for the survival of the UNFCCC and Kyoto Protocol itself. After ministerial-level negotiations an agreement could be reached that was translated into a formal decision which was put off again to COP 7.[98]

The COP 7 took place in Marrakesh in November 2001. At this meeting the "Marrakesh Accords" were adopted, they comprise of 23 decisions containing detailed rules for the implementation of the Kyoto Protocol and the Framework

[95] Kyoto Protocol, Homepage
[96] Kyoto Protocol, Homepage
[97] Pallemaerts et al (2006), page 42
[98] Pallemaerts et al (2006), page 42

Convention. They were drawn up as a draft at this time and formally adopted after the Kyoto Protocol entered into force in Montreal at COP/MOP 1.[99]

The COP 11 or COP/MOP 1 was one of the biggest environmental conferences after Kyoto, attracting especially business attention as a result of the European emission trading system and the Clean Development Mechanism.[100] At the end of the negotiations the “Montreal Action Plan” was built to set a road map for negotiating deeper cuts after the Kyoto Protocol’s timeframe.

Following Art. 3, paragraph 9 of the Kyoto Protocol the COP/MOP1 also established the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP). Until the end of August 2008 the AWG-KP met for six times to work on its mandate to complete its work as soon as possible so “that there is no gap between the first and second commitment period of the Kyoto Protocol.”[101] At the time of the writing of this paper no accomplishments are available for the second period of the Kyoto Protocol.

[99] Pallemaerts et al (2006), page 42
[100] COP 11
[101] AWG-KP

4. United States Climate Change Policy

This chapter has the task to describe United States action in the field of climate change. As a start the position of the United States at the multilateral negotiations of the UNFCCC and the Kyoto Protocol is described, ranging from George H.W. Bush's opposition to international treaties, to Bill Clinton's engagement for the Kyoto Protocol to George W Bush's refusal to admit it to the Congress for ratification.
Next the chapter portrays the shifts in internal policies for combating climate change, from reluctance or ignorance of George H.W. Bush to take action, to Clinton's ambitious programs and to George W. Bush's actual program to reduce greenhouse gas emissions.
Then the chapter describes sectoral actions in the field of energy, transport, industry, agriculture, forestry and waste. A short characterization of programs in the Research and Education Field is then focus of the enquiry. As it seems to be convenient for the work one section describes actions taken by non-federal entities like state governments, NGO's and private entities.
To round the chapter up and make comparison easier a resume is made about the findings in the various fields.

4.1 The United States and the International Climate Change Regime

President George H.W. Bush did not accept scientific assessment of the IPCC that led to the negotiations of the UNFCCC. Thus the United States position at the meeting was that they refused binding targets and timetables to reduce CO2 emissions to 1990 levels by 2000. This action was founded on ideological reasons because Bush administration's own analysis showed that such commitment was achievable.[102] At the end of the negotiations in Rio de Janeiro Bush's demand for flexibility was met so the president pledged support for the convention. The United States was one of the first nations ratifying the UNFCCC.[103]

[102] Harris (2000b), page 38
[103] Rabe (2004), page 10

Within the 1992 presidential campaign Bill Clinton and Al Gore made climate change to a major topic, and promised to take a new and creative approach when elected. However, the United States were not able to fulfil obligations under the UNFCCC because between 1990 and 2000 the GHG level increased by 15%. In 1995 Clinton signalled commitment to an agreement that would move beyond UNFCCC and endorsed the Berlin Mandate.[104]

In 1997 the Congress passed the Byrd-Hagel resolution that required the president to include two documents when submitting any climate change agreement to the senate: "(1) a detailed explanation of legislation or regulations that would be required to implement the agreement, and (2) a detailed analysis of the financial and economic costs to the United States incurred by implementing the agreement submitted to the Senate"[105] It also required the United States to refrain from signing any climate change agreement that does not impose commitments on developing countries and that may potentially have a serious impact on US economy. The resolution itself is nonbinding and highly questionable, but it represents a signal that Senate was not going to let White House have policy discretion to set the US Climate Change agenda. [106]

In December 1997 at the negotiations in Kyoto the administration announced that it would not accept binding reduction commitments unless developing countries also agreed to take such actions, and as long as countries had flexibility in implementing agreements – trade emissions, emissions budgets etc.[107] The negotiators of the Clinton administrations had to assess congressional criticism whatever measures they supported what made the negotiations uncomfortable for them.[108]

However, Clinton agreed to the Kyoto Protocol, but prospects were bleak because of the failure to gain binding commitments for the developing countries. Clinton signed it at Buenos Aires 1998, but repeated that it would not be submitted to senate until the meaningful participation and flexible measures conditions were met.[109]

[104] Rabe (2004), page 11-13
[105] Bryner (2000), page 116
[106] Park (2000), page 83-84
[107] Bryner (2000), page 116
[108] Bryner (2000), page 126
[109] Bryner (2000), page 117

The United States impact on the Kyoto Protocol is enormous:

- comprehensive approach that includes sum of all gases
- consideration of GHG sinks diminishes the necessary CO2 reductions.
- emission trading was pushed through in principle
- Exclusion of international air and sea transport: [110]

In the presidential elections 2000, global warming was not an important campaign issue, Democrats supported ratification of the Protocol, Republicans opposed ratifying it. George W Bush said that he was concerned about the threat of global warming, but opposed the Kyoto Protocol.[111] In March 2001 George Bush announced that he would not submit the Kyoto Protocol to US-senate for ratification.[112] As a result the delegation at COP5 "bis" in Bonn decided to act as observers.

4.2 Overview of the United States Climate Change Policy

President Reagan viewed climate change policies as fundamentally at odds to economic growth and prosperity. So the first and most important climate change-related bill of the 1980s was the 1987 Global Climate Protection Act that was pushed through Congress by Albert Gore and Timothy Wirth.[113]

George H.W. Bush was less ideological opposed than Reagan but showed no personal interest in the issue. Thus policies were left to Domestic Policy Council, whose members were mainly concerned with the economic consequences of limiting Greenhouse Gas emissions. At the end of Bush's administration climate change had moved from science to the economic and political sphere and there was a growing emphasis in the climate change debate.[114]

In October 1993 President Clinton released a Climate Change Action plan that became the basis for the National Action Plan that promised reduction of greenhouse gas emissions in the year 2000 to 1990 levels, 50 new programs containing energy

[110] Missbach (2000), page 140-141
[111] Park (2000), page 86
[112] Pallemaerts et al (2006), page 42
[113] Park (2000), page 80
[114] Park (2000), page 81-82

efficiency for commercial, residential and industrial users etc. Republican congress only approved half of the funds requested to comply with the UNFCCC.[115]

In October 1997 Clinton issued a new plan and called for a 5 year $ 5 billion program of tax incentives, research and development aimed at reducing CO_2 emissions by 2008 and would eventually initiate an emission trading scheme for greenhouse gases.[116]

The opposition in congress was bipartisan and in fiscal year 1999 no money for climate change scheduled. The congress banned any efforts to formulate and issue regulations of any other action to implement or prepare for the implementation of the Kyoto Protocol until it has been ratified by the Senate.[117]

In February 2002 President Bush set a national goal to reduce greenhouse gas intensity, what is defined as amount of CO_2 equivalents per unit of gross domestic product (GDP), of the American economy by 18 percent by 2012. If the US meets this target it will prevent the release of more than 1,833 teragrams of CO_2 equivalent to the atmosphere, adding to the 255 Tg CO_2 Eq avoided in 2002.[118]

Following actions shall help to achieve this goal:"

- An interagency, cabinet level committee to coordinate and prioritize federal research on global climate science and advanced energy technologies
- increased the federal budget for climate change activities
- proposed tax incentives that help spur GHG reductions by spurring cleaner, renewable energy and more energy-efficient technologies"[119]

The National Climate Change Technology Initiative (NCCTI) was created by the President in 2001 to:

- "evaluate the state of US climate change technology research and development (R&D) and make recommendations for improvement;
- provide guidance on strengthening basic research at universities and national laboratories, including the development of advanced mitigation technologies that offer the greatest promise for low-cost reductions of GHG emissions;
- develop opportunities to enhance private-public partnerships in applied R&D to expedite innovative and cost-effective approaches to reducing GHG emissions;
- make recommendations for funding demonstration projects for cutting-edge technologies;
- Evaluate improved technologies for measuring and monitoring gross and net terrestrial GHG emissions."[120]

[115] Bryner (2000), page 113-115
[116] Bryner (2000), page 117
[117] Bryner (2000), page 118
[118] US Climate Action Report 2006, page 37
[119] US Climate Action Report 2006, page 37
[120] US Climate Action Report 2006, page 37-38

In February 2002 President Bush established the cabinet-level Committee on Climate Change Science and Technology Integration (CCCSTI). This was charged with a number of basic principles for guiding and directing climate change activities:

- "be consistent with the long-term goal of stabilizing GHG concentrations in the atmosphere
- be measured and continually build on new scientific data
- be flexible to adjust to new information and take advantage of new technology
- ensure continued economic growth and prosperity
- pursue market-based incentives and spur technological innovation
- base efforts on global participation, including developing countries." [121]

For coordinating federal activities two multi-agency programs were established under CCCSTI auspices: the US Climate Change Science Program (CCSP) led by US Department of Commerce (DOC), and the US Climate Change Technology Program (CCTP) led by the US Department of Energy (DOE). Their work is to review "coordinate and integrate Federal activities, review progress and make recommendations."[122]

To achieve the president's goal, federal policies and measures are designed to balance near and long term measures, voluntary and regulatory activities, and research and development in various sectors.[123] Some actions are cross-sectoral in nature and thus mentioned in this chapter as the following subchapters concentrate on sectoral activities.

The Energy Policy Act of 2005 has far-reaching impacts on US energy economy. It contains many provisions that are planed to reduce the emission of GHGs, like tax breaks for production from advanced nuclear power; business solar investment tax credits. Furthermore the EPAct authorizes DOE to enter into loan guarantees for a variety of early commercial projects that use advanced technologies that avoid, reduce or sequester air pollutants.[124] In addition it "mandates an increase in the renewable content of gasoline from 4 billion gallons (15.1 billion litres) in 2006 to 7.5 billion gallons (28.4 billion litres) in 2012, establishes 16 new efficiency mandates covering a variety of appliances."[125] US agencies are provided to undertake a range

[121] US Leadership and Presidential Commitment
[122] US Leadership and Presidential Commitment
[123] US Climate Action Report 2006, page 38
[124] US Climate Action Report 2006, page 39
[125] US Climate Action Report 2006, page 39-40

of cooperative activities designed to reduce the GHG intensity of large developing countries.

