



Interest Mediation and Policy Formulation in the European Union

Influence of Transnational Technology-Oriented Agreements
on European Policy in the Field of Carbon Capture and Storage

Advances in Systems Analysis 3

Olga Schenk

Forschungszentrum Jülich GmbH
Institute for Energy and Climate Research (IEK)
Systems Analysis and Technology Evaluation (IEK-STE)

Interest Mediation and Policy Formulation in the European Union

Influence of Transnational Technology-Oriented Agreements
on European Policy in the Field of Carbon Capture and Storage

Advances in Systems Analysis 3

Olga Schenk

Bibliographic information published by the Deutsche Nationalbibliothek.
The Deutsche Nationalbibliothek lists this publication in the Deutsche
Nationalbibliografie; detailed bibliographic data are available in the
Internet at <http://dnb.d-nb.de>.

Publisher and
Distributor: Forschungszentrum Jülich GmbH
Zentralbibliothek
52425 Jülich
Phone +49 (0) 24 61 61-53 68 · Fax +49 (0) 24 61 61-61 03
e-mail: zb-publikation@fz-juelich.de
Internet: <http://www.fz-juelich.de/zb>

Cover Design: Grafische Medien, Forschungszentrum Jülich GmbH

Printer: Grafische Medien, Forschungszentrum Jülich GmbH

Copyright: Forschungszentrum Jülich 2013

Schriften des Forschungszentrums Jülich
Reihe Energie & Umwelt / Energy & Environment Band / Volume 165

D 82 (Diss., RWTH Aachen University, 2012)

ISSN 1866-1793

ISBN 978-3-89336-852-5

The complete volume is freely available on the Internet on the Jülicher Open Access Server (JUWEL) at
<http://www.fz-juelich.de/zb/juwel>

Neither this book nor any part of it may be reproduced or transmitted in any form or by any
means, electronic or mechanical, including photocopying, microfilming, and recording, or by any
information storage and retrieval system, without permission in writing from the publisher.

Table of Contents

Table of Contents	I
Abbreviations	V
Tables	IX
Figures	XI
Summary Boxes	XIII
I Introduction.....	1
I.1 Case Study Selection – the European Union	3
I.2 Carbon Capture and Storage as an Empirical Field of Application	4
I.3 Selection of TOA.....	5
I.4 Research Design and Structure.....	7
I.5 Methods of Analysis.....	11
II Previous Research on the Chosen Topic	16
II.1 Global Environmental Governance.....	16
II.1.1 Public-Private Forms of Cooperation	16
II.1.2 TOA	18
II.1.2.1 Contribution of TOA to the International Climate Change Mitigation Effort	19
II.1.2.2 Influence of TOA	22
II.2 Interest Mediation in the Context of Political System of the EU.....	24
II.2.1 Grand Theories of the European Integration and Interest Mediation	25
II.2.2 Accounts of Interest Mediation System of the EU	26
II.2.3 Drivers of Interest Mediation Processes in the EU	28
II.2.3.1 Resources.....	28
II.2.3.2 Institutional Setting	30
II.2.3.3 Issue Characteristics	32
II.2.3.4 Organizational Characteristics of the Groups.....	34
II.2.4 Democratic Quality of Interest Mediation in the EU	35
II.3 Influence	37
II.4 Research Gaps.....	39
III Conceptual issues – TOA, Influence of TOA, and Policy.....	41
III.1 TOA.....	41
III.1.1 Definition.....	41
III.1.2 Conceptualization of TOA from the political science perspective	42
III.1.2.1 TOA as a Complex Actor.....	42
III.1.2.2 TOA and Interest Mediation	43
III.1.2.3 TOA and the Knowledge-Based Approaches to International Relations	44

III.2 Influence of TOA	50
III.3 Policy	51
IV Analytical Framework	53
IV.1 Policy-Making in the Multi-Level Governance System of the EU	53
IV.2 Administrative Interest Mediation Approach	55
IV.2.1 Logic of the Reciprocal Exchange	57
IV.2.2 Organizational Properties and Influence	59
IV.2.3 Operationalization of the “Organizational Development”	63
IV.2.3.1 Operationalization of the Dimensions Underlying the Organized Complexity	64
IV.2.3.2 Operationalization of Dimensions Underlying the Organizational Autonomy	68
IV.2.4 Organizational Properties and the Logic of Exchange	72
IV.3 Summary and Hypotheses	72
V CCS Policy Sector in the EU	74
V.1 CCS – Brief Introduction into the Technology Chain	75
V.1.1 CO ₂ Capture	77
V.1.2 CO ₂ Transport	79
V.1.3 CO ₂ Storage	80
V.2 Technology Implications for Policy and Regulation	81
V.2.1 Policy	81
V.2.2 Regulation	83
V.3 Legal Groundwork for Policy-Making in the Field of CCS in the EU	84
V.3.1 Energy Policy	84
V.3.2 Climate Policy	85
V.3.3 Technology Policy	86
V.4 European CCS Policy	86
V.4.1 Strategic Positioning of CCS as a Climate Change Mitigation Option	88
V.4.2 Development of the Long-Term Incentives for CCS Deployment	91
V.4.3 Stakeholder Cooperation Frameworks	93
V.5 European CCS Regulation	95
V.5.1 Regulation on the Operation of the Geological CO ₂ Storage	107
V.5.2 Regulation on Incentivizing the Research, Development and Demonstration in the Field of CCS	108
V.6 Key European Institutions	110
V.6.1 European Commission	111
V.6.2 European Parliament	112
V.6.3 European Council	113
V.6.4 Council of the European Union	114
V.7 Intermediary Conclusions	115

VI Organizational Properties of TOA	117
VI.1 Carbon Sequestration Leadership Forum.....	119
VI.2 European Technology Platform for Zero Emission Fossil Fuel Power Plants	131
VI.3 Implementing Agreements of the International Energy Agency	139
VI.3.1 IEA Greenhouse Gas R&D Programme	141
VI.3.2 Clean Coal Centre	150
VI.4 Organizational Properties of TOA in Comparison and Individual Hypotheses.....	156
VII Analysis of the Influence of TOA on CCS Policy of the EU	161
VII. 1 Scope and Focus of the Influence of TOA.....	162
VII.1.1 Access of the Expert Knowledge Produced by TOA to the Political Decision-Making Process	162
VII.1.2 Alternative Approaches to the Output of TOA	168
VII.1.3 Alternative Approaches to the Influence of TOA.....	173
VII.2 Explaining the Variation in Influence.....	175
VII.2.1 Formal Status	175
VII.2.1.1 Access to the Decision-Makers.....	176
VII.2.1.2 Legitimacy	177
VII.2.1.3 Reciprocity in the Supply of the Resources	181
VII.2.2 Level of Organizational Development.....	183
VII.2.2.1 Target Groups for the Work Deliverables - Satisfying the Needs of the Membership vs. Dissemination.....	184
VII.2.2.2 Relative Autonomy, Consensus, and the Availability of Resources.....	189
VII.3 Summary of the Findings	193
VIII Conclusions and Outlook	196
Attachment 1.....	201
Attachment 2.....	225
Bibliography.....	227
Acknowledgements	253

Abbreviations

A

ACEC	Advisory Council Executive Committee
ALDE	Group of the Alliance of Liberals and Democrats for Europe
Art	Article

B

BAT	Best Available Techniques
-----	---------------------------

C

CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CERT	Committee on Energy Research and Technology
CCR	Carbon Capture-Ready
CCS	Carbon Capture and Storage
CIAB	Coal Industry Advisory Board
COM	European Commission
COP	Conference of the Parties
COR	Committee of the Regions
CSLF	Carbon Sequestration Leadership Forum

D

DG	Directorate-General
DG CLIMA	Directorate-General Climate Action
DG ENER	Directorate-General Energy
DG RTD	Directorate-General Research and Innovation

E

EBRD	European Bank for Reconstruction and Development
ECBM	Enhanced Coal Bed Methane Recovery
ECCP	European Climate Change Programs
ECOFIN	Economic and Financial Affairs Council
ECR	European Conservatives and Reformists Group
EEC	European Economic Community
EEPR	European Energy Program for Recovery
EERA	European Energy Research Alliance
EESC	European Economic and Social Committee
EGR	Enhanced Gas Recovery
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EII	European Industrial Initiative
ENVI	Committee on the Environment, Public Health and Food Safety of the European Parliament
EOR	Enhanced Oil Recovery
EP	European Parliament

ERA	European Research Area
ETP	European Technology Platform
EU	European Union
EU ETS	European Union Emission Trading System
F	
FENCO-ERA	Fossil Energy Coalition, a Coordination Action (CA) supported by the European
G	
GCCSI	Global CCS Institute
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GHGT	Greenhouse Gas Control Technologies
I	
ICT	Information and Communications Technologies
IEA	International Energy Agency
IEAGHG	Implementing Agreement of International Energy Agency Greenhouse Gas R&D
IPCC	Intergovernmental Panel on Climate Change
IPPC	Integrated Pollution Prevention and Control
ITRE	Industry, Research, and Energy Committee of the European Parliament
J	
JHA	Justice and Home Affairs Council
L	
LNG	Liquefied Natural Gas
M	
MEP	Member of Parliament
MWe	Megawatt electrical
N	
NAP	National allocation plan
NEDO	New Energy and Industrial Technology Development Organization
NER	New Entrants' Reserve
NER300	Abbreviation for the financial mechanism to subsidize CCS demonstration projects
NGO	Non-Governmental Organization
O	
OECD	Organisation for Economic Co-operation and Development
OLC	Office of Legal Counsel
OPEC	Organization of Petroleum Exporting Countries
OSPAR Convention	the Convention for the Protection of the Marine Environment of the North-East
P	
PIRT	Project Interaction and Review Team
pp	percentage points
QMV	Qualified Majority Voting
R	
VI	

R&D	Research and Development
RD&D	Research, Development and Demonstration
S	
S&D	Group of the Progressive Alliance of Socialists and Democrats in the European
SDD	Strategic Deployment Document
SET-Plan	Strategic Energy Technology Plan
SRA	Strategic Research Agenda
SWOT	Strengths, Weaknesses, Opportunities, and Threats (analysis)
T	
TEC	European Communities Treaty
TEU	Treaty on the European Union
TFEU	Treaty on the Functioning of the European Union
TOA	Technology-Oriented Agreements
U	
UNFCCC	United Nations Framework Convention on Climate Change
US DOE	United States Department of Energy
Z	
ZEP	Zero Emission Fossil Fuel Power Plants

Tables

Table 1: The dimensions of policy networks.....	49
Table 2: Sector-specific typology of members' representatives.....	66
Table 3: Issues related to CO ₂ capture that can require regulation	79
Table 4: Issues related to CO ₂ transport that can require regulation.....	79
Table 5: Issues related to CO ₂ storage that can require regulation.....	81
Table 6: Regulation related to CO ₂ capture in the context of CCS deployment in the EU (as of October 2010)	96
Table 7: Programs incentivizing RD&D of CO ₂ capture in the EU (as of October 2010)	98
Table 8: Regulation related to CO ₂ transport in the context of CCS deployment in the EU (as of October 2010)	99
Table 9: Programs incentivizing R&D and infrastructure construction for CO ₂ transport in the EU (as of October 2010).....	100
Table 10: Regulation related to CO ₂ storage in the context of CCS deployment in the EU (as of October 2010)	101
Table 11: Programs incentivizing RD&D of CO ₂ storage in the EU (as of October 2010)	105
Table 12: Programs incentivizing demonstration of an integrated CCS chain in the EU (as of October 2010)	106
Table 13: Number of seats per political group in the European Parliament (as of July 14, 2009)	113
Table 14: Summary of the operationalized dimensions of the organizational development of TOA.....	118
Table 15: The share of the CSLF members in the worldwide fossil fuels production and consumption	120
Table 16: Overview of the CSLF task forces, 2003-2009	124
Table 17: The IEA – CSLF cooperation in response to the G8 Leaders' Summit request on accelerating development and deployment of CCS	129
Table 18: IEAGHG international research networks (as of January 2011).....	146
Table 19: Overview of the organizational properties of TOA	157
Table 20: Legislative process on NER300 and the activities of ZEP	166
Table 21: Overview of the scope of influence of TOAs	201
Table 22: Overview of the work deliverables of TOA and their citation in the EU policy documents	210

Figures

Figure 1: Conceptual structure of the organizational development	60
Figure 2: Dimensions of the organizational development	71
Figure 3: CCS stages of technological maturity	77
Figure 4: European CCS policy and regulation – key documents (as of September 2011)	88
Figure 5: CSLF members (as of October 2010)	119
Figure 6: CSLF Policy Group delegates breakdown, 2003-2010	122
Figure 7: CSLF Technical Group delegates breakdown, 2003-2010	122
Figure 8: CSLF Structure	125
Figure 9: ETP ZEP Advisory Council membership breakdown, 2005-2010	133
Figure 10: ZEP Structure	134
Figure 11: IEAGHG membership development from 2003 to 2010	142
Figure 12: IEAGHG Contracting Parties' delegates breakdown, 2003-2010	144
Figure 13: IEAGHG Sponsors breakdown, 2003-2010	144
Figure 14: Clean Coal Centre membership development from 2003 to 2010	151
Figure 15: Clean Coal Centre Contracting Parties' delegates breakdown, 2003-2010	152
Figure 16: Clean Coal Centre Sponsors breakdown, 2003-2010	152

Summary Boxes

Summary Box 1.....	3
Summary Box 2.....	7
Summary Box 3.....	11
Summary Box 4.....	15
Summary Box 5.....	24
Summary Box 6.....	36
Summary Box 7.....	39
Summary Box 8.....	49
Summary Box 9.....	51
Summary Box 10.....	52
Summary Box 11.....	86
Summary Box 12.....	110
Summary Box 13.....	126
Summary Box 14.....	130
Summary Box 15.....	137
Summary Box 16.....	139
Summary Box 17.....	147
Summary Box 18.....	150
Summary Box 19.....	154
Summary Box 20.....	156
Summary Box 21.....	160
Summary Box 22.....	168
Summary Box 23.....	173
Summary Box 24.....	175
Summary Box 25.....	176
Summary Box 26.....	181
Summary Box 27.....	183
Summary Box 28.....	188
Summary Box 29.....	193

I Introduction

The United Nations Framework Convention on Climate Change (UNFCCC)¹ laid down the cornerstone in the international cooperation to reduce the greenhouse gas (GHG) emissions from fossil fuels combustion. The UNFCCC provided a general framework for global cooperation to mitigate climate change. The Kyoto Protocol² to the UNFCCC which formulated binding GHG emissions reduction targets did not result in universal participation. The United States – the major CO₂ emitting country at the time of the adoption of the Kyoto Protocol in 1997³ – signed but did not ratify the Protocol. China – the current top CO₂ emitter⁴ – does not belong to the list of countries which are committed to the CO₂ reductions in the framework of the Protocol.

Whereas the approach pursued within the UNFCCC is based on a goal-setting in the framework of the legally binding international treaties, an alternative approach to GHG mitigation presents a voluntary international cooperation in the field of development and deployment of innovative technologies. The technology-oriented approach to climate change mitigation led to the development of the specific forms of cooperation between the public authorities and the stakeholders. Previous research referred to the organizations aimed at the transnational cooperation in the field of development and deployment of innovative technologies to mitigate GHG emissions as the technology-oriented agreements (TOA) [de Coninck et al., 2008]. The literature on TOA focused on the scope of the contribution of the technology-oriented approach to the climate change mitigation targets [de Coninck & Bäckstrand, 2011, de Coninck et al., 2008, Philibert & Podkanski, 2005, Justus & Philibert, 2005, Philibert, 2004a].

This PhD research project analyzes the influence of those specific forms of cooperation on policies in the field of development and deployment of innovative technologies. *The principal research question* of the research project is formulated as follows – What is the influence of the technology-oriented agreements on policies aimed at supporting innovative technologies for mitigation of GHG emissions?

The research project addresses the influence of TOA in the framework of the *case study* that considers policy formulation in the European Union (EU).⁵ The EU pursues the ambitious GHG emissions reduction targets and highlights the importance of the technology-oriented approach to climate change mitigation. The supranational bodies of the EU identified energy as the important policy sector where GHG reduction can contribute to the achievement of the climate policy goals. The European Commission (Commission) participates in the work of

¹ The UNFCCC was adopted at the Rio Summit of the United Nations Conference on Environment and Development in 1992 and came into force in 1994.

² The Kyoto Protocol to the UNFCCC was adopted in 1997 and came into force in 2004.

³ Cf the data for 1997 [EIA, 2011].

⁴ Cf the data for 2009 [ibid].

⁵ For a detailed account of the rationale behind the case study selection see section I.1.

various TOA aimed at supporting the development and deployment of innovative energy technologies.

The empirical field of application of the research project presents the development and deployment of carbon capture and storage technologies (CCS).⁶ CCS is an innovative energy technology. The primary goal of CCS is to reduce the CO₂ emissions from combustion of fossil fuels for electricity generation. The key driving force for the deployment of CCS is the climate policy objective. The EU strategy to achieve GHG reduction targets identifies CCS as an important climate change mitigation option besides the increase in the share of the renewable energy and the growth of energy efficiency. The development of CCS as a climate change mitigation option was accompanied by the activities of TOA at the various levels of decision-making.

The research project is comparative in its design. *The unit of analysis* encompasses four formal organizations that pursue collective action.⁷ Following the criteria that were worked out in previous research and further developed in this research project, those organizations are classified as TOA.⁸ The unit of analysis includes three organizations that support the development and deployment of CCS as a climate change mitigation option at the international level and a Technology Platform of the European Union.⁹

The dependent variable is the influence of TOA; *the independent variables* are i) the formal status of the organization in the political decision-making system and ii) the level of the organizational development of TOA.¹⁰

The research interest of the project addresses the interest mediation processes in a specific policy sector. The goal of the research project is to contribute to the study of the influence of transnational organizations at policy-making in a specific policy sector of the EU. The organizations that are included into the unit of analysis do not have any formal decision-making authority in the decision-making system of the EU. They are assumed to influence the actors which are in possession of such authority. The focus of the project is directed at scope of the influence of the transnational organizations and the factors that explain the variation of their influence. The PhD project contributes to the research fields *Interest Mediation in the Multi-Level System of the EU* and *Global Environmental Governance*.

The research project was developed in cooperation between the Department for Political Science of the RWTH-Aachen University and the Department of Systems Analysis and Technology Evaluation of the Forschungszentrum Jülich.

⁶ For a detailed account of the rationale behind the choice of CCS as an empirical field of application, see section I.2.

⁷ The research project focuses on the analysis of the collective action. Interest representation through the individual action by persons or companies is not covered by the analysis [cf Schmitter & Streeck, 1981, 45].

⁸ For an outline of the criteria see the section III.1.1.

⁹ For a detailed account of the criteria for the choice of TOA that are included into the unit of analysis see section I.3.

¹⁰ Cf the general hypotheses on the variation of influence of TOA in the section IV.3.

Summary Box 1

Research question: What is the influence of the technology-oriented agreements on policies aimed at supporting innovative technologies for mitigation of greenhouse gas emissions?

Case study: the European Union.

Empirical field of application: carbon capture and storage technologies.

The unit of analysis: four technology-oriented agreements.

Focus of the PhD project: the influence of the technology-oriented agreements and the factors that explain the variation of the influence.

1.1 Case Study Selection – the European Union

Twenty years since the negotiations of the UNFCCC, the EU has established itself as a leader in the international climate change mitigation effort [Oberthür & Kelly, 2008, 36f, Schreurs & Tiberghien, 2007, 19]. Climate policy has increasingly been considered by the scholars of political science as a driver of the European integration [ibid, 43, ibid, 33f].

In 2007 the EU adopted the ambitious climate change mitigation targets that are effective independent of any international commitment [Commission, 2007f, 2]. The targets encompass a 20 % reduction of GHG emissions as compared to 1990 levels by 2020.¹¹ A reduction of energy-related GHG emissions is considered to present the major contribution to the fulfillment of the European climate change mitigation targets. Thus, the recent Communication of the Commission outlines a roadmap of the climate policy actions with the aim of establishing a competitive low-carbon economy in the EU by 2050 [Commission, 2011a]. The roadmap suggests a nearly total elimination of the CO₂ emissions from the power sector by 2050 [ibid, 5, Fig.1].

Since 2006 [Commission, 2006b], the European energy policy has shown a strong focus on climate change mitigation. The increased share of the renewable energy, the growth of the energy efficiency and the development and deployment of CCS are recognized as the crucial energy-related climate change mitigation measures in the EU. Thus, the EU has formulated a broad variety of policies to support those measures. The European activities on the development and deployment of innovative energy technologies include the Commission's engagement in the work of various TOA at the international and European levels of decision-making.

¹¹ In case of an international agreement, the Communication by the Commission foresees an increase of the target to 30% of GHG emissions reduction compared to 1990 levels [Commission, 2007f, 2].

From the perspective of political science, the choice of the EU as the case study allows the analysis of the contribution of the transnational TOA to the policy-making in the European multi-level governance system.¹²

I.2 Carbon Capture and Storage as an Empirical Field of Application

The PhD investigates the influence of the transnational TOA on European policy formulation. As an empirical field of application, the study regards the development and deployment of CCS technologies.

CCS is an incremental innovation¹³ to the electricity sector. Although the constituting parts of the CCS technology chain – CO₂ capture, transport, and storage – are not new, they have not been demonstrated as an integrated process on a large scale yet. Thus, it is possible to characterize CCS as an innovation¹⁴. Due to the environmental benefits which constitute the main driver for CCS development and deployment, it is possible to refer to this technology as an “environmental innovation”¹⁵. The distinguishing feature of technologies such as CCS from the total of other innovations is that the key driving forces for the deployment of CCS are the climate policy objectives. Without the need to integrate the climate policy objectives with the traditional goals of energy policy – energy security and competitiveness – there would be no need for CCS.

The deployment of CCS faces multiple market failures¹⁶ and requires the financial and policy incentives. While the state actors have an option of making the application of CCS mandatory by law, at the time of publication such decision is unlikely considering that CCS presents a new and risky technology. Therefore, although the timely CCS rollout is driven by the policy needs, the non-state actors – from power generation utilities to CO₂-intensive industry – are the key players regarding the demonstration and deployment of the technology. Such constellation typical for environmental innovations leads to the exchange relations between the state and non-state actors. In the framework of the development and deployment of environmental energy technology, a variety of issues needs to be addressed – from determining a basic stance toward CCS to deciding about the scope of public funding for R&D of the technology and to regulating the operation of the technology. Regarding

¹² Cf section IV.1.

¹³ The approach to differentiate between the radical and incremental innovations is based on Schumpeter's work. Compared to the current status of the technology, the incremental innovation reflects the continuous improvements of the existing technology whereas the radical innovation refers to the introduction of the entirely new technology [Fagerberg, 2005, 7f].

¹⁴ The innovation is understood as a novelty that refers to „the creation of something qualitatively new, via processes of learning and knowledge building [Smith, 2005, 149].“

¹⁵ From the perspective of the innovation studies, the environmental technology innovation differs from the total of technology innovations as besides the economic benefits these technologies also deliver environmental benefits [cf Oemer-Rieder & Toetzer, 2004, 6, Taylor et al., 2005, 348f].

¹⁶ For the definition of the concept of market failure and the outline of the market failures that face the deployment of CCS according to previous research, see section II.1.2.

these processes, both the state actors and the groups, need to cooperate in order to achieve their goals.

CCS presents a crucial element in the strategy to achieve the emission reduction targets agreed at the level of the EU. The identification of CCS as a climate change mitigation option in the EU was accompanied by the strategic positioning of CCS in the context of other options. During the period under study¹⁷, the EU formulated policy to support the research and development (R&D) of CCS and developed regulation to control the deployment of CCS. Further, the supranational institutions of the EU addressed the development of the incentives that target commercial deployment of CCS by 2020.

Thus, the requirements that result from the characteristics of CCS as an environmental innovation and the importance of CCS for the fulfillment of the European climate change mitigation targets make it an interesting empirical field of application to study the patterns of interest mediation between the European decision-makers and TOA.

I.3 Selection of TOA

The awareness of CCS as an option in the portfolio of climate change mitigation technologies has gradually developed since the adoption of the Kyoto Protocol in 1997 and culminated in the publication of the Special Report on CCS of the Intergovernmental Panel on Climate Change (IPCC) in 2005 [IPCC, 2005]. The Special Report confirmed the technical feasibility of the permanent CO₂ storage [ibid, 14] and therefore strengthened the position of CCS as a climate change mitigation option [cf Meadowcroft & Langhelle, 2009a, 6, Pena, 2009, 12].

The rising awareness of CCS as a climate change mitigation option was accompanied by the growing activities of TOA at the international level, at the level of the individual countries¹⁸ interested in the development and deployment of CCS, as well as at the level of the EU. On the one hand, new frameworks for cooperation between public actors and stakeholders¹⁹ were founded to deal with various aspects of CCS development and deployment. On the other hand, existing TOA with corresponding areas of concern shifted the focus of their activities toward CCS.

¹⁷ Cf section I.4 in the Summary Box 3.

¹⁸ The empirical evidence shows that there are several advanced industrialized democracies which recognized CCS as an important option in the portfolio of possible measures to reduce GHG emissions. These are the United States, Australia, Canada, Norway, the United Kingdom, Germany, the Netherlands, and the EU [cf Meadowcroft & Langhelle, 2009a, 18]. Each of these countries and the EU have considered CCS as a potential climate change mitigation measure in the national climate policy documents, developed state-supported CCS R&D programs, and introduced public-private partnerships to support the launch of the demonstration projects. In every case, the development and deployment of CCS involved an institutionalized form of cooperation between the state and non-state actors.

¹⁹ The research project adopts a general understanding of the stakeholders as “any group or individual that can affect or is affected by the achievement of a corporation’s purpose [Freeman, 2004, 229].”

The principal research question of this study is concerned with the influence of transnational TOA at European policy formulation in the field of CCS. During the period under study, the Commission participated in the work of the following TOA in the field of CCS which have been active at the international level:

- Carbon Sequestration Leadership Forum (CSLF),
- Implementing Agreement of the International Energy Agency (IEA) Clean Coal Centre, and
- Implementing Agreement of IEA Greenhouse Gas R&D Programme (IEAGHG).

The organizations listed above present the total of the relevant TOA which have been active since 2003-2005 – the period of time when CCS was recognized as a climate change mitigation option.²⁰

Previous research introduced the concept of TOA and studied TOA at the international level of decision-making. The literatures analyzed the role that TOA can play for the technology development. Further, the scholars compared the effectiveness of TOA as the frameworks for international cooperation to reduce GHG emissions with the cooperation that is based on legally binding goal-setting concerning the GHG emissions reduction. The research interest pursued in this study addresses the influence of TOA active at the international level of decision-making on the European CCS policy. The research project refers to the unit of analysis as *transnational* TOA as the membership of TOA includes state and non-state actors from more than one country.²¹

Although initially the PhD project intended to study the influence only of those TOA active at the *international* level of decision-making, the choice of the EU as the case study modified the composition of the unit of analysis. The influence of TOA at European policy-making in the field of CCS would be incomplete without considering the activities of the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP). ZEP was set up by the Commission to carry out the advisory functions in the field of CCS technologies R&D. It is ZEP's primary task to influence the Commission and the member states towards the implementation of ZEP's Strategic Research Agenda [Commission, 2007h, 1]. Due to its formalized status as the European Technology Platform, ZEP belongs to the set of organizations that have a privileged access to the Commission. Therefore, it can be assumed that ZEP has influenced the European CCS policy.²² Thus, ZEP was also included into the unit of analysis of the PhD project.

²⁰ Besides TOA covered in the study, the Global CCS Institute (GCCSI) presents further TOA active at the international level. The GCCSI is an initiative of the Australian government established in 2008 with the goal of speeding up an international effort of demonstration and deployment of CCS. Due to the short timeframe of the GCCSI activities to the moment of writing of this PhD project, this TOA was excluded from the analysis.

²¹ For the conceptualization of TOA see the section III.1.

²² Cf the hypothesis A in the section IV.3.

The inclusion of ZEP into the unit of analysis of the research project allows considering the formal status of an organization in the decision-making system as an explaining variable for variation of the influence of TOA.

Summary Box 2

Unit of analysis:

- *Carbon Sequestration Leadership Forum (CSLF),*
- *IEA Implementing Agreement Clean Coal Centre,*
- *IEA Implementing Agreement Greenhouse Gas R&D Programme (IEAGHG), and*
- *European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP).*

I.4 Research Design and Structure

The scholars of political science differ between three research perspectives – policy, polity, and politics. The analysis of *polity* accounts for the institutional structure which underlies the decision-making activities; the concept of *policy* reflects the content of concrete measures adopted to deal with public problems; and the study of *politics* addresses the more or less conflict-laden process of policy-making [cf Diez & Wiener, 2004, 18].

Against the background of the research interest pursued in the project, *policy* is understood as the output of decision-making activities of the supranational bodies of the EU. These are the documents that contain policy and regulation in the field of CCS. *Polity* refers to the institutional structure of decision-making in a specific policy sector in the context of the EU. The influence of the transnational TOA on policy-formulating efforts in the EU can be referred to as *politics*. It can be understood as a reciprocal, more or less conflict-laden process which involves interest representation and mediation between TOA and the European decision-making authorities.

The principal research question addresses the influence of four transnational TOA on European CCS policy. Thus, from the political science perspective the study of the influence of transnational TOA on the European policy formulation focuses on the interplay between policy and politics.

The research interest of the project focuses on the collective action. TOA are understood as the complex actors. The interest mediation activities of individuals that represent the members in TOA and the activities of the members of TOA that contribute to the collective interest pursued by TOA but belong to the realm of the individual action are not considered in the research project.

The PhD project contributes to the research fields *Interest Mediation in the Multi-Level System of the EU* and *Global Environmental Governance*. In a first step, the study gives an overview of the main findings from the studies related to the research interest of the PhD

project. The goal is to identify the research gaps that can be contributed to in the framework of this project.

Then, the study develops *definitions* and suggests *operationalizations* of the concepts that are included in the principal research question - transnational technology-oriented agreements, influence of TOA, and policy.

In the next step, the study introduces the *analytical framework* which guides the analysis. The principle question of the research addresses the influence of the groups on the political process. Within the European studies, the multi-level governance approach highlights the complexity of the decision-making process and the importance of non-state actors for policy-making in the EU. The unit of analysis of the project includes the Technology Platform ZEP - an organization that has a formalized status as an advisory body to the Commission. Although ZEP does not have any formal decision-making authority in the EU, it can be assumed that its status as an advisory body increases its influence on the policy-making activities of the supranational bodies of the EU. Against this background, the following hypothesis stresses the relation between the formal status of the ZEP and its level of influence.

- A. The more formal the status of TOA in the decision-making system of the EU, the higher its influence will be.

The comparative design of the research project requires an analytical framework that allows explaining the variation of influence of four organizations on policy formulation. The study applies the administrative interest mediation approach to account for the rationale for state-group relations, the driving forces behind them, and the variation in the patterns of influence.

The administrative interest mediation approach understands the state-group relations as the reciprocal exchange process shaped by the specific logic. The central assumption of the approach highlights the relationship between the organizational development of the group and its influence. The approach claims that an organization which pursues the collective interest targeted at influencing the political decision-makers will structure itself in a way that allows an effective production of the resources needed by the political decision-makers. The following hypothesis highlights the relation between the level of organizational development of TOA and their influence.

- B. The more developed the organizational structure of TOA, the higher its influence will be.

Against the background of the administrative interest mediation approach, the section formulates the set of empirically applicable criteria and suggests their operationalization in order to carry out the comparative analysis of the organizational development of TOA.

Having outlined the results of previous studies, clarified the main concepts applied in this research project, and having formulated the analytical framework that guides the analysis, the study of the influence of TOA is carried out in three major parts:

- the description of the CCS policy sector characteristics in the EU,
- the analysis of the organizational properties of TOA, and
- the analysis of the influence of TOA on the European CCS policy.

Each of these components encompasses the data collection and the use of data.

Against the background of the multi-level character of decision-making, the study needs to characterize the environment in which the state actors and TOA carry out interest mediation activities. The absence of an overarching theory of policy-making in the EU increases the significance of the sectoral approach to policy analysis. The account of the *CCS policy sector* in the EU falls into two parts.

The analysis begins with a general overview of the specifics of CCS technology and the implications for policy and regulation that result from the development and deployment of CCS. The goal is to show the range of issues which may become a subject of formulation of policy and regulation. This section also outlines possible rationale for public actors to support CCS against the background of climate, energy, and technology policy objectives. Then, the section gives a general account of the regulatory strategies which can be applied by the public actors to control and incentivize the deployment of CCS.

Further, the study turns to a comprehensive account of the CCS policy sector in the EU. The goal is to outline the constraints and opportunities of the environment in which TOA operate. Following John, this study adopts a descriptive, issue-oriented definition of policy sector as “[...] a field of decision-making concerned with a certain type of public problem, such as agriculture, energy, or the environment” [John, 2000, 205, cf also Windhoff-Héritier, 1983, 348]. An account of CCS policy sector in the EU focuses on the role of the decision-making bodies in driving CCS policy in the EU.

As the decision-making competences of the supranational organs of the EU may differ depending on policy sector, first the study identifies the competences of the European supranational bodies relevant for the formulation of CCS policy as they are regulated by the Lisbon Treaty. Then, the study outlines the cornerstones of the EU CCS policy and regulation. Against this background, the section identifies the key decision-making bodies that fostered CCS policy development in the EU. The section concludes by discussing the resources that these actors can offer for the exchange with the groups as well as the resources that they need to formulate and implement policies.

Having studied the sectoral characteristics relevant for interest mediation, the research interest turns to the analysis of *the organizational properties of TOA*.

The central assumption of the administrative interest mediation approach highlights the relation between the organizational properties of the groups and their influence. Against the background of the assumption that an organization which seeks to exert influence will structure itself in a way that improves the exchange of resources with the state actors the study pursues the research question – What is the level of the organizational development

of the individual TOA? The goal is to develop a set of hypotheses on the influence of the individual TOA basing on the characteristics of their organizational properties.

The empirical analysis of the organizational properties of the individual TOA is followed by a comparative overview. Based on the results of the analysis of the organizational properties of TOA, the section concludes with the formulation of the individual hypotheses on the influence of TOA.

The formulation of the individual hypotheses has a variation with regard to the explaining variable. Whereas the variation of the level of influence of TOA which are active at the international level is defined according to the level of their organizational development, the study considers the formal status as an explaining variable for the level of influence of ZEP. The analysis of the organizational development is carried out for all TOA which form the unit of analysis. Therefore, the discussion in the chapter VII addresses the relation between the formal status of ZEP, its organizational properties, and the influence.

The final part of the study analyzes *the influence of TOA on European policy formulation in the field of CCS*.

The section begins with an outline of the scope and the focus of influence of the individual TOA according to the definition and operationalization of the influence of TOA worked out in the study. Further, the data is analyzed to account for the alternative ways of operationalizing and defining the influence of TOA. Then, the research discusses the variation of the influence of the individual TOA against the background of independent variables *formal status* and *the level of organizational development*.

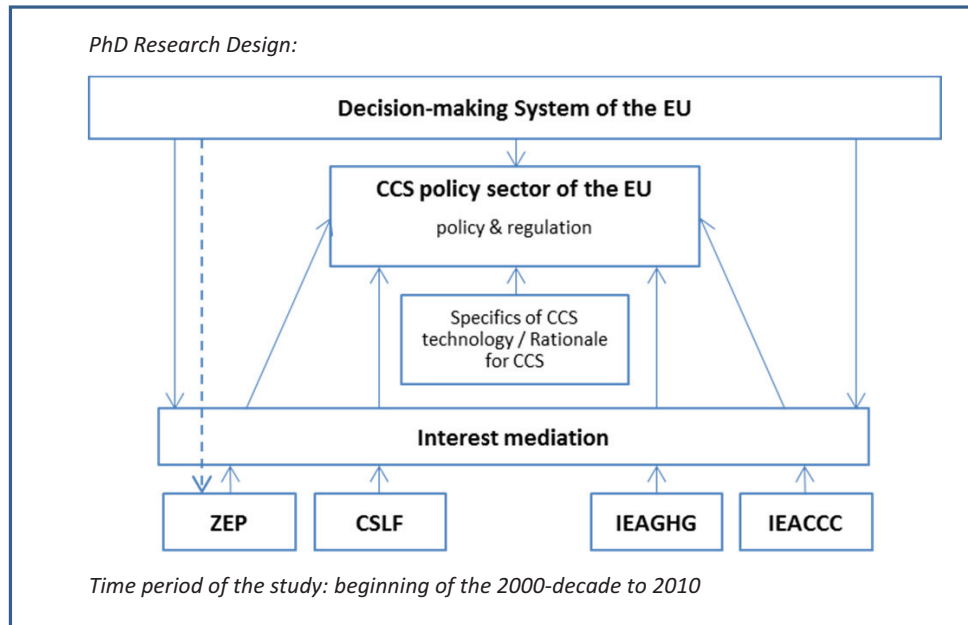
The research project concludes with the discussion of the main findings.

The main deliverables of the research project encompass:

- systematic account of the CCS policy sector in the EU,
- empirical analysis of the organizational properties of TOA, and
- empirical analysis of the influence of TOA.

The timeframe investigated stretches from the beginning of the 2000-decade to 2010. The beginning of the timeframe marks the rising awareness of CCS as a climate change mitigation option, and the shift of the focus in work agenda toward CCS. The time period under study encompasses the successful formulation of the CCS Directive and instruments to support the demonstration of CCS at the level of the EU. At the current point in time both CCS technology and policy are still “work-in-progress”. However, no matter, if CCS is going to experience a large-scale implementation or fail as a climate change mitigation option, the characteristics of CCS make it a valuable empirical field of application. The findings worked out during this study can be applied for analogous technologies.

Summary Box 3



I.5 Methods of Analysis

The research project focuses at the analysis of interest mediation processes in the context of the EU applying qualitative research methods. The study is comparative in its design; the unit of analysis includes four formal organizations.

Literature analysis forms a basis for an overview of the previous research on the topic of interest, the conceptualization of the main terms, and the analytical framework.

The interpretation of the administrative interest mediation approach draws from the essay by Gerhard Lehbruch [Lehbruch, 1987] and the study by Schmitter & Streeck [Schmitter & Streeck, 1981]. An analytical account of the organizational development of the associations is based on the work by Schmitter & Streeck [Schmitter & Streeck, 1981].

Document analysis is applied to study the competences of the supranational bodies of the EU in the field of CCS. Further, due to the lack of a comprehensive account of the EU CCS policy sector in the literature, the study draws from the analysis of the EU documents to outline the development of CCS policy and regulation. The account of the decision-making bodies relevant for policy-making in the CCS policy sector draws from the literature and document analysis. The goal is to identify the general decision-making competences of the Commission, the Council, and the European Parliament and their specific responsibilities in the field of CCS.

The knowledge gaps which could not be filled basing on the literature or document analysis were addressed in the email inquiries to the representatives of the Commission and the European Parliament. Thus, the accounts of the dispersion of responsibilities in the field of CCS within the Commission and the focus of the frameworks for cooperation with the stakeholders are based on the information gained via the inquiries (sections V.6.1 and V.4.3 respectively). An inquiry to the political parties of the European Parliament on their position toward the development and deployment of CCS did not produce a comprehensive response and therefore was not considered in the analysis.

The analysis of the organizational properties of TOA carried out in the section VI is based on the formulation of the empirically applicable dimensions of organizational development developed in the section IV.2.3. The definitions of the dimensions are derived from the analytical framework by Schmitter & Streeck [Schmitter & Streeck, 1981, 132, also section III.4.1.2, 140ff].²³ The operationalization of the dimensions reflects the specifics of CCS as the empirical field of application and the specifics of TOA as the unit of analysis.

The empirical analysis of the level of organizational development of TOA is carried out by means of the *software-based content analysis of the official documents and minutes*²⁴ of TOA. The operationalized dimensions of the organizational development are applied as the text codes to mark the characteristics of the respective dimension shown by TOA. This part of the analysis concludes with the comparative assessment of the level of organizational development of TOA. Based on the results of the analysis, the study develops the hypotheses regarding the level of influence of individual TOA.

The interpretation of the collected data follows the analytical framework by Schmitter & Streeck defined in the section IV.2. Schmitter & Streeck suggest ranking the results of the empirical analysis as corresponding with the ideal-type low or high level of organizational development (cf Figure 2). The classification of the results of the analysis requires the reference values, e.g. with regard to the classification of the number of members in TOA as high or low. The study identifies those dimensions which allow the definition of the reference values. The analysis of the remaining dimensions is limited to a detailed description. Regarding these cases, the classification as the low or high level of organizational development is justified according to the analytical framework guiding the analysis.

The final section of the research project carries out the analysis of the influence of TOA and discusses the findings against the background of the suggested hypotheses. The study defines influence as the activities of groups which alter or modify public policy. In the

²³ Although the definition of the dimensions of organizational development is derived from the work by Schmitter & Streeck, the labeling of the dimensions varies from the parameters suggested by the authors. The variation results from the goal to produce a set of dimensions comparable to the existing efforts of previous research [cf Rhodes & Marsh, 1992, Marsh & Rhodes, 1992a].

²⁴ The official minutes of the CSLF and ZEP meetings can be accessed online. The minutes of the Implementing Agreements IEAGHG and the Clean Coal Centre are not publicly available. The access to the minutes was made possible for the purpose of the study.

framework of this general definition, the influence of TOA is understood as a work deliverable which finds access to the political decision-making process by being considered and accepted by political decision-makers. TOA are considered to produce expert knowledge. Therefore the main work deliverables of TOA encompass the publications which contain expert knowledge in the field of CCS. The concept of influence is operationalized as a reference to the knowledge produced by TOA in the policy documents or regulation formulated by the decision-making bodies of the EU. That may refer to the adoption of the concepts and methodologies formulated by TOA, or a citation of the studies produced by TOA in the EU documents (cf section III.2).

The study of the influence of TOA draws from two sources of data – *the document analysis* and *the expert interviews*.

In the framework of the document analysis, the EU policy and regulation documents in the field of CCS are studied with the goal of finding the references to the work deliverables developed by TOA. The sample includes the key documents in the field of CCS identified in the section *CCS Policy Sector of the EU*. Besides the output of the legislative process in the EU, the sample encompasses the documents which prepare and accompany the legislation – the total of 74 documents during the time period from 2005 to May 2011. With regard to the specific legislative procedures, the documents were identified according to the procedure file number.

Due to the lack of generally available comprehensive data on decision-making during the comitology process, the sample does not include the documents associated with the comitology procedure. Table 21 in the Attachment 1 gives an account of the documents that were included in the sample and the number of references to the output of TOA that were identified in the documents.

The document analysis does not weight the references to the output of TOA as more or less important or “influential.” Thus, the reference to the suggested technical requirements on the purity of the captured CO₂ stream and the reference to the policy recommendation on the design of the CCS demonstration program in Europe are equally considered as influence. To acknowledge that policy recommendations are more important than technical expertise is to assume that the adoption of policy recommendations contributes to the greater extent to the overall goal of CCS deployment. This approach corresponds with the study of the impact level of influence.²⁵ The research design of the project is however directed at the analysis of the relation between the output of TOA and its access to political decision-makers (outcome level of influence). Further, the author shares the understanding of the technical knowledge as a source of power.

The capacity of science to authorize and certify facts and pictures of reality [is] a potent source of political influence. [Ezrahi, 1971, 121, cited in: Nelkin, 1975, 36]

²⁵ For the definition of the impact, outcome, and output levels of influence see section II.3 in the Summary Box 6.

The operationalization of the concept of influence as the reference to the written output is beneficial for the design of the empirical analysis of influence of TOA and is expected to produce reliable, objective, and comparable results. However, such precise operationalization of the dependent variable imposes limitations on the scope and depth of the inquiry because it blinds out the variety of interest mediation processes that do not result in written output and go beyond the production of expert knowledge. Further, a narrowly defined operationalization questions the validity of the results.

As TOA present an under-researched phenomenon, the study concentrates on the study of the access of the expert knowledge developed by TOA to political decision-making process using the EU as a case study. To be able to account for the validity of the suggested definition and operationalization of influence, and to identify the patterns of interest mediation between TOA and decision-makers at the level of the EU, the study complements the document analysis by collecting the data in the expert interviews and the analysis of the minutes of TOA.

In the framework of the study, 13 *structured expert interviews* were carried out.²⁶ Eight interviews carried out in person and five telephone interviews took place from May until September 2011. The average length of an interview was 45 minutes. The interview partners can be structured into two groups.

The perspective of TOA was recorded in the interviews with the representatives of the professional staff managing TOA and the representatives of the members of TOA in the position of chairpersons or vice-chairpersons (total eight interviews). One interview was carried out with an assistant to a chairman of one of TOA.

The Commission is the only European institution which is the member of TOA active at the international level of decision-making and has an observer status in ZEP. Therefore a series of interviews was carried out with the representatives of the Commission which were active in TOA during the period under study (total five interviews). The interview partners were promised anonymity with regard to the use of the data.

In order to assess the definition of influence of TOA adopted in the study, the representatives of TOA were asked to define the most important work deliverables, their target groups and the dissemination strategies. The second set of questions targeted the interest mediation processes in the context of the EU. The set included an explicit inquiry regarding the examples of the references of the EU documents to the work deliverables of TOA.

A set of question to the Commission elaborated on the estimation of the most important work deliverables of TOA from the Commission's perspective. The inquiry encompassed the Commission's rationale to participate in the work of a specific TOA, the interest mediation

²⁶ Key questions to the representatives of TOA and to the representatives of the Commission are outlined in the Attachment 2.

patterns, as well as the use of work deliverables produced by TOA for decision-making process.

The interview data is reflected against the background of the analysis of the minutes of TOA (*document analysis*). Due to the limited amount of data gained during the expert interviews, those results alone do not claim to fulfill the requirements of a systematic analysis. The approach is to combine the data gained from the document analysis (EU policy documents and the minutes of TOA) with the interview results. The data is then discussed against the background of the suggested hypotheses (section VII.2) and studied in order to broaden the understanding of the output of TOA (section VII.1.2) and the approaches to define their influence (section VII.1.3).

Summary Box 4

<i>Methods of analysis:</i>	
<i>Research focus</i>	<i>Methods of analysis</i>
<i>CCS policy sector characteristics in the EU</i>	<i>document and literature analysis</i>
<i>organizational properties of TOA</i>	○ <i>formulation of the empirically applicable dimensions of organizational development worked out according to Schmitter & Streeck (1981)</i> ○ <i>software-based content analysis of the official documents and minutes of TOA</i>
<i>influence of TOA on the European CCS policy</i>	○ <i>document analysis of 74 CCS policy and regulation documents as well as the minutes of TOA</i> ○ <i>13 structured expert interviews expert interviews</i>

II Previous Research on the Chosen Topic

The research question considers the influence of transnational TOA on policy formulation in the field of energy that is considered to contribute to climate change mitigation. The transnational TOA can be regarded as a form of public-private cooperation that constitutes a part of a broader climate change mitigation regime. This perspective highlights the points of reference to the research field “Global Environmental Governance”.

The research question addresses the influence of the groups on the European policy formulation. Thus, the project contributes to the European studies and particularly the field of research concerned with interest mediation in the multi-level system of the EU.

II.1 Global Environmental Governance

The research field Global Environmental Governance describes the varying architecture of the global environmental regime²⁷ and studies the new phenomena that characterize modern environmental politics. Those phenomena include the increased engagement of the non-state actors alongside with the intergovernmental diplomacy, the importance of the new institutions in addition to the binding treaties under international law, and the increasing fragmentation of the regime across the territorial and functional levels [Biermann & Pattberg, 2008, 280, Biermann et al., 2009b, Mol, 2007, 217f, 232]. The overall question that drives the research on the varying forms of governance concerns their contribution to the overall performance of the global environment regime [Biermann et al., 2007a, 255f, Biermann et al., 2007b, 292ff, Andonova, 2010].

Against the background of the unit of analysis of this research project, the overview of the literature in the field of Global Environmental Governance focuses on the public-private forms of governance. Previous research has considered TOA as a specific form of cooperation within the universe of public-private forms of cooperation. There are only few studies that analyze TOA as the distinctive forms of international cooperation. So far, the research introduced the definition of TOA and discussed their contribution to the climate change mitigation regime. Having outlined those findings, the section concludes by presenting the findings on the influence of those TOA that form the unit of analysis of the research project.

II.1.1 Public-Private Forms of Cooperation

The variety of the non-state actors involved and the fragmented architecture of the global environmental governance regime drives the attempts to their typological differentiation. Acknowledging the variety of the typologies suggested in the literature [cf Meadowcroft, 2007, 195], the basic way to categorize the forms of cooperation has been according to the

²⁷ Previous research referred to the variety of international approaches to address climate change as „the variable geometry of climate change“ [Fischer et al., 2008] and recently as a „building blocks“-approach [Falkner et al., 2010].

actors involved [Mol, 2007, 219]. From this perspective, the forms of cooperation can be divided into those that refer to the classical intergovernmental cooperation [Biermann et al., 2009c, DeSombre, 2007, Jacob et al., 2007], the cooperation between the non-state actors [Pattberg, 2005], and mixed forms of cooperation that include state and non-state actors [Börzel & Risse, 2005, 197].

Those forms of cooperation that involve state and non-state actors and pursue policy-oriented goals in the field of environmental governance have been referred to as “networks” or “partnerships” and often specified with the modifiers “transnational”, “multi-sectoral” or “public-private” [Betsill & Bulkeley, 2004, Szulecki et al., 2011, Börzel & Risse, 2005, Vollmer, 2009, Glasbergen et al., 2007, Mol, 2007, Selsky & Parker, 2005, Liese & Beisheim, 2011]. The public-private forms of cooperation have been evaluated in terms of their contribution to the effectiveness and legitimacy of global governance [Börzel & Risse, 2005, 2, Brinkerhoff, 2007, 71, 74f, Biermann et al., 2007a, Bäckstrand, 2008, 2006]. Previous research approached the effectiveness of the public-private forms of cooperation in terms of their problem-solving capacity.²⁸ Thus the focus of research was directed at the contribution to the solution of the sustainability problems. The majority of the existing studies on public-private forms of cooperation concerns the partnerships that were announced at the 2002 UN World Summit on Sustainable Development in Johannesburg [Biermann et al., 2007a, Bäckstrand, 2006, 2008, Hale & Mauzerall, 2004, Vollmer, 2009, Szulecki et al., 2011, Andonova & Levy, 2003].

The evaluations of the research carried out so far highlight the lack of the empirical data to support the established perception of the public-private forms of cooperation as a new form of governance that is able to provide effective and legitimate governance [Börzel & Risse, 2005, 14, Biermann et al., 2007a, 240, Bäckstrand, 2006, 303f]. First, the literature emphasizes a bias in the selection of the case studies towards the successful forms of cooperation [Börzel & Risse, 2005, 14, Biermann et al., 2007a, 241]. Second, the authors criticize the lack of the data that would demonstrate the linkage between the activities of the public-private forms of cooperation and their environmental impacts [Biermann et al., 2007a, 248, Bäckstrand, 2006, 301]. Against this background, the scholars suggest that the cooperation in the first line contributes to the networking and bureaucracy-building activities [Biermann et al., 2007a, 248]. Those activities can potentially result in the coordinated environmental solutions in the future but this is – again – a matter of empirical investigation [ibid].

The discussions of the factors that separate the successful forms of public-private cooperation from unsuccessful emphasize the importance of the organizational design of cooperation. The level of institutionalization of cooperation, the size of the cooperation, the style of decision-making, the quality of the process management, membership pattern, and the institutional learning practices embedded in the design of cooperation are considered to

²⁸ For an overview of the various conceptualizations of effectiveness see [Kütting, 2000].

relate to the effectiveness [Liese & Beisheim, 2011, 125ff, Szulecki et al., 2011, Selsky & Parker, 2005, 864, Andonova & Levy, 2003, 30, Bernauer, 1995, 374ff].

The discussion of the legitimacy of public-private forms of cooperation can be assigned to the broader discussion of the legitimacy of transnational governance [Held, 2004, Anderson, 2002b]. The scholars of transnational democracy theorize about the features of the current and the desirable global governance systems as well as discuss what form of transnational democracy is possible and under what conditions [Anderson, 2002a].

Regarding the public-private forms of cooperation, the evaluation in terms of legitimacy considers the accountability and transparency of the actions as well as the level of representativeness in the partnerships. In this context, Börzel & Risse highlight that the participation of non-state actors in governance does not make those uprising forms of governance automatically more legitimate [Börzel & Risse, 2005, 17]. The selectiveness of the representatives and the lack of the transparency behind the actions increase the democratic deficit [ibid]. Further, the scholars question a symmetric distribution of the representativeness in the public-private forms of governance and stress the dominating role of the state actors and intergovernmental organizations [Biermann et al., 2007a, 252, Bäckstrand, 2006, 299, Andonova & Levy, 2003, 23]. Thus, the scholars conclude that the public-private forms of governance rather reproduce the existing patterns of actors' representation in the international system than contribute to the input legitimacy by mobilizing a variety of the stakeholders concerned [Biermann et al., 2007a, 254].

On the whole, the scholars criticize that the fragmentation of the existing literature impedes the generalization of the findings from the individual case studies [Mol, 2007, 219, Biermann et al., 2007a, 241].

//.1.2 TOA

In the framework of global governance studies, TOA were identified as a specific form of transnational public-private cooperation. The criterion which distinguishes TOA among other forums of international cooperation highlights the technology development aspect as the ultimate goal of the cooperation. The authors define the universe of TOA as "[...] including those international agreements that are aimed at advancing research, development, demonstration, and / or deployment of technologies [de Coninck et al., 2008, 336]." By characterizing those forms of cooperation as the "agreements", previous research develops a semantic relation between the technology-oriented agreements and the international agreements on GHG emissions reduction, notably the Kyoto Protocol. That conceptualization implies the comparability of both forms of cooperation. As the utmost achievement of the Kyoto Protocol presents the reduction of the GHG emissions, previous research has assessed the effectiveness of TOA towards their potential to contribute to the GHG emissions reduction.

II.1.2.1 Contribution of TOA to the International Climate Change Mitigation Effort

De Coninck et al address the role of international cooperation in the framework of TOA for the environmental technology development and deployment. The authors consider the economics, engineering, international relations, and sociological perspectives to discuss the role of technology in climate policy in general and particularly the role of TOA in technology development and deployment [de Coninck et al., 2008, 337ff].

From an economics perspective, environmental technologies such as CCS are considered to face multiple market failures²⁹. These are:

- general tendency of the markets to underinvest in new technologies³⁰ under the condition of uncertainty³¹, and
- not full internalization of the environmental externalities³².

International cooperation within TOA has been referred to as a policy instrument which addresses those market failures through coordination of R&D resources, benefits associated with a spreading scale of technology adoption, and cost reductions resulting from the learning effects and learning spills [de Coninck et al., 2008, 338].

According to previous research, the rationale for international cooperation in TOA depends on the type of innovation³³ and the stage of technology development³⁴ [Philibert, 2003, Philibert & Podkanski, 2005, Philibert, 2004a, Justus & Philibert, 2005].

²⁹ The neo-classical framework argues that the market is the most efficient mechanism for the allocation of the society's resources [Howlett et al., 2009, 22]. However, under certain circumstances it fails to fulfill its function. Those cases are referred to as the "market failures." See also [Stiglitz, 1988].

³⁰ For international trends in energy R&D funding see [Margolis & Kammen, 1999].

³¹ The uncertainty results from the lack of information necessary to make rational decisions [cf "imperfect information" in Howlett et al., 2009, 23]. Regarding the case of CCS, the condition of "imperfect information" concerns the revenue stream due to the uncertainties regarding the levels of the CO₂ price as well as due to the technology scale-up uncertainties and regulatory uncertainties [Rai et al., 2009, 9].

³² The market failure of negative externality occurs when the costs for anthropogenic climate change are not born by the GHG emitters but passed on to the general public [cf Howlett et al., 2009, 23].

³³ The classification according to the type of innovation refers to the objects or areas of innovative activity. There are various possibilities to account for the type of innovation and the classifications differ with the purpose of research. For an overview see [Fagerberg et al., 2005].

³⁴ "The stage of technology development" refers to the classification of innovation according to its distance from market and therefore the focus of attention is directed at the variability of the innovation in time. The most well-known approach to capture the development of innovation over time is a linear model of innovation. It suggests that there is a well-defined sequence of stages that innovations assumed to go through whereas each stage has specific implications for the innovation process. The basic stages of innovation include R&D, demonstration, and commercialization. Although the stock of the empirical research has shown that an innovation does not present a linear process driven by its own logic [cf Fagerberg et al., 2005, 8f] but it is rather characterized by the multiple feedbacks which face the researcher with the complex and fuzzy picture [Pavitt, 2005]. Nevertheless, the "stages"-sequence is often used as the heuristics for analytical purposes and strategic planning activities like policy planning or technology roadmapping. The research project applies the stages heuristics to account for the maturity of CCS technologies in section V.1, Figure 3.

CCS together with technologies such as hydrogen-fuel cells and fusion power belong to a category of the “[l]ong-term and largescale transformative energy technologies and systems that entail significant costs and risks” and are well-suited for international collaboration [Justus & Philibert, 2005, 5, 8, cf Philibert, 2003, 26].

The scholars agree that considering the variability of innovation in time, international cooperation is rather common in the early pre-competitive stages of the technology development whereas for commercially mature technologies the scope of cooperation becomes more limited [Justus & Philibert, 2005, 8, 18, Philibert & Podkanski, 2005, 16]. Philibert claims:

[t]he clean coal case suggests that the form of international collaboration depends heavily on the degree of maturity of a particular technology: open international collaboration is possible only for the very new and risky technologies, such as carbon dioxide capture and storage. [Philibert & Podkanski, 2005, 16]

Further, the government support or “some kind of government strategic interest” is considered to be an essential driver for the early R&D and the demonstration phase of technology development³⁵ [Philibert, 2003, 5, Rai et al., 2009, 13]. Rai et al [2009] conclude that concerning technologies analogous to CCS³⁶, in all cases the government played a decisive role either by providing direct subsidies for R&D and / or by financing the first demonstration projects [Rai et al., 2009, 4, 16]. The rationale for the governments to engage in international energy technology collaboration is considered to be multi-faceted. It includes: knowledge creation, sharing costs, access to facilities and resources, enhancement of domestic scientific capabilities through the exchange of information and experience, support of specific economic, technological, political objectives, leverage of limited national resources, and helping domestic enterprises by enhancing their competitiveness [Justus & Philibert, 2005, 8]. Summarized, the rationale for countries to engage in international energy technology collaboration is similar to that of domestic spending on R&D [Philibert, 2003, 26]. That is to correct the market failure of underinvestment in new risky technologies under conditions of uncertainty.

From an engineering perspective, the development and deployment of technologies for the purpose of climate change mitigation is considered against the background of their technical potential for the emissions reduction [ibid, 339]. Considering the emissions reductions targets and cost estimations, the scientists working from the engineering perspective estimate, if it is technically possible to achieve the GHG emissions reductions. The authors conclude that the main message from such studies³⁷ is that there is a variety of

³⁵ This finding corresponds with the welfare economics literature which highlights the important role of governments in correcting the market failures.

³⁶ For an outline of the technologies which were a subject of the study see page 21.

³⁷ For an overview of various technology options in the context of global climate change mitigation see [Pacala & Sokolow, 2004, Hoffert et al., 2002]; in the context of Germany see [Wietschel et al., 2010, Martinsen et al., 2007].

technologically feasible options³⁸ whereas their development and deployment depends on the technology diffusion [ibid].

From an international relations perspective, de Coninck et al address a failure of nation-states to commit to an international climate protection regime basing on the rational choice logic [ibid]. A tendency to “free-ride” on the GHG mitigation efforts by other states leads to the strategic choice to avoid the cooperation [ibid, de Coninck & Bäckstrand, 2011]. Furthermore, the authors highlight the challenge of compliance. It implies that even in case of an international legally binding agreement on climate change, there is no supranational authority which would punish the parties for a failure to comply [de Coninck et al., 2008, 339]. TOA are considered to be able to alter the calculation of national interest underlying this strategic choice [ibid]. Thus, once the technology reaches a critical mass, it may become a standard and the costs for joining the agreement and following the standards will be lower than the costs of non-participation [ibid].

The assumption that the costs of the technologies usually decrease with growing installed capacity³⁹ has been contested in the empirical studies. Rai et al [2009] draw parallels between CCS and the US nuclear-power industry, the US SO₂-scrubber industry, and the global liquefied natural gas (LNG) industry. These technologies are characterized as having the “extremely high capital intensity”, “uncertain revenue stream”, “technology and regulatory scale-up uncertainties”, and “complex value-chain” [ibid, 9]. The authors conclude that the diffusion of the technologies that share such characteristics does not lead to the costs reduction. On the contrary, the costs tend to increase with the growth of the cumulative installed capacity [Rai et al., 2009, 19ff, 28]. Philibert [2004b] also argues against the “critical mass”-assumption whereas he suggests that the adoption of the environmental technologies by the advanced industrialized economies would not lead to the diffusion, if these technologies entail added costs compared to the alternatives [ibid Philibert, 2004b, 6f].

Further, de Coninck et al argue that a broad participation of the Kyoto Protocol parties and non-parties in the activities of TOA may expand “the zone of possible agreements”⁴⁰ and, thus, change strategic interactions between the parties [de Coninck et al., 2008, 339]. Finally, the authors challenge this idea by presenting the game-theoretical arguments⁴¹. They refer to the modeling results which show that there are few positive effects from the international cooperation on technology R&D [ibid].

³⁸ The lack of government action to support the deployment of the environmental technology innovation despite the technical feasibility of the option has been referred to as the “government failure” [Bach & Matt, 2005, 31]. This notion reflects the failure of government institutions to adjust to the speed of the technological and/or scientific change [ibid].

³⁹ For an outline of the studies which support this finding see [Rai et al., 2009, 19 in the footnote].

⁴⁰ See [Sebenius, 1983].

⁴¹ Cf also [Buchner & Carraro, 2005].

From a sociological perspective, the role of technological change is considered in the context of the “sociotechnical systems”. The latter are defined as the systems at the sectoral level which are

[...] made up by a cluster of elements, involving technology, science, regulation, user practices, markets, cultural meaning, infrastructure, production and supply networks [...]. This cluster of elements forms a sociotechnical system. The elements of socio-technical systems are created, maintained and refined by supply-side actors (firms, research institutes, universities, policy makers) and demand-side actors (users, special-interest groups, media). [Geels & Kemp, 2007, 442, cf also Geels, 2004, 900]

Based on the theories of energy transition and industrial transformation, as well as on the numerous studies which attempt to outline pathways of technology development, de Coninck et al argue that it is almost impossible to “navigate” the technological change [de Coninck et al., 2008, 340]. However, the authors conclude that from the sociological perspective, policies can facilitate technology niche formation, technology accumulation and “careful, but nonlinear transition” to the new technological regimes [ibid]. TOA are considered to be more capable of inducing those policy approaches as compared to the top-down international emissions reduction regimes [ibid].

The influence of knowledge-sharing and coordination in the framework of TOA on the pace of technological progress and on the emissions reduction is considered to have an indirect character [ibid, 353]. The authors claim that depending on the stage of technology development, TOA can either help to identify the RD&D needs or move barriers inhibiting technology diffusion.

II.1.2.2 Influence of TOA

De Coninck et al relate the influence of TOA to their type. Within the universe of TOA, de Coninck et al. identifies four broad types [de Coninck et al., 2008, 336f]. The distinguishing criterion for the typology is the purpose of joint activities. Thus, the authors identify:

- knowledge-sharing and coordination agreements,
- research, development and demonstration (RD&D) agreements,
- technology transfer agreements, and
- technology deployment mandates, standards, and incentives agreements.

Activities undertaken under knowledge sharing and coordination agreements include meeting, planning, exchange of information (e.g., the Carbon Sequestration Leadership Forum or the task-sharing within International Energy Agency Implementing Agreements), and possibly the coordination and harmonization of research agenda and measurement standards.

RD&D agreements include jointly agreed RD&D activities and funding commitments (e.g., the ITER fusion project) or mutual agreements to expand or enhance domestic RD&D programs.

Technology-transfer agreements include commitments for technology and project financing (e.g., the Global Environment Facility), particularly flowing from developed to developing countries, as well as potentially facilitating international licensing and patent protection.

A fourth class of TOA is comprised of international agreements encouraging technology deployment by establishing deployment mandates for a specific technology or group of technologies (e.g., renewable portfolio standards), international technology performance standards (e.g., automobile fuel economy or appliance efficiency), or technology deployment incentives (e.g., renewable subsidies). [ibid]

The typology shows a broad span of organizations covered by the notion of TOA. Three of four TOA which are the focus of this research project are mentioned in the classification by de Coninck et al.

The CSLF is characterized as a knowledge-sharing and coordination type of the agreements [ibid, 341]. While assessing the *effectiveness* of the different types of TOA regarding their potential to make a significant contribution to the international climate change mitigation regime, de Coninck et al characterize the knowledge-sharing and coordination agreements as “the least demanding type” [ibid]. The authors conclude that this type of TOA may only serve as one option in the portfolio of international climate change mitigation efforts [ibid]. Thus, the activities of the CSLF are considered to have a minor effect on the R&D of CCS [de Coninck et al., 2008, 342]. The authors estimate its influence in terms of the indirect effects on domestic R&D funding priorities [ibid].