EPA introduced the Energy Star program as voluntary labelling program in 1992, designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. Nowadays it is on major appliances, office equipments, lighting and also extended to cover new homes and commercial and industrial buildings. The partnership has 12 000 private and public sector organizations and delivered energy and cost savings of about $16 billion in 2007 alone.[126] Energy Star works in various fields so there is Energy Star for the residential market, which focuses on home envelope, heating and cooling systems, Energy Star-labelled products covers efficient products for home and business, Energy Star for Commercial Market and Energy Star for Industry.[127]

The Guidelines for Voluntary GHG Emissions Reporting under section 1605(b) of the Energy Policy Act of 1992 were revised and intend to encourage utilities, industries, farmers etc. to submit comprehensive reports to an on-line registry on their emissions and emission reductions, including sequestration. In 2004 226 companies filed GHG reports.[128]

The Federal Energy Management Program, started in 1973, promotes energy efficiency and the use of renewable energy resources at federal sights and thereby helps to save energy and taxpayer's money.[129]

The Climate Leader program was launched in early 2002 to encourage individual companies to develop long-term, comprehensive climate change strategies. Partners set corporate-wide GHG reduction goals and made inventories of their emissions to measure progress.[130] In July 2008, the number of participants exceeded 200 members.[131]

Being part of EPA's Clean Energy Initiative, the Green Power Partnership has more than 600 partners committed to purchasing more than 4 million megawatt hours of green power.[132] Partners range from companies, local, state and federal

[126] Energy Star History
[127] US Climate Action Report 2006, page 41-42
[128] US Climate Action Report 2006, page 39
[129] Federal Energy Management Program
[130] US Climate Action Report 2006, page 39
[131] Climate Leaders Press Release 7/24/2008
[132] US Climate Action Report 2006, page 39

governments to colleges and universities,[133] and have agreed to buy a certain percentage of electricity of green power provider and therefore receive valuable recognition.[134]

Launched by EPA in 2005 the Clean Energy-Environment State Partnership Program has reached 16 member states. This program encourages states to develop and implement cost-effective clean energy and environmental strategies.[135]

4.3 Sectoral Policies and Measures within the United States

4.3.1 Energy

Residental and Commercial sectors represent approximately 35 % of US GHG emissions. Programs in the residential and commercial sector are very similar. The Commercial Building Energy Alliances are designed to minimize the energy and environmental impact of commercial buildings and reduce energy costs for these buildings.[136]

Building America is a partnership that is financed by the U.S Department of Energy. It conducts research to make homes more energy efficient.[137] The U.S. Department of Energy's Appliances and Commercial Equipment Standards Program develops test procedures and minimum efficiency standards for residential appliances and commercial equipment.[138] To develop cost-effective, energy-efficient, advanced technologies for residential and commercial building the DOE invented the Emerging Buildings Technologies program.[139]

Low Income families are assisted by the Weatherization Assistance Program in meeting their energy needs and thereby also reducing GHG.[140] The State Energy Program strengthens and supports the states in promoting energy efficiency and adopts renewable energy technologies. It was created in 1975 and over time consolidated so that it now consists of several pieces of legislation.[141]

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[133] Green Power Partnership Communities
[134] Green Power Partnership
[135] State Partnership Program
[136] Commercial Building Energy Alliances
[137] Building America
[138] Appliances and Commercial Equipment Standards
[139] US Climate Action Report 2006, page 41
[140] US Climate Action Report 2006, page 41-42
[141] State Energy Program

The industrial sector is responsible for about 30% of GHG emissions.[142] The Industrial Technologies Program (ITP) seeks to reduce energy intensity of the industrial sector through coordinated research and development, validation and dissemination of energy-efficiency technologies and operating practices. In Fiscal year 2007 it requested a budget of $ 45.6 billion, what represents a reduction of $ 11.3 million from 2006 appropriation, reflecting a shift away from activities that industry can perform on its own behalf.[143] According to the Climate Action Report 2005 it consists of five program areas: ITP Research and Development, ITP Best Practices and Save Energy Now, ITP Industrial Assessment Centres, ITP Process Technologies and ITP Crosscutting Technologies.[144]

The Climate Vision – Voluntary Innovative Sector Initiatives: Opportunities Now – program is a public-private partnership initiative launched by the Department of Energy on February 12, 2003. Other agencies participating in Climate VISION include the Environmental Protection Agency, Department of Transportation, and the Department of Agriculture.[145] It is a program that assists industry efforts to accelerate the transition to practices, improved processes, and energy technologies that are cost-effective, cleaner, more efficient, and more capable of reducing, capturing or sequestering GHGs. Partners represent a broad range of industry sectors that account for about 40-45 percent of total US emissions.[146]

Generation of Electricity by using fossil fuels is a major contributor to CO_2 emissions in the US. CO_2 reductions in this field shall be gained through the development of energy efficient technologies for power generation and transmission, cleaner fuels, and the use of nuclear power and renewable resources.[147]

In the field of nuclear power there is the Nuclear Energy Plant Optimization Program and the Nuclear Power 2010 Program, which started in 2002 and supports the

[142] US Climate Action Report 2006, page
[143] Industrial Technologies Program
[144] US Climate Action Report 2006, page 42
[145] Climate Vision - Mission
[146] US Climate Action Report 2006, page 38
[147] US Climate Action Report 2006, page 43

deployment of new nuclear power plants as well as the development of advanced nuclear plant technologies.[148]

Another focus is on renewable energy sources, especially wind power, which has the potential to supply more than one and a half times the current electricity consumption of the United States.[149] Hydro-Power is predicted to decline through 2020 due to environmental issues, regulatory complexity and energy economics.[150] Solar Energy programs shall mainly improve the performance of solar energy systems and reducing development, production, and installation costs to competitive levels, thereby accelerating large-scale usage across the nation.[151]

In 2000 the GeoPowering the West program was initiated by the DOE, resulting in working groups that were active in five states in 2002.[152] Programs are working that geothermal energy becomes an economically competitive contributor to the US energy supply, in 2004 geothermal electricity generation displaced 11.000 short tons of CO_2 emissions.[153] Another contribution was made by biomass technology that displaced approximately 50.000 tons of CO_2 emissions in 2004.[154]

The Distributed Energy program develops diverse high-efficiency, integrated, distributed-generation and thermal energy technologies at market-competitive prices so that private and commercial entities choose to use them.[155] For 2004 a budget of $57 million was requested by DOE for this program.[156]

An EPA program in the energy field, the Clean Energy Initiative, consists of two partnership programs promoting cost-effective technologies that offer improved efficiencies and lower emissions than traditional energy supply options. Together they are estimated to avoid 29 Tg CO_2 Eq in 2012.[157]

[148] US Climate Action Report 2006, page 43; Nuclear Power 2010 Program
[149] Wind Energy Resource Potential
[150] Hydropower Resource Potential
[151] US Climate Action Report 2006, page 43
[152] Geothermal Energy in the United States
[153] US Climate Action Report 2006, page 43
[154] US Climate Action Report 2006, page 43
[155] US Climate Action Report 2006, page 44
[156] Distributed Generation Technology Development – Budget
[157] US Climate Action Report 2006, page 44

In 2001 the Combined Heat and Power (CHP) Partnership was launched. It provides technical assistance to organizations that invested in CHP projects and helps state governments to encourage investment in CHP. The program includes 170 partners who have installed 3,460 MW of operational CHP.[158]

The Carbon Sequestration Program's focus is on "developing capture and separation technologies that dramatically lower the costs and energy requirements of reducing CO_2 emissions from fossil fuel treatment".[159] This program also contains the Carbon Sequestration Leadership Forum (international), the Regional Sequestration Partnership, the FutureGen Clean Coal Projects and the Carbon Sequestration Core Program.[160] The Woody Biomass agreement, signed by the secretaries of Agriculture, Energy and Interior, encourages the use of woody biomass from forest, rangeland and woodland wherever ecological sustainable.[161]

4.3.2 Transportation Sector

Under the Corporate Average Fuel Economy Program, automobile manufacturers are required to meet average fuel economy standards for the light-duty vehicle fleet sold in the United States.[162]

The SmartWay Transport partnership is a voluntary partnership between EPA and the transportation industry launched in 2004 that aims to increase energy efficiency to save fuel and reduce emissions.[163] The partnership-programs can be divided into two groups: SmartWay Vehicle and SmartWay Transport.[164]

[158] US Climate Action Report 2006, page 44
[159] US Climate Action Report 2006, page 44
[160] Carbon Sequestration Program
[161] US Climate Action Report 2006, page 44
[162] Corporate Average Fuel Economy
[163] US Climate Action Report 2006, page 44
[164] SmartWay Basic Information

A Renewable Fuel Standard was established by EPA to ensure that gasoline contains a specific volume of renewable fuel, starting in calendar year 2006. This provision shall double the amount of renewable fuel usage by 2012[165]

The Clean Cities program was introduced in 1993, with the goal of reducing the use of petroleum in the transportation sector. The program shares its goals with international groups in India, Peru and the Philippines.[166]

Founded in the early 1990s[167], the Congestion Mitigation and Air Quality Improvement Program "provide states with funds to reduce congestion and to improve air quality through transportation control measures and other strategies."[168]

As aviation in the United States makes up to 3 percent of the national GHG inventory and about 12 percent of transportation emissions[169], DOT is involved in several different projects that objectives are to reduce emissions of GHG from aircrafts: The Voluntary Airport Low Emissions (VALE) program, System for Assessing Aviation's Global Emissions (SAGE), Partnership for Air Transportation Noise and Emissions Reduction (PARTNER), Next Generation Air Transportation System (NGATS) and has also international activities, as it works together with the International Civil Aviation Organization (ICAO) and the IPCC.[170]

Research and Development in Biomass and Biorefinery Systems is fostered by DOE, the US Department of Agriculture and industry work. Biomass shall be converted by advanced technologies into affordable industrial products. An example for this is alternative fuels like gasohol that accounts for approximately 10 % of the fuel used on US highways. The efforts could yield an estimated 0.6 Tg CO_2 EQ in avoided emissions[171]

Formed in 1998 by EPA, the Society of Automotive Engineers and the Mobile Air Conditioning Society Worldwide, the Mobile Air Conditioning Climate Protection

[165] US Climate Action Report 2006, page 45
[166] Clean Cities – Mission and Background
[167] Congestion Mitigation and Air Quality Improvement Program
[168] US Climate Action Report 2006, page 45
[169] US Climate Action Report 2006, page 45
[170] Aviation and Emissions Reductions
[171] US Climate Action Report 2006, page 46

Partnership aims to reduce the climate impact of mobile air condition and was joined by a number of other states like Australia, Canada and Europe, but also by NGOs.[172]

4.3.3 Industry: Non-CO_2 Sector

Several voluntary programs were implemented to reduce emissions of methane. EPA runs four voluntary methane programs: AgSTAR; Natural Gas STAR, Coalbed Methane Outreach Program and Landfill Methane Outreach Program LMOP.[173]

Coalbed Methane Outreach Program (CMOP) is a voluntary program established 1994 that aims at reducing methane emissions in coal mining.[174] The strategy to control emissions of High-GWP gases is a combination of industry partnerships and regulatory mechanisms to minimize atmospheric releases of HFCs, PFCs and SF_6.[175]

Emissions of HFCs, PFCs and SF_6 shall be limited by the Environmental Stewardship program in three industrial applications: semiconductor production[176], electric power distribution[177] and magnesium production[178] .