The authors evaluate the incentives for participation in the CSLF activities as high. First, a compliance with the CSLF charter does not involve significant action other than the attendance of the twice-yearly CSLF meetings. Second, the administration hurdles of cooperation are low [ibid, 342]. The environmental effectiveness of the CSLF activities is considered to be difficult to evaluate but suggested to be limited. Concerning the contribution of the CSLF to the CCS deployment, in a later essay de Coninck [2008] characterizes the results of the CSLF activities as “disappointing” [ibid, 2]. The membership structure of CSLF that consists of the political decision-makers with limited mandates and the difficulties with the development of the effective approaches to coordinate CCS demonstration are considered to be the cause for an initial failure to contribute to commercialization of CCS [ibid].

In the framework of the typology developed by de Coninck et al, the Implementing Agreements the Clean Coal Centre and IEAGHG are classified as the cost-sharing agreements⁴² [de Coninck et al., 2008, 342]. The authors estimate the impact of the Implementing Agreements on the technological change and on the emissions reduction in terms of better coordination of technology research activities and technology standardization [de Coninck et al., 2008, 343]. The incentives for the participation in the Implementing Agreements are considered to be high – the administrative hurdles and participation fees are relatively low, and the membership is also open to the OECD non-

⁴² A cost-sharing type of international cooperation requires from the participants to pay into a common fund which serves as a budget for a contractor to perform research tasks [IEA, 2003, 5, cf also de Coninck et al., 2008, 343]. Besides the cost-sharing type, there is a task-sharing form of international cooperation. The latter implies that the participants pursue a common project while each country assigns the resources and personnel for carrying out their share of the work.

member countries. As the Clean Coal Centre and the IEAGHG do not conduct research by themselves but rather bundle R&D results in desk studies and disseminate this information, they are considered to indirectly contribute to the technological development.

The study concludes that TOA may present one option in the portfolio of international climate change mitigation efforts. The activities of TOA may facilitate technological progress and therefore help correct the market failure of underinvestment in new technologies [ibid, 349].

Summary Box 5

Previous research identified the characteristic features of the emerging global environmental governance regime.

The public-private forms of cooperation were analyzed in terms of their contribution to the effectiveness and the legitimacy of the global environmental governance regime.

Previous research on TOA gave a definition of the phenomenon and discussed the potential of TOA to contribute to the reduction of GHG emissions.

II.2 Interest Mediation in the Context of Political System of the EU

Interest mediation school is a broad and well-established research field in political science. The empirical research on state-group relations is more developed in the context of the US federalism than in the context of the multi-level system of the EU [Dür, 2008b, 560, Kohler-Koch, 1994, 166f]. Although recently, the researchers highlight the points of convergence in the US and European traditions [Mahoney & Baumgartner, 2008].

The focus of previous empirical research on state-group relations in the context of the EU:

- highlights the role of interest groups in the framework of the grand theories of the European integration,
- identifies the modes of interest mediation in the European Union against the background of two basic interest mediation systems – pluralism and corporatism,
- identifies the factors which have a consistent impact on the patterns of interest mediation between state and non-state actors in the context of the EU, and
- discusses whether the established patterns of interest mediation improve the democratic development of the political system of the European Union or hinder it.

The following section briefly outlines the results of the empirical research on the role of interest groups in the context of the European integration and on the modes of interest mediation in the EU. Against the background of the research question, the focus of the section covers the research on the factors driving interest mediation processes in the EU. The section also addresses the research results reflecting the impact of interest groups activities on the democratic development of the political system of the EU.

II.2.1 Grand Theories of the European Integration and Interest Mediation

There are only few studies which analyze the behavior of interest groups in the context of the grand theories of European integration - functionalism, intergovernmentalism, and the multi-level governance approach.⁴³ This fact reflects a general trend in the studies of European integration to skip the analytical complexity of the grand theories in favor of meso-level explanations usually restricted to a specific policy-making sector [Grande, 1996, 320]. Those meso-level explanations reflect the approach of the governance studies in the context of the EU.

In the empirical case studies, Eising analyzes the development of interest mediation patterns of domestic interest groups against the background of the major assumptions of the grand theories of European integration [Eising, 2004b]. The research interest behind the study focuses on the evolution of the interest mediation strategies in course of the European integration. Thus, the core assumptions of the *neofunctionalism* suggest the shift of interest mediation activities to the new European center of authority [ibid, 213]. According to the *intergovernmentalism*, the interest groups would continue their activities at the national level complementing them with the occasional supranational activities [ibid, 214]. In line with the *multi-level governance* perspective, the patterns of interest mediation would reveal a share of interest groups pursuing a “dual strategy” of lobbying the state actors at the domestic and supranational levels with equal intensity [ibid, 216].

The empirical analysis of the interest groups’ behavior invalidated the assumption resulting from the theoretical framework of neofunctionalism – only a small percentage of the interest groups shifted their activities entirely to the level of the EU [ibid, 227]. The assumption resulting from the intergovernmentalism was confirmed – most domestic associations continued representing their interest at the level of the member-states [ibid, Kriesi et al., 2007, 69]. However, the intergovernmentalism cannot explain the results of the empirical research which show a distinctive share of organizations representing their interests routinely on the domestic and supranational levels [Eising, 2004b]. Eising concludes that the multi-level governance framework is best suited to explain interest mediation in the EU due to a share of multilevel players which follow a dual strategy to promote their interests [ibid, 229].

However, the research results did not prove the strategy of multi-level interest representation to be dominant among the interest groups [ibid, 236]. Thus, Eising draws attention to the factors which mediate the interest representation of the actors in the multi-level setting. Eising argues that the socialization of interest organizations in a particular political context and a sufficient resource endowment improve their capabilities for interest representation on both levels of decision-making [ibid]. As these factors reflect the patterns of interest mediation at the domestic levels, Eising concludes:

⁴³ Strictly speaking, only functionalism and intergovernmentalism with their modifications can be referred to as the grand theories of European integration as only those develop hypotheses about the process of integration and its outcomes.

For the most part, European integration stimulated extensions and modifications of established practices. [...] In sum, it appears that multilevel governance has a built-in tendency to work to the disadvantage of weaker interests even though not each and every policy decision needs to reflect this asymmetry [...]. [ibid, 236f]

In the empirical study of the “enlargement waves” and interest group participation, Blavoukos & Pagoulatos emphasize the value of adopting a bottom-up research strategy by analyzing the impact of new member countries on the EU system of interest mediation and EU politics [Blavoukos & Pagoulatos, 2008]. The authors conclude that Europeanization is not a “unidirectional process” and it is therefore not sufficient to study the effects of European integration on interest groups to fully understand the dynamics of the Europeanization [ibid, 1162]. They stress the importance of studying interest groups as a “complementary transmission belt of national inputs” and highlight the need for further research of the impact of transnational actors at the process of European integration [ibid].

II.2.2 Accounts of Interest Mediation System of the EU

There are few systematic accounts of the interest mediation system in the context of the EU which draw on empirical research in order to identify the predominant system of interest mediation as showing rather pluralist or corporatist features.

Pluralism and corporatism are the best-known and frequently contrasted systems of interest representation which refer to particular institutional practices of linking the organized interests with the decision-making authorities [Schmitter, 1974, 86f]. The definitions of pluralism and corporatism as they are shown below highlight the organizational structure of interest mediation as well as the degree of coordination of the groups by the state actors [Eising, 2007c, 288].

The predominant coordination mechanism in *pluralism* is the competition between a large variety of groups which results in a rather equal representation of all interests whereas the state actors take the role of the referees [Truman, 1951, Sebaldt & Straßner, 2004, 29ff, Eising, 2007c, 286]. The *corporatism* is characterized through the negotiations between the state actors and groups in a mutually-agreed institutional framework whereas the groups allocate resources for policy formulation and implementation and state actors influence the composition of the groups and award them with the recognition [Eising, 2007c, 288, Lijphart, 1999, 171f, Sebaldt & Straßner, 2004, 41ff].

Pluralism can be defined as a system of interest representation in which the constituent units are organized into an unspecified number of multiple, voluntary, competitive, nonhierarchically ordered and self-determined (as to type or scope of interest) categories which are not specially licensed, recognized, subsidized, created or otherwise controlled in leadership selection or interest articulation by the state and which do not exercise a monopoly of representational activity within their respective categories. [Schmitter, 1974, 96]

Corporatism can be defined as a system of interest representation in which the constituent units are organized into a limited number of singular, compulsory, noncompetitive, hierarchically ordered and functionally differentiated categories, recognized or licensed (if not created) by the

state and granted a deliberate representational monopoly within their respective categories in exchange for observing certain controls on their selection of leaders and articulation of demands and supports. [Schmitter, 1974, 93f]

Streeck & Schmitter highlight the gap between the expectations of the neofunctionalists with regard to the role of interest groups in the polity of the EU and the observable patterns of interest mediation [Streeck & Schmitter, 1991]. From the neofunctionalist perspective, the status of interest groups in the ever more integrated EU would likely resemble the neocorporatist interest mediation system characterized through “mutual supportive organizational arrangements between the machineries of government on the one hand and large, centralized interest organizations on the other” [ibid, 135]. However, the empirical research shows an organizationally fragmented, competitive, less hierarchically integrated setting typical for pluralist interest mediation systems [ibid, 136]. Streeck & Schmitter argue that the formation of the corporatist structures of interest mediation in the EU was impeded by the inability of labor to organize itself which, as a consequence, hindered the development of the reciprocal reinforcing effects between centrally organized labor, centrally organized business groups and the EU decision-making institutions [ibid, 139, cf also Lehmbruch, 1991, 134].⁴⁴ Thus, Streeck & Schmitter explain the absence of the European business associations due to the lack of necessity for those to organize themselves in order to negotiate with the centralized labor [ibid, 141]. Further, the authors point out the outstanding role of the Council of Ministers with its unanimous decision-making procedure which allows business interest to persuade only one country in order to veto a decision [ibid, 142].⁴⁵ The authors therefore describe the interest-mediation system of the EU as pluralism characterized through a multi-level setting and a broad variety of actors with an uncertain status. Streeck & Schmitter conclude:

As long as the Community – that is, its nonintergovernmental institutions such as the Parliament and the Commission – cannot autonomously determine the range of policy issues that come under its jurisdiction, its ability to influence the structure of organized group interests will remain low indeed. [Streeck & Schmitter, 1991]

Mazey & Richardson also characterize the interest mediation system of the EU as pluralistic [Mazey & Richardson, 2006, 251, 254, 264, also Greenwood et al., 1992 cited in, Rittberger, 2006, 458, Crombez, 2002, 29]. The authors argue that the characteristic features of decision-making in the EU are the complexity and uncertainty. That encourages “promiscuous” behavior on the side of the interest groups [ibid, 256]. Mazey & Richardson further describe the interest groups’ behavior as rational and independent therefore the interest groups are expected to exploit the political opportunity structure at the venues

⁴⁴ In this argument Streeck & Schmitter oppose the empirical evidence at the level of the EU with the pattern of neocorporatism at the level of member-states in the 1970-ies. The latter is characterized through the collective bargaining between the centralized labor interests and centralized business interests [Streeck & Schmitter, 1991, 157]. For the comparison of the organizational properties of trade unions and business associations see [Streeck, 1991].

⁴⁵ For the institutional characteristics of the EU polity which favor pluralist interest mediation patterns see [Traxler & Schmitter, 1995, 208].

which promise the highest pay-offs from the interest-mediation activities [ibid]. Besides the attempts to characterize the interest mediation system in the EU, several studies argue that the system of interest mediation varies with the policy sectors due to changing nature of incentives and interests of interest groups and policy-makers [Hix, 2005, 211, Saurugger, 2007, 483].

II.2.3 Drivers of Interest Mediation Processes in the EU

The number of studies addresses the factors which explain the variation in the patterns of access and influence of interest groups toward the supranational bodies of the European Union. The overview of the existing studies distinguishes four drivers which will be discussed in the context of the findings from the empirical research.

II.2.3.1 Resources

The majority of studies on interest mediation in the context of the EU understands the rationale for state-group relations as the exchange of resources. Those studies which claim the resource perspective to be too narrow to understand the interest mediation processes of state-group relations still do not abandon the importance of the resources [Beyers, 2004, 212f]. Although seldom explicitly defined, the application of the concept of resources in the empirical studies implies the two following observations:

- both the non-state and the state-actors have resources which can become a subject of the exchange relations,
- what is considered as a resource in the exchange process is negotiable between the actors involved and is derived from the characteristics of the policy sector.

Most scholars agree that *information* is a crucial resource which becomes a currency in the exchange process between public actors and groups. Although both state and non-state actors can exchange information, it is generally considered that information in the form of expertise is the main resource of the *private actors*. This understanding is shared by the analytical approaches which study state-group relations in the framework of policy-making processes [e.g. Haas, 1992] and plays an important role in the context of empirical research [Bouwen, 2002, 369, 2004, 340, Biermann et al., 2009a, 47, Dür, 2008a, 1214f, Mazey & Richardson, 2006, Princen & Kerremans, 2008, 1131f, Peterson & Bomberg, 1999, Eising, 2007b, 352].

Bouwen distinguishes three kinds of information which can be applied by the private actors as a resource in the exchange process – expert knowledge, knowledge of the interests of the private sector aggregated at the European sectoral level, and knowledge of the interests of the private actors in the member states [Bouwen, 2002, 369f]. In the empirical study Bouwen identifies the linkages between the types of information most needed by key

European institutions and the organizational forms of interest mediation which are best suited to provide this kind of information [Bouwen, 2004].

Money is considered to be a crucial resource of the private actors which first of all allows the interest group organizations to pursue the multi-track strategy of interest mediation [Eising, 2004b, 236, Dür, 2008a, 1214, Princen & Kerremans, 2008, 1131f]. In the context of policy implementation, money which is potentially allocated by the interest organizations – predominantly by business organizations – can be considered by the European institutions as a significant resource for enabling or facilitating policy implementation.

Legitimacy has been identified as a further resource which is required by the European institutions – especially the Commission. In this context, the scholars of political science have particularly referred to the low democratic accountability of the European institutions, as compared to the domestic institutions, and weak political parties [Princen & Kerremans, 2008]. Since the beginning of the 1990-ies the Commission introduced a range of measures to enhance the cooperation with the societal actors in the framework of the legislative process with the goal to increase its transparency and legitimacy [McLaughlin & Greenwood, 1995]. Those measures include but are not limited to the consultations, hearings, establishment of formalized networks between the European industry and European institutions as in the case of the European Technology Platforms. The role of the interest groups in the exchange processes is then to strengthen the link between the EU policy-makers and the European societal actors [ibid]. Further, the early involvement of the interest groups in the legislative process is considered to facilitate the implementation of the policies. The latter aspect is in so far important as it allows the Commission to save the resources needed to track and enforce policies' implementation which falls into Commission's responsibilities. Thus both legitimacy and political support have been recognized in the empirical research as the important resources which can be provided by the interest groups [Dür, 2008a, 1214, Princen & Kerremans, 2008, 1131f, Mazey & Richardson, 2006].

The crucial *resource of the public actors* which has been highlighted by the number of the studies is the *relevance for political decision-making*. Indeed, several studies derive the intensification of the activities of interest groups at the level of the EU from the growth of competences of the European institutions in a steady increasing number of policy sectors [Mahoney & Baumgartner, 2008, 1260, Eising, 2007b, 352].⁴⁶

Mahoney distinguishes three resources by means of which the European institutions can influence the interest groups activities. Besides (i) *the growing scope and depth of relevance for political decision-making*, Mahoney distinguishes (ii) *the direct subsidies*, and (iii) *the power to compose formal arenas for political debate* as further important resources which can be deployed by the European institutions in order to channel the interest groups'

⁴⁶ Kohler-Koch stresses that it is rather the anticipation of a growing importance of the European level, not the actual growth of the EU competences, that led to the intensification of the activities of the interest groups [Kohler-Koch, 1994, 171].

activities [Mahoney, 2004]. The empirical study by Mahoney confirms the broader assumption that the government influences interest groups [ibid, 446]. First, the Commission subsidizes the interest groups whereas the dominant share of funding supports the citizen's groups. Second, the Commission channels interest mediation activities in the legislative process by deciding in what areas to establish committees and by allocating the committee seats [cf also Hooghe & Marks, 2001, 15].

Finally, Mahoney highlights the correlation between the adoption of the major European treaties that formalize the incremental power expansion of the European institutions and growth in the number of interest organizations. Mahoney concludes that it is difficult to establish causal relations for the phenomena of interest mediation, as e.g. the establishment of the committees can be proceeded by the Commission but might be the result of the interest organizations activities [ibid, 449]. However, in analyzing the feedback relations between the public actors and groups, it is important not to neglect the public actors' resources which are strongly under-researched compared to the resources of interest groups [ibid, 444, 461ff].

II.2.3.2 Institutional Setting

The horizontal and vertical dispersion of power in the EU is considered to impact the access and influence of the interest groups, however, there is no agreement as to whether those have an impeding or a facilitating effect [Dür, 2008a]. The study of the impact of the location in the multi-level system of the EU on the contacts to the EU institutions considers the location at the European versus national level of decision-making as the explaining variables [Eising, 2007b, 350]. Previous research has not yet covered the groups active at the international level of decision-making.

Dür provides an overview of the studies portraying the opportunities and limitations which the European institutional setting provides for the interest groups [Dür, 2008a, cf also Grande, 1996]. On the one hand, the research concludes that the multi-level structure of the EU with its multiple access points supports the influence-exerting activities of the private actors [ibid, 1215ff, 1219, also Mazey & Richardson, 2006]. On the other hand, complex, multi-level, multi-arena structure of the EU's political system [Richardson, 2006] with its legislative process characterized through uncertainty [Mazey & Richardson, 2006] are also considered to impede the interest groups in developing effective lobbying strategies [Dür, 2008a, 1216]. Dür further argues that the logic of the two-level game which supports the state actors vis-à-vis the European institutions [Moravcsik, 1993, Putnam, 1988], can be reconsidered in a way that the activities on the European level may strengthen the state actors vis-à-vis the domestic interest groups [Dür, 2008a, 1215f, cf also Grande, 1996, 328].

Eising distinguishes three elements of the EU institutional setting which impact the access of interest groups: the segmentation of the EU policies into three pillars, the allocation of powers to the institutions, and vertical and functional differentiation [Eising, 2007b, 332]. The number of studies supports this understanding as they claim that the demand of the

European institution on specific resources results from its positioning in the institutional context. “Political opportunity structure” [Princen & Kerremans, 2008], “venue shopping” [Baumgartner & Jones, 1993], and resource exchange are the frameworks which highlight the importance of understanding the institutional setting as a context for interest mediation [Mahoney & Baumgartner, 2008, 1264]. The scholars claim that on the one hand, as a response to the characteristics of the European institutions, interest groups adapt their strategies in order to gain access and to be heard [Beyers, 2004, 235]; on the other hand the groups engage in “political scale construction” by actively framing⁴⁷ the discourse on a specific problem as a “European” or “domestic” issue depending on the pay-offs they expect from interest mediation at the specific level [Princen & Kerremans, 2008, 1139ff].

A number of scholars understand the Commission as an understaffed, resource poor bureaucracy which has agenda-setting and legislative competences with regard to the broad spectrum of policies falling into the first pillar and is less a subject of the electoral sanctions. This understanding justifies both (i) the attractiveness of the Commission as a target for interest mediation activities and (ii) the demand of the Commission for exchange with the groups [Crombez, 2002, 10, Eising, 2004a, 498, Kriesi et al., 2007, 52]. The research on the impact of the design of the legislative process in the EU shows that the interest mediation activities of the groups target the revision of the content of the Commission proposals. Those activities are “[...] based on common knowledge that some form of the proposal was highly likely to be adopted at some point [...] [Mahoney & Baumgartner, 2008, 1265]. Mahoney & Baumgartner further argue that as the Commission officials are not driven by the results of the coming elections, they are not attuned to their constituents’ concerns but rather responsive to the exchange about issues that affect policy feasibility and policy details [ibid, 1264f].

With the growing number of the issues which fall into the co-decision procedure, the European Parliament has been increasingly considered as a target of interest mediation processes [Eising, 2007a, 394]. The demand of the European Parliament for exchange with the interest groups has been derived from its responsibility to assess the Commission’s proposals and introduce amendments to the legislation [Bouwen, 2004, 345f]. Further, due to the direct elections, the members of the European Parliament have been considered to have strong links with their domestic constituencies. On the one hand those links can facilitate the exchange with the domestic interest groups [ibid], and on the other hand they impede the influence of the interest groups, in case of the public visibility of the issue.

The Council is considered to be the institution with the most intergovernmental characteristics. The processes of interest mediation are considered to shift from the supranational to the lobbying of decision-makers at the domestic level. Thus, the groups⁴⁸ tend to maintain less contacts to the Council as compared to the European Parliament or the Commission [Eising, 2007a, 394].

⁴⁷ For definition of the concept of framing see [Entman, 1993, Nullmeier, 1993, 180f].

⁴⁸ Predominantly business associations [Eising, 2007a, 394].

II.2.3.3 Issue Characteristics

The idea that the specific characteristics of an issue which is a subject of political decision-making shape the actors' constellation and the interest mediation patterns originates from the policy studies. No systematic research on the causalities between the characteristics of policy issues and interest mediation patterns could be found. The majority of the results which are being discussed in this section originates from the empirical research in the framework of case studies whereas the issue characteristics are referred to as one of several explaining variables for the interest mediation patterns. The analytical points of reference result with the governance studies and the network studies. Both schools claim that the specific modes of governance and types of networks are linked to the characteristics of the policy sectors they evolve in.

Against the background of CCS as an empirical field of application, the overview below points out the results of the research which relate the scope of the influence of the interest groups to:

- the importance of the policy type,
- the degree of technicality of the issue,
- public salience of the issue, and
- policy-making stage for interest-mediation.

First, the research stresses the importance of the *policy type* for determining the scope of influence of interest groups. In the framework of public policy analysis, the idea "policies determine politics" goes back to Lowi [Lowi, 1972]. Against the conventional wisdom „politics (and polity) determines policies", Lowi assumes that the kind of policy at stake accounts for the institutional structure and the strategies of political actors (politics) [Lowi, 1972, 299]. Precisely, Lowi argues that the expectations about the type of policy determine the relationships between the actors involved and thus the type of politics [Lowi, 1964, 688f]. Following the logic "policies determine politics", Lowi suggests the typology of policies which differs between distributive, regulative, and redistributive policies [Lowi, 1964, 690ff, Lowi, 1972, 299ff].⁴⁹ The goal is to allow a prediction about the degree of involvement and balance of power between the government institutions, i.e. Lowi applies the taxonomy to the political system of the United States to explain the cases of "weak" or "strong" Presidencies through the prism of policies at stake [Lowi, 1972].

Lowi's taxonomy has been criticized on the grounds of a possibility to classify a single policy issue according to various policy types [Heinelt, 2008, 119, Schneider & Janning, 2006, Windhoff-Héritier, 1983, 354, cf also Baumgartner & Leech, 1998, 39] and the capacity of

⁴⁹ Later this taxonomy is completed by adding the constituent type of policies. However, the main focus of the attention of public policy analysis scholars has been directed at the "distributive-redistributive" policies dichotomy [cf Windhoff-Héritier, 1983, 349].

policies to show various characteristics throughout different stages of policy-making process [Windhoff-Héritier, 1983, 354]. However, the idea that a policy sector may show a type of politics that differs from the national style of politics became the mainstream within the public policy analysis [John, 2000, 5f, Kohler-Koch, 1994, 171]. The scholars of interest mediation in the context of the EU claimed that the characteristics of the policy at stake (distributive, regulative, and redistributive) play role at determining the scope of influence of interest groups.

In distributive politics, where the benefits of action are concentrated on a specific group, and the costs are widely dispersed, groups representing concentrated interests tend to win out over diffuse interests. The main advantage of the former is that they can better monitor the implementation of policies that affect their economic well-being than diffuse interests that face collective action problems [...]. Regulatory decisions generally entail concentrated benefits for one and concentrated costs for another group. In this situation, at least two groups with opposing interests should clash, imposing a limit on the power of individual groups [...]. Interest group influence should be rather small with respect to redistributive policies, as such policies produce diffuse costs and benefits. [Dür, 2008a, 1217]

Second, the studies claim that the degree of *technicality* of the issue determines the scope of influence as the interest groups will likely have more influence on low-politics than high-politics issues [ibid]. The idea is that the demand of the European institutions in information is especially high with regard to the issues which require technical expertise. Kohler-Koch claims that “[w]henver a policy has to deal with highly technical matters, expert knowledge will carry great political weight” [Kohler-Koch, 1994, 170]. In this context, the analytical points of reference result with the epistemic communities approach (cf section III.1.2.3). Haas highlights the importance of technical expertise in form of “human interpretations of social and physical phenomena” in the exchange relations between the epistemic communities and state actors [Haas, 1992, 4].

Third, the *salience* of the issue is claimed to be of importance for the scope of influence of the interest groups [Mahoney & Baumgartner, 2008, 1268, Biermann et al., 2009a, 51, Beyers, 2008, 1190, Schneider & Baltz, 2003, 265, Lowery, 2007, 44]. Salience is defined as “[...] the perceived relevance of a problem to a national government, including the visibility of the problem, its perceived urgency, and the level of affectedness of a country [Biermann et al., 2009a, 51].” The results of the empirical research show that the salience of the issue tends to reduce the influence of the interest groups as the political decision-makers become more sensitive to the opinions of general public and their constituencies [Beyers, 2008, 1192].

Finally, according to the *policy-stage* model, the scholars argue that interest mediation differs in time. Policy-stage model presents the heuristics that describes the phases of policy-making process from problem definition and agenda setting, via policy formulation to

policy implementation.⁵⁰ The results of the research show that in the initial phase of policy formulation which focuses on the agenda setting and policy formulation by the Commission, the interest groups have the best opportunities – as compared to the later stages of policy formulation – to influence policy [Mazey & Richardson, 2006, Grande, 1996]. The resource-poor Commission is considered to be dependent on the outside expertise regarding policy formulation in highly technical areas. Further, as the majority of the EU legislation is adopted in form of Directives, it is in interest of the Commission to keep the costs of tracking the implementation low by involving the key stakeholders in the legislative process from the very beginning. The researchers also point to the stages in the decision-making process where the policy formulation process can be inaccessible and opaque for interest groups, e.g. during the Council meetings [Grande, 1996]. Thus, the variation of influence of the interest groups in time is explained on the grounds of the institutional design of the EU characterized through multiple levels of decision-making and, thus, multiple tracks available to the interest groups for influencing policy and varying demand for exchange of resources on the side of European institutions.

II.2.3.4 Organizational Characteristics of the Groups

Although Baumgartner and Leech [1998] stress the importance of the research on collective action in the context of the interest mediation in the United States, few studies highlight a relation between the organizational structure of an interest group and its influence. Biermann et al points to the importance of organizational structure in the sense of the effective management, the dominance of a distinctive professional culture in the organization, and the style of the organizational leadership with regard to explaining the variation in influence [Biermann et al., 2009a, 55ff]. Mahoney highlights the causalities between the organizational characteristics of the groups and their access to the positions on the Commission's Consultative Committees. The author concludes that the maintenance of a Brussels office and broader representation of the European member states improve their chances of getting a seat on the Committee [Mahoney, 2004, 453]. Mazey & Richardson refer to the organizational structures of the interest groups by describing the Euro-associations as "sluggish policy actors". They conclude that poor organization and slow internal decision-making deprive the Euro-associations of technical expertise – the "currency of the influence" [Mazey & Richardson, 2006]. Beyers points out to the importance of organizational properties of groups as defined by Schmitter & Streeck' approach [Beyers, 2008, 1200ff].

⁵⁰ For an alternative approach to account for the stages of the ideal-type policy cycle and the discussion of the characteristic features of the distinctive stages see [Janning, 2006, 48f]. For critical appraisal of the policy-stage approach see [Sabatier, 1999, Deleon, 1999].

II.2.4 Democratic Quality of Interest Mediation in the EU

The participation of groups in a political process presents the foundation of any democratic society. The discussion on the value of the interest groups for the democracy in the EU can be summarized according to the following central concepts:

- the input legitimacy (governance by the people) which refers to the requirement for decision-makers to pursue the “common interest” of the community members; and
- the output-legitimacy (governance for the people) which refers to the capability for the effective solving of the collective problems [Scharpf, 1999, 17-28].

According to Scharpf [1999], the notion of the input legitimacy assumes the existence of the *collective identity* that allows the members of the community accepting the majority decisions, even if one disagrees with them. That collective identity is based on the trust in the goodwill of the fellow members of the community. This trust is based on the historical, linguistic, cultural, and ethnical commonalities. Due to its inherent heterogeneity, the EU is considered to lack the collective identity. Thus, Scharpf generally questions the input legitimacy of the EU.

The output legitimacy does not require the presence of a strong collective identity [ibid]. The precondition for the output legitimacy is fulfilled, if there is a collective interest. The output legitimacy as the capability for the effective public problem-solving is based upon two sometimes contradictory requirements. First, the output legitimacy requires consideration of all interests concerned by the policy (representativeness). Second, the output legitimacy is based on the codified procedures which require from decision-makers to account for their choices and which allow the general public to reward or punish decision-makers for their actions (accountability).

Two extremes can be formulated with regard to the view on the role of the groups in any political system⁵¹. On the one hand, the participation of the groups in the political process is perceived as “a route for popular presentation” which ensures that the decision-making processes profit from the diversity of interests represented in a society [Baumgartner & Leech, 1998, 83, 88]. On the other hand, groups are perceived as the biased voices of few economically powerful and “a threat to good government” [ibid]. The empirical findings highlight the trend toward one of those extremes, although it is acknowledged that with regard to the advanced industrialized democracies both views do not hold empirical proof.

Saurugger summarizes the results of the existing empirical case studies and concludes that the characteristics of the organized interests in the EU (representativeness) reflect bias toward a privileged position of the resourceful business interests [Saurugger, 2008, cf also Schneider & Baltz, 2003, 267]. Thus, the number of scholars conclude that the patterns of European interest mediation reflect domestic power relations and favor resource rich business interests [Beyers, 2002, Eising, 2004b, 236f, Princen & Kerremans, 2008, 1133,

⁵¹ For a discussion of the theoretical stances and the empirical evidence of the value of interest groups for the democracy in the United States cf [Baumgartner & Leech, 1998, 83-99].

Mahoney, 2004, 450-454]. Although the empirical case studies demonstrate that the European institution subsidize the less endowed groups [Mahoney, 2004], it is not clear whether public funding helps to reduce power gaps between the groups as large business interests are regarded as a source of “strong economic legitimacy” due to their importance for the economic development of the EU [Saurugger, 2008, 1283f]. Finally, the existing empirical evidence shows few attempts of grassroots-level citizens’ organizations to pursue their interests on the level of the EU usually preferring to act at the domestic level [ibid, 1285]. Saurugger concludes by highlighting the top-down perspective of the evolution of the grassroots-level organizations’ participation in the EU. It means that the main driver for the participation was rather the state actors addressing gaps in power and resources than the grassroots-level organizations increasingly seeking to pursue their interests at the level of the EU [ibid, 1286]. The state actors are rather motivated by the needs to obtain information and legitimacy than by creating new forms of interest representation [ibid].

Although Greenwood also highlights the top-down perspective on the organization of the interest representation system in the EU, he considers the benefits that result from strong institutionalization of interest mediation and multi-level decision-making [Greenwood, 2007]. While noting the lack of the accreditation system for interest groups in the EU, Greenwood stresses the existing criteria that must be fulfilled for the group in order to register for the consultation databases and considers the institutionalization of interest mediation driven by the EU institutions through the standardized consultation procedure and the transparency measures as beneficial for input legitimacy and accountability [ibid, 185f]. Those procedures and measures are designed to allow the interest groups to act as checks-and-balances upon each other and thus exercise the accountability pressures on the system of decision-making [ibid]. Further, the multi-level system of decision-making in the EU brings about both fragmentation of the decision-making and of the interest groups as well as the consensus-oriented decision-making which does not produce clear losers or winners-outcomes [ibid, 180ff]. The strong institutionalization of interest mediation and the multi-level decision-making result in the system of “designed pluralism” [ibid, 192]. Greenwood highlights those characteristics of interest mediation in the EU as designed for advancing both output and input legitimacy [ibid].

Summary Box 6

The rationale for state-group relations is understood as the exchange of resources. In comparison to the resources of non-state actors, the resources of the state-actors are under-researched. The Commission is considered to be an understaffed and resource poor bureaucracy with broad agenda-setting and legislative competences. Thus, on the one hand the Commission presents an attractive target of interest mediation activities. On the other hand, it depends on the exchange with the groups. Technical non-salient character of the issues in the policy-formulation phase is considered to enhance interest-mediation processes.