Within the Voluntary Aluminium Industry Partnership which was launched in 1995, participating companies try “to improve “aluminium production efficiency while reducing perfluorocarbon (PFC) emissions”[179]

The Significant New Alternatives Policy (SNAP) Program has initiated programs to monitor and minimize emissions of global-warming gases used as substitutes for ozone-depleting chemicals. SNAP is projected to reduce emissions by 150 Tg CO_2 Eq in 2012.[180]

[172] Mobile Air Conditioning
[173] EPA – Methane – Voluntary Programs
[174] Coalbed Methane Outreach Program
[175] US Climate Action Report 2006, page 46
[176] EPA’s PFC Reduction/Climate Partnership for the Semiconductor Industry
[177] SF6 Emission Reduction Partnership for Electric Power Systems
[178] SF6 Emission Reduction Partnership for the Magnesium Industry
[179] Voluntary Aluminium Industry Partnership
[180] US Climate Action Report 2006, page 47

EPA's Green grocer program works with supermarkets and equipment manufacturers and promotes the development of new, energy-efficient technologies that reduce emissions of fluorocarbon refrigerants. The first stage of this program is underway.[181]

The Voluntary Code of Practice for the Reduction of Emissions of HFC and PFC Fire Protection Agents project was launched in 2002 "with the dual goals of minimizing nonfire emissions of HFCs and PFCs, used as fire-suppression alternatives to ozone-depleting halons, and continuing to protect people and property from the threat of fire through the use of proven, effective products and systems."

4.3.4 Agriculture and Forestry Sector

Many USDA actions and activities reduce GHG emissions and increase carbon sequestration. In 2003 it announced that it would give consideration to GHG benefits in implementing the Nation's forest and agriculture conservation programs. The Environmental Quality Incentives Program (EQIP) provides "financial assistance for conservation practices on working farm and ranch lands" [182] The Conservation Reserve Program (CRP) is a voluntary program for agricultural landowners and gives annual rental payments and cost-share assistance to establish long-term resource conserving covers for eligible farmland.[183] Under a new rule of the FSA it is allowed to sale carbon credits for lands enrolled in the CRP. USDA estimates that this program will offset GHG emissions by 3.1 Tg CO_2 Eq in 2012.[184]

Another voluntary program to promote conservation on working crop-land, pasture, and range land, as well as forested land that is an incidental part of an agricultural operation is the Conservation Security Program (CSP). Under CSP NRCS provides enhancement payments to promote energy conservation and the production and use of renewable fuels and electricity.[185]

AgSTAR, sponsored by EPA, USDA and DOE, encourages the voluntary use of methane-recovery technologies at the confined animal feeding operations that

[181] US Climate Action Report 2006, page 47
[182] US Climate Action Report 2006, page 47
[183] Conservation Reserve Program
[184] US Climate Action Report 2006, page 48
[185] US Climate Action Report 2006, page 48

manage manure as liquids or slurries.[186] Established in 1994 the number of operational digester systems has grown to more than 111 systems across the United States.[187]

Established by the 2002 Farm security and Rural Investment Act, USDA provides loan guarantees and grants to agricultural producers and rural small businesses to purchase renewable energy systems and improve energy efficiency.[188]

In the forestry sector the President's Healthy Forest Initiative includes the National Fire Plan and the joint federal-state 10-year Comprehensive Strategy Implementation Plan. Both efforts have the goal to increase biomass and wood fibre utilization as an integral component of restoring the Nation's precious forests, woodlands and rangeland.[189]

The Forest Land Enhancement Program (FLEP) is part of the Farm Security and Rural Investment Act of 2002 and provides assistance to nonindustrial private forest landowners for forest stewardship. It promotes carbon sequestration by tree planting, forest improvements and agro-forestry practices.[190]

Beside these measures the United States is member to forest conservation partnerships. The Tropical Forest Conservation Act (TFCA) was enacted in 1998 and encompasses now 12 agreements that will directly generate more than $135 million for tropical forest conservation in participating countries. It is also intended to strengthen civil society.[191] In July 2003 the President's Initiative Against Illegal Logging was launched to assist developing countries in combating illegal logging, including the sale and export of illegally harvested timber and fighting corruption in the forest sector. It focuses on three critical regions: the Congo Basin, the Amazon Basin and Central America, and South and Southeast Asia. The key strategies are good governance, community-based actions, technology transfer and harnessing market forces.[192]

[186] US Climate Action Report 2006, page 48
[187] AgSTAR Accomplishments
[188] Farm security and Rural Investment Act; US Climate Action Report 2006, page 48
[189] US Climate Action Report 2006, page 48
[190] US Climate Action Report 2006, page 48
[191] US Climate Action Report 2006, page 84-85
[192] US Climate Action Report 2006, page 85

4.3.5 Waste management Sector

The Landfill Methane Outreach Program (LMOP) is an EPA program to reduce GHG emissions at landfills by supporting the recovery and use of landfill gas for energy. The projects reductions are estimated to be 24 Tg CO_2 Eq in 2012.[193] In December 2007 LMOP had more than 700 partners, the first projects started in 1995.[194]

Established under the Clean Air Act in March 1996, the Stringent Landfill Rule requires large landfills to capture and combust their landfill gas emissions. It was established at state level in 1998. Reductions for 2012 may remain the same as of 2002, 9 Tg CO_2 Eq[195].

EPA's Waste Wise program encourages recycling and source reduction. EPA projects reductions could increase to 21 Tg CO_2 EQ in 2012. The Federal Woody Biomass Working Group is working on alternative disposal options for woody biomass resulting from catastrophic events like hurricanes or floods. This effort may serve as an alternative to green waste disposal in landfills.[196]

4.4 International Actions of the United States

In the United States there are numerous governmental agencies that are involved in providing "trade and development financing to developing and transition countries."[197] Reasonably the US Agency for International Development represents the primary vehicle, but also US EPA, US DOE, the US Department of State, the US Department of Agriculture, the National Oceanic and Atmospheric Administration, NASA, and the US Department of Commerce have their own development programs that have now incorporated climate change policies.[198]

[193] US Climate Action Report 2006, page 49
[194] Landfill Methane Outreach Program - Accomplishments
[195] US Climate Action Report 2006, page 49
[196] US Climate Action Report 2006, page 49
[197] US Climate Action Report 2006, page 86
[198] US Climate Action Report 2006, page 86-87

US agencies facilitate the transfer of technologies by providing official assistance, export credits, project financing, risk and loan guarantees and investment insurance to US companies as well as enhancements for host-country financial institutions.[199]
To mention here are the Overseas Private Investment Corporation (OPIC), the Export-Import Bank (Ex-Im), USAID Development Credit Authority, USAID Global Development Alliance, US Trade and Development Agency and Private Sector Assistance.[200]

USAID included global climate change in 1991 in its development funding and spent approximately $2.6 billion on climate-related development programs.[201] USAID's Global Climate Change Program is active in more than 40 countries and has dedicated over $ 1 billion since 2001 to promote clean energy technology, sustainable land use and forestry, adaption to climate change, climate science for decision making. [202]

The Asia Pacific Partnership on Clean Development and Climate is a key means of implementing Title XVI of the EPAct 2005 and shall accelerate the development and commercialization of clean energy technologies and practices. Established in January 2006 the partnership includes Australia, China, India, Japan, the Republic of Korea, and the United Stated and has established eight public/private sector task forces on clean fossil energy, renewable energy and distributed generation, power generation and transmission, steel, aluminium, cement, coal mining and buildings and appliances.[203]

Launched in November 2004 the methane to markets partnership encompasses 14 nations that want to reduce methane emissions.[204] It has the potential to deliver by 2015 annual reductions in methane emissions of up to 50 million metric tons of carbon equivalents or recovery of 500 billion cubic feet of natural gas.[205]

[199] US Climate Action Report 2006, page 87
[200] US Climate Action Report 2006, page 87-89
[201] US Climate Action Report 2006, page 77
[202] USAID Global Climate Change Brochure
[203] US Climate Action Report 2006, page 81
[204] Methane to Markets Partnership
[205] US Climate Action Report 2006, page 81

The International Partnership for the Hydrogen Economy (IPHE) was established in 2003 and is committed to accelerate the development of hydrogen and fuel cell technologies.[206] Partners are developed and also from developing countries: India, Germany, Korea, Brazil, China, and the European Union.[207]

The Carbon Sequestration Leadership Forum (CSLF) focuses on developing improved and cost-effective technologies for the separation and capture of CO2, its transportation and long-term storage.[208] It comprises 22 members, including 21 countries and the European Commission. [209]

Beside of these programmes, the United States are also committed in international programmes that investigate nuclear power alternatives and research like ITER, Generation IV International Forum, Global Nuclear Energy Partnership. ITER "aims to demonstrate the scientific and technical feasibility of fusion power"[210] financed by the EU, Japan, China, India, the Republic of Korea, Russia and the United States.[211]

The Generation IV International Forum, established in 2001, is a multilateral partnership of 10 countries and the EU that is fostering international cooperation in research and development for next generation of nuclear energy systems.[212] The Global Nuclear Energy Partnership (GNEP) has the goals to expand carbon free nuclear energy and to promote non-proliferation objectives[213]

In the field of Technology Transfer the US/China Energy and Environmental Technology Centre, the Clean Energy Technology Export Initiative and the US Climate Technology Cooperation Gateway are to be mentioned.[214]

The aim of the US Climate Technology Cooperation Gateway is to promote international technology cooperation to address global climate change by providing access to information on programs online.[215]

[206] US Climate Action Report 2006, page 81
[207] International Partnership for the Hydrogen Economy
[208] US Climate Action Report 2006, page 82
[209] Carbon Sequestration Leadership Forum
[210] ITER
[211] ITER
[212] US Climate Action Report 2006, page 82
[213] US Climate Action Report 2006, page 82
[214] US Climate Action Report 2006, page 82
[215] USCTC Factsheet

At the World Summit on Sustainable Development (WSSD) in august 2002 the US Clean Energy Initiative was launched and consists of three market-oriented partnerships: Efficient Energy for Sustainable Development (EESD), Global Village Energy partnership and Partnership for Clean Indoor Air.[216]

EPA has several programs that promote energy efficiency in developing countries. The programs draw on experiences within the United States like Energy Star. Programs abroad are the Energy Efficiency Endorsement Labelling Programs, Collaborative Labelling and Appliance Standards Program and the Integrated Environmental Strategies Program. [217]

Regional programmes with US participation are the Central America Greenhouse Gas Inventory Improvement Project, and the United States-Asia Environmental Partnership.[218]

Other important programs for climate change are the International Renewable Energy Program (IREP), the Climate Technology Initiative (CTI) and the Renewable Energy and Energy Efficiency Partnership (REEEP).[219]

Beside those programs, the United States also help developing countries to undertake vulnerability assessment and adaption. Some examples are the Building Resilience through Development Assistance, the Regional Climate Outlook Forums, The Hermosillo Project: Vulnerability and Adaption Support for Mexico, Famine Early Warning System Network, the RANET Program. [220]

4.5 Research and Systematic Observations

As mentioned before, the National Climate Change Technology Initiative contains the Climate Change Science Program (CCSP) and the Climate Change Technology Program (CCTP). The CCSP was launched in February 2002 and invests $ 1.5 billion in monitoring and predicting global change. Through the CCTP robust technology

[216] US Climate Action Report 2006, page 83
[217] US Climate Action Report 2006, page 83
[218] US Climate Action Report 2006, page 84
[219] US Climate Action Report 2006, page 84
[220] US Climate Action Report 2006, page 85-86

research, development and coordination efforts are coordinated and financed with $3.0billion annually. [221]

CCSP's core approaches are:

- "scientific research: planning, sponsoring and conducting research on changes in climate and related systems"[222]
- "observation research: enhance observations and data management systems to generate a comprehensive set of variables needed for climate-related research",[223] the United States are participating in Group on Earth Observations (GEO) and Group on Earth Observation System of the Systems (GEOS)[224]
- "Decision Support: develop improved science-based resources to Aid Decision Making"[225]
- "Communications: Communicate Results to Domestic and International Scientific and User Communities, Stressing Openness and Transparency."[226]

The CCTP conducts research in Energy Use and Infrastructure, Energy Supply and Carbon Capture and Sequestration.[227] It also takes part in a variety of multilateral efforts like the International Partnership for the Hydrogen Economy, the Carbon Sequestration Leadership Forum, the Generation IV International Forum, ITER and the Global Nuclear Energy Partnership. [228]

4.6 Education, Training, Public Awareness

Climate Change Education, Training and outreach has expanded over time, encompassing various governmental agencies like the US Department of Energy, US Department of Agriculture, US Department of Interior, US Department of Transportation, US Environmental Agency, NASA and the National Science

[221] US Climate Action Report 2006, page 99
[222] US Climate Action Report 2006, page 99
[223] US Climate Action Report 2006, page 100
[224] US Climate Action Report 2006, page 100
[225] US Climate Action Report 2006, page 100
[226] US Climate Action Report 2006, page 100
[227] US Climate Action Report 2006, page 102-104
[228] US Climate Action Report 2006, page 105-106

Foundation. The CCSP has a Communications Interagency Working Group that conducts communication with stakeholders nationally and globally.[229]

4.7 Nonfederal Policies and Measures

State and local governments and private and non-profit organizations also contribute to the overall GHG reduction goal.[230] The action of state governments are seldom mentioned in press but about one third of the American states have enacted multiple policies against climate change.[231]

In many states climate change initiatives became a high priority, and they recognize the significant economic and environmental benefits and widespread public support.[232] Current examples for regional initiatives launched by states and local authorities are: West Coast Governors' Global Warming Initiative, Regional Greenhouse Gas Initiative: Western Governors' Association Clean and Diversified Energy Initiative, Powering the Plains, Carbon Sequestration Regional Partnership, US Majors Climate Protection Agreement (especially recognizes Kyoto targets), Cities for Climate Protection Campaign, Heat Island Reduction Initiative.[233]

Some states have developed Climate Action Plans to combat climate change, for example: California (April 2006), Connecticut (February 2005), Massachusetts (May 2004), New Mexico (December 2006), Oregon (December 2004).[234]

Within Lead by Example Programs state governments implement policies that are lowering GHGs within their own facilities and operations. About 35 states have some form of these programs established by now. Examples for successful programs are New Hampshire's Building Energy Conservation Initiative and the New Jersey's Green Power Purchasing Program.[235]

[229] US Climate Action Report 2006, page 111-117
[230] US Climate Action Report 2006, page 50
[231] Rabe (2004), XI-XII
[232] US Climate Action Report 2006, page 51
[233] US Climate Action Report 2006, page 51, 53
[234] US Climate Action Report 2006, page 51
[235] US Climate Action Report 2006, page 53

The Regional Greenhouse Gas Initiative, encompassing 5 states, and the Western Climate Initiative, 8 states,[236] are part of the International Carbon Action Partnership that was founded in October 2007. The purpose of ICAP is "to contribute to the establishment of a well-functioning global cap and trade carbon market."[237] Therefore it provides a forum to share experiences and knowledge.[238]

In the United States many private Sectors and NGO Initiatives are active to reduce GHG emissions: Climate Savers, Cere's Investor Network on Climate Risk, Green Power Market Development Group, Business Environmental Leadership Council, Power Switch, and Climate RESOLVE.[239]

One important initiative for this study is the Chicago Climate Exchange (CCX) that includes 25 member companies who have agreed to reduce their GHG emissions by 1 percent per year from 2003 through 2006. Electronic trading of GHG emissions began on December 12, 2003. Tradable allowances are exchange allowances and exchange offsets, the first ones are issued on the basis of forest carbon sequestration and reductions in electricity use. It is the worlds first and Americas only active voluntary, legally binding integrated trading system of GHG allowances with offset projects worldwide.[240]

4.8 Resume United States Climate Change Policy

Environmental policies, as other policies, in the United States depend on the interest of the President and strong advocates in congress. George H.W. Bush was reluctant against international obligations but at the end accepted the UNFCCC because his demand for flexibility was met. The Clinton administration was very committed to international regulations but the Senate restricted action by issuing the Byrd-Hagel resolution. However the United States fingerprint in the Kyoto Protocol is remarkable: the basket of Greenhouse gases, flexibility mechanisms, exclusion of international air

[236] International Carbon Action Partnership – Members
[237] International Carbon Action Partnership
[238] International Carbon Action Partnership
[239] US Climate Action Report 2006, page 53-54
[240] Chicago Climate Exchange

and sea transport. But without having gained any commitment regulations for developing countries, Clinton did not submit the Protocol to Senate for ratification. George W. Bush finally announced that he would not submit the Protocol to Senate for ratification. So the United States are party to the UNFCCC but not to the Kyoto Protocol.

On the domestic front one can find the same pattern: in the era of Ronald Reagan only strong advocates of climate change policies could push through regulations. George H.W. Bush accepted the UNFCCC but was not interested in pursuing climate change policies. Bill Clinton tried to engage the United States in comprehensive climate change policies but that attempt was undermined by the Senate.

President George W. Bush set national GHG emission goals but they are relative to the GDP and not absolute like it is usual in international measuring. He founded the National Climate Change Technology Initiative and a cabinet-level Committee on Climate Change Science and Technology Integration that encompasses the US Climate Change Science Program and the US Climate Change Technology Program.

Further legislation concerning climate change at nation-wide, cross-sectoral level are the Energy Policy Act, EPA's Energy Star program, the Federal Energy Management Program, EPA's Clean Energy Initiative, the Climate Leader Program and the EPA in 2005 the Clean Energy-Environment State Partnership Program.

In the residential and commercial energy sector, policies consist of various programs. Here one can find actions that reduce energy consumption and support energy efficiency: the Commercial Building Energy Alliances, Building America, the Appliances and Commercial Equipment Standards Program, and the Emerging Buildings Technologies program. The Weatherization Program assists low-income families.

The energy-industrial sector knows the Industrial Technologies Program that seeks to reduce the energy intensity and has various sub-programs. The Climate Vision program assists industry to accelerate transition to environmental friendly processes.

Within the energy sector one can find programs aiding nuclear power, for example the Nuclear Energy Plant Optimization Program, the Nuclear Power 2010 Program, and green-energy programs for wind energy and solar energy, and geothermal energy like GeoPowering the West. Other programs are the Distributed Energy

Program, the Clean Energy Initiative, the Combined Heat and Power Partnership and the Carbon Sequestration Program.

For the transportation sector the United States provide legislation like the Corporate Average Fuel Economy Program that requires certain fuel standards of automobiles, the SmartWay Transport partnership, a voluntary partnership to increase energy efficiency and to save fuel and reduce emissions. Renewable Fuels are fostered by the EPA's Renewable Fuel Standard and research and development actions by the DOE and the Department of Agriculture. The Clean Cities program shall reduce the use of petroleum in transport. The impact of mobile air conditions is tackled by the Mobile Air Conditioning Climate Protection Partnership, and overall air pollution by the Congestion Mitigation and Air Quality Improvement Program.

In the Industry-Non CO_2 sector, EPA runs following programs: AgSTAR; Natural Gas STAR, Coalbed Methane Outreach Program and Landfill Methane Outreach Program LMOP. Further programs in this area are: the Environmental Stewardship Program, the Voluntary Aluminium Industry Partnership, the Significant New Alternatives Policy and other voluntary programs.

The agriculture and forestry sector has the Environmental Quality Incentives Program, the Conservation Reserve Program (allows carboncredits to be sold), the Conservation Security Program, the AgSTAR (sponsors methane-recovery technologies), the Farm security and Rural Investment Act (loan guarantees for renewable energy systems), the President's Healthy Forest Initiative (increases biomass and wood fibre utilization), the Forest Land Enhancement Program assist private landowners for forest stewardship. To conserve rainforests the Tropical Forest Conservation Act was introduced in 1998, and in 2003 the President's Initiative Against Illegal Logging was created.

For managing greenhouse gases of the Waste Sector there is the Landfill Methane Outreach Program, the EPA's Waste Wise program, the Stringent Landfill Rule and the Federal Woody Biomass Working Group.

International Actions against climate change is conducted by various US-agencies that work abroad. Nearly all of them have their own programs that have now incorporated measures against climate change. One example is USAID that has spent $2.6 billion on climate-related development programs. The United States takes part in various international programs and forums that have an impact on greenhouse gas reductions including research programs for nuclear energy, energy efficiency and renewable energy.

Research and Systematic Observations is conducted via the Climate Change Science Program, monitoring and predicting global change, and the Climate Change Technology Program, coordinating technology research and development.

Education, Training and Public awareness is provided by programs of various US agencies like EPA, US Department of Energy and so on.

Despite federal initiatives various state and local governments, as well as private and non-profit organizations have launched their own programs. For the context of this work especially the Chicago Climate Exchange is worth mentioning as it represents a cap and trade emissions trading scheme that began in 2003. The other one worth mentioning is the International Carbon Partnership that was founded in 2007 and pursuits the establishment of a global cap and trade system.

5 European Union Climate Change Policy

The purpose of this chapter is to take a closer look on the European Union's efforts to tackle climate change in her own entity as well as in international arenas like the multilateral negotiations and international society. The first part describes the Decision taken by the Union in the multilateral process of the UNFCCC and the Kyoto Protocol, giving insight on internal factors for the position taken at the deliberations. Then the main instruments of the European Union in combating climate change are illustrated, policy instruments like the European Climate Change Program and the European Union Emission Trading Scheme. The longest part of this chapter is about policies and measures in different sectors: energy, transport, industry, agriculture, forestry and waste. Having done this the chapter findings are summarized to make a comparison to the United States' policies easier.