II.3 Influence

The concept of influence plays a central role in the Global Environmental Governance and Interest Mediation studies.

Back in 1955, March highlighted the importance of arriving at a general definition of *influence* as opposed to the empirically-derived conceptualizations to avoid limited comparability of the empirical results and to enable the synergies with the disciplines beyond political science [March, 1955, 432]. His effort to contribute to the clarification of the concept defines interpersonal influence as

[...] that which induces behaviour on the part of the individual at time t_1 different from that which might be predicted on the basis of a knowledge of the individual organism at time t_0 . By behaviour is meant any change in the state of the organism [...]. Thus, any changes in the organism are considered except of those that are implicit in the original condition of the organism and, therefore, predictable on the basis of knowledge held in time t_0 [...]. [March, 1955, 438]

Fifty years later, Biermann et al refer to the Webster's Dictionary for a definition of influence in the context of studying the international bureaucracies [Biermann et al., 2009a]. There, the influence is defined as "the bringing about of an effect [...] by a gradual process; controlling power quietly exerted; agency [...] of any kind which affects, modifies, or sways [ibid, 40]."

Both definitions share an understanding of the actor exerting the influence and an actor being exposed to the influence whereas the influence can be understood as the activities which effect a change in the behavior of the recipient of the influence. This simplified conceptualization helps revealing the problems which still confront the researchers.

First, the causality which results from the "sender and receiver" - relationship inherent to the concept of influence is not clear. Against the background of the state-group relations, it is a common wisdom in political science that the state-group relations in the advanced industrialized democracies are those of reciprocal exchange. Thus, it is a difficult task to clearly determine the causalities between the intended action and the resulting effect.

Second, as Biermann et al argue, it is challenging to ascribe the change in the behavior of the targeted actor to the activities of a specific organization and not to the overall regime effectiveness. The latter reflects those general factors like changes in economic situation or crisis which may also evoke change [ibid, 45f, also Michalowitz, 2007, 134].

Finally, the concept of change in the behavior of the recipient of influence provides not only analytical difficulties but also poses problems for empirical research. The questions which arise are: What is considered to be the change as a result of the influence-mediating activities? What is the point of reference of measuring the change? And what are the tokens for the researcher to conclude that the change took place (operationalization)?

The scholars of Global Environmental Governance draw on the concepts originating from the public policy analysis [Easton, 1965] in order to conceptualize and operationalize influence. Thus, the literature differs between the output, outcome, and the impact levels of influence

[Biermann et al., 2009a, 41]. The *output level* refers to the actual activities of the organization; the *outcome level* refers to the “observable changes in the behavior of actors” targeted by the influence-mediation activities; the *impact level* indicates a change in the broader “economic, social, or ecological parameters” which were induced by the change of the behavior of the targeted actor [ibid].

According to this classification, the study of the activities and work deliverables of TOA would refer to the output level of influence. Then, the analysis of the access of the output of TOA to political decision-makers corresponds with the outcome level of influence. Finally, the research on the influence of the activities of TOA on the overall progress of the development and deployment of CCS refers to the impact level of influence.

Biermann et al suggest studying the outcome level of the influence. An analysis of the output level – although the least challenging from the perspective of empirical research – does not consider whether the output of the organizations was actually noticed by the political decision-makers [ibid, 42]. A study of the impact level is the most challenging from the empirical point of view because as it was mentioned above it is difficult to establish a causal relationship between the influence of an organization and the change in the broader parameters without accounting for the impact of alternative explanations – predominantly the overall regime effectiveness [ibid, 41ff].

Michalowitz argues that the EU interest groups literature usually lacks an explicit definition of influence [Michalowitz, 2007, 133]. In the context of the analysis of interest mediation in the EU, the number of researchers rejects studying *influence* in favor of the concept of *access* to the decision-making institutions [Bouwen, 2002, Beyers, 2002, Bouwen, 2004, Beyers, 2004, Eising, 2007b]. The scholars agree that the access to the decision-makers does not necessarily mean influence but access is an ultimate condition for exercising influence within a political decision-making process [Bouwen, 2002, 366, Beyers, 2002, 587, Eising, 2007b, 331f]. Beyers defines access as “[...] the channeling or exchange of policy-relevant information through formal or informal networks with public actors” [Beyers, 2002, 587]. This definition resembles the conceptualization of the outcome-dimension of influence as suggested by Biermann et al [2009a, 41]. Indeed, the research agenda of the scholars studying access is similar to those studying the influence. It includes the rationale for engaging in interest mediation at the EU level and the determinants of access in the context of reciprocal exchange of resources between the public actors and groups.

Whereas the conceptualizations of *influence* and *access* identified above focus on the observable phenomena, “the dynamics of nondecision-making” are reflected in the concept of *power* [Bachrach & Baratz, 1962, 952]. Bachrach & Baratz suggest studying not only the exercise of power visible in a series of concrete decisions but also the barriers which a person or a group create to prevent an issue from becoming a subject of political process [ibid, 948f]. Therefore, the extent to which a group can sustain the status quo reflects the group’s power. This approach has not been pursued in the study of interest mediation at the level of the EU.

Michalowitz argues in favor of applying the concept of power for studying state-group relations in the context of the EU [Michalowitz, 2007]. However, power is then understood according to Max Weber's definition as "[...] the ability of an actor to force another actor, even against their own will, to pursue a certain course of action", whereas influence is understood as "a weaker form of power" [ibid, 134]. Biermann et al criticize the approach as it implies "involuntary, forced action by the addressee", whereas the majority of the international organizations – including TOA – do not have any formal decision-making competencies and, thus, exercise "soft" patterns of influence [Biermann et al., 2009a, 40].

Summary Box 7

Conceptualization of the levels of influence:

- *output level – the actual activities of the organization;*
- *outcome level – changes in the behavior of actors targeted by the influence-mediation activities;*
- *impact level – changes in the broader parameters which were induced by the change of the behavior of the targeted actor.*

II.4 Research Gaps

TOA present an under-researched phenomenon in the field of Global Environmental Governance. Against the background of the need for further systematization of the "rich universe of the partnerships" [Biermann et al., 2007b, 290, 292], the PhD project contributes to the research field Global Environmental Governance by further defining the characteristic features of the specific form of transnational cooperation.

Previous research on TOA has focused at their potential influence on GHG emissions mitigation, thus, addressing the impact level of influence. Similar, the majority of the studies on public-private forms of international cooperation has addressed their effectiveness with regard to the contribution to the achievement of the environmental and sustainability goals [Biermann et al., 2007b]. Further, the understanding of the linkage between the production of the knowledge and its access to political decision-makers is still regarded as a primary challenge of research [Vollmer, 2009, 57]. The research question pursued in this project covers the influence of TOA on policy formulation. The PhD project therefore contributes to the research field Global Environmental Governance by emphasizing the outcome level of influence and by studying the access of the work deliverables produced by TOA to political decision-making process.

Previous research in the field of Global Environmental Governance lacks a systematic knowledge on the factors that explain the effectiveness of the public-private forms of cooperation [Biermann et al., 2007b, 291]. The analysis of the relation between the organizational structure, formal status of TOA and their influence contributes to the closure of this research gap. That research also contributes to the European interest mediation

studies by highlighting the factors that mediate the exchange processes between the European decision-makers and the groups.

The principal research gap in the field of interest mediation in the multi-level system of the EU exists with regard to the influence of interest groups active at the international level of decision-making on the European policy-making. The concept of multi-level governance originates from the studies of European integration. Thus, the research of the European policy-making processes has focused at the interplay between the European, national, and supranational levels. In contrast the influence of the international level has attracted less attention. The focus of the PhD project is directed at the exchange relations between the European policy-makers and groups active at the international level of decision-making.

III Conceptual issues – TOA, Influence of TOA, and Policy

The principal research question of the project can be outlined as follows – what is the influence of transnational TOA on the EU policy in the field of CCS? The following section develops the definitions and suggests the operationalizations of the concepts that constitute the major research question – transnational TOA, influence, and policy.

The section that addresses the transnational TOA aims at the development of the criteria that allow distinguishing the universe of TOA (unit of analysis) from the total of the transnational organizations.

The section on the conceptualization of influence sets the goal to develop the definition of the influence of TOA. That definition should on the one hand allow the researcher to relate the influence of TOA to the general definition of the influence of groups on public policy, on the other hand to carry out further operationalization in the framework of the comparative empirical analysis.

Policy is a well-defined and firmly established concept in political science. The section on the conceptualization of the term policy provides a classical definition of the concept by Jenkins [1978] and specifies the use of the term policy in the research project.

III.1 TOA

III.1.1 Definition

Previous research defined TOA as the transnational agreements that are aimed at advancing research, development, demonstration, and / or deployment of specific technologies [de Coninck et al., 2008]. Against the background of this rather broad definition, the study applies the concept of transnational TOA on the *formal organizations with transnational character of membership consisting of the state and non-state actors which share a collective goal of advancing a specific technology*. The primary features of the definition include three aspects which are relevant in the context of this study.

The first aspect is a definition of TOA as the *formal organizations*. TOA are formally structured and permanent organizations which have a set of official documents that specify their collective goal and strategy, permanent staff allowed to speak on behalf of the organization, and a set of criteria for definition of the eligible members.

The second aspect refers to the *characteristics of membership*. The complexity of the membership structure of TOA is twofold. On the one hand, the membership of TOA consists of the state and non-state actors whereas:

- state actors⁵² refer to the government representatives, i.e. a government which is a member to the agreement and which can designate its representatives from business circles, academia, or bureaucracy;
- non-state actors comprise individual firms as well as national or regional business associations, public R&D organizations, consulting companies, representatives of the international organizations, environmental non-governmental organizations (NGOs), and public-private partnerships.

On the other hand, the membership structure of TOA reflects the geographical diversity. It means that TOA as a unit of analysis do not comprise the actors from a specific nation-state. Rather, TOA offer a platform for transnational cooperation in the field of development and deployment of specific technologies.

Finally, the third aspect is the *collective goal* of advancement of a specific technology. The activities of TOA belong to the realm of collective action. In a joint effort, the participants of TOA seek to develop a work deliverable and / or to pursue a goal.

III.1.2 Conceptualization of TOA from the political science perspective

III.1.2.1 TOA as a Complex Actor

The analysis of the influence of TOA can be carried out from two perspectives⁵³.

From the *outer-perspective*, TOA can be viewed as the autonomous actors that have the resources and the capabilities to apply the resources to reach the collective goals.

From the *inner-perspective*, TOA can be viewed as the institutional structures within which the actors (ministries, companies, academic institutions) interact to produce actions which can then be ascribed to the group. Thus, a comprehensive analysis of decision-making in TOA must first consider the strategic interaction linked to the formation of perceptions, preferences and capabilities of the members of TOA, e.g. within a ministry or a business association; second, the strategic interactions within the institutional structures of TOA; and finally, the strategic interactions between TOA and third parties. Such approach is a matter of empirical observation in a framework of a case study. The benefit of this approach is a detailed insight into the decision-making processes of TOA. The disadvantage is a low comparability of the results of such inquiry across policy sectors and political systems, and therefore low generalizability of the results and theoretical fragmentation.

⁵² The study considers the influence of TOA on policy formulation in the European context. Acknowledging that the political system of the EU does not show all characteristics ascribed to the definition of the modern state, notably “[...] it lacks the monopoly on the legitimate use of coercion [...]” [Richardson, 2006, 4], the study refers to the decision-making bodies of the EU as the “state actors” analogous to the decision-making bodies of nation states. Such labeling occurs on the grounds of the ability of the supranational bodies of the EU to formulate and implement policies according to the scope and procedure stated in the Treaty on the European Union [TEU, 2010] and the Treaty on the Functioning of the European Union [TFEU, 2010]. The scope of competences of the supranational bodies of the EU to formulate policies in the field of CCS is identified in section V.3.

⁵³ On the dual character of the complex actors see [Scharpf, 2000, 97].

The theory of actor-centered institutionalism introduces a concept of the complex actor to allow analyzing the effects of the activities of the groups without reconstructing a variety of internal interactions of decision-making within them [Scharpf, 2000, 96ff]. The theory claims that the complex actors are capable of strategic action and can be characterized on the basis of its perceptions, preferences and capabilities⁵⁴. An intention to reach a collective goal shared by the participants of TOA qualifies TOA to be characterized as the complex actors [Scharpf, 2000, 101].

Thus, the analysis of the influence of TOA in the framework of this PhD project considers TOA as the complex actors that pursue strategic action according to their perceptions, preferences and capabilities and on the basis of the resources available to them. The detailed description of the processes within TOA which led to the production of the output defined as “influence” in the framework of this study will, for the most part, remain uncovered. Therefore, the decision-making within TOA stays a black box. However, it is assumed that the data on the organizational properties of TOA collected during the empirical analysis will also provide limited insights on the “inner-perspective” of the work of TOA (see section VI).

III.1.2.2 TOA and Interest Mediation

From the perspective of interest mediation studies, TOA can be referred to as a hybrid actor. On the one hand, TOA have a collective goal of development and deployment of CCS and act as an autonomous actor; on the other hand they serve as a negotiation platform for interests of their members. In both cases the state-group relations can be interpreted as interest mediation. Interest mediation defined as a course of action through which the interests become an issue (*Datum*) in the political process [Lehmbruch, 1987, 11]. In this respect TOA show a Janus-like nature typical for the associations.⁵⁵

The associations present the unit of analysis of the administrative interest mediation – an approach that provides an analytical framework of this PhD project. Schmitter & Streeck highlight a hybrid nature of associations as they serve as the “[...] intermediaries between at least two independently constructed, resourceful and strategically active sets of actors – between firms on the one hand and state agencies and / or labor organizations on the other” [Schmitter & Streeck, 1981, 49]. In the framework of the administrative interest mediation approach, the business interest associations are defined as:

⁵⁴ Scharpf describes as *capabilities* the resources which enable an actor to influence policy outcomes [Scharpf, 2000, 86]. It is a crucial category as without the resources, neither perceptions nor preferences have a practical usability [ibid, 95]. *Perceptions* and *preferences* are stable categories which can be modified through the learning processes; they get activated through a stimulus of a specific problem and refer to the evaluation of the status quo, the cause of the problem, as well as the effectiveness and desirability of specific course of action and resulting outcomes [ibid, 86f].

⁵⁵ Cf Eising distinguishes between the association as an actor that pursues goals and has means of achieving them and a platform for the communication between the members [Eising & Kohler-Koch, 2005, 28].

[...] a subset of formal organizations (associations) which specialize in the aggregation, definition, advancement and defense of the collective goals in the political realm (interests) of a distinct group of producers defined by their dominant position in the economic division of labor under capitalism. [Schmitter & Streeck, 1981, 33]

According to the definition formulated above, TOA cannot be referred to as the business associations. The individual TOA which are the focus of this project are assumed to have a varying degree of specialization in interest mediation. Further, in contrast to the associations, the membership of TOA includes not only non-state but also state actors.

However, like the associations TOA share the characteristic features of the hybrid actors. Thus, while pursuing the collective goal of development and deployment of CCS technologies, TOA can on the one hand be seen as the intermediaries between the individual members of TOA and on the other hand as the intermediaries between the members of TOA and the state agencies. Further, from the interest mediation perspective, TOA can be generally classified as *groups* referring to a number of persons who pursue the same interest [Olson, 2004 (1968), 7].

III.1.2.3 TOA and the Knowledge-Based Approaches to International Relations

TOA are the frameworks for international cooperation that produce expert knowledge.⁵⁶ Within the discipline of International Relations, the phenomenon TOA can be reflected upon from the perspective of knowledge-based approaches to explain international cooperation. Those approaches consider the importance of knowledge and ideas for the emergence and maintenance of the international cooperation regimes. Among the theories of International Relations the power-based and the interest-based theories present the dominant threads that explain the emergence and the effects of the international cooperation [Hasenclever et al., 2004]. Recently, the knowledge-based accounts have gained on importance in the field of the environmental regimes [de Coninck & Bäckstrand, 2011]. The rising influence of the knowledge-based approaches is considered to reflect the changing realities of the new environmental governance regime⁵⁷ [Bäckstrand, 2008]. The following section reflects the phenomenon of TOA against the background of the knowledge-based perspective represented by the Epistemic Communities, Advocacy Coalitions, and Network approaches. Those three approaches originate from the Policy Analysis. They highlight the growing role of technical information and call for broadening the range of actors considered in policy analysis.

Epistemic Communities

Haas explores the role of knowledge-based expert networks – epistemic communities – in shaping policies in the specific issue-areas. The starting point for the influence of the

⁵⁶ Cf section III.2.

⁵⁷ Cf section II.1.

knowledge-based expert networks are the complexity⁵⁸ and uncertainty⁵⁹ that dispose the decision-makers to the new patterns of influence [Haas, 1992, 2]. The central idea of the approach is that the members of the epistemic communities may provide the decision-makers with a guidance regarding the policy choices and change the opinion of the decision-makers. Haas defines the epistemic communities as the “network of professionals with recognized expertise and competence in a particular domain or issue area” [Haas, 1992, 3]. These professionals must have:

- shared set of principled (normative) beliefs,
- shared causal beliefs, e.g. regarding a cause of a particular problem,
- shared notions of validity, and
- common policy enterprise in the sense that the ideas diffused by epistemic communities are not “neutral” but reflect a particular political vision [ibid 3, 27].

Haas defines “influence” as the adoption of knowledge that has a character of technical expertise in form of “human interpretations of social and physical phenomena” [Haas, 1992, 4]. This definition excludes policy recommendations and “raw” data [Haas, 1992]. The theory develops two assumptions about the variation of the level of the influence of epistemic communities.

- Those epistemic communities are more influential, that integrate themselves into the bureaucracy. „[...] [T]he success of epistemic communities depends on their ability to transmit this knowledge to gain and exercise bureaucratic power.” [Haas, 1992: 30]
- The transnational epistemic communities are more influential than the national epistemic communities. “Because of its larger diffusion network, a transnational community’s influence is likely to be more sustained and intense than that of a national community.” [Haas, 1992, 17]

In the literature on policy analysis, the concept of epistemic communities is often applied to any expert network that produces knowledge. In this sense, TOA can be also referred to as the epistemic communities. However, research is needed in order to assess whether TOA really fulfil the criteria that distinguish epistemic communities according to Haas [Haas, 1992, 3]. It is not clear, whether the four organizations that compose the unit of analysis pursue a “particular policy vision” beyond the general call for the deployment of CCS technologies or whether those organizations present four different epistemic communities rather than they form part of a broader epistemic community.

The research project does not adopt the theory of epistemic communities as an analytical framework because the assumptions that the theory generates to account for the influence

⁵⁸ The complexity in terms of the number of actors on the international arena and their interactions [Haas, 1992, 12].

⁵⁹ The uncertainty, especially in combination with a shock or a crisis, makes it for the decision-makers difficult to refer to the established practices and institutions [ibid, 14].

of epistemic communities do not adequately contribute to answering the research question of the work. The research interest of this PhD project is directed at the comparative analysis of the influence of four transnational TOA. Thus, according to the assumption on the influence of transnational epistemic communities developed by Haas [Haas, 1992, 17], the influence of all TOA can be assumed to be high. This assumption does not account for the variation of influence between the transnational TOA.

The assumption on the variation of influence related to the transfer of knowledge to the bureaucracy [Haas, 1992: 30] can be interpreted in a twofold way. It can either refer to the access of the knowledge produced by the epistemic communities to the bureaucracy or the formalization of the status of the epistemic community as an advisory body or an agency within the decision-making system. The second approach generates an interesting hypothesis with regard to the unit of analysis of this research project. As the Technology Platform, ZEP has a formalized status as an advisory body for the European Commission and the member states. Thus, according to the theory of epistemic communities ZEP can be considered more influential due to its formalized status in the decision-making system of the EU.

Advocacy Coalitions

The advocacy coalitions framework was worked out by Sabatier over a number of years [e.g. Sabatier & Jenkins-Smith, 1993, Sabatier, 1993, Sabatier & Jenkins-Smith, 1999, Sabatier, 2007] to deliver a framework for policy analysis alternative to the then well-established “stage approach” to policy analysis. The framework considers a policy subsystem as a unit of analysis. It suggests broadening the range of actors within the subsystem to include not only the participants of the iron triangles⁶⁰ but all actors relevant for policy-making process. The advocacy coalitions approach is designed to be applied to the whole policy cycle thus the policy analysis must cover the time span of over ten years. The approach assumes that within a policy subsystem, the actors can be divided into a number of

[...] “advocacy coalitions”, each composed of people from various governmental and private organisations that both (1) share a set of normative and causal beliefs and (2) engage in a nontrivial degree of coordinated activity over time. [Sabatier & Jenkins-Smith, 1999, 120]

The focus of the advocacy coalitions framework is directed at the dynamics of the multiple competing coalitions and their effects on policy-making. As the focus of this PhD project covers the influence of four formal organizations, the advocacy coalitions framework is not well-suited to guide the analysis.

Networks

Within the network approach of political science Börzel [1998] differs between two perspectives – a theoretical and a methodological.

⁶⁰ An “iron triangle” metaphor stresses a stable and closed interaction pattern between the executive bureaus, congressional committees, and interest group clienteles in the decision-making system of the United States [Heckel, 1978, 88].

The methodological network perspective combines tools and methods for assessing network structures – density, centrality, cliques, clusters, etc. [Scott, 2009]. The focus of research is directed not at a specific unit and its characteristic features but at the relations between the units [Pappi, 1993, 85]. The strength of the methodological network approach is in the identification and graphic illustration of the relations between various units. From the methodological perspective, network is understood as “a number of social entities - persons, positions, organizations, etc. – connected through certain types of relationships [Pappi, 1987, 13].”

The theoretical network perspective claims that the decision-making in the advanced industrialized democracies cannot be understood by focusing exclusively on formal politico-institutional arrangements [Kenis & Schneider, 1991, 27]. In order to grasp the decision-making process in its complexity and account for the various ways in which political systems process policy, it is important to pay attention to the different types of relationships between decision-makers, groups, and other actors [John, 2000, 6]. Although there is no distinct network theory, the network approach has been applied by several analytical frameworks. Börzel [1998] differs between the German Governance School [Marin & Mayntz, 1991, Kenis & Raab, 2008] and the Anglo-Saxon School of Interest Mediation [Atkinson & Coleman, 1992, Jordan & Schubert, 1992, Rhodes & Marsh, 1992].

In the framework of the German Governance School, networks are understood as *a new form of governance*. The latter refers to a specific organizational mode of policy-making along with *policy markets* and *policy hierarchies*⁶¹ [Kenis & Schneider, 1991, 40f, Kenis & Raab, 2008, 133]. A characteristic feature of a network is a non-hierarchical pattern of the relations between the network members. Policy network refers to an interaction between the state and non-state actors that share their resources to contribute to the production of more effective policy solutions [Mayntz & Scharpf, 1995, 26]. Policy networks are interpreted as a token of a “weak state” which cannot achieve its goals by means of hierarchical steering [ibid, 41]. This conceptualization bears a normative dimension – network as a form of governance is considered to be more efficient and effective for specific policy areas⁶² [Mayntz, 1993]. Without having analyzed the pattern of interaction, TOA cannot be characterized as a non-hierarchical mode of relations. Further it is not yet clear whether TOA present a more efficient form of governance. It is an interesting research question that however explodes the scope of this study. Thus, TOA cannot be characterized as networks from the perspective of German Governance School.

⁶¹ The governance form *market* constitutes one extreme on the continuum of the sectoral governance structures. It is characterized through the absence of both state regulation and societal self-regulation [Mayntz, 1993, 24]. Mayntz claims that at least in non-totalitarian societies this mode of governance is distinctive of visual arts, music, literature, fashion, media content, etc [ibid]. In order to explain the governance form *hierarchy* (Etatismus), Mayntz outlines the specifics of the health care sector in Great Britain which is characterized through a high level of state regulation [Mayntz, 1993, 26].

⁶² Kenis & Raab [2008] argue that with few exceptions there is no empirical research which would support or contest this idea.

The Anglo-Saxon School of Interest Mediation focuses on the analysis of causal relations between the specific characteristics of the network types and policy process and outcomes. This perspective relates to the research question of this PhD project. Thus according to the network theory, it is possible to suggest a relation between the network types of various TOA and their influence.

The scholars of the Anglo-Saxon School of Interest Mediation introduced a range of typologies followed by the development of the assumptions about the policy process [for an overview see Börzel, 1998, 256ff, Lang & Leifeld, 2008, 227f, Jansen & Schubert, 1995, 10f]. For instance, Marsh & Rhodes develop a set of criteria to classify the networks between the ideal types of open and loosely-connected *issue networks* and closed and highly-integrated *policy communities* [cf Rhodes & Marsh, 1992, Marsh & Rhodes, 1992a]. *Policy communities* are considered to be able to control policy outcomes over a longer period of time whereas *issue networks* are characterized through instability [Peterson, 1995, 391]. Table 1 gives an overview of the dimensions that determine the network type and their attributes with regard to the policy community and issue network types.

The definitions of the dimensions suggested by Marsh & Rhodes (Table 1) leave much room for interpretation. That makes their operationalization difficult. An overview of the literature that applies the typology shows that the studies seldom choose a systematic application of the typology but rather draw from the attributes of the individual dimensions to explain policy outcomes [Marsh & Rhodes, 1992b]. The administrative interest mediation framework develops similar approach with regard to the relation between the level of the organizational development of groups and policy outcomes. However, the analytical framework of the administrative interest mediation approach is more robust. Thus, I decided in its favor.

The remaining question is whether TOA can be characterized as networks from the perspective of Anglo-Saxon School of interest mediation. Peterson [1995, 391] defines networks as “[...] clusters of actors representing multiple organizations [which] interact with one another and share information and resources.” The core of this definition reflects the exchange relations between the state and non-state actors. Against this background TOA can be characterized as networks.

However, first I find it difficult to refer to the formal organizations as networks. The history of the term “network” [Heclo, 1978] suggests that its value lies in highlighting the importance of the clusters of actors that are not tied together by the organizational affiliation. Second, the analytical value of referring to TOA as “networks” is not clear. Thus, in this PhD project I do not refer to TOA as networks.

Table 1: Dimensions of policy networks

Dimension	Policy Community	Issue Network
Membership:		
- number of participants	very limited number, some groups consciously excluded	large
- type of interest	economic and/or professional interests dominate	encompasses range of affected interests
Integration:		
- frequency of interaction	frequent, high-quality interaction of all groups on all matters related to policy issue	contacts fluctuate in frequency and intensity
- continuity	membership, values and outcomes persistent over time	access fluctuates significantly
- consensus	all participants share basic values and accept the legitimacy of the outcome	a measure of agreement exists, but conflict is ever-present
Resources:		
- distribution of resources within network	all participants have resources; basic relationship is an exchange relationship	some participants may have resources, but they are limited, and basic relationship is consultative
- distribution of resources within participating organizations	hierarchical; leaders can deliver members	varied and variable distribution and capacity to regulate members
Power:	there is a balance of power among members. Although one group may dominate, must be a positive-sum game if community is to persist	unequal powers, reflecting unequal resources and unequal access; a zero-sum game

Source: [Marsh & Rhodes, 1992a, 251]

Summary Box 8

The unit of analysis – the transnational technology-oriented agreements (TOA) – is defined as the formal organizations with transnational character of membership consisting of the state and non-state actors which share a collective goal of advancing a specific technology.

III.2 Influence of TOA

The main research question of the study addresses the influence of transnational TOA on the EU policy. A general definition adopted in this study understands *influence* as the activities of groups which alter or modify public policy.⁶³ The decision to study *influence* of TOA and not their *access*⁶⁴ is justified on the grounds of the argumentation that the Commission is a member to all TOA which are the focus of the study. Thus, although the frequency of the access may vary, all four TOA have access to the Commission according to the definition formulated in the section II.3.

The study is comparative in its design; it seeks to determine the scope of influence of four formal organizations and contribute to the study of factors which explain the variation of influence. For the purpose of operationalization and further comparative analysis, the suggested general definition of influence needs to be specified.

At this stage of the analysis the expert knowledge can be identified as the main output of TOA. The expert knowledge is developed by TOA in form of technical studies, reports, guidelines, inventories, concept definitions, and methodologies.⁶⁵ Hereafter, the output of the TOA is referred to as the *work deliverables*. The production of the work deliverables by TOA corresponds with the *output level of influence*⁶⁶. The identification of the information as a critical resource for the political decision-makers corresponds with the findings from previous research (section II.2.3.1).

The *influence of TOA* is then defined as a work deliverable which finds access to the political decision-making process. "Finding access" means being considered and accepted by political decision-makers. This understanding corresponds with the outcome level of influence.⁶⁷

The fact that policy-making in the field of CCS requires knowledge (cf section V.1) and the work deliverables of TOA encompass knowledge suggests concentrating on the observable phenomena. Further, the comparative design of the research project highlights the benefits of a precise operationalization of the concept of influence. Hence, in the context of the empirical study, *influence is operationalized* as the reference to the knowledge produced by TOA by the decision-making bodies of the EU in the documents which formulate policy or regulation in the field of CCS. That refers to the citation of the studies or the adoption of the concepts or recommendations developed by TOA in policy documents of the EU.

⁶³ For an understanding of *public policy* see section III.3.

⁶⁴ See section II.3.

⁶⁵ Cf publications [CSLF, 2012], ZEP CCS Library [ZEP, 2012], Publications [IEAGHG, 2012], Publications [Clean Coal Centre, 2012].

⁶⁶ For an overview of the levels of influence see section II.3 in the Summary Box 6.

⁶⁷ The analysis of influence at the impact level would trace the influence of the individual TOA on the commercial rollout of CCS in the EU or on the international level. The study rejects this approach due to a variety of alternative explanations for changes at the impact level. Those refer to the conditions which must be fulfilled to allow commercial rollout of CCS (cf sections V.1-V.2) and to the activities of a variety of actors involved in this process just at the level of the EU.

The operationalization on the grounds of empirical convenience blinds out the important facets of influence which do not result in the explicit referencing of the adopted knowledge by the decision-makers as well as the facets of nondecision-making [Bachrach & Baratz, 1962]. Being aware of these limitations, the study concentrates only on the recorded evidence. The collection of the data on the influence of TOA via the expert interviews will address the alternative facets of influence at the output and at the outcome levels of influence (sections VII.1.2-VII.1.3). The former refers to the work deliverables that are considered to be influential besides the expert knowledge. The latter refers to the considerations of the work deliverables by political decision-makers alternative to the references to the written output.

Summary Box 9

Influence refers to the activities of groups which alter or modify public policy.

Influence of TOA is defined as the work deliverable which finds access to the political decision-making process. "Finding access" means being considered and accepted by political decision-makers.

Influence of TOA is operationalized as a reference to the knowledge developed by TOA in CCS policy or regulation documents formulated by the supranational organs of the EU. That refers to the citation of the studies produced by TOA, the adoption of the technical concepts or policy recommendations developed by TOA in the EU policy or regulation documents.

III.3 Policy

Policy is understood as "[...] [a] set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where these decisions should, in principle, be within the power of these actors to achieve" [Jenkins, 1978, 15]. This definition follows the classical distinction in polity, politics, and policy⁶⁸ introduced by the Anglo-Saxon school of political science. It describes policy as the content and concrete measures applied to deal with public problems, i.e. "goals and the means of achieving them." Further, it pictures policy as a dynamic process that results from "a set of interrelated decisions" taken by the constrained actors [ibid, 16]. Policy is understood as the government's intentional actions. However, the ambition itself is not sufficient; the actor must also have the resources to shape policy-making process [ibid, 16]. This conceptualization also considers the government's capacity to implement the decisions taken and includes the possibility of an inaction [cf Howlett et al., 2009, 6].

In the context of this study, policy refers to the decisions taken by the supranational bodies of the EU which target support of development and deployment of CCS technologies. Regarding the range of policies in the context of development and deployment of a specific

⁶⁸ For the description of the dimensions policy, politics, and polity, see the section I.4.

technology, Meadowcroft and Langhelle [2009a] suggest an analytical division between policy framework and regulatory framework. The former includes decisions which provide the rationale for technology development and deployment and introduce appropriate incentives; the latter refers to legislation controlling the actual deployment of the technology [cf Meadowcroft & Langhelle, 2009a, 11].

The examples of the policy framework for CCS include policy documents which formulate a “basic stance” toward this technology, its integration with other goals and policies, and the mechanisms for funding its R&D. The examples of the regulatory framework cover legislation which controls the environmental risks of CO₂ storage and prescribes CO₂ purity standards for CO₂ transport. The study adopts this understanding as an analytical tool for structuring various objectives of decision-making in the context of development and deployment of a specific energy technology. In cases when this distinction does not serve the analytical purpose, policy is applied as an overarching concept.