5.1 The European Union and the International Climate Change Regime

European Union policy on climate change developed in relation to the multilateral negotiation process. 1989 marks the beginning of European Community policy during the preparatory process for the Rio summit. The UNFCCC was ratified without having a concrete internal policy and it was on the Member States to develop programmes and establish exchange mechanism.[241]

As is often stated, the European Union takes a leader-ship role in climate change negotiations. In contrast to this observation, the Commission only has limited competency in this field, thus the Union's position is elaborated by the Council together with the Member States and the Commission.[242]

The position taken by the Union was influenced by various factors. In the energy sector, the European Union relies on 50% on self production therefore a change in

[241] Pallemaerts et al (2006), page 43
[242] Oberthür et al (2000), page 40

Energy policy was necessary, otherwise the share of imports would exceed 55-70% by 2020. Therefore the EU is interested in lowering energy consumption as well as that of fossil fuels.[243]

In the 1990s CO2 emissions in the European Union were declining because of the German reunification and decline of industry in Eastern-Germany, and the privatisation of energy-markets in Great Britain that lead to the replacement of coal through natural gas in energy production.[244]

It's also to mention that environmental NGOs have more influence within the European Union in comparison to the United States and that at this time Green Parties participated in two thirds of European Parliaments. [245]

During the Kyoto negotiations North-South cleavages emerged in the internal decision-making process. Southern EU members, supported by Ireland, demanded to increase their emissions, an increase to be balanced by the Northern Members, a good reason for an "EU-Bubble". Despite various differences, the EU's position was consistent on the outside. [246]

In the AGBM-process the position of the Union varied considerably, due to economic recession and a proposition to imply an energy tax was finally declined in 1994.[247] EU's main pursuit in this process was to establish the possibility of joint implementation by its Member States – a so called "EU-bubble".[248] At AGBM 6 in March 1997 EU ministers suggested to combine emissions of CO2 CH4 and N2O and to reduce emissions at 2010 to 15% of base year emissions and combined this proposal with the stipulation to fulfil obligations jointly.[249]

At the Kyoto Negotiations EU's diplomats had to respect Member States positions as well as the position of the whole Union what made negotiations difficult in comparison to other participants. Furthermore the leadership role was undermined by the windfall

[243] Oberthür et al (2000), page 42
[244] Oberthür et al (2000), page 42
[245] Oberthür et al (2000), page 43
[246] Oberthür et al (2000), page 44
[247] Oberthür et al (2000), page 77
[248] Oberthür et al (2000), page 82-83
[249] Oberthür et al (2000), page 89

produced by declining emission levels of the German reunification that in view of other participants were shared through the proposal of joint fulfilment of obligations. The EU regained credibility through a coherent strategy by founding an internal ad-hoc group on climate change that helped to coordinate the formation of coordinated policies and measures.[250] However the most important achievement at the Kyoto Negotiations for the European Union was that Art.4 allows regional economic integration organization to fulfil their obligations jointly, important to create the "EU-bubble"

The European Union tried to foster the international climate change regime by bilateral dialogues for example with Australia and New Zealand[251] during the AGBM process and also after the Protocol was signed by bargaining with Russia.[252]

The European Union signed the UNFCCC on 13 June 1992 and ratified it on 21 December 1993. The Kyoto Protocol was signed on 29 April 1998 and ratified on 31 May 2002.[253] Thus the EU has obligations to fulfil under the UNFCCC and the Kyoto Protocol. Within the Kyoto Protocol's commitment period from 2008 to 2012, the European Union has to cut greenhouse gas emissions by 8% from 1990 levels. The European Community and the Member States decide through internal distribution who realizes what responsibilities. However, the Union is responsible for non-compliance of their Member States.[254]

Given this short introduction to EU's actions and positions in the multilateral deliberations on climate change, the chapter will now turn to European Union's policies to combat global warming.

5.2 Overview of the European Climate Change Policy

[250] Oberthür et al (2000), page 101-102
[251] Oberthür et al (2000), page 98
[252] Douma (2006) 51-69
[253] UNFCCC – Parties and Observers, European Community
[254] Bambrilla (2004), page191-192

In June 2000 the Commission launched the first European Climate Change Programme in response to a request of the EU Council.[255] The overall goal of this effort was to identify "environmentally and cost effective additional"[256] measures to meet the target of the Kyoto Protocol. In the first phase the ECCP acted merely as catalyst and discussion forum in order to present an Action Plan in October 2001.[257] The Commission published an ECCP Report that identified 42 possible measures[258] including 12 measures to be implemented with priority.[259] The second phase ran from 2003 to 2004 and was working on the implementation of the priorities identified in the first phase.[260]

In 2005 the ECCP II was launched by the Commission to continue the programme for policy preparation and policy development. Again the Programme runs with close cooperation of stakeholders[261] and investigates policies in areas like aviation, carbon capture and storage and adaption.[262]

The ECCP II is part of the EU Climate Change Strategy post 2012 that was outlined in the Commission Communication "Winning the Battle Against Climate Change" – COM (2005) 35 and a more detailed Staff Working Paper.[263] After a meeting in 2005, EU looks forward to "reduction pathways by the group of developed countries in the order of 15-30% by 2020 and 60-80% by 2050 compared to the base line envisaged in the Kyoto Protocol."[264] Furthermore, a global approach is wanted which "includes cooperation with big industrialised countries that have opted out of Kyoto", as well as emerging "economic powers like China and India." [265]

COM (2004) 38 final contains the Environmental Action Plan (ETAP) of the European Union. The main goal of the plan is to speed up the development of environmental

[255] De Cendra de Larragon (2006), page 102
[256] COM(2006) 40 final, page 43
[257] COM(2006) 40 final, page 43
[258] EU ECCP First Phase
[259] COM(2006) 40 final, page 44
[260] EU ECCP Second Phase
[261] EU ECCP II
[262] COM(2006) 40 final, page 44
[263] COM(2006) 40 final, page 44
[264] COM(2006) 40 final, page 44
[265] COM(2006) 40 final, page 44

technologies within the EU and globally encompassing areas related to climate change.[266]

Decision 280/2004/EC of 11 February 2004 contains the new legal basis for the monitoring mechanism for Community greenhouse gas emissions within the EU and therefore is important for the Kyoto Protocol. The Decision contains "new monitoring and reporting requirements that cover areas such as the registries for flexible mechanisms set out under the Kyoto Protocol."[267] Member States have to report to the Commission "not later than 15 January each year (X) their anthropogenic greenhouse gas emissions by sources and removal by sinks for the year before last (X-2). By 15th March 2005 and every two years thereafter, Member States are required to report on projected progress."[268] Decisions 2005/166/EC includes additional implementing provision to Decision 280/2004/EC.[269]

In July 2003 Directive 2003/87/EC was adopted and thereby established the legal framework for an Emission Trading Scheme (EU ETS) covering CO2 releases. The deadline for implementation into domestic law was the 31st December 2003. By 31st March 2004 Member States had to submit their National Allocation Plans (NAPs) for the period 2005 – 2007.[270]

So the EU ETS, also representing the world's first international trading system for CO_2 emissions, came into force in January 2005. Covering installations representing nearly half of EU's CO2 emissions, its aim is to help Member States to comply with Kyoto Protocol commitments. It allows the use of credits of Kyoto project-based mechanisms to help companies to comply with their obligations and thereby "creates additional incentives for business to invest in emission-reduction projects elsewhere"[271], thus contributing to technology transfer to developing countries.[272]

Following principles are fundamental for the scheme:

[266] COM(2006) 40 final, page 45
[267] COM(2006) 40 final, page 45
[268] COM(2006) 40 final, page 45
[269] COM(2006) 40 final, page 46
[270] Campins Eritja (2006), page 69
[271] COM(2006) 40 final, page 47
[272] COM(2006) 40 final, page 47

"- it is a cap and trade system, where participants are distributed a set amount of allowances up front and they are required to annually surrender an amount of allowances that is equal to their emissions in that year,
·the EU-wide total amount of allowances to be allocated is less than what the included sector would emit in the absence of emissions trading, and the resulting scarcity creates
a market for emission reductions
·its initial focus is on CO2 from industrial emitters
·implementation will take place in phases, with periodic reviews and opportunities for expansion to other gases and sectors
·the allocation of emission allowances is decided in advance for 5 year periods by the Member States for the installations on their territory
·it includes a strong compliance framework, with severe penalties for non-compliance
·the market is EU-wide but taps emissions reduction opportunities in the rest of the world through the Kyoto mechanisms
·allowances are held in a fully electronic registry system which allows immediate transfers of allowances from one installation to another all over the EU "[273]

The National Allocation Plan that every Member State had to develop states "the total number of allowances allocated in the first trading period 2005 to 2007".[274] Furthermore it has to contain the number of allowances that each plant that is covered by the scheme will receive. Allowances have been distributed free of charge, with only allowing auctioning to a small extent.[275]

The Directive also set out principles for monitoring and reporting as well as criteria for verification that were further elaborated by the Commission. Member States had to establish competent authorities for permitting and verification. The allowances are hold in a fully electronic registry system, which comprises of national registries of each Member State which communicate with each other through the Community Independent transaction log. This controls all trans-boundary transactions for any irregularities. The system is a useful forerunner for setting registries required for international country-level emissions trading under the Kyoto Protocol. 156 million allowances have been traded until September 2005, with average trading volumes of around 1.5 million allowances per day.[276]

Directive Art 25 allows that the EU ETS can be linked with compatible greenhouse gas emission trading schemes in other Annex B countries that have ratified the Kyoto

[273] COM(2006) 40 final, page 47-48
[274] COM(2006) 40 final, page 48
[275] COM(2006) 40 final, page 48
[276] COM(2006) 40 final, page 48

Protocol.[277] A review is foreseen in 2006, when Member States have to submit their NAPs for the period 2008-2012.[278]

Directive 2004/101/EC amends Directive 2003/87 EC and allows linking credits from the JI and CDM of the Kyoto Protocol.[279] The linking will lower the annual compliance costs for companies covered by the ETS at about a quarter and also improves liquidity of EU ETS. By supporting this kind of technology transfer, the Linking Directive contributes to sustainable development of host countries.[280]
Seventeen Member States intend to use Kyoto mechanisms but preparation for the use of CDM and JI activities differ greatly between Member States.[281]

5.3 Sectoral Policies and Measures within the European Union.

5.3.1 Energy

Within the last decade the European energy market was continually liberalised and this restructuring is supposed to help the use of environmentally friendlier forms of energy.[282]

One important part of this attempt are regulations on renewable energy. Beside a directive that directly addresses renewable energy sources, Directive 2003/96/EC that restructures the Community framework for the taxation of energy products and electricity allows exemptions or reductions to promote renewable sources of energy.[283]

As renewable energy sources are a central aim of the EU energy policy, Directive 2001/77/EC, the so-called renewable energy sources or RES-E Directive, was adopted in October 2001 to promote renewable energy sources for electricity

[277] COM(2006) 40 final, page 49
[278] COM(2006) 40 final, page 49-50
[279] COM(2006) 40 final, page 50
[280] De Cendra de Larragon (2006), page 103
[281] COM(2006) 40 final, page 50-51
[282] COM(2006) 40 final, page 55
[283] Directive 2003/96/EC, Art 15; COM(2006) 40 final, page 55

generation. "Between 1990 and 2003, wind power production increased by almost 57 times and electricity production from solar photovoltaic cells by 87 times."[284]

A comprehensive EU regulatory framework is now in place, Member States have to adopt national targets for green electricity consumption. With the accession of the new member States the 22.1% target set initially for EU-15 for 2010 becomes 21% for the EU-25.
An assessment by the European Commission in 2004 showed however that only four members were in line to meet their renewable electricity targets, the rest needs further measures to increase the achievement.[285]

Renewable energy regulations are proposed to be incorporated to the main EU financial instruments, the Common Agricultural Policy and the Structural and Cohesion funds. Renewable Energy is also supported through other programs like ALTENER within Intelligent Energy-Europe and the Campaign for Sustainable Energy and ongoing community wide standardisation of technologies and products. This includes the development of standards for biodiesel and solar PV and will be reinforced by the proposed directive on eco-design of energy using products.[286]

The CAP reform 2003 introduced decoupling of price and support and is a key instrument to further facilitate supply of energy crops and also introduced a specific aid for energy crops, so that "for a maximum guaranteed area of 1.5 million hectars a premium of € 45 per ha will be available." [287]

To promote and develop high efficiency cogeneration based on useful head demand and primary saving, Directive 2004/8/EC was introduced in February 2004. It amends Directive 92/42/EEC and defines high-efficiency cogeneration as achieving more than 10% savings compared to the separate productions of heat and electricity. Member States have to report annually on cogeneration statistics, and the Directive also includes analysis of national potentials and requirements for Member States to facilitate access to the electricity grid for combined heat and power.[288]

[284] COM(2006) 40 final, page 56
[285] COM(2006) 40 final, page 56
[286] COM(2006) 40 final, page 56-57
[287] COM(2006) 40 final, page 57
[288] Directive 2004/8/EC; COM(2006) 40 final, page 57

On 22 June 2005 COM (2005) 265 final – Green Paper on Energy Efficiency or Doing More With Less – was adopted that started an international effort to contribute to addressing climate change through energy efficiency. The Green paper enumerates three reasons for a focus on energy efficiency: for the first, the EU could save up to 20% of its energy consumption in a cost-effective manner, for the second, energy savings are likely to be the quickest and most cost-effective manner for reducing GHG and improving air quality and for the third accounts the security of supply, because energy efficiency is a key mechanism to help minimise the risk of rising energy prices and shortages of supply. Furthermore the green paper identifies a number of bottlenecks and suggests a number of key actions that might be taken to overcome these.[289]

The Energy Efficiency Plan, prepared in 2000 proposed a target of energy intensity that is 1% per year above and beyond business-as-usual trends. This target shall be reached by agreed core policy instruments for implementing the action plan.

According to Directive 2006/32/EC that was adopted in April 2006, Member States shall adopt and aim to achieve an overall energy savings target of 9% for the ninth year of application of the Directive. This target is to be reached by way of energy services and other energy efficiency improvement measures.[290]

Beside these regulations, the European Union also has launched various programmes to take action in the field of energy. So Decision 1230/2003/EC adopted a multiannual programme called “Intelligent Energy-Europe” in June 2003. The programme’s objectives are to promote energy efficiency and the increased use of renewable sources and energy diversification, to monitor and evaluate the impact of measures in theses fields and to promote efficient and intelligent patterns of energy production and consumption. [291]

[289] COM(2006) 40 final, page 58; COM (2005) 265 final
[290] EU – Energy Efficiency Homepage; COM(2006) 40 final, page 59
[291] COM(2006) 40 final, page 59; Decision 1230/2003/EC, Art 2;

The IEE programme has four specific fields, SAVE, ALTENER, STEER, COOPENER, and a financial framework of approximately €200 million in the period 2003 to 2006.[292]

COM (2005) final, of 6 April 2005, adopted a proposal for the continuation of the IEE program during the period 2007-2013 as part of the Competitiveness and Innovation framework Programme (CIP). The continued IEE will support the same fields and also introduce "Replication Projects" throughout the SAVE and ALTENER parts of the programme. These projects aim to help speed commercialisation of particular innovative process or products that are close to but not yet cost-competitive. The budget for IEE is proposed to be €1.639 billion from 2007-2013.[293]

For raising public awareness two campaigns for the promotion of sustainable energy were financed by the European Union, the first one from 1999-2003 was called RE – Campaign for Take Off and the successor was the Campaign for Sustainable Energy from 2004 to 2007. [294]

Apart from GHG emissions, two directives also aim to improve the air quality. The National Emissions Ceiling Directive, Directive 2001/81/EC sets upper limits for each Member State for the total emission in 2010 of the four pollutants responsible for acidification, eutrophication and ground-level ozone pollution. The Large Combustion Plant Directive - Directive 2001/80/EC - applies to combustion plants with a thermal output of greater than 50 MW replaces the existing LCPD.[295]

As the residential and tertiary sector accounts for more than 49% of final energy consumption in the Community, in December 2002 Directive 2002/91/EC was adopted to promote improvement in energy efficiency in buildings. It contains following requirements:

> "(a) the general framework for a methodology of calculation of the integrated energy performance of buildings;

[292] COM(2006) 40 final, page 59-60
[293] COM(2006) 40 final, page 60
[294] Campaign for Take Off; COM(2006) 40 final, page 60
[295] COM(2006) 40 final, page 60-61

(b) the application of minimum requirements on the energy performance of new buildings;

(c) the application of minimum requirements on the energy performance of large existing buildings that are subject to major renovation;

(d) energy certification of buildings; and

(e) regular inspection of boilers and of air-conditioning systems in buildings and in addition an assessment of the heating installation in which the boilers are more than 15 years old."[296]

Another Directive, Directive 2005/32/EC, contains regulations concerning the eco-design of energy using products. It aims to ensure

"the free movement of energy-using products in the EU; improving the overall environmental performance of these products; contributing to the security of energy supply and enhancing the competitiveness of the EU economy; and preserving the interests of both industry and the consumer."[297]

It includes annexes setting out methods for setting generic and specific eco-design requirements.[298] Also a list of products is contained that are offering a high potential for cost-effective reduction of GHG emissions. Products will only be selected if they represent an important volume of sales in the EU market and have an important environmental impact. Eco-design requirements should normally be established on the basis of technical, economic and environmental analysis. However, priority is given to alternative course of actions such as self-regulation by the industry, "where such actions are likely to deliver the policy objectives faster or with less cost than mandatory requirements"[299]

Also labelling and minimum energy efficiency requirements for household appliances, electrical and electronic end-use equipment are part of EU policies. Thus the "Labeling Directive" Directive92/75/EEC is extended by Directives 2002/31/EC, 2002/40/EC and 2003/66/EC, encompassing labelling household air-conditioners, household electric ovens, household electric refrigerators, freezers and their combination.[300]

[296] Directive 2002/91/EC, Art 1,
[297] COM(2006) 40 final, page 65
[298] COM(2006) 40 final, page 65
[299] COM(2006) 40 final, page 66
[300] COM(2006) 40 final, page 66

CH4 and N2O emissions from the building sector are relatively small and emissions are mainly linked to boiler operation, thus improving with the improvement of boiler efficiency and lowering of the demand. Directive 92/42/EEC focuses on the improvement of boiler efficiency. [301]

5.3.2 Transportation Sector

Despite having made clear progress, demand in the road transport sector continues to grow, thus emissions of air pollutants have decreased and alternative fuels policy takes effect still modestly. [302]

COM(95)689 final sets out a strategy for reducing CO_2 emissions of passenger cars and will improve fuel efficiency of passenger cars through voluntary commitments with car manufacturing associations (ACEA;JAMA, KAMA), labelling and fiscal measures. In 1999 voluntary agreements with European, Japanese and Korean car manufacturers were signed to increase fuel efficiency in passenger cars. The aim is that the new passenger car fleet average CO_2 emissions do not exceed 140 g CO_2/km by 2012. In 2003 CO_2 emissions from new cars in the EU-15 were 12% lower than in 1955. In 2006 Commission reviewed the options available for further reductions.[303]

COM(2005) 261 final proposed to link CO_2 emissions and the tax bases for registration taxes and annual circulation tax based on the number of grams of CO_2 emitted per kilometre by each passenger car.[304]

A nowadays contested approach to saveguard supplies and promote sustainability is set out in the biofuels directive, Directive 2003/30/EC. Drawing on the finding that most vehicles currently in circulation in the Union are capable of using a low blend of

[301] COM(2006) 40 final, page 66-67
[302] COM(2006) 40 final, page 69
[303] COM(2006) 40 final, page 69
[304] EU Passenger Car Related Taxes

biofuels without a problem, it requires fuels to be substituted by biofuels from agricultural crops.[305] The directive, together with the energy taxation directive,

> "sets indicative targets for biofuel substitution and then gives a legal framework for fiscal and other national measures to promote biofuels. The indicative targets for biofuel share in the Union are set at 2 % by 2005, and 5.75% by 2012, with member States setting their own national targets."[306]

Member States can choose how to implement its objectives, but also to ensure that the measures are selected and designed with "the whole life cycle of the particular biofuel in mind, taking account of the overall carbon balance and other impacts, and given priority to promoting those fuels that are environmentally cost-effective."[307]
Furthermore Member States are required to report yearly on their measures and every two years, the European Commission will produce an evaluation report on progress towards the biofuel target.[308]

Another regulation that has to be mentioned for the impact on GHG emissions is Directive 2004/52/EC that creates the development of road charging for heavy goods vehicles. Road charges should enable Member States to recover the total cost of infrastructure and should also reflect the level of congestion of the road network and the level of pollution.[309]

The European regulatory framework for rail transport is progressing in conformance with the White Paper on the common transport policy. The revitalisation of the rail sector is at the heart of the sustainable mobility strategy and seeks "to improve the attractiveness and competitiveness of more environmentally friendly modes of transport." [310]

The Marco Polo Programme was created by Regulation (EC) No 1382/2003, and in 2005 a proposal by the Commission for a second period from 2007 onwards was presented within COM (2005) 478 final.[311] It is the EU's programme for funding projects which shifts freight transport from the road to sea, rail and inland waterway,

[305] Directive 2003/30/EC
[306] COM(2006) 40 final, page 69
[307] COM(2006) 40 final, page 70
[308] COM(2006) 40 final, page 70
[309] COM(2006) 40 final, page 70
[310] COM(2006) 40 final, page 70
[311] COM(2006) 40 final, page 71

thereby it causing fewer trucks on the road what means lesser congestion, pollution and reliable and efficient transport of goods. The programme's budget is € 450 million and now encompasses funding for countries bordering the EU.[312]

Last but not least STEER is to mention in this section. This is one of the sub programmes within IEE and focuses on the transport energy issues. The task of STEER is to provide funding "for alternative fuels and vehicle propulsion, policy measures for efficient use of energy in transport and strengthening the knowledge of local energy agencies in the transport field"[313]

5.3.3 Industry: Non-CO_2 Sector

The guidelines and policies in this sector are based upon the Action Plan to improve Energy Efficiency and the Green Paper on Integrated Product Policy. The Green paper – Com (2001) 68 final – presents a strategy to promote a gradual increase in the environmental quality of goods and services in a life cycle perspective. [314]

Commission proposal COM (2003) 492, adopted by the Council on June 20th 2005, puts in place a legislative framework to reduce emissions of fluorinated gases by focusing on new requirements for the containment, recovery, training and certification of personnel involved in maintaining equipment containing fluorinated gases. Apart of this the focus is on a limited number of marketing bans for specific fluorinated gases in specified applications. [315]

Aware that industrial production is responsible for a big share of overall pollution, in 1996 the IPPC (Integrated Pollution Prevention and Control) Directive, Directive 1996/61/EC was created.[316] After a two year review process a new Directive was codified in 2006, Directive 2008/1/EC.[317]

[312] EU Marco Polo Programme
[313] COM(2006) 40 final, page 71
[314] SEC (2001) 2053, page 101
[315] COM(2006) 40 final, page 74
[316] EU IPPC Homepage – Summary
[317] EU IPPC Homepage – Proposal

The IPPC targets pollution from various industrial sources and covers 52.000 installations within the EU. Under the directive, industrial installations covered in Annex I are required to obtain an authorisation/environmental permit from authorities in Member State countries.