Summary Box 10

Policy is understood according to Jenkins as “[...] [a] set of interrelated decisions taken by a political actor or group of actors concerning the selection of goals and the means of achieving them within a specified situation where these decisions should, in principle, be within the power of these actors to achieve” [Jenkins, 1978, 15].

In the context of the research project, policy refers to the output of the legislative process at the level of the EU that targets support of development and deployment of CCS technologies.

IV Analytical Framework

The research interest of the project includes the analysis of the influence of four formal organizations that do not have any formal decision-making authority in the decision-making system of the EU. Three of four TOA that constitute the unit of the analysis act at the international level of decision-making. ZEP is active at the level of the EU.

Political science developed a variety of theories and approaches to account for interest mediation processes between the state actors and groups. Against the background of the research question pursued in the study and the unit of the analysis, the choice of the concepts and approaches for the analytical framework is required to acknowledge the importance of the non-state actors in the political decision-making process and to enable the comparative analysis of the influence of TOA.

The chapter begins by outlining the multi-level governance approach to the study of policy-making in the EU. Then, the research interest turns to the presentation of the principal ideas underlying the administrative interest mediation approach. The final section summarizes the ideas that constitute the analytical framework of the research project and introduces the research hypotheses.

IV.1 Policy-Making in the Multi-Level Governance System of the EU

The multi-level structure of the decision-making is the characteristic feature of the political system of the EU. In the framework of recent research, the grand theories of European integration – intergovernmentalism [Hoffmann, 1964a, Hoffmann, 1966, Hoffmann, 1964b] and supranationalism [Mitrany, 1966, Haas, 1958, Haas, 1964] as well as their revised paradigms liberal intergovernmentalism [Moravcsik, 1993] and neofunctionalism [Stone Sweet, 1997] – have not provided the dominant approaches in the European studies. Instead, the governance studies present the prevailing framework to policy analysis in the EU [Tömmel, 2008, 13].

The most widely used paradigm to explain the decision-making in the EU present the multi-level governance approach. Previous research has addressed the multi-level governance from two perspectives – as a *normative* and as an *analytical approach*. In general, the multi-level governance highlights the dispersion of the decision-making authority between various territorial levels, the interdependence and interpenetration of those levels, and the actor-centered as opposed to the state-centered approach to the analysis of decision-making [cf Knodt & Große Hüttmann, 2006, 225ff].

The normative approach draws from the idea that a centralized “command-and-control” authority is less efficient than a dispersion of governance across multiple levels and jurisdictions [Hooghe & Marks, 2003, 233, 235f]. Especially in the policy sectors which entail diversity, e.g. education or environment, the scholars argue in favor of replacing the centralized governance by more flexible multi-level governance that is more capable to accommodate heterogeneity [ibid]. Against this background, the scholars that pursue the

normative approach to multi-level governance raise the question of what is the best way to design the multi-level governance [Hooghe & Marks, 2003, Marks & Hooghe, 2004].

The analytical approach addresses the multi-level governance either as a *theory* [George, 2004, Marks et al., 1996] or as an *analytical concept* [Jordan, 2001].

In the first sense, multi-level governance is usually applied to explain the process of the European integration [Jachtenfuchs & Kohler-Koch, 2004, Hooghe, 2001, George, 2004, Richardson, 2006, Marks et al., 1995]. The multi-level governance approach is applied to highlight the sui generis character of the political system of the EU [cf Knodt & Große Hüttmann, 2006, 223]. Guided by the question of why the states transferred the decision-making authority to the supranational level of decision-making [cf George, 2004, 113], the multi-level governance theory targets the identification of causal relations in form of hypotheses and the prediction of future developments. Regarding the hypotheses and the outcomes, the theoretical groundings of multi-level governance draw from the neofunctionalism. George characterizes the multi-level governance as “[...] a more modern and sophisticated version of neofunctionalism, although minus functional spillover” [ibid, 112]. Further distinguishing feature of the multi-level governance is its sectoral approach to policy analysis instead of the development of broad generalizations [ibid, 116, Knodt & Große Hüttmann, 2006, 227]. Thus, the neofunctionalism and the multi-level governance approach share the pluralist version of the political process, the understanding of the autonomous role of the European institutions and subnational actors, as well as the understanding of the importance of the alliances between the Commission and the subnational actors for the European integration [George, 2004, 108ff].

From the perspective of the analytical concept, multi-level governance is considered to have a descriptive function which first and foremost addresses the structure of policy-making but does not necessarily explain how this structure came about or what is a possible path of further development [cf Jordan, 2001, 196, 201, Peters & Pierre, 2004, 88]. While the descriptive character of the multi-level governance conceptualization has been criticized by Jordan [2001, 201f], Bache & Flinders highlight the opportunities which result from the open nature of the concept which “[...] may provide a unique opportunity to foster and develop a deeper understanding of the complementarity of a range of theoretical and empirical models and tools drawn from a number of interrelated disciplines and subdisciplines” [Bache & Flinders, 2004, 1]. Thus, on the one hand a number of scholars suggest combining the concept of multi-level governance with the theories which offer assumptions about the causal relationships between the multi-level structure of decision-making and policy output and outcomes [cf Peterson, 2004, 121, Jordan, 2001, 197]. On the other hand, Scharpf rejects the holistic explanations offered by the grand theories and proposes combining the multi-level governance concept with the game-theoretical approaches to account for the sectoral variation of governance modes in the EU [Scharpf, 2010].

In the context of this research project, multi-level governance is applied as an analytical concept. It highlights the multi-level character of the decision-making in the EU and the

importance of non-state actors. The legislative competences in the CCS policy sector in Europe are dispersed between the supranational, national, and – depending on the political structure of the country in focus – local levels of authority. Thus, it can be claimed that policy-making in the field of CCS has a multi-level character. As the concept of multi-level governance originates from the European integration studies, previous research has paid greater attention to the interplay of the supranational, national, and local territorial levels. This PhD project modifies this understanding by focusing at the international territorial level.

The study focuses on the analysis of the influence of transnational TOA on the European policy formulation. Although TOA do not have any formal decision-making authority, they are assumed to influence the actors which are in possession of such authority. Therefore, according to the German school of governance studies, in the following governance is defined as the total of coexistent forms of intentional regulation of public policy issues [Mayntz, 2008, 45]. This understanding⁶⁹ highlights the importance of non-state actors in policy-making process as opposed to the definition which focuses only on those actors which have formal decision-making authorities.

The goal of the study is to contribute to the understanding of state-group relations in the context of development and deployment of specific environmental energy technology at the level of the EU. Thus, the study blinds out the analysis of driving forces for dispersion of authority between the various levels of decision-making in the EU. The research interest is not directed at the explanation of another aspect of the European integration, rather the study addresses the rationale for state-group interactions and factors which explain variation of interest mediation processes. In this context, the study draws from the administrative interest mediation approach.

IV.2 Administrative Interest Mediation Approach

The state-group relations in the context of this study are understood as interest mediation. Within the interest mediation school the interpretation of growing inter-organizational institutionalization of state-group relations has occurred in the framework of various theoretical frameworks – pluralism theory, corporatism and neocorporatism theories, capture and clientelism theories, and network theories of Anglo-Saxon Interest Mediation school. The theorizing about state-group relations is concerned with the patterns of interest mediation, the contextual factors which mediate the influence of interest groups, the dispersion of power, the rationale for cooperation between state and non-state actors, and the rationale for the specific forms of cooperation.

Theoretical points of reference in the context of this study arise from the *administrative interest mediation approach*. The approach belongs to the organizational theories within the interest mediation school [Eising, 2007b, 338]. The concept of administrative interest mediation was introduced by Lehmbruch [1987]. His essay which presents the approach

⁶⁹ Cf also [Peters & Pierre, 2004, 82].

draws on the work by Schmitter & Streeck. The authors develop a research program for the cross-sectoral comparison of the organizational properties of business associations in Western societies [Schmitter & Streeck, 1981]. Both papers interpret state-group relations as a reciprocal exchange process shaped by the specific logic. This understanding implies that neither the state actors are surrendered to the various pressures exercised by the groups nor the groups are exploited by the state. Rather, both the state actors (administration) and the groups are understood as the rational actors which pursue strategic considerations. The organizational properties of state-group relations are then considered to be a result of balancing out of different sets of logic which guide the behavior of state and non-state actors. This project refers to the ideas discussed in both papers as the administrative interest mediation approach.

The argumentation in favor of the administrative interest mediation approach to guide the analysis in the framework of this study is based on the following considerations:

- *Similar units of analysis.* The unit of analysis in focus of the administrative interest mediation approach is business association. The conceptualization of business associations⁷⁰ is not congruent with that of the TOA. TOA do not specialize in interest mediation and consist of non-state and state actors. However, the business associations and TOA are comparable as both present hybrid actors and engage in interest mediation activities.
- *Importance of state actors.* The administrative interest mediation approach understands the rationale behind the state-group relations as a reciprocal exchange of resources. Although this conceptualization reflects the mainstream thinking in the framework of contemporary interest mediation studies, the approach highlights the importance of state actors in explaining the patterns of interest mediation. CCS as an empirical field of application presents an environmental energy technology. Its deployment is justified only on the grounds of climate policy objective therefore the state actors are assumed to play the key role in the process of development and deployment of CCS (cf sections V.1-V.2). The specific focus of the administrative interest mediation approach on the role of the state actors in the exchange relations with the groups is beneficial to guiding the analysis resulting from the research question.
- *Comparative research design.* The research in the framework of this study is based on the comparative analysis of the influence of four formal organizations on the policy formulation process. Schmitter & Streeck suggest a research design that is based on the cross-sectoral comparison of the organizational properties of business associations. The analytical categories to understand the logic behind the state-group exchange and the assumptions which underlie the comparative perspective on the

⁷⁰ For a definition of business associations suggested by Schmitter & Streeck, see section III.1.2.2.

analysis of these relations are well-suited to outline an analytical framework and guide the subsequent empirical analysis.

The remainder of this section is divided into three parts. Those highlight different aspects of the administrative interest mediation approach which are of relevance for the research question.

The first section introduces the logic of exchange which guides the behavior of state actors and groups. Against the background of the hybrid nature of the associations, the study highlights the contradictory demands which result from the organizational characteristics of the associations and their functional requirements. Further, the section clarifies the requirements which drive the state actors to engage in exchange relations with the groups.

The second section introduces the concept of organizational development to reflect the relation between the organizational structure and strategies of an association and its influence. Having outlined the analytical framework behind the concept of organizational development, the study suggests definitions and operationalization of the dimensions of organizational development.

Further, the study reflects on the implications of the logic of exchange for the characteristics of the organizational development.

IV.2.1 Logic of the Reciprocal Exchange

Following the administrative interest mediation approach, this research project understands the relations between TOA, their individual members, and the public authorities as the reciprocal exchange of resources. Schmitter & Streeck account for the variation of the exchange processes between the associations, their members, and the state actors by outlining different rationale that drives the respective exchange processes. Thus, the interest mediation of hybrid actors follows different, sometimes contradictory *logic of exchange* [Schmitter & Streeck, 1981, 49ff].

The logic of membership drives the exchange processes between the formal organization and its members. The imperative of such an exchange is to offer incentives and extract enough resources from the members to ensure the stability of the organization or even promote its growth. The TOA must compete for the membership with other organizations which may show a greater territorial proximity to the state or non-state actors, offer same services at a cheaper price or show less administrative hurdles for participation.

The logic of influence is a driving force behind the exchange processes between the organization and the state. In the framework of those exchange processes, groups must offer sufficient incentives to be able to access state authorities and influence them.

The central assumption developed by Schmitter & Streeck claims that the organizational properties of the associations relate to their influence as the organizational properties of any group can be viewed as a result of a balancing of the logic of membership and the logic of

influence [ibid, 50]. The link between the logic of membership and the logic of influence may be interpreted in a twofold way:

- either the group has a strong membership with established practices of mobilizing and coordinating the members' action and therefore it has sufficient resources to influence state authorities, or
- the group is influential, e.g. via privileged access to the state authorities, and therefore it attracts members because of its "status" [ibid, 104].

Schmitter & Streeck do not provide an explicit definition of the resources of the associations [Schmitter & Streeck, 1981, 202ff]. Following the logic of collective action, it is possible to distinguish between the resources that are extracted by TOA from its members in order to develop the work deliverables. The work deliverables of TOA can be considered as the resources that are then offered for the exchange with the state actors. Following Benson, the study adopts the understanding of the resources of TOA as "[...] elements [...] which the organization requires if it is to meet the conditions for its survival or performance"⁷¹ [Benson, 1982, 148]. The exchange processes that are required to meet the conditions for TOA's *survival* are considered to be driven by the logic of membership. The exchange processes that are directed at meeting the conditions for TOA's *performance* are considered to be driven by the logic of influence.

Lehmbruch develops the approach introduced by Schmitter & Streeck further by focusing the research interest on the rationale of the state actors to participate in the exchange process with the associations.⁷² Lehmbruch claims that previous research provided insights on the development of state-society relations whereas the state actors often initiated the cooperation, pushed it forward and played a leading role regarding further development of the relations [cf Lehmbruch, 1987, 17]. The rationale of the state actors to cooperate with the groups is not synonymous with the logic of influence as the state actors participate in the exchange process to acquire governance resources. Therefore, the strategic considerations of the state actors consist in *the logic of governance* – an effort to acquire governance resources to safeguard its own autonomy [ibid, 18]. As such Lehmbruch defines the *governance resources* as the informational resources and communication possibilities⁷³. The analytical framework assumes that a sufficient level of provision with governance resources increases the autonomy of state actors. The *autonomy* can be mainly understood as a capability of the state actors to develop and implement policies.⁷⁴

⁷¹ For the alternative operationalization of the concept of resources applied by the policy studies and the network studies see [Jordan & Schubert, 1992, 12, Koob, 1999, 160].

⁷² See also [Lehmbruch, 1991, 130f].

⁷³ For an outline of the previous research results on the resources of state actors see section II.2.3.1.

⁷⁴ In the framework of the studies of the European integration, Hooghe & Marks define the concept of power in a similar key, namely as an ability to achieve substantive policy goals [Hooghe & Marks, 2001, 5].

The state actors can either be the “bearer” of the governance resources due to the specific qualification of the personnel or they can acquire governance resources by means of hierarchical authority. In the advanced industrialized democracies both strategies face limitations. Therefore, the state actors rely on the exchange with their environment while pursuing the goal of acquiring the governance resources. Lehmbruch also claims that the dependence of the state actors on the external resources which they can be gained from the exchange with the groups vary with the specific tasks resulting from the requirements of the policy sector [ibid, 15]. Therefore, Lehmbruch assumes that the strategies and organizational structures of the exchange relations between the state actors and the associations are a result of the reciprocal adjustment process in a relationship of resource interdependence [ibid, 12]. However, Lehmbruch does not elaborate on the specifics of the relation between the resource dependence of the state actors in a given policy sector and the influence of the associations.

The administrative interest mediation approach considers the relations between the state actors and the interest groups which only consist of non-state actors. As the membership of TOA encompasses both the state and non-state actors the TOA themselves can be considered as an institutionalized form of the administrative interest mediation. The research interest that is triggered by this perspective focuses on the relations between the state and the non-state actors in the framework of TOA.

IV.2.2 Organizational Properties and Influence

The aim of the project is to analyze the influence of the TOA on the European policy formulation and contribute to the explanation of the variation in influence patterns. The central assumption of the administrative interest mediation approach is that the organizational properties relate to the influence of an association and the characteristics of a specific policy sector. Thus, the study of the organizational properties can indicate the level of influence of an association.

Schmitter & Streeck introduce a concept of organizational development⁷⁵ to assume that the more important the collective action, the more developed the organizational properties of an association will be [Schmitter & Streeck, 1981, 124]. The characteristic features of the highly developed organizational structures are identified below.

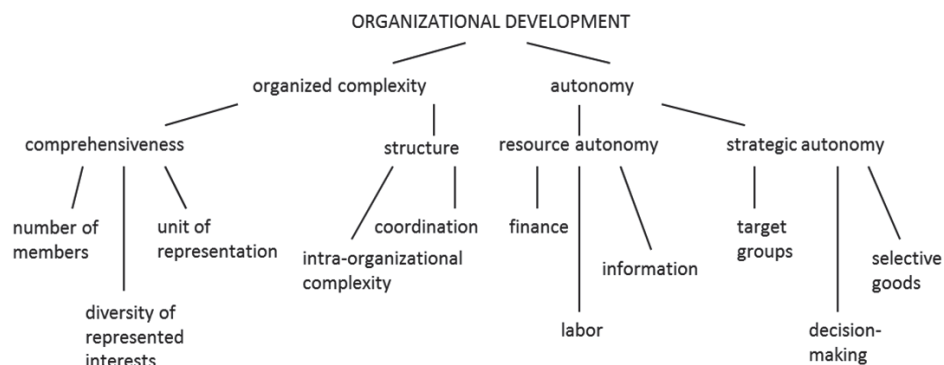
Organizational structures are the more “developed” the more encompassing they are in scope and purpose [...]; the more specialized and coordinated they are internally; the more safely their supply of strategic resources is institutionalized; the greater their autonomous capacity to act

⁷⁵ According to Schmitter & Streeck, the concept of organizational development is applied mainly from the analytical and less from the historical perspective [Schmitter & Streeck, 1981, 124, in the footnote]. However, the conceptualization of the organizational development as presented in this and the subsequent chapter allows for studying the dynamics of TOA in terms of a description of organizational characteristics inherent to the state A as compared to the state B. The explanatory forces behind the dynamics are considered to be the logic of reciprocal exchange – the logic of membership, the logic of influence, and the logic of governance, cf sections IV.2.1 and IV.2.4.

and to pursue long-term strategies regardless of short-term environmental constraints and fluctuation. [Schmitter & Streeck, 1981, 124]

Central to the understanding of the concept of *organizational development* are the notions of *organized complexity* and *autonomy* (Figure 1).

Figure 1: Conceptual structure of the organizational development



Source: author according to [Schmitter & Streeck, 1981, 132] with modifications

The *organized complexity* refers to a scope of the interests represented by the participants in an association and the way these interests are structured to contribute to the pursuit of common interests. It has two aspects *comprehensiveness* and *structure*.

The aspect *comprehensiveness* includes three dimensions as it refers to *a number of members* in an association, *diversity of underlying interests*, and *a unit of representation* [ibid, 126]. The *number of members* and the *diversity of interests* are interlinked – a large number of members usually implies greater heterogeneity of interests and vice versa.

The aspect *structure* refers to the mechanisms of managing structural complexity [ibid, 128, in the footnote]. A large variety of interests represented in an association is usually reflected in the organizational *structure* as it leads to a process of internal differentiation and building of subunits aligned according to the specific tasks or interests. The former refers to the internal labor division, the latter to the representation of the particular interests within an organization. Schmitter & Streeck claim that if size and heterogeneity are held constant, an organization with a high number of internal subunits is more complex and developed than an organization with few or no internal subunits [ibid, 126]. An association which has a number of subunits will need to develop mechanisms of coordination between various subunits while linking them to a broader common interest definition [ibid, 126f].

The authors claim that an association is more complex, the larger the number of its members and the broader the scope of the represented interests; and an association is more organized, the higher the number of institutionalized relations between the subunits and the

higher the extent to which the internal subunits are coordinated toward common objectives [ibid, 125].

An ideal-type management strategy of the organized complexity shows the following features:

- the number of subunits should be limited to what is required to achieve the objectives,
- the subunits should be singular in purpose to avoid duplication of effort,
- the subunits should be non-competitive to avoid internal tensions,
- the subunits should be functionally differentiated according to a complementarity of the division of labor, and
- the subunits should be hierarchically ordered [ibid, 127].

According to Schmitter & Streeck such organizational characteristics allow the most efficient management of organized complexity as they release the resources which otherwise would be extracted from the organization's overall purpose to manage the negative effects of organized complexity.

The concept of *autonomy* refers to the independence in a supply of resources. Schmitter & Streeck differ between the *resource autonomy* (input-oriented autonomy) and the *strategic autonomy* (output-oriented autonomy) [ibid, 128f]. The former refers to the supply of resources which are required to enable organizational survival and growth. The latter refers to the capacity of an organization to determine its goals and means of achieving them.⁷⁶ The authors assume that the organizations will strive to enhance both types of autonomy [Schmitter & Streeck, 1981, 129].

Schmitter & Streeck distinguish two kinds of resources needed to produce work deliverables by the associations – finances and labor. Against the background of CCS as an empirical field of application, the study introduces the third resource relevant for the successful operation of the TOA – information. The latter refers to the expertise needed to produce a work deliverable. That expertise encompasses but is not restricted to the technical information which relates to the requirements resulting from the technology development. The resource *information* differs from the resource labor as it does not require for the contributor to be involved in the process of authoring the work deliverable directly.

An organization which attempts to increase its *resource autonomy* pursues two strategies: institutionalization and diversification of the supply of resources [ibid, 130, 202]. Both strategies aim at decreasing the vulnerability of the organization to changes in its external circumstances and enabling it to balance the needs pursued by various contributors of the resources against each other.

⁷⁶ Cf the definition of “autonomy” regarding the logic of governance pursued by the state actors, see page 58f.

The organizations with a low level of development acquire the resources only from its membership on a voluntary basis and therefore are likely to suffer from instabilities and insecurities in work processes which impede their ability to long-term strategic planning. The organizations with the high level of organizational development draw their financial resources not only from their membership but from several other income sources on a routine, long-term and, thus, predictable basis which allows the association to balance one sort of support against the other [ibid, 130]. For instance, the membership fees are the initial source of funding for the associations. Therefore, the associations can strive to enhance their resource autonomy by pursuing the following strategies:

- turning away from the voluntary membership contributions to formalized (contractual) obligations enforceable by law,
- securing additional sources of income by selling the work deliverables, and
- turning to other “sponsoring environments” for subsidizing. Usually this suggests referring to the state support [ibid, 129f].

Regarding the supply of the resources labor and information, the associations will seek to enhance their autonomy by turning away from voluntary contributions which bear fundamental insecurities for a process of pursuing a common interest to paid labor [ibid, 209]. Schmitter & Streeck assume that the professional staff depends on the successful operation of an association much more than the members’ representatives whose primary loyalty lies with their companies and not with the association [ibid, 1981, 210]. The obligations of the professional staff toward the association are contractually specified, they can be evaluated, and, in case of a failure, cause personnel consequences [ibid]. The authors also assume that an intra-organizational structure which involves a professional staff unit includes a new, autonomous “self-interest of full-time officials” which need not necessarily to align with the interests of the membership [ibid]. With an increase in the level of the organizational development of an association, the influence of the professional staff is considered to grow. Ultimately, Schmitter & Streeck suggest:

While organizational development normally does not make elected leaders [e.g. chairpersons elected by the members’ representatives - author] completely disappear – except in the extreme case of associations turning into full-fledged business firms – the number of elected officials in relation to the number of full-time staff declines, and the function of the elected leadership is increasingly reduced to legitimating the policies selected and carried out by the full-time staff. [Schmitter & Streeck, 1981, 211]

The *resource autonomy* is closely related to *strategic autonomy*. Low-developed organizations have to adjust their work according to short-term preferences of their members because the latter provide the only source of income. High-developed organizations may allow themselves to reject members’ short-term demands in favor of strategic planning and make decisions binding upon the members even against their opposition. Thus, associations whose work deliverables are addressed exclusively toward its membership cannot gain much strategic autonomy as they cannot achieve much control over the demand for their work deliverables [ibid, 220f]. In this context, the association

which attempts to increase its strategic autonomy pursues two strategies – the diversification of the work deliverables and target groups for those work deliverables [ibid, 221].

An association with a high level of organizational development is also characterized through the ability to make binding decisions on behalf of the membership [ibid, 223]. The ability to transform and reformulate particular interests according to a collective interest is an important feature of the organizational design [ibid]. According to Schmitter & Streeck, if an association does not reach consensus on a formulation of a collective interest, it is in jeopardy either to stay silent or to fall apart [ibid]. Among the decision-making procedures, the majority voting corresponds with the characteristics of the association with a high level of development as it allows rejecting short-term particular interests of the members in favor of long-term strategic planning.

Finally, a characteristic feature of the organization with a high level of development is the provision of its membership with the selective goods. The study defines the selective goods as the private goods available only to the members of the organization. Schmitter & Streeck claim that, if the selective goods offered by an association are indispensable, they create an incentive for a current or potential membership to contribute to the production of the work deliverables and to comply with the majority decision-making [ibid, 225f].

IV.2.3 Operationalization of the “Organizational Development”

The *organizational development* refers to the organizational properties which include the organization’s scope and purpose, the specialization and coordination of its internal subunits, institutionalization of the supply of resources necessary to produce the deliverables, and the autonomous capacity to formulate goals and pursue long-term strategies [cf Schmitter & Streeck, 1981, 124]. The principal concept of *organizational development* includes two underlying concepts – *organized complexity* and *autonomy*. Both concepts have two aspects in each case – *comprehensiveness* and *structure* as well as *resource autonomy* and *strategic autonomy* respectively. These, in their turn, consist of various dimensions (cf Figure 1).

The remainder of this section provides definitions and suggests operationalization of the dimensions of the organizational development. These reflect the parameters developed by Schmitter & Streeck with modifications resulting from the definition of TOA and the specifics of the CCS policy sector [ibid, section III.4]. The operationalization of the dimensions is structured according to the concepts *organized complexity* and *autonomy*. The operationalization concludes with an overview of the organizational characteristics of the ideal-type high and low levels of organizational development (see Figure 2). The interpretation of the results of the empirical analysis of the organizational development of TOA (see section VII) follows the framework outlined in the Figure 2.

IV.2.3.1 Operationalization of the Dimensions Underlying the Organized Complexity

The *organized complexity* refers to “[...] a multiplicity of different units that are related to each other in a non-accidental, orderly, purposively designed pattern making them contribute to the performance of a specific common function” [ibid, 125]. For the analytical purpose, the concept of *organized complexity* may be further divided into the aspects that encompass the *comprehensiveness of the represented interests* and the *complexity of the intra-organizational structure* (Figure 1). An assessment of the comprehensiveness and intra-organizational complexity of a TOA is based on the following dimensions.

Number of members

Definition: The number of members in a given TOA.

Operationalization:

- indication of a maximum number of members allowed participating in the work of TOA, if specified by the official documents; and
- indication of the actual number of parties which constitutes the membership of a TOA.

In order to evaluate the absolute number of members as “large” or “small” in terms of its meaning for the organizational development, the study compares TOA with the organizations with similar purpose and structure. The number of members in the Implementing Agreements Clean Coal Centre and IEAGHG is compared with other Implementing Agreements of the IEA. ZEP is compared with the European Technology Platforms in the field of energy. The membership of CSLF is evaluated by comparing the pool of eligible members set by the membership criteria and the current number of members.

Diversity of represented actors

Definition: The extent to which the actors in a TOA represent different interests.

Operationalization:

- identification of the criteria underlying the choice of potential members as determined by the official documents, and
- specification of the actual pattern of participants which represent the members of TOA. The analysis is based on the records of the participants present in the meetings according to the minutes of TOA. The diversity of the delegates representing the members of TOA can be structured along the following aspects:
 - region-specific diversity shows whether the membership is limited to a particular set of countries, e.g. OECD member / OECD non-member countries, EU member countries; and

- sector-specific diversity indicates the scope of organizations represented in the TOA structured either according to the standing of the state actors within the machinery of government (state actors) or according to the focus of activities (non-state actors).

Regarding the *region-specific aspect*, the analysis indicates whether the governments or the organizations from the OECD non-member countries participate in the work of TOA. The idea that the OECD member and non-member countries have varying interests regarding development and deployment of CCS is based on the assumption that the participation of the OECD non-member countries introduces new issues into the work scope of TOA such as technology transfer and capacity building in the emerging economies.

If more than one OECD non-member country participates in the work of TOA and if the topics associated with CCS use in the emerging economies are reflected in the work of the subunits, then the membership of TOA is considered to be heterogeneous from the region-specific perspective. If one of those conditions is not fulfilled, then the membership of TOA is considered to be not heterogeneous from the region-specific perspective

The analysis of the membership profile from the *sector-specific perspective* is based on the classification of the delegates which represent the members of the individual TOA according to their organization or company. The classification reflects a variety of the interests concerned with the development and deployment of CCS (section V.1). The categories encompass the positions within:

- system of government public administration,
- industry sectors which constitute the CCS process chain,
- academia,
- environmental non-governmental organizations, and
- international organizations.⁷⁷

The membership profile is considered heterogeneous, if it includes at least six from thirteen suggested categories (see Table 2).

⁷⁷ See Table 2, the source of the data for the analysis is the minutes of the meetings of TOA.

Table 2: Sector-specific typology of members' representatives

Category	Definition
Government department	Public organization responsible for a sector of government public administration, led by a minister or a senior public servant, that has responsibility for one or more departments, agencies, bureaus, or commissions
Governmental agency	Public organization in the machinery of government that is responsible for the oversight and administration of specific energy-related functions, for example administration, coordination, and promotion of national energy-related programs
R&D organization	Public or private-funded organization focused on in-house research and development activities
Environmental NGO	National or international non-profit organization focused on the issues of environmental protection
International organization	Multilateral organization or a formal body representing a multilateral organization with international membership consisting of governmental and / or non-governmental entities with international scope of activities
Power company	State-owned or private company which generates, transmits and distributes electricity
Oil and / or gas company	State-owned or private company or a subsidiary focused on oil and / or natural gas exploration and production activities
Engineering / consulting service company	Private company which specializes in providing engineering, management solutions and / or consulting services for energy-related industries
Industry association	National or international organization consisting of more than two members which belong to a specific industry for a purpose of representing a common interest
Manufacturing company	State-owned or private company which designs, constructs, and supplies systems and / or components for the needs of power generating industry
Coal producer	State-owned or private company or a subsidiary which focus lies on coal mining activities
Public-private partnership	"[...] forms of cooperation between public authorities and the world of business which aim to ensure the funding, construction, renovation, management or maintenance of an infrastructure or the provision of a service [Commission, 2004b]."
Financial services	Private-owned company specialized at the provision of the financial advisor services

Source: author

Unit of representation

Definition: The position of the delegates to TOA in the hierarchy of the organizations they are representing.

Operationalization: The existence of the eligibility criteria for the individuals to represent the member of a TOA specified by the official documents.

TOA do not enter in a contractual relationship with the individuals but with the companies, government departments or agencies which are then represented by the individuals.

Schmitter & Streeck assume that the high level of organizational development of an association representing significant interests of its members demands the high-level status for members' representation. Thus, the official documents of TOA with high level organizational development will require from the delegates to have a high status in the hierarchy of the organizations they are representing. TOA with low level of organizational development will not formulate such requirements (Figure 2).

Intra-organizational complexity

Definition: The intra-organizational patterns of accommodating specific interests and integrating them into a broader, collective interest definition [Schmitter & Streeck, 1981, 127].

Operationalization:

- the existence of the documents which formulate collective interest, and
- indication of the number of the intra-organizational subunits within a TOA.⁷⁸ The subunits can be categorized according to the following dimensions:
 - professional staff⁷⁹: subunits which consist of the employed staff and perform administrative functions and / or contribute to a production of work deliverables on behalf of the membership, e.g. TOA secretariat;
 - specific issue⁸⁰: formal subunits which unite homogeneous interests within a group by covering a specific issue usually in the framework of task forces or working groups; and
 - member categories: these refer to the structural components which are either built on the basis of specific characteristics of members or result from the intra-organizational labor division.

TOA is considered to have a high level of organizational development, if its official documents formulate the collective interest, if TOA has professional staff which acts on behalf of the whole membership, and if TOA has few issue-specific subunits. TOA is considered to have a low level of organizational development, if its members did not formulate the collective interest, if it has no or a large number of highly independent subunits corresponding to specific interests of members, and if the professional staff is allocated to fulfil specialized interests of members to the disadvantage of the collective interest.

⁷⁸ The linkages between the various subunits are captured by the dimension coordination.

⁷⁹ Corresponds with Schmitter & Streeck's task-oriented subunits [Schmitter & Streeck, 1981, 167].

⁸⁰ Corresponds with Schmitter & Streeck's special interest-oriented subunits [ibid].

Coordination

Definition: The extent of hierarchical coordination which allows the activities of all subunits to be determined by one central subunit.

Operationalization: Indication of a decision-making competence of the subunits as well as a competence to give tasks to other subunits and be reported on the progress of the work deliverables as determined by the official documents and as follows from the analysis of the minutes.

TOA is considered to have high level of organizational development, if the coordination of TOA's activities is centred at one unit. TOA is considered to have a low level of organizational behaviour, if the hierarchy of coordination of the units' activities is not cleared.

IV.2.3.2 Operationalization of Dimensions Underlying the Organizational Autonomy

The organizational *autonomy* refers to the supply of resources required for the organization to function and produce the deliverables (resource autonomy) as well as to the capacity to set its goals and select means and strategies of achieving them (strategic autonomy) [cf Schmitter & Streeck, 1981, 129]. The assessment of the resource and strategic autonomy of a TOA draws upon the following criteria (cf Figure 1).

Finance

Definition: The actors which provide funding for TOA.

Operationalization: Identification of the sources which provide funding for TOA.

TOA with high level of organizational development keep various sources of funding on a routine, predictable and long-term basis. Low level of the organizational development is characterized through funding provided only by the membership.

Labor

Definition: actors which contribute to the production of work deliverables.

Operationalization: identification of actors which contribute to the production of the work deliverables.

Supply of the resource labor by the professional staff and by the membership characterizes the high level of organizational development of TOA. Supply of the resource labor only by the membership on a voluntary basis reflects low level of organizational development of TOA.

Information

Definition: The actors which provide knowledge required to produce work deliverables.

Operationalization: specification of the knowledge sources used by the TOA to produce their work deliverables.

Supply of the resource information from various sources including professional staff, buying information on the market, and gaining information via cooperation with other organizations distinguishes TOA with the high level of organizational development. Supply of the resource information only from the membership that contributes on a voluntary basis marks low level of organizational development.

Target groups

Definition: The audiences addressed by the work deliverables of TOA.

Operationalization: Identification of the main work deliverables and the primary target groups to which they are addressed.

TOA with high level of organizational development will address their work deliverables to various audiences. TOA with low level of organizational development will address their work deliverables predominantly to its members.

Decision-making

Definition: The capacity to make binding decisions upon the members.

Operationalization: Decision-making procedures as set by the official documents; and identification of the voting patterns regarding actual decision-making in TOA.

Majority voting as a decision-making procedure is a characteristic feature of TOA with high level of organizational development. Consensus as a decision-making procedure distinguishes TOA with low level of organizational development.

Selective goods

Definition: The incentives provided by TOA exclusively for its members.

Operationalization: Identification of the work deliverables produced exclusively for the members of TOA.

In TOA with high level of organizational development the selective goods for the members are produced by professional staff. In TOA with low level of organizational development the selective goods are produced by the members themselves on a voluntary basis.

The chapter VI carries out the empirical analysis of the organizational development of the four TOA according to the research design worked out above. It is obvious that none of the TOA will reflect the ideal-type high or low level of development as outlined above (Figure 2).

However, the specific organizational properties featured by TOA will make it possible to develop assumptions about the scope of their influence on the state actors.

Figure 2: Dimensions of the organizational development

Characteristics of organizations with the low level of organizational development	<i>Dimensions</i>	Characteristics of organizations with the high level of organizational development
<i>number of members & diversity of represented interest</i>		
small and homogeneous		large and heterogeneous
<i>unit of representation</i>		
not specified		high entrepreneurial status of managers representing the members
<i>intra-organizational complexity</i>		
collective interest not specified; no subunits or highly independent subunits corresponding to specific interests by members; allocation of professional staff to fulfill specialized interests of members to the disadvantage of a collective interest		unitary in terms of collective interest; differentiated in terms of activities performed by professional staff which serves on behalf of the whole membership; and consisting of few issue- specific subunits
<i>coordination</i>		
weak unity of command		unity of command centered at one subunit
<i>finance</i>		
funding is provided only by the members		various sources of funding on a routine, predictable and long-term basis
<i>labor</i>		
contributed by the members on a voluntarily basis		provided by the employed labor recruited from market and not from the membership
<i>information</i>		
provided by the membership on a voluntary basis		various sources of information including employment of professional staff, buying the information on the market, and gaining information via cooperation with other organizations
<i>target groups</i>		
exclusively the membership		diversification of outputs, customers, and target groups
<i>decision-making</i>		
capacity to make binding decisions against the opposition of the membership is not provided by the official documents		capacity to make binding decisions is defined in the official documents and is reflected in the respective procedures carried out on a regular basis
<i>selective goods</i>		
selective goods are produced by the membership on a voluntary basis		selective goods are produced by employed professional staff and/or in cooperation with other organizations

Source: author after [Schmitter & Streeck, 1981, 137a] with modifications

IV.2.4 Organizational Properties and the Logic of Exchange

The logic of membership and the logic of influence impose contradictory demands on the organizational complexity and the autonomy. Regarding the organized complexity, the logic of membership affects the organizational development in a way that it favors a low number of members with homogeneous interests and simple structures. Such development is caused by “[...] the desire of members to have their immediate, particularistic interests represented as undistorted as possible [...]” [Schmitter & Streeck, 1981, 133]. This idea is supported by Olson in *The Logic of Collective Action* [2004 (1968)]. Olson claims that the smaller groups are better suited to provide an optimal amount of public good. First, compared to the large groups the members of the smaller groups are better motivated to act on behalf of the organization since a successful effort of an individual does not get lost in the anonymity of a crowd; second, the group size makes it harder to “free-ride” on the effort of other members.

The logic of influence, however, demands such level of organizational development which aggregates a large variety of particular interests. First, due to resource efficiency and legitimacy reasons, state actors prefer dealing with a small number of interest representatives covering a large variety of interests which, in an internal process, are processed to a common general interest. Further, the exertion of effective political influence may demand from an organization a coordination of effort and concentration of resources and power.

Thus, both sets of logic work in opposite directions. Which logic succeeds depends on the conditions of membership and the characteristics of the policy sector. Usually the organizational properties of an association encompass a mixture of both sets of logic [ibid, 135].

Both sets of logic have similar contradictory effects on the autonomy. Following the imperatives of the logic of membership, the organization pursues the short-term particular interests of its membership as the latter presents the only source of its income. However, a long-term and profound political influence requires organizational continuity, long-term planning, and the ability to formulate a common interest by enforcing binding decisions against the will of particular members.

Against the background of the logic of governance, it is possible to assume that, if the state actors expect that the exchange process with the association will enhance their governance resources, they may assist the development of such organizational structures which are characterized through a high level of organized complexity - this in order to establish the access to one counterpart representing a variety of interest and strategic autonomy which enables long-term planning and continuity [cf ibid, 134, 137, Lehmbruch, 1987, 17].

IV.3 Summary and Hypotheses

The study combines the multi-level governance approach with the administrative interest mediation approach. Whereas the important contribution of the multi-level governance

approach is to recognize the importance of the non-state actors, the administrative interest mediation approach stresses the importance of the state actors in the exchange process with the groups.

The concept of multi-level governance has been developed in the tradition of the European integration studies. The contribution of the multi-level governance approach is to highlight the complexity of the decision-making as well as the importance of non-state actors and “soft” patterns of influence in the policy-making process. The literature on interest mediation in the context of the multi-level system of the EU has focused mainly on the interest mediation activities of the non-state actors. The overview of the previous research on the drivers of interest mediation in the context of the EU showed that whereas there is a lot of research on the resources of the non-state actors, the resources of the state actors are under-researched. The administrative interest mediation approach highlights the importance of the state actors and contributes to the understanding of the rationale of state-group relations and the variation in their pattern. Thus, the combination of both approaches – multi-level governance and administrative interest mediation – offers complementary perspectives.

Within the multi-level governance system of the EU, ZEP has a formalized status as the Technology Platform. This status is connected with the advisory functions to the Commission and the member states. The administrative interest mediation approach considers that groups can be influential because they are granted privileged status by the state actors [Schmitter & Streeck, 1981, 104]. In a similar key, the epistemic communities approach claims that groups enhance their influence, if they “gain and exercise bureaucratic power” [Haas, 1992, 30]. Thus, the first hypothesis that accounts for the variation of the influence of TOA highlights the relation between the formal status and the level of influence.

- A. The more formal the status of the TOA in the decision-making system of the EU, the higher its influence will be.

The central assumption of the administrative interest mediation approach claims that the organizational properties of an association relate to its level of influence. The second hypothesis relates the level of organizational development of TOA with its influence.

- B. The more developed the organizational structure of the TOA, the higher its influence will be.

The next section investigates the characteristics of the European CCS policy sector.

V CCS Policy Sector in the EU

Following John, the research project understands the *policy sector* as “[...] a field of decision-making concerned with a certain type of public problem, such as agriculture, energy, or the environment” [John, 2000, 205, cf also Windhoff-Héritier, 1983, 348]. The study addresses the interest mediation processes in the CCS policy sector of the EU. Thus, the policy sector that is in focus of the analysis is concerned with the variety of issues related to the development and deployment of CCS technology. The chapter falls into two parts that highlight CCS as “a certain type of public problem” as well as the EU as “a field of decision-making.”

Prior to the focus on the CCS policy sector of the EU, the study gives a general account of the CCS technology and its implications for policy and regulation. Against the background of the CCS value chain, the study identifies the range of the issues which may become a subject of formulation of policy and regulation by policy-makers. The CCS policy sector crosscuts climate, energy, and technology policy sectors. The study outlines how the goals of these policies can be linked to the development and deployment of CCS. Further, the study considers how the various weighting of the goals of these individual policies can affect policy to support CCS. The section concludes with an overview of the regulatory strategies that can be applied by state actors to support the deployment and control operation of CCS.

Considering the CCS policy sector in the multi-level governance system of the EU, the study gives an outline of the legal framework underlying the decision-making activities of the supranational bodies of the EU in the field of CCS. Thus, this part of the analysis investigates the competences of the supranational bodies of the EU relevant for the formulation of CCS policy as it is regulated by the Lisbon Treaty.⁸¹

In the next step, the study outlines the development of the European CCS policy framework and highlights its cornerstones. This section addresses the rationale for development and deployment of CCS, the integration of CCS in the portfolio of other climate change mitigation measures, and the EU bodies’ stand toward the extent of public support to foster the development and deployment of CCS [cf Meadowcroft & Langhelle, 2009a, 11].

Then, the study addresses the European CCS regulatory framework. That encompasses the regulatory strategies applied in the European CCS Directive and in the financial instruments to support the demonstration and control the operation of CCS in the EU.

Further, the research interest turns to the analysis of the principal European institution involved in the decision-making process with regard to the EU CCS policy. Previous studies show that depending on the policy sector and policy-making stage in the framework of the decision-making system of the EU, the importance of the individual European institutions may vary. Thus, the study needs to identify the key state actors which were driving the policy development process during the time period under study. To this purpose, the study

⁸¹ The ratification of the Lisbon Treaty began in December 2007 and continued until November 2009. The treaty entered into force on December 1, 2009 [Eurostep - EEPA, 2008-2009].

outlines the formal competences of the major European institutions as stated in the Lisbon Treaty and studies their role in the formulation of various aspects of CCS policy and regulation.

The administrative interest mediation approach understands the resources of the state actors as elements that enhance their capability to develop and implement policies. The identification of the key players in the CCS policy sector at the level of the EU needs to be complemented with the analysis of the resources which the state actors may offer for exchange with the groups. The final section concludes by addressing the resources of the state actors.

V.1 CCS – Brief Introduction into the Technology Chain

The main rationale behind the development and deployment of CCS technologies is an attempt to reconcile the climate policy requirements which target the reduction of the atmospheric CO₂ concentration with the wish to maintain the fossil fuels-dominated energy infrastructure [cf Meadowcroft & Langhelle, 2009b, 287, Stephens & van der Zwaan, 2005, 69]. Although a comprehensive climate policy accounts for the limitation of all GHG emissions, the reduction of the CO₂ emissions have received widespread attention as CO₂ presents the dominant anthropogenic GHG [Pacala & Sokolow, 2004, 968].

The idea behind the CCS technologies is to capture the CO₂ produced during the combustion of fossil fuels and to store it instead of releasing it into the atmosphere. That is, CCS does not avoid the production of CO₂ emissions but prevents these emissions from entering into the atmosphere. CCS is the technology which exclusively fulfils policy requirements – without the imperative of CO₂ emissions reduction there would be no need for CCS.

CO₂ capture for the purpose of enhanced oil recovery (EOR) has been applied since the 1970's in the United States [US DOE, 2009]. However, the CO₂ sequestration as a solution for fulfilling climate policy objectives appeared on the political agenda rather recently [cf Meadowcroft & Langhelle, 2009a, 4ff].

CCS can be applied in the power generation sector (coal, natural gas, and biomass power plants), in industrial processes (cement, chemicals, iron and steel), and in the fuel transformation sector (refineries, liquid natural gas, and synfuel production) [IEA, 2008a, 15, 28, 72]. However, the option which has attracted the most worldwide attention as a climate change mitigation opportunity is CCS applied for coal-fired power plants. For those countries with large domestic coal reserves, coal remains the most reliable and economical fossil fuel for electricity generation [cf. Hawkins et al., 2008, Philibert, 2003, 10]. The use of domestic coal reserves has also been increasingly advocated by the advanced industrialized democracies as a solution to the energy security concerns. Those may refer to the volatility of prices for energy sources – notably for natural gas – but usually energy security concerns reflect geostrategic risks resulting from the anticipated dependence on energy sources producer-countries. Thus, an idea of a diversified energy mix includes coal-fired electricity

generation. On the other hand, against the background of the climate protection objectives, coal is the most “dirty” energy carrier as its combustion releases the largest amount of CO₂ pollution per unit of electricity generated compared to oil, natural gas, renewable or nuclear energy. CCS technology is considered to ally the goals of energy security and climate protection by enabling low CO₂ emissions electricity generation from coal.

The CCS process chain consists of three steps – CO₂ capture, transport, and storage. The range of CCS technologies includes a number of CO₂ capture technologies, as well as various transport and storage options. Although the elements of CCS process chain show various levels of maturity (Figure 3), CCS has not been demonstrated as an integrated process on a commercial-size power plant yet. The figure below (Figure 3) pictures the levels of maturity of technology options classified according to the CCS process chain.

The most well-known approach to capture the development of any technology over time is a linear model.⁸² It suggests that there is a well-defined sequence of stages that technologies are assumed to go through in their development. The basic stages of technology development include invention, R&D, demonstration, and commercialization. Further, there are a variety of ways to distinguish the subcategories within this basic model and a range of definitions of the respective stages of technology development. In this study, the stages of technology development are understood as follows:

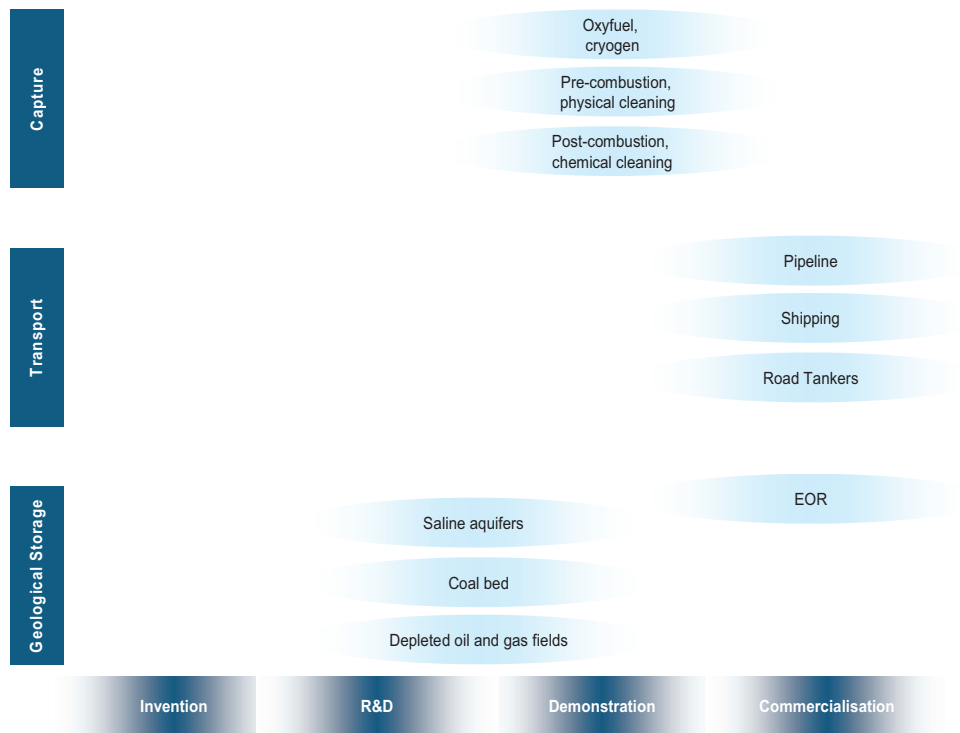
- *invention* refers to the occurrence of the idea,
- *R&D* applies to research under lab conditions,
- *demonstration* refers to technology application at different scales,⁸³ and
- *commercialization* means an application of technology by private industry without support via public funding.

Although the stock of empirical research has shown that technology development does not present a linear process driven by its own logic [cf Fagerberg et al., 2005, 8f] but is rather characterized by multiple feedbacks which face the researcher with the complex and fuzzy picture [Pavitt, 2005], the “stages”-sequence is often used as the heuristics for analytical purposes and strategic planning activities like policy planning or technology roadmapping. To acknowledge the fuzzy nature of technology development, the picture below shows blurred boundaries between the technology development stages as well as blurred boundaries marking the level of technology options development.

⁸² Cf also the linear model of innovation.

⁸³ Referring to technology application on power plants, it is common to differentiate between small-scale demonstration, the so-called “pilot” projects, and large-scale demonstration. The former usually refers to the installations of ca. 30 megawatts (MW), the latter to the installations of 250-300 MW.

Figure 3: CCS stages of technological maturity



Source: author after Wietschel et al [2010]

The remaining sections *CO₂ Capture*, *CO₂ Transport*, and *CO₂ Storage* briefly describe the technology, outline the technology areas requiring further research, show the opportunities for policy intervention, and highlight the technology issues requiring regulation.

V.1.1 *CO₂ Capture*

The CO₂ capture is economically feasible from large stationary sources such as electricity and heat plants, as well as from the industrial production [IEA, 2008a, 46]. Three main technology options exist for CO₂ capture: post-combustion, pre-combustion, and oxyfueling. Two principal domains which require further research are common to these technology options [cf Hake & Schenk, 2010]. These are the reductions of efficiency losses and costs.

Notwithstanding the capture technology in focus, the process of CO₂ capture and the following CO₂ compression for transport and sequestration reduces the efficiency of the power plant. According to the current state-of-the-art technology, the efficiency losses amount to 10-14 percentage points (pp) depending on the capture technology [Wietschel et al., 2010, 120]. In the course of learning effects in the middle and long term, the reduction of the efficiency losses is expected to reach 8-10 pp [ibid]. According to current estimations, the second generation of capture technologies which is currently undergoing the R&D phase will be able to reduce the efficiency losses under eight pp [ibid, 145].

The target to reduce efficiency losses not only corresponds with the environmental concerns due to the increased consumption of resources but also allows exploiting the cost reduction potentials. CO₂ capture is currently the most costly part of the CCS-chain. While incremental cost reductions due to the learning effects are expected to occur, the possibilities for considerable cost savings are still to be exploited [CSLF, 2010a, 56, see also Rai et al., 2009]. In addition, different plant configurations, improvements in existing methodologies, and further development of the next generation of capture technologies may provide larger cost savings [CSLF, 2010a, 56].

Depending on the extent of public support for CCS technology, the following issues can become a subject of regulation. First, the regulation may either ban the construction of new fossil fuel power plants without CCS and therefore make CCS mandatory, or set up a carbon capture-ready (CCR) standard for the construction of new fossil fuel power plants. The CCR-standard envisages a later retrofit of new-built power plants. Although a retrofit of existing power plants with net electric efficiency less than 40%⁸⁴ is currently considered not economically feasible because of the efficiency losses resulting through CCS, the retrofit of the new-built power plants with higher efficiencies can be technically and economically viable [IEA, 2008a, 58]. Thus, the regulation which defines and prescribes a “capture-ready” capacity for the new-built power plants would make a later retrofit of new-built power plants easier. The regulatory framework may also include a standardization regarding a definition of CCR-standard and / or regarding the CO₂ stream characteristics.

Second, without mandatory CCS at the current stage of technology development, public funding is crucial to demonstrate the existing capture technologies on a scale of commercial power plant. Thus, state may develop financing instruments to foster R&D and demonstration.

Finally, the commercial-scale demonstration and wide-spread deployment of CCS require environmental regulation with respect to CO₂ capture processes. Below is a summary of the issues which may become a subject of regulation against the background of CO₂ capture technologies development and deployment.

⁸⁴ The world average efficiency of the coal-fired power plants is below 35% [IEA, 2008a, 53].

Table 3: Issues related to CO₂ capture that can require regulation

CO ₂ Capture						
Environmental risks of CO ₂ capture	Environmental impact assessment of CO ₂ capture	Mandatory CCS	Mandatory "capture-readiness"	Definition of "capture-ready"-standard	Composition of the CO ₂ stream	Funding RD&D

Source: author

V.1.2 CO₂ Transport

CO₂ can be transported as a gas in pipelines and ships or as a liquid in pipelines, ships and road tankers [Wietschel et al., 2010, 229]. Although the transport of CO₂ still poses technological challenges concerning the impacts of CO₂ purity on corrosion and CO₂ transport properties, the CO₂ transportation via pipelines is considered to be an established technology and has been practiced in the United States since the 1970's [Clemente, 2009, 27].

The major challenges for an elaborated CO₂ transportation system are cost and regulation. The regulation framework needs to address a range of issues associated with the pipeline siting and access. Further, the regulation needs to account for the environmental impact assessment associated with the construction and operation of CO₂ transportation infrastructure.

The issue of incentivizing the pipeline infrastructure may also become a subject of regulation. The magnitude of the CO₂ pipeline infrastructure required by the large-scale implementation of CCS and the fluctuation of steel prices suggest that private investments in CO₂ transportation system can benefit from a favorable tax regime [IEA, 2008a, 82]. Thus, the existing CO₂ pipeline infrastructure in the United States has been developed under beneficial tax provisions regarding EOR and accelerated depreciation rules applied to capital investments [ibid]. In the following is the summary of the issues which may become a subject of regulation in the context of the CO₂ transport.

Table 4: Issues related to CO₂ transport that can require regulation

CO ₂ Transport							
Access to transport network	Pipeline siting	Environmental impacts assessment of CO ₂ transport	Incentivizing infrastructure construction	Definition of CO ₂ purity standards	Classification of CO ₂ as a pollutant or a commodity	Funding R&D	Funding infrastructure construction

Source: author

V.1.3 CO₂ Storage

CO₂ storage is a key element of the CCS chain. Therefore, the technological feasibility of the CO₂ storage stated by the IPCC Special Report on CCS⁸⁵ in 2005 was a crucial precondition for considering CCS as a climate change mitigation option.

There are three options for CO₂ storage – physical, chemical, and hydrodynamic trapping. The potential CO₂ sinks include geological sequestration in depleted oil and gas fields, deep saline aquifers, and other geological media, ocean storage, mineral carbonation, and industrial uses [IPCC, 2005, 8]. It is possible to store CO₂ in geological formations onshore and offshore. The geological sequestration in deep saline formations, depleted oil and gas fields, and the CO₂ use for EOR currently present the only proven storage options [ibid, 81]. Whereas the use of CO₂ for EOR, enhanced gas recovery (EGR), and Enhanced Coal Bed Methane recovery (ECBM) purposes is expected to give a jump-start to the implementation of CCS technologies because of associated benefits in oil and gas production, the CO₂ storage in deep saline aquifers is regarded to be the most promising storage option in the long term [ibid, 105]. However, due to the previous lack of economic interest in saline aquifers, they currently present the least analyzed storage option [Wietschel et al., 2010, 172].

The domains requiring further research in the framework of CO₂ storage are much more comprehensive than CO₂ capture. First, the research needs to approach the analysis and demonstration of the long-term behavior of the CO₂ injected. Second, further R&D is needed for a more accurate estimation of worldwide storage capacities. Finally, the research needs to develop more advanced instruments for long-term monitoring of the storage complexes [cf also IEAGHG, 2009b, 13]. According to the current state-of-the-art technology, the next step in the R&D of CO₂ storage is a demonstration of safe CO₂ storage on a large scale. This approach will not only bring benefits from the R&D perspective but it also may help secure public acceptance for future storage projects.

The regulatory framework regarding the storage of CO₂ comprises a wide range of issues and is summarized in the Table 5. The regulation varies depending on the onshore or offshore siting of CO₂ storage reservoirs. The consideration of environmental and human safety concerns can be addressed by regulation from various perspectives – from environmental impact assessment to monitoring of storage site integrity. Similar to CO₂ transportation, the access to storage sites requires regulation. Further, the permanent character of geological CO₂ storage needs to be addressed in the context of long-term liability issues resulting from the storage site operation.

⁸⁵ “Observations from engineered and natural analogues as well as models suggest that the fraction retained in appropriately selected and managed geological reservoirs is very likely [...] to exceed 99% over 100 years and is likely [...] to exceed 99% over 1,000 years” [IPCC, 2005, 14]. “Very likely” is a probability between 90 and 99% [ibid], “Likely” is a probability between 66 and 90%” [ibid, 12].

Table 5: Issues related to CO₂ storage that can require regulation

CO ₂ Storage							
CO ₂ storage offshore in international waters	CO ₂ storage in saline aquifers	Access to storage sites	Exploration permits	Storage permits	Procedure in case of leakage	Leakage and ETS credits	Monitoring and verification

CO ₂ Storage							
Site closure and post-closure obligations	Financial provisions for closure and post-closure obligations	Long-term liability issues	Environmental impacts assessment of CO ₂ storage	Environmental liability	CO ₂ stream criteria	Demonstration funding	R&D funding

Source: author

V.2 Technology Implications for Policy and Regulation

The following section gives a general overview of the main issues which impact the development of policy and regulatory frameworks for CCS. The former refers to the considerations which provide the rationale for technology development and deployment and state support; the latter refers to legislation controlling the actual deployment of the technology [cf Meadowcroft & Langhelle, 2009a, 11].

V.2.1 Policy

CCS is a complex technology which requires commercial-scale demonstration. Previous findings on analogous technologies have shown that as an environmental innovation CCS faces multiple market failures⁸⁶ and requires state support for the early phase of R&D and the demonstration of the technology⁸⁷ [Rai et al., 2009]. The formulation of CCS policy crosscuts climate, energy, and technology policies. Therefore, the rationale and the extent of state support for CCS are derived from a specific combination and weighting of the goals of these policies.

Climate policy can be considered as a subarea of environmental policy. It comprises policies which address the reduction of the atmospheric concentration of human-induced GHG. As

⁸⁶ Regarding the definition of the concept of market failure and an overview of the market failures related to CCS, see section II.1.2.1.

⁸⁷ Regarding the previous research results on the role of the governments in supporting environmental technology innovation, see section II.1.2.1.

referring to climate policy, the relative importance of CCS among other climate change mitigation options draws upon the following factors.

First, it results from the expected contribution of CCS to the emissions reductions and the expected timescale for CCS deployment. The understanding of CCS as a bridge technology on the way to the energy mix dominated by the renewable energies implies that there is a limited time window in which CCS can contribute to GHG emissions reduction. This consideration provides rationale for timely support of CCS demonstration, in order to enable early commercial rollout.

Second, it draws from the perceived competition between CCS and other climate change mitigation options, notably the renewables [cf Meadowcroft & Langhelle, 2009b, 261f]. This may comprise competition over funding resources and future competition over the use of suitable geological formations. For instance, the competition over various uses of geological formations may arise between CO₂ storage and natural gas storage sites or concerning the use of the geothermal energy.

CCS primarily fulfills climate policy objectives – without the need for GHG emissions reduction there would be no need for CCS. The stringency of climate policy targets has direct implications for CCS. The assessment of the current status of CCS development shows that the major challenge facing this technology is the funding to enable short-term demonstration and further commercialization. Although the governments can offer short-term assistance for the implementation of CCS in form of direct R&D funding and tax incentives, to enable a mid- and long-term development of this technology, policies leading to a sufficient price per CO₂-ton emitted are needed. CCS only makes sense considering stringent climate policy targets against the background of continuing use of energy sources whose combustion produces CO₂. “Stringent climate policy targets” implies that the costs of a CO₂-ton avoided via CCS are lower than the costs of a CO₂-ton emitted into the atmosphere.

Energy policy can be considered as a subarea of the economic policy. It comprises policies which address energy production, energy supply, energy consumption, and energy pricing policies [Schneider, 2009, 27]. Regarding the energy policy, the potential contribution of CCS must be evaluated against the background of the expected role of fossil fuels – notably coal – in future base-load electricity generation. The environmental consequences of coal mining, coal-fired electricity generation, and a prospect of the onshore storage of CO₂ near populated areas may lead to a public opposition which – even if the technological challenges are solved – may hinder the large-scale demonstration of CCS and its deployment. Therefore, policy which fosters the development and deployment of CCS – particularly regarding CCS application on coal-fired power plants and / or onshore storage – must take into account the issues of public acceptance. Further, the use of CCS also depends on the competitiveness of CCS-equipped electricity generation compared to the options such as natural gas- and nuclear-fired electricity generation.

Technology policy is considered to be a subarea of the economic policy. It comprises policies which are directed at fostering technological advances and at the structural conditions which provide the basis for the development and application of new technologies and services [BMW, 2010]. In supporting CCS or analogous technologies in a pre-commercial stage of technology development, state actors can choose from two approaches. They can either follow the principle of indiscriminate, all-around distribution of funding by supporting all technology lines or they can pursue the “pick-the-winner” principle by granting support to a specific technology line depending on the climate and / or energy policy objectives. From the perspective of technology policy, the relative importance of CCS draws upon the expected technology export earnings.⁸⁸

V.2.2 Regulation

To regulate the demonstration and deployment of CCS, the scope of issues ranges from environmental, health and safety protection concerns to ensuring free market competition mainly regarding the access rights.⁸⁹ State has a variety of regulatory strategies to control and incentivize the deployment of CCS. Baldwin & Cave [1999] distinguish between the following:

- command-and-control regulation imposes rules and standards backed by criminal sanctions. It can involve standard setting and / or a prior approval-regime whereas an individual or a company must acquire a license or a permit to undertake a specific activity [cf Ogus, 1994, 214],
- self-regulation and enforced self-regulation can be referred to as self-administered command-and-control strategy. It applies if a business association or an organization develops, enforces, and controls a set of rules against its members [cf Baldwin & Cave, 1999, 39],
- incentive-based regimes aim at altering a behavior of the potential mischief causer by imposing negative (e.g. taxes) or positive (e.g. subsidies and grants) incentives [ibid, 41f],⁹⁰
- market-harnessing controls prevent unfair and anticompetitive practices (competition laws) or regulate markets by using tradable permits to engage in an activity (tradable permits) [ibid, 44ff],⁹¹

⁸⁸ For a discussion see [Meadowcroft & Langhelle, 2009b, 275].

⁸⁹ See section V.1.

⁹⁰ For an alternative way to distinguish between incentive-based regimes and market-harnessing controls see [Ogus, 1994, 245ff].

⁹¹ For further instruments of market-harnessing controls – franchising and regulation by contract – see [Baldwin & Cave, 1999, 46f].

- information disclosure regulation either requires mandatory provision of information or prohibits a disclosure of false information [ibid, 49f],
- direct action usually refers to a public ownership of infrastructure [ibid, 50f],
- rights and liabilities is a regulatory technique which allocates rights, e.g. for the enjoyment of clean air, so that the polluter can be sued by the holder of the right [ibid, 51f], and
- public compensation / social insurance schemes provide premiums for performance records [ibid, 53ff].

These regulation techniques are classifiable according to the degree of state intervention. At the end of the spectrum associated with high intervention is situated command-and-control regulation strategy which imposes a licensing regime or prescribes standards. At the other end of spectrum relating to a lower degree of intervention are the self-regulation, incentive-based regimes, and information disclosure [cf Ogus, 1994, 5]. Depending on the weight of CCS as a climate change mitigation option, the state may vary the scope of public support for RD&D or develop policy instruments prohibiting geological storage or, on the contrary, prescribe a mandatory use of CCS.

V.3 Legal Groundwork for Policy-Making in the Field of CCS in the EU

CCS policy sector crosscuts energy, climate, and technology policy sectors. The decision-making competences of the European Union in these policy fields are regulated by the international treaties between the member states. The most important treaties are the Treaty on the European Union (TEU) and the Treaty on the Functioning of the European Union (TFEU). Both form part of the Lisbon Treaty which was signed by the heads of state and government of the 27 EU Member States on December 13, 2007, and entered into force on December 1, 2009.

The climate, energy, and technology policies belong to the area of shared competence between the Union and the member states [TFEU, 2010, Article 4 (2) (e), (i), Article 4 (3) respectively]. It means that the member states can exercise their competence to the extent that the Union has not exercised its competence [TFEU, 2010, Article 2 (2)].