Two different sets of requirements were implemented, the first one was for new installations and existing installation in transformation which were required to meet the standards of the regulation since 30 October 1999. All other installations had to fulfil their requirements by 30 October 2007 that also marks the key deadline for full implementation of the Directive.[318]

Apparently there are synergies between the EU-ETS and the IPPC in a number of areas like permitting, coverage and emission limitations. The EU ETS was formed so that it would complement the IPPC and also covers some installations that fall under the IPPC. In these overlapping cases, installations have to conform to the IPPC requirements and also that of the ETS. [319]

5.3.4 Agriculture and Forestry Sector

The policies in this section are related to Agenda 2000, reforms of the Common Agricultural Policy (CAP) in 1999 and 2003-2004 and the Forestry Strategy of the European Union. A working group identified a mitigation potential for carbon sinks of 60-70 Mt CO_2 Eq.[320]

COM (2004) 490 final is part of the CAP reform and aims to support the rural development by the European Agricultural fund for Rural Development and increases EU funding, amounting a total of €13.7 billion per year for 2007-2013.[321] CAP reform has various impacts on climate change, so there are carbon credits of 45 €/ha for energy crops for a maximum guaranteed area of 1.5 Mio ha and the set aside scheme allows non-food crops to be grown on set-aside land with financial support.

[318] EU IPPC Homepage – Summary
[319] COM(2006) 40 final, page 75
[320] COM(2006) 40 final, page 78
[321] COM(2006) 40 final, page 78

Also rural development supports can have positive impact on climate change, for example the investment in state owned forests for ecological and social reasons can enhance carbon sequestration.[322]

The EU forestry strategy recognizes forests' function as carbon sinks and reservoirs and also as sustainable source of biomass for renewable energy and material. A framework for sustainable forestry and strengthened coordination and cooperation was established by the Ministerial Conferences on the Protection of Forests in Europe. National Forest programmes also address climate change mitigation beside other issues. Beside various efforts, carbon sequestration through afforestation, reforestation and forest management did not work out as expected and also the use of biomass has not developed its full potential. [323]

The protection of forests against fires is represented in Council regulation (EEC) NO 2158/92 and Council Regulation (EEC) No 3528 aims to protect forests against atmospheric pollution.[324]

As a measure against tropical deforestation also known as illegal logging, what is a major source of anthropogenic greenhouse gas emissions, COM (2003) 251 final proposes activities aimed to reduce and eliminate imports into the EU of illegally harvested timber.[325]

5.3.5 Waste management Sector

Waste management is considerably important as operations in this area account for about one third of all anthropogenic methane emissions. In 1996 the Commission issued a Strategy Paper for Reducing Methane Emissions – COM(96)557[326], and COM (2003) 301 developed a thematic strategy on the prevention and recycling of waste.[327]

[322] COM(2006) 40 final, page 79-80
[323] COM(2006) 40 final, page 80-82
[324] COM(2006) 40 final, page 82
[325] COM (2003) 251 final; COM(2006) 40 final, page 82
[326] SEC (2001) 2053, page 118
[327] COM(2006) 40 final, page 85

Directive 1999/31/EC on Landfill of Waste has the overall objective to reduce and prevent negative effects on the environment including the global climate.[328] The directive provides that landfill gases must be collected and if possible used for producing energy or otherwise have be flared.[329]

Directive 2004/12 EC amended Directive 94/62/EC on waste packaging and set out increased targets to be achieved by 2008. Member States need to introduce systems for the return and collection of used packages.[330] The EC Environment DG estimated that recycling of waste packaging at 2001 level reduces emissions by around 25 Mt CO_2 compared to zero recycling.[331]

Directive 2000/53/EC, the End-of-Life Vehicles Directive aims at making vehicle dismantling and recycling more environmentally friendly[332] and also mandates the separation and treatment of air condition fluids.[333]

Directive 2002/95/EC and 2002/96/EC complement EU's measures on landfill and incineration of waste by setting up legislation concerning the waste of electrical and electronic equipment.[334] The climate change impact consists of regulations concerning the separation and treatment of greenhouse gases like CFC, HCFC and HFC.[335]

Directive 2000/76/EC was created to reduce the effects of incineration and co-incineration of waste on the environment through operational conditions, emission limit values and technical requirements for installations. The deadline for implementation of this directive was 28 December 2995, marking also the time when all old directives will be repealed.[336]

[328] Directive 1999/31/EC, Art 1
[329] COM(2006) 40 final, page 85
[330] EU – Packaging and Packaging Waste
[331] COM(2006) 40 final, page 86
[332] EU – End of Life Vehicles
[333] COM(2006) 40 final, page 86
[334] EU - Waste Electrical and Electronic Equipment
[335] COM(2006) 40 final, page 86
[336] EU – Industrial Emissions; COM(2006) 40 final, page 86-87

5.4 International Actions of the European Union

By providing over €30 billion in 2003, the European Union is one of the worlds largest donor in the development field.
In 2003 the Commission was asked by the Council to develop an Action Plan to accompany the EU Strategy on Climate Change in the context of Development Cooperation. In December 2004 the Council adopted the conclusions together with the EU Action Plan. The recommendations encompassed the integration on climate risk management into planning processes, raising awareness on climate change, supporting adaptation measures in partner countries, help to exploit the benefits of environmentally sound technology and also encouraging the private sector to invest in mitigation in partner countries. [337]
Following the EU Action Plan, $ 369 million annually are allocated for climate change funding in developing countries since 2005. Additionally the European Investment Bank and the World Bank agreed on the creation of a Pan-European Carbon Fund (PECF), so that the EU ETS will allow purchases of GHG emissions reduction through CDM and JI arrangements.[338]

Many of the active projects in 140 countries and six region of the world have climate relevance, although it is complicated to quantify this. Some programs have more climate change impact then others. One of the strategic objectives of the EU Plan for climate change is to increase the visibility of EU climate change programmes and projects in the context of development cooperation. [339]

European Union efforts concentrate on six regions in the world. In the Western Balkans, the EU spent over €113 million for developing environmental policies and infrastructure. In the South and East Mediterranean and the Middle East, the second phase of the environment programme has allocated € 30 million starting in 2002. The TACIS programme contains three capacity building projects for the implementation of the UNFCCC and the Kyoto Protocol in Eastern Europe, the Caucasus and Central Asia. Climate change and energy efficiency are continuing to have a priority in environmental dialogue with Asian countries, especially the EU-China Partnership on

[337] COM(2006) 40 final, page 109-110
[338] COM(2006) 40 final, page 110
[339] COM(2006) 40 final, page 111-112

Climate Change that was agreed in September 2005 is worth mentioning. Strengthening disaster prevention and preparedness in support of adaptation of sustainable energy policies are the core priorities in EU's work in Latin America. Unfortunately the Cotonou Agreement with African, Caribbean and Pacific states has no explicit climate change programmes concerning EU and those States.[340]

Some development cooperation initiatives cover countries in multiple regions, for example the BASIC (Building and Strengthening Institutional Capacity on Climate Change) Project that supports strengthening the capacity of partner countries to develop own policies. Environmental and forest budget lines are also relevant to climate change, the largest shares are in Latin America (33 %) and ACP regions (30%), followed by Asia (15%) and Global (22 %).[341]

The Environmental Helpdesk is working on mainstreaming environment into development projects, focusing on training and developing a manual.[342]
The EU is also active in Technology Transfer. Improving access to adequate sustainable energy services in rural, peri-urban and urban areas is one of the tasks of the EU Energy Initiative. COM (2004) 711 final established an initiative to increase access to modern energy services for people in Africa, the Caribbean and the Pacific, accompanied by an € 250 million energy facility that is promoted by the Commission. The SYNERGY programme finances activities in Non-EU Countries to formulate and implement energy policies and contains activities related to the Kyoto Protocol. Technology transfer is also an important component of bilateral agreements between EU and third countries, like the EU-China Partnership on Climate Change. The 6th Framework Programme for research also reinforces scientific and technological capacity in developing countries.[343]

5.5 Research and Systematic Observations

[340] COM(2006) 40 final, page 121-122
[341] COM(2006) 40 final, page 122
[342] COM(2006) 40 final, page 123
[343] COM(2006) 40 final, page 124-126

As this is again no priority area of the current work, it therefore only gives a short introduction in the EU's activities in this area. For those interested in further details the author would refer to Chapter 7 of the 4th National Communication of the European Union.

Climate change investigations were supported by the EU since the 1980s, so that EU policies have moved towards placing sustainability at the centre of policy initiatives. Under the 6th Framework Program a wide spectrum of projects was supported like operational forecasting, modelling, climate observation systems studies about on-going and past climate changes and carbon sequestration.[344]
Research is done through international projects, in the field of socio-economic research and in mitigation and adaptation technologies. The EU participates in the Group on Earth Observations and Global Earth Observation System of Systems.[345]

5.6 Education, Training and Public Awareness

The European Commission provides a large amount of information to the public in a variety of forms. Since most activities are conducted at the Member State level, activities are focused on raising public awareness. The Directorate General uses a comprehensive website, an information centre, printed publications, relationships with the media, co-operation with business, NGOs and networks, subsidies for awareness-raising projects and conferences to fulfil this task. Green Week 2005 was entirely devoted to climate change and brought together various stakeholders to discuss this issue. [346]

5.7 Resume European Union Climate Change Policy

Within the field of climate change, the European Union was comparably slow, as it needed the UNFCCC to develop programs and mechanisms. But as it did so, it

[344] COM(2006) 40 final, page 144
[345] COM(2006) 40 final, page 144 – 155
[346] COM(2006) 40 final, page 156 - 160

became known as a leader in this policy area. The position taken by the EU at the forefront and at the Kyoto negotiations itself was influenced by a decline of emissions in Germany and the United Kingdom a North-South cleavage at the question of reduction amounts, the influence of environmental NGOs and participation of Green Parties in Parliaments. Negotiations at Kyoto were difficult for EU's diplomats because they had to respect both the common strategy of the European Union and that of the Member States. The leadership-role was undermined by the windfall produced by the German Reunification but regained through a coherent strategy. It was able to be flexible enough so that a compromise could be achieved and therefore accomplished that the Kyoto Protocol allows regional economic integration organizations to fulfil their obligations jointly. Finally the Protocol was ratified in May 2002 and obliged the Union to cut emissions by 8% from 1990s level in the period 2008-2012.