V.3.1 Energy Policy

Since the creation of the European Union, the EU energy legislation is a function of the EU treaties [IEA, 2008c, 25]. The issue of the dispersion of competences between the Union and the member states is especially relevant for energy policy as until coming into force of the Lisbon Treaty, the European Communities Treaty (TEC) did not contain a specific article on

energy [cf Schneider, 2009, 316].⁹² However, the number and the scope of legislative activities of the supranational bodies of the EU have steadily increased – especially after the oil shock of 1973/74 [ibid, 23]. The energy-related legislation was then dispersed under various legal bases [IEA, 2008c, 27]. The main focus of legislation concerned the liberalization of the internal market, energy security, renewable energies, and the emission trading [Schneider, 2009, 28ff].

TFEU under the Lisbon Treaty introduces a specific title on energy [TFEU, 2010, Article 194]. It defines the goals of the European energy policy broadly – those comprise all existing legislation in the field of energy policy [ibid, 319]. However, the TFEU does not add any new content besides those which are covered in the existing legislation [ibid]. Thus, the common European energy policy pursues the establishment of the internal market and the environmental protection. It is aimed at ensuring the functioning of the energy market, enhancing the security of supply, and promoting the interconnections of energy networks. The TFEU confirms the basic principles of the EU energy policy – member state’s right to determine the conditions for exploiting its energy resources and member state’s right to determine its energy mix. However, the Union energy policy aims at promoting specific energy resources, notably the renewable forms of energy together with energy efficiency and energy saving. Besides, the energy-related legislation draws upon the following sections [cf IEA, 2008c]:

- Environment, Article 192 (previously Article 175 TEC),
- Trans-European networks, Article 170 (previously Article 154 TEC),
- Difficulties in supply of certain products in the area of energy, Article 122 (previously Article 100 TEC),
- Research, Article 182 (previously Article 166 TEC),
- Competition and approximation of laws, Part 3, Title VII (Chapter 1, Chapter 3) [TFEU, 2010].

V.3.2 Climate Policy

An objective to promote “[...] measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change” [TFEU, 2010, Article 191 (1)] forms part of the Union’s environmental policy. Two basic principles shape the EU legislation in this area, these are the precautionary and “polluter-pays” principles [ibid, Article 191 (2)].

⁹² Compared to the EC Treaty, the Euratom Treaty contained specific decision-making competences in the field of peaceful use of nuclear energy.

V.3.3 Technology Policy

The energy technology policy is an integral part of the energy research policy. The main instrument to finance R&D in the field of energy research at the level of the Union is the multiannual Framework Program for Research and Technology Development (Framework Program). The procedure for formulation, adoption and implementation of the Framework Programs is clarified in the Articles 182-186, TFEU. Framework Programs are adopted under the co-decision procedure following a proposal issued by the Commission [European Parliament & Council, 2006]. The Seventh Framework Program which runs from 2007-2013 is implemented via the specific programs [ibid, Article 3]. Among those energy research is supported under the specific program *Energy* adopted by the Council Decision [Council, 2006]. The Commission is responsible for the implementation and monitoring of the progress of the specific programs [ibid, Articles 7, 9]. The Commission is further responsible for the general monitoring, review, and evaluation of the Framework Programs [European Parliament & Council, 2006, Article 7]. The implementation of the specific programs proceeds via the formulation of the work programs and calls. In this context, the Commission must take account of the views of the stakeholders at the level of member states, the EU, and at the international level [Council, 2006, Article 6]. In its activities the Commission is assisted by the Committee [ibid, Article 8].

Summary Box 11

The idea behind the CCS technologies is to capture the CO₂ produced during the combustion of fossil fuels and to store it instead of releasing it into the atmosphere. The deployment of CCS fulfills policy requirements – without the imperative of CO₂ emissions reduction we would not need CCS.

CCS is an incremental innovation to the power sector. CCS has not been yet demonstrated as an integrated process on a large scale in the power sector.

The development and deployment of CCS requires policy and regulation. The scope of the support for CCS depends on a specific combination and weighting of the goals of climate, energy, and technology policies.

V.4 European CCS Policy

The Green Paper *Towards a European Strategy for the Security of Energy Supply* issued by the Commission in 2000 showed a pessimistic perspective for coal in the future European energy mix because of the competitive disadvantage of domestic production, poor competitive performance compared to other fuels, notably natural gas, as well as on the grounds of coal's environmental performance [Commission, 2000]. The Green Paper concluded:

Although in the short-to-medium term there are no major problems regarding security of supply in solid fuels, coal's future depends largely on the development of techniques which make it

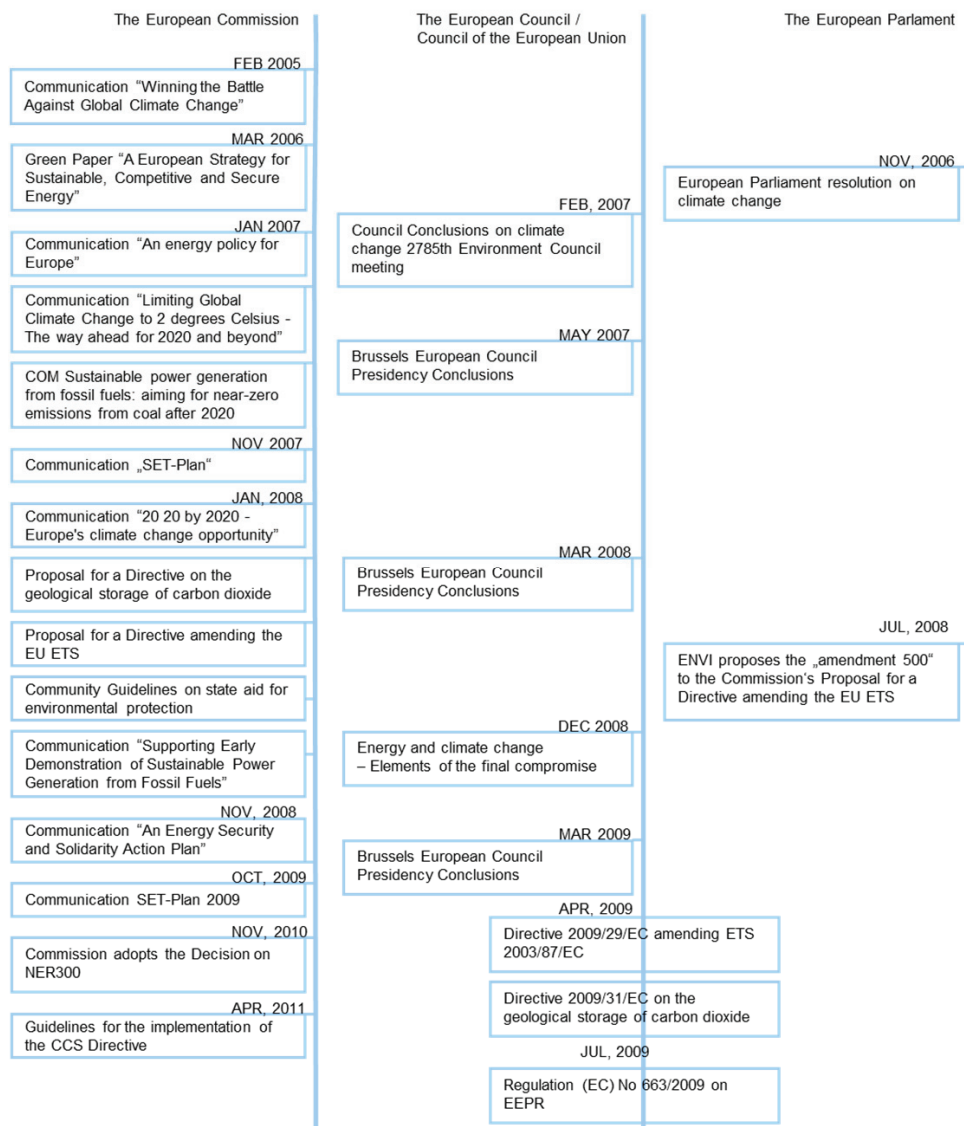
easier to use (like gasification) and lessen its environmental impact in terms of pollutant emissions through clean combustion technologies and CO₂ sequestration. [ibid, 36]

However, growing prices for natural gas, the disturbances in the supply of natural gas from Russia to Europe in winter 2006 and 2009 as well as the increasing demand for fossil fuels from the emerging economies changed the strategic position of coal in the energy mix of the EU. Compared to natural gas, coal improved its position due to the characteristics as a cheap domestic source of energy. Further favorable condition was the integration of new EU members with considerable coal reserves in 2004 [Mills, 2010, 7, vgl auch Mills, 2004]. Poor environmental performance of coal gained in importance as an issue in the context of the new climate policy approach introduced by the EU in the second half of the 2000-decade.

For the first time CCS was mentioned as a climate change mitigation option at the level of the EU in the Commission's Communication issued in 2005 [Commission, 2005b]. The Communication reflected the results of the paper by Pacala and Sokolow which identified 15 strategies – predominantly technology options – for a long-term GHG emissions reduction [Pacala & Sokolow, 2004]. The early identification of CCS as a climate change mitigation option assumed a broad field of application for CO₂ capture – from base-load power plants to H₂ plants and coal-to-synfuels plants [ibid, 970]. However, the following Green Paper *A European Strategy for Sustainable, Competitive and Secure Energy* that was issued in 2006 focused on coal-fired power plants as the main scope of application for CCS in the EU [Commission, 2006b, 14].

The Green Paper highlighted the importance of development and deployment of CCS from the perspective of three cornerstones of the European energy policy – sustainability, competitiveness, and the security of supply [ibid]. Considering the high level of emissions from coal combustion, CCS was viewed as a solution to combining the targets of the energy mix diversity and the environmental protection. Alongside the energy efficiency improvements and with the increased share of electricity production from the renewable energy sources, the Green Paper identified CCS as a third option for climate change mitigation. Introduced in the Green Paper, this idea was reflected in all latter major policy documents of the EU (Figure 4).

Figure 4: European CCS policy and regulation – key documents (as of September 2011)



Source: author

V.4.1 Strategic Positioning of CCS as a Climate Change Mitigation Option

In preparation for the meeting of the Spring European Council in 2007, the Commission issued an integrated climate and energy package [Commission, 2007b]. The overarching objective of the package was to limit the global temperature increase to 2°C compared to

the pre-industrial levels. For this purpose the Commission proposed the goal of 20 % reduction of GHG emissions by 2020 as compared to the 1990 levels in the EU independent of any international commitment [Commission, 2007f]. The decision to commit to such emissions reduction irrespective of any international agreement presented a change in the strategy as compared to the first and the second European Climate Change Programs (ECCP)⁹³. The activities proposed in the ECCP were aimed at achieving the Kyoto target. They considered the international cooperation to be the dominant climate change mitigation instrument [cf IEA, 2008c, 101].

According to the new approach in climate policy of the EU, the focus of the effort to reduce the GHG emissions was directed at the measures in the field of energy policy. The activities included strengthening of the EU Emissions Trading System (EU ETS), limiting of the transport emissions, achieving the GHG emissions reduction in the buildings sector and addressing the reduction of non-CO₂ emissions [ibid, 6f]. Recent Communication of the Commission presents a long-term policy plan to achieve 80-95% of GHG reduction compared to the 1990 levels in the EU by 2050 [Commission, 2011a, 3].⁹⁴ As the elimination of the GHG emissions in such sectors as industry and transport is not feasible [cf Fig.1 in ibid, 5], the main measure to achieve the emissions reduction of that order concerns the near elimination of the GHG emissions in the power sector [ibid].

Following the Green Paper 2006, the Commission issued the Communications in preparation for the Spring European Council 2007 (cf Figure 4). The Communications contained energy and climate policy proposals. The demonstration and wide-spread deployment of CCS as the GHG emissions reduction option was the focus of the proposals. Considering the cornerstones of energy policy in Europe – sustainability, security of supply and competitiveness – the Commission developed an Action Plan that outlined the measures in the field of energy policy necessary to achieve the emissions reduction [Commission, 2007g]. The measures of the Action Plan encompassed:

- completion of the internal market via:
 - ownership unbundling,
 - harmonization of the European energy regulations,
 - increasing the transparency of the energy markets,
 - development of the European energy infrastructure,
 - development of binding common minimum network security standards,
 - investments in sufficient electricity generation and gas supply capacities, and
 - expanding the rights of energy customers (EU citizens);

⁹³ 2001 and 2005 respectively

⁹⁴ Agreed at the European Council in October 2009 [European Council, 2009, 3].

- development of the effective solidarity mechanisms between the member states in the event of an energy crisis,
- long-term commitment to GHG reductions via the EU ETS,
- growth of the energy efficiency with the goal of reducing the total primary energy use by 20% by 2020,
- binding goal of increasing the level of renewable energy in the EU's overall mix to 20% by 2020,
- development and implementation of the European Strategic Energy Technology Plan (SET-Plan) considering the long-term goal of decarbonization of the EU energy system [Commission, 2007e],
- acceleration of the development of CCS technologies in the EU via the construction and operation of 10-12 demonstration plants by 2015 with the goal of the commercial deployment of CCS by 2020 [Commission, 2007d],
- promoting nuclear security, safety and research as well as the development of the additional European rules on nuclear security and safety,
- development of the common European international energy policy, and finally
- establishment of a common office to monitor the development of the European energy policy [Commission, 2007g].

The Action Plan and the accompanying Communications identified CCS as a crucial option in the portfolio of climate change mitigation measures. The importance of CCS as a strategic energy technology was justified by the position of coal in the energy mix of the EU and by growing share of coal in the global electricity generation mix. The Commission identified four major action areas in order to enable the deployment of CCS from 2020 on:

- incentivizing CCS development and deployment,
- coordinating R&D and demonstration effort,
- developing the regulatory framework, and
- recognizing CCS as a climate change mitigation option in international regimes, notably the international climate protection regime under the UNFCCC framework.

The Spring 2007 European Council approved an integrated approach to the EU's energy and climate change policies [European Council, 2007]. The central requirement in the adopted *Action Plan* on energy policy for the period 2007-2009 called the member states and the Commission to work toward the deployment of CCS in the EU by 2020 [ibid, Annex I, 22]. The Council also supported the Commission's initiative of incentivizing the construction of up to 12 demonstration plants equipped with CCS by 2015 [ibid].

Following the new objectives for the integrated climate and energy policy covered in the Action Plan adopted by the Spring European Council in 2007 [European Council, 2007], the

Commission worked out the cornerstones of a new European policy for energy technology [Commission, 2007e]. The *SET-Plan* identified the development and deployment of CCS as the key technological challenge to be overcome in order to achieve the 2020 targets. The SET-Plan proposed to develop the strategy to improve the planning for the EU-wide RD&D of energy technology activities, to accelerate and coordinate the implementation strategies for energy technologies, to enhance financial and human resources necessary to achieve the targets set, and to stimulate international cooperation with developed and developing countries.

Whereas the SET-Plan issued in 2007 developed a strategic view on the energy technology policy of the EU, the *SET-Plan "Investing in the Development of Low Carbon Technologies"* issued in 2009 focused on accelerating the implementation of the targets set [Commission, 2009b]. Thus, the SET-Plan justified CCS with regard to the need for a deep cut of emissions and further use of global coal reserves [ibid]. The cost-effective deployment of CCS by 2020 was the focus of the SET-Plan 2009. The document estimated the total public and private investment for CCS demonstration and R&D over the next 10 years to 13 billion Euros [ibid, 6]. The major target formulated in the SET-Plan concerns the cost reduction of CCS to 30-50 Euros per CO₂-ton abated by 2020 [ibid].

V.4.2 Development of the Long-Term Incentives for CCS Deployment

Whereas the integrated climate and energy package of 2007 identified the strategic position of CCS among the climate change mitigation options on the level of the EU, set the goal of commercial deployment of CCS by 2020 and outlined the milestones on the way to commercial availability of CCS, the climate and energy package of 2008⁹⁵ included specific legislative proposals with relevance to CCS. The package encompassed the Proposal to extend the EU ETS Directive on CCS, new Community Guidelines for state environmental protection which specified the Commission's position toward state aid for CCS projects and a Proposal for the CCS Directive (cf Figure 4).

The package encompassed the goals of increasing the share of the renewable energy to 20% and increasing the energy efficiency by 20% by 2020. Therefore, the goals of the package are referred to as the "20-20 by 2020" initiative. Combined with the goal of 20% GHG emissions reduction compared to the 1990 levels by 2020, the comprehensive objectives of the European climate and energy policy are referred to as the "20-20-20 by 2020" initiative.

In the Communication on supporting early CCS demonstration projects which accompanied the package (see Figure 4), the Commission estimated that a volume of one billion Euro

⁹⁵ The climate and energy package includes the following documents: (i) a Proposal for a Directive aimed at the revision and strengthening of the Emissions Trading System (ETS), (ii) an 'Effort Sharing Decision' covering the emissions from sectors not encompassed by the EU ETS, (iii) a Proposal for a Directive aimed at increasing the share of the renewable energies, (iv) a Proposal for a Directive aimed at the development of a legal framework for CCS deployment [Commission, 2010] The analysis carried out in the study takes into account documents related to CCS development and deployment.

investment in R&D is needed from 2008 to 2020 to make CCS ready for wide-spread application whereas the demonstration of CCS requires further spending of similar dimension [Commission, 2008d, 4]. Although the incremental capital and operating costs associated with CCS were expected to fall through learning effects and economies of scale, the deployment of CCS was considered to lead to the increased fixed and variable costs as compared to power generation without CCS [ibid, 4, 6]. Therefore, the Commission concluded that the long-term incentives for CCS deployment and state support for CCS demonstration presented the important policy objectives. The revision of the EU ETS and the publication of the new guidelines for state aid regarding CCS projects contributed to these goals.

The amendment of the EU ETS refers to the third trading period from 2013 to 2020⁹⁶ which provides for the auctioning of the emission allowances in the power sector. The original EU ETS Directive already made it possible to cover CCS installations via the “procedures for unilateral inclusion of additional activities and gases” [European Parliament & Council, 2003, Article 24]. However, the objective to develop the long-term incentives for CCS deployment gave an impetus for the introduction of a harmonized approach. The latter led to the inclusion of the CO₂ capture, transport, and storage installations into the list of the activities covered by the Directive [European Parliament & Council, 2009a, Annex I]. According to the amendment, the operators of CCS installations do not need to surrender allowances for permanently stored emissions. However, the proposal did not include free allocation of the emissions certificates for capture, transport or storage of CO₂.

Furthermore, on the initiative of the Committee on the Environment, Public Health and Food Safety (ENVI) of the European Parliament, the Proposal was amended with a financial instrument to support the demonstration of CCS. The mechanism sets aside up to 300 million emissions allowances from the New Entrants Reserve⁹⁷ of the EU ETS by 2015 to stimulate the projects in the field of innovative renewable energy technologies and the construction of up to 12 CCS demonstration plants [European Parliament & Council, 2009a, Article 10a (8)].⁹⁸ Besides the NER300 mechanism adopted in the framework of the climate and energy package 2008, the adoption of the European Energy Program for Recovery (EEPR) presents a further financial mechanism to stimulate the demonstration of the selected energy technologies including CCS at the level of the EU [European Parliament & Council, 2009c].

The funding mechanisms at the level of member-states were considered in the new community guidelines on state aid for environmental protection. The guidelines recognized

⁹⁶ The first trading period of the EU ETS stretches from 2005-2007, the second trading period covers 2008-2012.

⁹⁷ A small amount of emissions rights reserved in each national allocation plan (NAP) for new market participants.

⁹⁸ Due to the source and the number of the emission allowances, the mechanism has been referred to as “NER300”.

the strategic importance of CCS in terms of energy security and GHG reduction [Commission, 2008e, (69)]. The Commission allowed the state aid to cover the additional costs of CCS demonstration in the power generation sector [ibid]. Further, the Commission recommended using the revenues from the EU ETS [see also European Council, 2008, Annex V - ETS Directive, Council, 2009, 4] and the EU Structural and Cohesion Funds.

An important contribution to the long-term incentives for CCS was the development of a legal framework regulating CCS deployment, notably CO₂ storage. The EU CCS Directive was the worldwide first legal framework developed for CCS application. To facilitate the implementation of the Directive in the member states and ensure a coordinated approach, the Commission issued four implementation guidelines which clarified various issues related to CO₂ storage [Commission, 2010b, Commission, 2010c, Commission, 2010d, Commission, 2010e].

Further Communication which forms an element within the broader strategy of achieving targets of the “20-20-20 by 2020” initiative was aimed at the development of the measures to improve the security of supply in the EU. In the Communication *An Energy Security and Solidarity Action Plan* issued in 2008, the Commission stressed the importance of CCS as a crucial technology to maximize the EU’s indigenous resources, notably coal. According to the Communication, the threat to the Union’s security of supply results from the shrinking reserves of fossil fuels coupled with the growing demand from developing countries. The price increases and the volatility of prices for oil and gas reflect this trend. Therefore, the Commission highlighted the need for development and deployment of CCS and concluded that a concerted European action would spread the risks and “make the best use of the combined weight of the EU in world affairs” [Commission, 2008c, 3].

In the end of 2008, the European Parliament adopted the package, including the amended EU ETS Directive and the CCS Directive. The package entered into force in 2009.

V.4.3 Stakeholder Cooperation Frameworks

CCS policy development in the EU was accompanied by growing institutionalization. The following section outlines the focus of the major organizations which deal with various aspects of CCS development and deployment at the level of the EU.

The Commission supported the cooperation between the stakeholders involved in CCS R&D by establishing a knowledge-sharing network CO₂NET under the Fifth Framework Program. Founded in 2000, the network developed into an industry-led and self-funded initiative [CO₂NET, 2011]. The Commission participates in the work of the network under the Board Guest status.

The overarching target of the European Research Area (ERA) confirmed in the Seventh Framework Program by the Commission is to strengthen and improve the European research by contributing to the creation of the coherent European R&D policy [Commission, 2011c]. There are a number of issue areas, instruments, projects, and cooperations which contribute

to the integration and coordination of the European research in various areas. FENCO ERA-NET is a network within ERA which aims at the coordination and integration of national programs and R&D activities in the fields of fossil energy technologies and CO₂ capture and storage [Schneider & Baltz, 2003]. FENCO ERA's mandate ran from 2005-2010. The Commission contributed to the funding of FENCO-ERA via the Sixth Framework Program. The European Energy Research Alliance (EERA) builds on the effort of the FENCO ERA. It encompasses the European Research Institutes which pool their resources in Joint Programs. The goal is to contribute to the accelerated deployment of the SET-Plan and to the development of the next generation energy technologies [EERA, 2011].

The High Level Group on Competitiveness, Energy and the Environment was set up by the Commission for Enterprise and Industry, Competition, Energy, and the Environment in 2006 as a dialogue with "[...] high level persons with competence and responsibility in the areas of industry, energy, and the environment" [HLG, 2006, 1]. The objective of the Group was to advise the Commission on policy measures by analyzing the existing opportunities and constraints on the European level and on the level of member states. The goal of the Group's activities was to increase the investments in the energy field. The work of the High Level Group provided the input for the formulation of the SET-Plan. The Group terminated its activities in 2007.

ZEP was initiated by the Commission in 2006 with the purpose of supporting the collaboration between the European stakeholders in the field of CCS. The main objective of the ZEP is to provide the input into the identification of the research priorities and into the Commission's annual calls in the context of the Framework Programs. In 2009, the Commission initiated a European Industrial Initiative (EII) on CCS⁹⁹ in the framework of the SET-Plan. The EII consists of two pillars: demonstration and research. The EERA mentioned above contributes to the latter pillar; the European CCS Demonstration Project Network¹⁰⁰ contributes to the activities within the former pillar. The goal of the EII is to contribute to the accelerated commercial availability of CCS. The EII consists of the stakeholders in the field of CCS. The membership of the ZEP and EII overlap but are not identical. Compared to ZEP, the EII is considered to be a broader and more formal initiative in the framework of the implementation of the SET-Plan. ZEP is also a member of the Advisory Board of the EII.

An important part of the financial instruments developed to support the demonstration of CCS in the EU is the knowledge-sharing agreement which has to be signed by the operators of the CCS demonstration projects as part of the contract for receiving the EU funding. To facilitate and coordinate the knowledge-sharing processes between the project operators, the Commission established and coordinates the European CCS Demonstration Project

⁹⁹ Further EIIs are established in the areas of Solar Energy, Bioenergy, Wind Energy, Smartgrids, Smart cities, and Sustainable Nuclear Fission.

¹⁰⁰ See below.

Network. As the level of the knowledge-sharing in the Network is more advanced than in the CSLF¹⁰¹ or GCCSI¹⁰², the network includes only European projects.

The Berlin Forum on Fossil Fuels is a dialogue between the European stakeholders on the outlook for fossil fuels [Commission, 2011e]. The Forum consists of the Working Parties set up in 2005 and meeting several times a year and an annual plenary session. The Commission's Directorate-General for Energy DG Energy act as a Secretariat of the Forum.

V.5 European CCS Regulation

Among the CCS issues which may become a subject of regulation as identified in the section V.1, the EU has approached the major part of the issues. The following table gives an overview of the EU legislation on CCS. It is structured in three major blocks according to the CCS process chain – capture, transport, and storage. Within these, the issues which are subject of regulation are grouped together depending on whether they deal with the regulation of CCS deployment or present programs incentivizing the RD&D of CCS. If the EU has addressed the issue, the information on the content of legislation and decision procedure is structured along the following categories:

- *Legal Act and Article* indicate the document and the specific article which contain regulation;
- *Highlights of Regulation* gives an insight into the content of legislation;
- *the Legal Groundwork* informs on the specific Treaty which provides the EU with the competence to legislate in the respective issue area;
- the category *Actors* gives an overview of the specific EP committees, Commission DGs, and Council configurations which were involved in the legislative process; finally,
- the table provides information on *the Decision Procedure* underlying the legislation on the issue in focus and on the actors involved in the decision-making process.

¹⁰¹ The major work deliverable of the CSLF is the recognition of the CCS projects with the CSLF label. CSLF stimulates knowledge-sharing between the projects in form of regular presentations on the progress made by the projects and workshops. For more information see section VI.1.

¹⁰² In 2011 the GCCSI announced funding of six CCS demonstration projects. For more information on GCCSI see sections I.3, in the footnote, and VI.1, subsection "Autonomy".

Table 6: Regulation related to CO₂ capture in the context of CCS deployment in the EU (as of October 2010)

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
Environmental risks of CO ₂ capture	Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (IPPC) <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Annex I (6.9)	IPPC imposes a permitting regime on capture installations; an IPPC permit demands the use of best available techniques (BAT-standard) for CO ₂ capture, imposes clean-up requirements in cases of unauthorized release and site closure, and lays down the rights to public participation.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Legal Affairs (responsible); COM: DG Legal Service; Council: Agriculture and Fisheries	Co-decision procedure, 1st reading; opinion of the EESC; consultation of the COR
Environmental impact assessment of CO ₂ capture	Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Annex I (24), Annex II (j)	Environmental Impact Assessment (EIA): Directive requires the operators to carry out an assessment of the likely significant effects on the environment of any capture facilities including public consultations. The assessment carried out must be taken into account when permitting the facility under IPPC.	EEC Treaty, Part 3 - Policy of the Community, Title I - Common rules, Chapter 3: Approximation of laws, Article 100		Consultation procedure; Proposal COM; opinion EP, opinion EESC
Mandatory CCS						

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
Mandatory "capture-readiness" / Definition of CCR-standard	Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Article 9a	Directive requires all combustion plants of 300 MWe or more built after the entry into force of this Directive to have suitable space on the installation site for the equipment necessary to capture and compress CO ₂ if suitable storage sites are available, and if CO ₂ transport and retrofitting for CO ₂ capture are technically and economically feasible. The competent authority of the member state should determine whether these conditions are met (Article 9a, 1.2). There are, however, no potential timescales for the retrofit for CCS, and there is no mechanism for requiring an actual retrofit in the future.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health, Consumer Policy (responsible); COM: DG Environment; Council: Internal Market	Co-decision procedure, 3rd reading; delegation to Conciliation Committee; opinion of the EESC
Composition of the CO ₂ stream	Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Annex I (6.9)	The application of the Directive requires that BAT-standard is applied to improve the composition of the CO ₂ stream.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Legal Affairs (responsible); COM: DG Legal Service; Council: Agriculture and Fisheries	Co-decision procedure, 1st reading; opinion of the EESC; consultation of the COR

Source: author

Table 7: Programs incentivizing RD&D of CO₂ capture in the EU (as of October 2010)

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
Funding RD&D	Decision No 1513/2002/EC of the European Parliament and of the Council of 27 June 2002 concerning the Sixth Framework Program of the European Community for research, technological development and demonstration activities, contributing to the creation of the European Research Area and to innovation (2002 to 2006)			EC Treaty, Part 3 Community Policies, Title XVIII - Research and technological development, Article 166 (1)	EP: Industry, External Trade, Research, Energy (responsible); COM: DG Research; Council: Employment and social policy	Co-decision procedure, 2nd reading; opinion and report of the EESC; opinion of the COR
	Decision No 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Program of the European Community for research, technological development and demonstration activities (2007-2013)			EC Treaty, Part 3 Community Policies, Title XVIII - Research and technological development, Article 166 (1)	EP: Industry, Research and Energy (responsible); COM: DG Research; Council: Environment	Co-decision procedure, 2nd reading; opinion and report of the EESC; opinion of the COR
	Council Decision of 29 April 2008 on the adoption of the Research Program of the Research Fund for Coal and Steel and on the multiannual technical guidelines for this program (2008/376/EC)		The Decision adopts the Research Program of the Research Fund for Coal and Steel and on the multiannual technical guidelines for this program	EC Treaty/Euratom Treaty	EP: Industry, Research and Energy (responsible); Budgets (opinion), Environment; Public Health and Food Safety (opinion); COM: DG Research; Council: General Affairs and External Relations	Consultation procedure; EP opinion

Source: author

Table 8: Regulation related to CO₂ transport in the context of CCS deployment in the EU (as of October 2010)

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
Access to transport network	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Article 21 (2)	Directive requires that the access to CO ₂ transport network is provided in a transparent and non-discriminatory manner determined by the Member State	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: Justice and Home Affairs (JHA)	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR
Pipeline siting						
Environmental impacts assessment of CO ₂ transport	Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Annex I (16), Annex II (i)	EIA: Directive requires operators to carry out an assessment of the likely significant effects on the environment of the pipelines for the transport of CO ₂ streams for the purpose of geological storage. The assessment carried out must be taken into account when permitting the facility under IPPC.	EEC, Part 3 - Policy of the Community, Title I - Common rules, Chapter 3: Approximation of laws. Article 100		Consultation procedure; Proposal COM, Opinion EP, Opinion EESC
CCS and waste legislation	Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on waste <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Article 2 (1a)	The Directive specifies that the CO ₂ captured and transported for the purposes of geological storage is excluded from the scope of application of this instrument	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175	EP: Legal Affairs and Internal Market (responsible), Environment, Public Health, Consumer Policy (opinion); COM: DG Legal Service; Council: General Affairs and External Relations	Co-Decision procedure, 1st reading; opinion and report of the EESC; consultation of the COR

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
CCS and waste legislation	Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Article 1 (3h)	The Regulation specifies that the CO ₂ captured and transported for the purposes of geological storage is excluded from the scope of application of this instrument	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible); COM: DG Environment; Council: Competitiveness	Co-decision procedure, 2nd reading; opinion of the EESC; consultation of the COR

Source: author

Table 9: Programs incentivizing R&D and infrastructure construction for CO₂ transport in the EU (as of October 2010)

Issue	Legal Act	Article	Highlights of Regulation	Legal basis	Actors	Decision procedure
Funding R&D	Decision No 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Program of the European Community for research, technological development and demonstration activities (2007-2013)			EC Treaty, Part 3 Community Policies, Title XVIII - Research and technological development, Article 166 (1)	EP: Industry, Research and Energy (responsible); COM: DG Research; Council: Environment	Co-Decision procedure, 2nd reading; opinion and report of the EESC; opinion of the COR
Incentivizing infrastructure construction						
Funding infrastructure construction						

Source: author

Table 10: Regulation related to CO₂ storage in the context of CCS deployment in the EU (as of October 2010)

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
CO ₂ storage offshore in international waters						
CO ₂ storage in saline aquifers	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Article 11(3j)	Directive allows for injection of CO ₂ into saline aquifers for the purposes of geological storage	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health, Consumer Policy (responsible); COM: not specified; Council: Justice and internal security	Co-Decision procedure, 3rd reading; opinion of the COR
Access to storage sites	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Article 21	Directive determines the conditions for a third-party access to storage sites. The access shall be provided in a transparent and non-discriminatory manner determined by the Member State.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: JHA	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR
Exploration permits	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Article 5	Directive determines that if Member States decide that exploration is required, no exploration of storage sites should take place without an exploration permit. Member States shall ensure that the procedures for the granting of exploration permits are open to all entities possessing the necessary capacities and that the permits are granted or refused on the basis of objective, published and non-discriminatory criteria.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: JHA	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
Storage permits	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Articles 6-9, Article 11	Directive lays down that Member States shall ensure that the procedures for the granting of storage permits are open to all entities possessing the necessary capacities and that the permits are granted on the basis of objective, published and transparent criteria. The priority for the granting of a storage permit for a particular site shall be given to the holder of the exploration permit for that site. The Directive establishes a detailed procedure for the content of the application of storage permits, the conditions for the issuing of a storage permit, the content of the storage permits, and the conditions for the change, review, update, and withdrawal of storage permits.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: JHA	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR
Procedure in case of leakage	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Article 16	In case of CO ₂ leakage, the Directive requires corrective measures by the operator with the immediate notification of the competent authority. If the operator fails to provide corrective measures, the competent authority must take corrective measures itself whereas the costs should be recovered from the operator.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: JHA	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR
Leakage and ETS credits	Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community		Directive is used for regulating the liability for climate damage by requiring surrender of allowances for leakage.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (2)		Co-Decision procedure, 2nd reading; opinion of the EESC; opinion of the COR