To accomplish this goal the European Union developed various instruments. The European Climate Change Program is more likely to be a forum for policy preparation and development then a strategy to reduce greenhouse gases. Environmental technologies shall be fostered by the Environmental Development Plan that encompasses areas related to climate change. The basis for using the Kyoto Mechanisms is laid by Decision 280/2004/EC that contains a monitoring mechanism for Greenhouse Gases within the EU. Building on that the EU ETS was implemented to help the Member States to comply with their Kyoto targets. Through allowing use of credits of the Kyoto Mechanisms Joint Implementation and Clean Development Mechanism it contributes to technology transfer. The EU ETS is a cap and trade system with a strong compliance framework and penalties for non-compliance.

In the energy sector, renewable energy is advocated by the Union through tax abatements, a directive addresses renewable energy explicitly, the implementation of national targets for green energy, through incorporation into the Common Agricultural Policy and the Structural and Cohesion Fund and last but not least ALTENER and the Campaign for Sustainable Energy are to be mentioned.

Energy efficiency is promoted through the Cogeneration Directive, national energy saving targets, an energy efficiency plan, and the Intelligent Energy Europe program.

In the residential and tertiary sector energy efficiency is set forth by a directive that promotes the improvement of buildings and another one on eco-design of appliances, accompanied by labelling of appliances and the improvement of household boilers.

The main strategy in the transport sector is to reduce CO_2 emissions of cars through voluntary commitments by the industry. A directive sets targets for the amount of biofuels used in the Union and the charging of heavy goods vehicles is on the way. The heart of the sustainable mobility strategy is built by the revitalisation of the rail sector, best shown through the Marco Polo program that shifts freight from the road onto rail. STEER is a project under the Intelligent Energy Europe program and supports alternative fuels.

In the Non CO_2 industrial sector, the European Union's best instrument is the IPPC directive that targets pollution from various industrial sources and is interlinked with the EU ETS.

Within the agriculture sector the focus for climate change is on the Common Agriculture Reform that allows supports for growing energy crops and also the Rural Development fund that can enhance sequestration through investing in forests, what leads the forest sector. Here a framework for strengthening forests was established that together with national forest programs addresses climate change through afforestation and forest management. Noteworthy are also the ambitions against illegal logging of tropical forests.

Methane is the biggest issue in the Waste sector, so the European Union created a Directive that provides that landfill gases have to be collected and used for electricity production or otherwise to be burned. Other directives in this sector concern waste packaging, end-of-life vehicles and waste of electrical and electronic equipment.

Going outside of the Union's territory, EU incorporated climate change in the context of development cooperation and funds climate change programs in developing countries for about $ 369 million annually. The EU ETS will allow the purchasing of GHG emission credits of CDM and JI arrangements. Through the EU Energy

Initiative access to sustainable energy services is made easier for developing countries. Despite of this initiative technology transfer is an important component of bilateral arrangements between EU and third countries.

The European Union supports a wide range of research and development programs concerning climate change, such as forecasting, modelling, climate observations. Also socio-economic research, and mitigation and adaption are part of research efforts.

Since most of the work is done by the Member States in education, training and public awareness, the Directorate General uses distinct ways to promote climate change like websites, information centres and so on.

6 Comparing the European Union and the United States Climate Change Policies

On a first glance, European Union's and United States' climate change policies are very similar. They both follow the regulations of the UNFCCC of reporting and divide the actions into sectors. But, compared to the European Union, the United States are lacking of regulations for an emission trading scheme, what is a central instrument of the Kyoto Protocol. Also no rules for a clean development mechanism are found in the United States policies.

In the normal areas energy, transport, industry, agriculture, forestry and waste, the actions taken are very similar.

In the energy sector, both entities support renewable energy, clean/green energy and energy efficiency. Only the United States are enumerating provisions for nuclear energy as means to combat climate change, the European Union takes part in some of the programs mentioned by the USA, but does not include them into their program against climate change.

For the residential and commercial sector, the United States and the EU promote the improvement of buildings and appliances, as well as have labelling programs for energy-efficient products.

The transport sector basically sees voluntary commitments by industry and renewable fuel standards. One difference in policies is that the European Union is trying to revitalize the rail sector, whereas United States Clean Cities program tries to reduce the use of petrol in transportation. A regulation that tackles air pollution through automobile's air condition system is in force in both entities.

Actions in the Industry-Non CO2 sector differ remarkably. Problematic industries in the United States have their own program, whereas the European Union relies on only one instrument, the IPPC that is interlinked with the EU-ETS.

In the agriculture and forest sector the goals are slightly different: first of all rural development is in the centre of the regulations. This is done in the European Union by allowing the growing of energy crops on put-away land and through investing into forests as carbon sinks. The United States allows the selling of carbon-credits as part of the conservation program, supports renewable energy systems in rural area as

well as financing forestry. The European Union and also the United States have adopted laws against illegal logging.
The emission of methane through landfills is in both entities the subject of specific regulations. Other regulations in the waste sector are for waste packaging, end-of-life vehicles and waste of electrical and electronic equipment in the Union and EPA's Waste Wise program, the Stringent Landfill Rule and the Federal Woody Biomass Working Group in the United States.
Both the United States and the European Union have integrated climate change into their development programs. One main difference here is that the EU ETS allows the purchase of emission credits of CDM and JI whereas the United States thus far does not have provisions for that as at least CDM is a Kyoto mechanism.
In the research area both conduct research and systematic observations. Education, Training and public awareness is conducted by various US agencies on the one side, and on the other mainly through the Member States of the European Union, but also by the Directorate General.

So the main difference seems to be that the European Union established an emission trading system on a cap-and-trade basis whereas the United States of America, because they did not ratify the Kyoto Protocol do not have provisions for a trading system. Within the ETS it is also allowed to use credits obtained by CDM and JI, measures explicitly invented by the Protocol, although Joint Implementation is also possible as part of the UNFCCC.
It is true that the United States do not have a cap-and-trade system at the federal level, but they have at least one at the private level: the Chicago Climate Exchange, that allows participants trading of emission credits. Furthermore some states are participating in the International Carbon Action Partnership. This allows arguing that at least for some politicians in the United States a cap-and-trade system for tackling climate change might be convenient.

7 Conclusion

Through comparing actual Policies and Measures of the United States of America and the European Union the current work has shown that climate change policies of these entities are not as different as the media is suggesting, at least on the formal, the regulations and policy, sector. Furthermore it seems that the main achievements in combating climate change are made so far by implementing UNFCCC regulations and not by Kyoto Protocol regulations. Certainly this paper is written in the first year of the Protocol's commitment period and thus no experiences with the Kyoto mechanisms are available by now.

On the theoretical side of this paper the findings suggest that there is a possibility that the influence of international treaties goes beyond its participants. The United States of America have no obligation to create an emission trading scheme, but there are states that are involved in the International Carbon Action Partnership that pursues an international carbon trading system on cap and trade basis. Then there is the Chicago Climate Exchange that was founded by industry and commercial entities and also can be seen as a hint that the idea of an emission trading system is accepted nowadays in the industrial and commercial area of the United States. Two incentives out of the whole range of activities within the United States must not be meaningful at all. But recognizing that the United States itself introduced the idea of an emission trading system this development makes a little more sense. International regimes theory also suggests that states would not invest resources and time to negotiate a treaty and then refrain from complying. Thus the government of the United States has refrained from the Protocol but not from the ideas that were written into it. The main reason why the Protocol was not ratified by the United States of America was not that it was discontent with the overall treaty, but only that it wanted a participation of any kind by developing countries. Another reason why the idea of an emission trading system fits perfectly into the logic of politicians and commercial entities is that it surely reflects economic approaches to environmental issues. As the current work suggest, the EU ETS will make compliance with obligations cheaper then without a trading system where reductions have to be made within the own

company or the own country. Thus it might be possible to get the United States back into the multilateral “boat” of the Climate Change regime in the next commitment period, if at least some of the developing countries are willing to accept obligations on their part. By the way, the last point, to get developing countries to accept obligations, represents an important issue for the United States of America as well as for the European Union in the current deliberations on the future of the international climate change regime. Thus we will see if in the next commitment period an international trading system will be established or not.

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Abstract

The goal of the work at hand is to compare activities in the field of climate change of the United States of America and the European Union by using the theoretical background of regime theory. The central theoretical question to be elaborated is if international regulations that a country chooses to negotiate can have an impact on the country itself even though it did not ratify the treaty itself. For this task the work shades light on the policies of the United States of America and the European Union on climate change – their positions taken in the international negotiations and the policies taken internal to combat climate change. Therefore the chapters unfold like follows: first an introduction to International Regimes Theory is given then the international negotiations for the United Nations Framework Convention on Climate Change and the Kyoto Protocol and their regulations are summarized briefly. The two main chapters comprise the EU and United States policies explaining the decision making process for the international deliberations and the actual steps taken for mitigating the emission of Greenhouse Gases. Last but not least a comparison of the findings concerning those two entities is made. By comparing the findings of this attempt it can be argued that international regulations might have an impact on the behaviour of states, or at least subjects within them, even though they have not formally agreed to the treaty. For the practical level the work suggests that an international climate change treaty containing market-based mechanisms like the Kyoto Protocol is likely to be achieved if there is a participation of some level by developing countries.

Zusammenfassung

Das Ziel dieser Arbeit ist es, die Aktivitäten der Vereinigten Staaten von Amerika und der Europäischen Union im Bereich Klimawandel aus der Perspektive der Regime-Theorie zu untersuchen. Die zentrale theoretische Frage ist herauszufinden, ob internationale Vereinbarungen, an deren Entstehung ein Land mitgewirkt hat, einen Einfluss auf dieses haben könnte obwohl es den entstandenen Vertrag nicht unterzeichnet hat. Zu diesem Zweck wirft die Arbeit Licht auf die Politiken der Vereinigten Staaten von Amerika und der Europäischen Union im Hinblick auf den Klimawandel – ihre Positionen während den internationalen Verhandlungen und den Aktivitäten die sie intern unternommen haben um den Klimawandel zu bekämpfen. Die Kapitel entfalten sich folgendermaßen: zunächst gibt es eine kurze Einführung zu Regimetheorie um dann die internationalen Beratungen für die United Nations Framework Convention on Climate Change und das Kyoto Protokoll sowie deren Inhalt kurz zu skizzieren. Die beiden Hauptkapitel umfassend den Positionsfindungsprozess der EU und der Vereingten Staaten für die internationalen Verhandlungen und die Schritte die unternommen wurden um eine Verringerung der Treibhausgasemissionen zu erreichen. Zu guter Letzt werden die Ergebnisse der beiden Länder miteinander verglichen. Durch diese Gegenüberstellung der Ergebnisse lässt sich argumentieren das Internationale Vereinbarungen einen Einfluss auf Staaten, oder zumindest Subjekten in ihnen, haben können obwohl sie den Vertrag nicht formell akzeptiert haben. Auf der praktischen Ebene suggeriert die Arbeit das ein internationaler Klimaschutzvertrag der markt-orientierte Mechanismen wie das Kyoto Protokoll enthält sehr wahrscheinlich angenommen wird, wenn er zumindest irgendeine Form der Partizipation seitens von Entwicklungsländern enthält.