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
Monitoring and verification	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Articles 13-15	Directive requires Member States to ensure that the operator carries out monitoring of the injection facilities, the storage complex and where appropriate the surrounding environment. Member States and the competent authority should establish a system of reporting by the operator and inspections of all storage complexes.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: JHA	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR
Site closure and post-closure obligations	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Article 17	Directive establishes the criteria for closure and post-closure obligations. The post-closure requirements shall be fulfilled by the competent authority on the basis of the provisional post-closure plan.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: JHA	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR
Financial provisions for closure and post-closure obligations	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Article 20	Directive specifies the financial contribution to cover costs of monitoring for 30 years to be decided by the member states. The guidelines for financial contribution are to be determined by the Commission.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: JHA	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR
Long-term liability issues	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Article 18	Directive specifies the long-term liability issues. Where a storage site was closed, all legal obligations relating to monitoring and corrective measures, the surrender of allowances in the event of leakages and preventive and remedial action, shall be transferred to the competent authority on its own initiative or upon request from the operator. The Directive states the conditions for the transfer of responsibilities.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: JHA	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
Environmental impacts assessment of CO ₂ storage	Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Annex I (23)	The EIA Directive requires operators to carry out an assessment of the likely significant effects on the environment of the storage sites pursuant to Directive 2009/31/EC. The assessment carried out must be taken into account when permitting the facility under IPPC.	EEC, Part 3 - Policy of the Community, Title I - Common rules, Chapter 3: Approximation of laws, Article 100		Consultation procedure; Proposal COM, Opinion EP, Opinion EESC
Environmental liability	Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage <i>Amended by Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide</i>	Annex III (14)	The Directive establishes a framework of environmental liability for the operation of storage sites based on the 'polluter-pays' principle, to prevent and remedy environmental damage.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Legal Affairs and Internal Market (responsible), Economic and Monetary Affairs (opinion), Industry, External Trade, Research, Energy (opinion), Environment, Public Health, Consumer Policy (opinion), Petitions (opinion); COM: DG Environment; Council: JHA	Co-Decision procedure, 3rd reading; delegation to Conciliation Committee; opinion and report of the EESC; consultation of the COR
CO ₂ stream criteria	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide	Article 12	The Directive requires the CO ₂ stream to consist overwhelmingly of CO ₂ . The establishment of the control mechanisms over the composition of CO ₂ streams is in the responsibility of Member States.	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), Industry, Research and Energy (opinion, associated committees); COM: DG Environment; Council: JHA	Co-Decision procedure, 1st reading; opinion of the EESC; consultation of the COR

Source: author

Table 11: Programs incentivizing RD&D of CO₂ storage in the EU (as of October 2010)

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
RD&D funding	Decision No 1513/2002/EC of the European Parliament and of the Council of 27 June 2002 concerning the Sixth framework program of the European Community for research, technological development and demonstration activities, contributing to the creation of the European Research Area and to innovation (2002 to 2006)			EC Treaty, Part 3 Community Policies, Title XVIII - Research and technological development, Article 166 (1)	EP: Industry, External Trade, Research, Energy (responsible); COM: DG Research; Council: Employment and social policy	Co-Decision procedure, 2nd reading; opinion and report of the EESC; opinion of the COR
	Decision No 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Program of the European Community for research, technological development and demonstration activities (2007-2013)			EC Treaty, Part 3 Community Policies, Title XVIII - Research and technological development, Article 166 (1)	EP: Industry, Research and Energy (responsible); COM: DG Research; Council: Environment	Co-Decision procedure, 2nd reading; opinion and report of the EESC; opinion of the COR

Source: author

Table 12: Programs incentivizing demonstration of an integrated CCS chain in the EU (as of October 2010)

Issue	Legal Act	Article	Highlights of Regulation	Legal groundwork	Actors	Decision procedure
Funding commercial-size demonstration	Regulation (EC) No 663/2009 of the European Parliament and of the Council of 13 July 2009 establishing a program to aid economic recovery by granting Community financial assistance to projects in the field of energy	Chapter II, Sec.3	The Directive lays down a program to aid economic recovery by granting Community financial assistance to projects in the field of energy (EEPR)	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1); EC Treaty, Part 3 - Community Policies, Title XV - Trans-European Networks, Article 156	EP: Industry, Research and Energy (responsible), Budgets (opinion), Budgetary Control (opinion), Environment, Public Health and Food Safety (opinion), Regional Development (opinion); COM: not specified; Council: Economic and Financial Affairs ECOFIN	Co-decision procedure, 1st reading
	Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community	Article 10a (8)	The Directive makes available up to 300 million allowances from the new entrants' reserve of the EU ETS to fund commercial demonstration projects in the field of CCS and renewable energy technologies in the territory of the Union	EC Treaty, Part 3 - Community Policies, Title XIX- Environment, Article 175 (1)	EP: Environment, Public Health and Food Safety (responsible, associated committees), International Trade (opinion), Economic and Monetary Affairs (opinion), Industry, Research and Energy (opinion, associated committees), Regional Development (opinion); COM: DG Environment; Council: JHA	Co-decision procedure, 1st reading; opinion of the EESC

Source: author

V.5.1 Regulation on the Operation of the Geological CO₂ Storage

The central position in the regulation of CCS deployment takes the European CCS Directive. The supranational organs of the EU succeeded in the development of a worldwide first legal act which regulates the long-term onshore and offshore CO₂ storage in geological formations [European Parliament & Council, 2009b]. According to the Commission, the rationale for a unified approach with respect to the issue of CO₂ storage results from the need to guarantee a high level of environmental and security protection [cf Commission, 2008f, 6f]. The thematic priorities of the Directive cover the following issues:

- amendment of the existing environment legislation in line with the needs of CCS,
- development of the frameworks, standards, and criteria ensuring the security of the CO₂ storage operation,
- development of the framework specifying the access issues.

Regarding the regulation in the field of environment protection, the Directive chooses a conservative approach that applies existing legislation by amending it (cf Tables 6, 8, 10). Further, the majority of the issues concerning CO₂ capture and transport are also regulated by the existing legislation frameworks (cf Tables 6, 8). As for the aspects relating to the permanent CO₂ storage, the Directive develops a new framework (cf Table 10).

The majority of regulation in the framework of the CCS Directive presents command-and-control regulation which involves both standard setting and prior approval regimes. The examples of the former include:

- the application of the BAT-standard for CO₂ capture installations and CO₂ stream requirements as required by the amended IPPC Directive [European Parliament & Council, 2008],
- the introduction of the CCR-standard [European Parliament & Council, 2001].

The examples of the latter encompass:

- permitting regime under the IPPC [European Parliament & Council, 2008] which includes the EIA for capture installations, pipeline infrastructure, and storage sites,
- permitting regimes for the implementation of exploration and storage activities [European Parliament & Council, 2009b].

The purpose of applying the highest degree of state intervention is to ensure the EU-wide unified environment and security standards and thus to provide or increase the public acceptance. This strategy is backed by a softer approach which targets the information disclosure. Thus, the permitting regime under IPPC and the EIA provides for public consultations. Further, the Commission imposes a reporting regime on permit applications and generally on the implementation of the Directive.

The legal groundwork for decision-making is mostly provided by the EU competences in the field of environment (EC Treaty, Part 3 – Community Policies, Title XIX, Article 175 (1)). A co-decision procedure is the most common rule of decision-making regarding CCS.

Regarding the dispersion of decision-making authorities between the EU and the member states, the CCS Directive gives the EU member states the right of choosing the location of the CO₂ storage reservoirs or prohibiting the CO₂ storage on their territory. Although the implementation of the Directive falls into the responsibility of member states, the Commission retains control functions in certain areas in order to increase the public acceptance for new technology. The issues which have not been addressed by the EU encompass the CO₂ transport issues which have traditionally belonged to the member states regulation.

The CO₂ storage in international waters is also not covered by the decision-making authority of the EU but is subject of regulation by the international and regional marine pollution treaties. Thus, the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972, commonly called the "London Convention" and its London Protocol as well as the Convention for the Protection of the Marine Environment of the North-East Atlantic (the 'OSPAR Convention') were amended¹⁰³ in a way to allow for the offshore geological storage of CO₂.

V.5.2 Regulation on Incentivizing the Research, Development and Demonstration in the Field of CCS

The CCS policy framework covers a range of regulatory strategies to incentivize the development and deployment of CCS. Thus, the EU has developed an incentives-based regime by imposing positive incentives, notably the subsidies for RD&D in the field of CCS.

The EU has chosen a conservative approach to fund R&D on CCS. The research has been funded in the Framework Program. In this context, the funding of elements of CCS and clean coal technologies on the European level goes back to the Third Framework Program (1990-1994) [Commission, 2011b]. In the Fifth Framework Program (1998-2002) the support for CCS R&D amounted for 16 million Euros EC contribution, with the total expenditure on CCS accounting for 32 million Euros [Commission, 2004a, 4]. The total R&D budget for CCS in the Sixth Framework Program (2002-2006) consisted of 150 million Euros whereas 70 million Euros constituted the EU share [Commission, 2007a, 5]. So far, more than 100 million Euros of European funding have been spent or earmarked for CCS projects from the Seventh Framework Program [Commission, 2011b]. In addition, part of the annual sum of circa 9 million Euros dedicated to coal-related research from the Research Fund for Coal and Steel

¹⁰³ The London Protocol was amended in 2006, the amendment came into force in 2007 [IMO, 2007]. The decision to amend the OSPAR convention was taken at the meeting of the OSPAR Commission in 2007 [OSPAR, 2007]. While the OSPAR convention allows CO₂ storage under the seabed, it prohibits CO₂ storage in a water column [OSPAR, 2007].

will continue to go to complementary R&D projects also in the field of CCS [Commission, 2008d, 8, in the footnote].

Regarding the commercial-size demonstration of the CCS process chain, the Commission has developed new funding mechanisms. First, together with the renewable energy technologies, commercial demonstration projects on CCS will be funded with up to 300 million allowances according to the NER300 mechanism [European Parliament & Council, 2009a, Article 10a (8)]. With the NER300 funds the Commission intends to support up to eight commercial-size integrated CCS demonstration projects. The project selection is scheduled as a two-stage process. First, the member states collect and examine the project bids which they can forward to the European Investment Bank (EIB) by December 31, 2010. In cooperation with the EIB, the Commission decides by December 31, 2011 about the final project selection.

Second, in the framework of the EEPR the EU funds demonstration projects in the specific sectors in the field of energy which are considered to make "a clear contribution to the objectives of the security of energy supply and the reduction of greenhouse gas emissions" [European Parliament & Council, 2009c, (6)]. Besides CCS, the funding covers the sectors of gas and electricity infrastructure, as well as offshore wind energy. The budget of the EEPR for 2009 and 2010 amounts to 3.98 billion Euros, thereof the funding for CCS projects amounts to 1.05 billion Euros [ibid, Article 3 (1)]. The CCS funding in the framework of EEPR covers six projects from six European countries [Europa, 2009]. The funding does not give any preference to a specific capture or storage option but rather supports a variety of currently existing technology options.

EIB has announced the support for CCS demonstration projects via its loan products. Further, no new commercial coal power plants will be supported by the EIB, if these are not "capture-ready" [EIB, 2007, 3f]. The European Bank for Reconstruction and Development (EBRD) supports CCS demonstration projects in the framework of the scope of its geographic activities.

A further incentive which is considered to curb the deployment and development of CCS in the middle term is the integration of CCS into the EU ETS. The latter imposes a CO₂-pricing regime which is strengthened by i) auctioning the allowances instead of distributing them without cost, ii) reducing the number of allowances. Currently, the price per CO₂-ton avoided does not justify a private investment in CCS technology.

Summary Box 12

The supranational bodies of the EU have pursued active CCS policy. CCS was considered as a means of aligning the goals of climate protection and security of supply with respect to further use of coal for electricity generation. Along with the increased share of the renewable energy and the efficiency improvements, CCS was considered as an energy technology option which allows deep CO₂ emissions cuts beyond 2020.

2007: The strategic positioning of CCS as a climate change mitigation option in the EU elaborated on the most relevant application fields of CCS, outlined a timeline for CCS commercialization, and specified the contribution of this technology option to the overall goals of the EU energy policy - sustainability, competitiveness and security of supply.

2008: The climate and energy package contributed to the development of the long-term incentives for CCS deployment via the amendment of the EU ETS Directive and the Proposal for a CCS Directive.

An important track of activities on the level of the EU was the development of the instruments to support CCS demonstration (NER300, EEPR). The development of the SET-Plan can be considered to be a "technology pillar" of the European energy and climate policy.

V.6 Key European Institutions

The main supranational bodies of the EU are comprised of the European Parliament, the European Council, the Council of the EU, the Commission, the Court of Justice of the European Communities, the European Central Bank, the European Court of Auditors [TEU, 2010, Article 13]. Further participants in the legislative procedure are the EU advisory bodies – the European Committee of the Regions, a political assembly which represents local and regional authorities, and the European Economic and Social Committee, an advisory body representing social groups. The previous analysis showed that as for the current stage of CCS policy development, the principal actors in the European decision-making process have been the Commission, the Council which is usually regarded as an intergovernmental institution representing the interests of the member states, and the European Parliament elected by the citizens of the European Union.

Most decisions covering CCS policy and regulatory frameworks were made through a co-decision procedure [TEU / TEC, 2006, TEC, Article 251]. According to the procedure, Parliament shares legislative power equally with the Council. If the Council and Parliament cannot agree on a piece of proposed legislation, it is put before a conciliation committee, composed of equal numbers of Council and Parliament representatives [Europa, 2010a]. Having reached agreement in committee, the text is sent once again to Parliament and the Council so that they can finally adopt it as law [ibid]. The Lisbon Treaty [TFEU, 2010] refers to the co-decision procedure as the ordinary legislative procedure [ibid, Article 294]. With

coming into force of the Lisbon Treaty, the decision-making procedure remains unchanged. However, the extent of application of the procedure is expanded significantly increasing the interdependence between the Parliament and the Council [cf Duff, 2007].

V.6.1 European Commission

The Commission is the executive body of the EU which is responsible for policy development, management and monitoring of policy enforcement. The main functions of the Commission can be summarized as follows:

- in all areas of the EU competence, the Commission has an exclusive right of legislative initiative thus it participates in the legislative process of the EU by submitting proposals. The proposals are then discussed and adopted by the European Parliament and the Council;
- the Commission is the EU's executive body, thus, it is responsible for managing and implementing the EU budget;
- the Commission monitors the enforcement of the EU policies;
- the Commission represents the EU members at the international stage [Europa, 2010b].

Regarding the development of CCS policy during the time period under study, the Commission can be considered as the key actor which is responsible for the development of focus of CCS policy – from strategic positioning to the development of long-term incentives, identification of the R&D focus and support for the demonstration. The Commission is also responsible for the establishment of a range of institutionalized relations with the stakeholders in the field of CCS.

The Commission is organized in sectoral Directorates-General (DG). The most important DGs in the CCS policy sector are:

- DG Climate Action (CLIMA),
- DG Energy (ENER), and
- DG Research and Innovation (RTD).

The DG Climate Action is responsible for the development of the legal framework – CCS Directive – and the guidance documents to the Directive which aim at implementing the European CCS Directive by the member states. Further, this DG is in charge of the selection of projects and funding under the NER300 mechanism. The choice of the projects is carried out in cooperation with the member states and the EIB [Commission, 2011f].

The DG Energy is responsible for the general issues related to CCS. This DG is particularly responsible for supporting CCS demonstration. For instance, the CCS project funding under the EEPR framework falls in the area of its responsibility. The DG Energy also manages the European CCS Demonstration Project Network.

The DG Research is responsible for the development of the research program for the whole CCS value chain. Also, the funding of the CCS projects from the Research Fund for Coal and Steel falls into the responsibility of DG Research. However, as several DGs other than the DG Research have their research units in the context of the Seventh Framework Program, the issues related to clean coal technologies R&D and to CCS is the responsibility of DG Energy.

V.6.2 European Parliament

The regulation on the European Parliament is defined in Article 14 TEU and in Article 223-234 TFEU. The European Parliament is the only EU body in which members are directly elected by the citizens of the EU. The Parliament has the legislative and budgetary powers at its disposal and exercises democratic control over the Commission and to a certain degree over the Council.

The work of the Parliament is organized through the sectoral committees. The political design of the committees reflects that of the plenary assembly. The Committees form an important part of the EU legislation as they produce legislative reports by drafting and approving the proposed legislation. Further, they may also issue non-legislative reports, own-initiative reports, and opinions. Regarding the Framework Program as an important tool for financing CCS R&D on the EU level, the Parliament and its Industry, Research, and Energy Committee (ITRE) took an active part in the negotiation of Sixth and Seventh Framework Programs by framing the priorities for funding and discussing suitable mechanisms [European Parliament, 2006]. However, the European Parliament does not impact the formulation of the thematic priorities for the annual calls of the Seventh Framework Program. The EP is however informed about the budget issues in the context of implementation of the framework programs.

The Environment, Public Health and Food Safety (ENVI) Committee took part in the legislative procedure with respect to the development of the Directives in the framework of the climate and energy package, particularly regarding the amendment of the EU ETS and the CCS-Directives [Claes & Frisvold, 2009, 229]. The Members of Parliament (MEP) Avril Doyle (EPP), supported by Chris Davies (ALDE), and Linda McAvan (S&D) suggested and argued for the amendment of the EU ETS Directive with an instrument to fund CCS demonstration projects in the EU which lead to the development of the NER300 funding mechanism [ibid, 229ff].¹⁰⁴

The European Parliament is involved in the legislative process with respect to CCS via the ordinary legislative procedure. The members of the European Parliament are organized in political groups – not by nationality but by political affiliation. The current European Parliament (2009-2014) consists of seven political groups and several independent members (see Table 13). Among those, only the EPP and the ECR have formulated a group-overarching

¹⁰⁴ For a detailed description of the legislative process with regard to the NER300, see [Claes & Frisvold, 2009, 229ff]

stance toward CCS generally supporting its development and deployment [EPP Group, 2009, 7, ECR, 2009, 6].¹⁰⁵ However, while a common stance on CCS is missing, the individual members of Parliament can advocate the positions of their national parties.

Table 13: Number of seats per political group in the European Parliament (as of July 14, 2009)

Political group	Abbreviation	No. of seats
Group of the European People's Party (Christian Democrats)	EPP	265
Group of the Progressive Alliance of Socialists and Democrats in the European Parliament	S&D	184
Group of the Alliance of Liberals and Democrats for Europe	ALDE	84
Group of the Greens / European Free Alliance	Greens / EFA	55
European Conservatives and Reformists Group	ECR	55
Confederal Group of the European United Left – Nordic Green Left	GUE / NGL	35
Europe of Freedom and Democracy Group	EFD	32
Non-attached	NA	26
TOTAL		736

Source: [European Parliament, 2011]

V.6.3 European Council

Both the European Council and the Council of the European Union are regarded as the intergovernmental institutions which give the member states an opportunity to influence the European integration [Christiansen, 2006]. While the European Council is considered to provide a political guidance for the Union, the Council is responsible for the day-to-day business [Thiele, 2010, 73].

According to the TEU, the European Council drives the development of the Union [TEU, 2010, Article 14 (1)]. On this basis, the European Council may issue general policy guidelines that define the objectives and timescales or issue the declarations and resolutions that express the views of the member states on a specific problem [Europa, 2010b].

The European Council is composed of the heads of state and government, presidents and / or prime ministers of the member states, together with the President of the Commission. After coming into force of the Lisbon Treaty, the European Council becomes a formal EU institution with a new 'permanent' President elected for 2.5 years [TEU, 2010, Article 15 (5)].

Although the European Council does not count to the formal legislative bodies and its decisions have a status of policy guidelines, they are still relevant for the EU legislative

¹⁰⁵ As of October 2010.

process as the Council of the European Union is responsible for the implementation of these guidelines [ibid, 75]. A predominant voting procedure in the European Council is consensus (unanimity of acceptance) [TEU, 2010, Article 15 (4)]. Thus, the heads of states and governments adopted the integrated climate and energy package presented by the Commission in 2007 and endorsed the actions of the Commission directed at demonstration and commercial availability of CCS by 2020 in Europe.

V.6.4 Council of the European Union

The Article 16 [TEU, 2010] and Articles 237-243 [TFEU, 2010] regulate the responsibilities of the Council. The main function of the Council is to represent the interests of the member states therefore the Council is not an independent supranational EU body [Thiele, 2010, 76]. Further, together with the European Parliament, the Council is a main legislative body in the decision-making architecture of the EU. The Council consists of the ministers from all member states which meet depending on the agenda issue in different Council configurations [TEU, 2010, Article 16 (2)]. There are nine such Council configurations adopted by a qualified majority of the members of the European Council [TFEU, 2010, Article 236]:

- General Affairs and External Relations
- Economic and Financial Affairs (ECOFIN)
- Justice and Home Affairs (JHA)
- Employment, Social Policy, Health and Consumer Affairs
- Competitiveness
- Transport, Telecommunications and Energy
- Agriculture and Fisheries
- Environment
- Education, Youth and Culture.

The Presidency over the Council configurations is held on a rotating basis in accordance with a decision of the European Council adopted by a qualified majority [ibid]. The voting procedure for decision-making in the Council can be either “unanimity” or “qualified majority voting” (QMV).¹⁰⁶ The unanimity gives every member-state an opportunity to veto a decisions, on the other hand the application of QMV has been interpreted as “one of the defining features of the European Union” as it enables legally binding decision-making potentially against the will of the individual member-states [Christiansen, 2006, 151]. The Lisbon Treaty has extended the number of areas for QMV [Duff, 2007].

¹⁰⁶ “A qualified majority shall be defined as at least 55 % of the members of the Council representing the participating Member States, comprising at least 65 % of the population of these States” [TEU, 2010, Article 16 (4)].

With respect to the legislative procedure of the CCS-Directive, the Commission's proposal was discussed at numerous meetings of the Transport, Telecommunications and Energy Council and the Environment Council before the JHA Council approved the Commission draft by means of QMV. The Council Environment recognized CCS as a climate change mitigation option in the EU and called the Commission to support the development and deployment of environmentally safe CCS by 2020 [Council, 2007]. Further, the member states' representatives are involved in the formulation of the annual calls in the context of the Seventh Framework Program via the Program Committee. In the framework of the comitology¹⁰⁷ process, the members of the Program Committee assess the proposal by the Commission from the perspective of member states and can suggest ideas.

V.7 Intermediary Conclusions

The most important player in the field of CCS at the level of the EU during the time period under study is the Commission. According to the results of previous research formulated in the section II.3.3.1, the following resources of the Commission can be identified [cf Mahoney, 2004]:

- *Growing scope and depth of relevance for political decision-making.* The Commission initiated the new approach to the climate policy of the European Union and identified measures in the field of energy policy as the main contribution to the achievement of the targets set. The Commission was the key player in the process of identifying CCS as a climate change mitigation option in the EU and developing policy and regulation to address the obstacles to the deployment of CCS. Among the issues related to the specifics of CCS technology which were identified in the section V.1 as potentially requiring policy intervention and regulation, the majority was addressed by the Commission. A large share of the regulation in the framework of CCS Directive proposed by the Commission and adopted by the European Parliament and the Council presents command-and-control regulation. Although the implementation of the Directive falls into the responsibility of member states, the Commission retains several control functions.
- *Direct subsidies.* Besides the regulative, the Commission also carried out the distributive functions. The funding for CCS R&D allocated to the Framework Programs has been steadily growing. The funding for CCS demonstration projects in the framework of the EEPR was allocated from the Commission's budget.
- *Power to compose formal arenas for political debate.* The overview of the major frameworks for cooperation with the stakeholders initiated by the Commission showed high level of activity of the Commission in this field. According to the

¹⁰⁷ The term *comitology* refers to a system of committees at the level of the EU. The committees consist of the representatives of the EU member states and the Commission and assist the Commission in its policy implementation functions [cf Hooghe & Marks, 2001, 24]. The committees vary regarding the types of comitology procedure and, thus, the scope of committees' decision-making powers [ibid, 24f].

administrative interest mediation approach, the power to establish organizations and provide them with a privileged access can be interpreted as a strategy of diversification of supply of resources. Several organizations at the level of the EU have a privileged access to the Commission and are assigned with the advisory functions in the specific areas. The time period under study covers policy-making stages directed at the support, of R&D and demonstration activities. The majority of cooperations with the stakeholders initiated by the Commission address the issues which concern R&D and demonstration of CCS.

- *Information.* The information encompasses knowledge about the stage of CCS policy development in international comparison, the research gaps and the level of CCS R&D in the EU, as well as the progress of the demonstration activities in the EU and from the international perspective. The Commission can be considered as a bearer of information due to its funding and monitoring activities with regard to CCS R&D as well as due to its active engagement in the European and international forums that deal with CCS development and deployment. Information can be considered as a valuable resource which can be offered for exchange to the EU bodies, member states and stakeholders in the EU and at the international level.

The resources which the Commission can extract from the exchange with the groups can be considered:

- *Funding.* The key financial instruments to support CCS at the level of the EU are based on co-financing mechanism. Financial commitments by the industry are necessary in order to carry out the CCS demonstration projects as the European funding provides for a small share of the project budgets.
- *Information.* Information on the interests of the European stakeholders with regard to the possible projects, knowledge on R&D gaps and priorities are needed to develop an effective demonstration program and adjust the priorities of the R&D funding.

The identification of the relevance for political decision-making, direct subsidies, and power to compose formal arenas for political debate as the resources employed by the Commission corresponds with the results of previous research (section II.2.3.1). Further, the study identifies information as an important resource of the Commission. Previous research identified information as the resource that is needed by the Commission to formulate policies (section II.2.3.1). The analysis of the CCS policy sector of the EU shows that information can be also considered as the Commission's currency in the exchange with the stakeholders and decision-makers in the EU and at the international level.

VI Organizational Properties of TOA

The research project applies the administrative interest mediation approach as the analytical framework for the analysis of influence of TOA. The study argues that there is a relation between the organizational development of the group and the scope of its influence – if a group has a collective interest and wants to pursue it, the analysis of the organizational development of such group will reveal specific features. The section IV.2 introduced the analytical framework that supports this assumption, developed a set of empirically applicable criteria for the analysis of organizational development of TOA and suggested their operationalization. An overview of the dimensions of the organizational development and their operationalization is summarized in the Table 14.

This part of the study focuses on the empirical analysis of the organizational development of four TOA which are the focus of the analysis. First, the study carries out the analysis of the organizational properties of the individual TOA according to the dimensions of the organizational development (Table 14). The analysis of the dimensions is structured into two groups – those referring to the *organized complexity* and *autonomy* of TOA (Table 14). Then, the study provides a comparative overview of the level of organizational development of TOA. The section concludes with the development of the individual hypotheses which highlight the relation between the level of organizational development and influence of TOA.

Table 14: Summary of the operationalized dimensions of the organizational development

Dimension	As defined in the official documents	As observed in the analysis of the minutes
<i>Organized complexity: a scope of the interests represented by the participants and the way these interests are structured to contribute to the pursuit of the collective interest</i>		
Number of members	Max number of members allowed	Number of members
Diversity of represented interests	Membership criteria	Pattern of participants in the meetings: -region-specific -sector-specific
Unit of representation	Eligibility criteria for individuals who represent members in the meetings	
Intra-organizational complexity	Collective interest, if formulated	Number of intra-organizational subunits: -professional staff -specific issue -member categories
Coordination	Decision-making competence of the subunits / competence to give tasks and be reported on the progress	Patterns of task assignments and reporting
<i>Autonomy: independence in a supply of the resources. Resource autonomy: the pattern behind the supply of the resources which are required to ensure the organizational survival and growth. Strategic autonomy: the capacity of the organization to determine goals and means of achieving them.</i>		
Finance	Sources of funding	Sources of funding to produce work deliverables
Labor		Actors who contribute to the production of work deliverables: -membership -professional staff -contractors -other organizations
Information		Sources of knowledge used to produce the work deliverables -membership -professional staff -purchase of information on the market -cooperation with other organizations
Target group for the work deliverables		Main deliverables, primary addressees
Decision-making	Decision-making procedure	Decision-making patterns observed
Selective goods		Work deliverables produced exclusively for members

Source: author

VI.1 Carbon Sequestration Leadership Forum

The CSLF was founded in 2003 by the United States Department of Energy (US DOE) and the United States Department of State as an international cooperation effort to advance development and deployment of CCS. The foundation of the CSLF built an element of the technology-oriented climate change mitigation approach advocated by the George W. Bush administration¹⁰⁸ [Fischer et al., 2008]. The approach aims at the GHG reductions by means of the deployment of the innovative technologies. The international aspect of this strategy refers to a voluntary international cooperation with the goal of fostering technology development and deployment.

The CSLF is a formal organization which has the Charter signed by the founding members, the Terms of Reference updated on a regular basis, and the Secretariat located with the US DOE [ibid, section 3.7]. The cooperation within the CSLF is of a voluntary nature. The Charter of the CSLF does not have a binding character for its signatories [ibid, section 4.1]. Each member individually decides about the scope of the involvement with the activities of the CSLF [ibid, section 3.8].

Organized Complexity

As of October 2010, the CSLF consisted of 25 members, including 24 countries and the Commission. Figure 5 shows the development of the membership since the foundation.

Figure 5: CSLF members (as of October 2010)



Source: author

The membership in the CSLF is eligible to the national governmental entities which are major fossil fuels producers or consumers and which are committed to deploy CCS and invest in CCS RD&D [cf CSLF, 2010b, section 2.1]. Table 15 shows the share of the fossil fuels¹⁰⁹ production and consumption covered by the members of the CSLF. Based on the results presented in the Table 15, it is possible to conclude that the members of the CSLF represent the major share of the total fossil fuels producers and consumers worldwide. Therefore, *the number of the CSLF members* can be considered as large.

¹⁰⁸ Terms in office: 2001-2009.

¹⁰⁹ The analysis does not include nuclear energy as it is not of relevance for CCS.

Table 15: The share of the CSLF members in the worldwide fossil fuels production and consumption

CSLF members ¹	Oil production (%)	Oil consumption (%)	Gas production (%)	Gas consumption (%)	Coal production (%)	Coal consumption (%)
Australia	0,6	1,1	1,4	0,9	6,7	1,6
China	4,9	10,4	2,8	3,0	45,6	46,9
India	0,9	3,8	1,3	1,8	6,2	7,5
Japan	other	5,1	other	3,0	♦	3,3
New Zealand	other	0,2	0,1	0,1	0,1	0,1
South Korea	other	2,7	other	1,1	♦	2,1
Brazil	2,6	2,7	0,4	0,7	0,1	0,4
Colombia	0,9	0,2	0,4	0,3	1,4	0,1
Canada	4,1	2,5	5,4	3,2	1,0	0,8
Mexico	3,9	2,2	1,9	2,4	0,2	0,2
The United States	8,5	21,7	20,1	22,2	15,8	15,2
Denmark	0,3	0,2	0,3	0,1	other	0,1
France	other	2,3	other	1,4	♦	0,3
Germany	other	2,9	0,4	2,6	1,3	2,2
Greece	other	0,5	other	0,1	0,2	0,2
Italy	0,1	1,9	0,2	2,4	other	0,4
The Netherlands	other	1,3	2,1	1,3	other	0,2
Norway	2,8	0,3	3,5	0,1	other	♦
Poland	other	0,7	0,1	0,5	1,7	1,6
Russia	12,9	3,2	17,6	13,2	4,1	2,5
The United Kingdom	1,8	1,9	2,0	2,9	0,3	0,9
Saudi Arabia	12,0	3,1	2,6	2,6	other	♦
The United Arab Emirates	3,2	0,6	1,6	2,0	other	♦
South Africa	other	0,6	other	0,3	4,1	3,0
Total CSLF members %	59,7	72,1	64,3	68,4	88,7	89,7
Total World (2009)²	3820,5	3882,1	2696,0	2653,1	3408,6	3278,3

Status of data - 2009

other - conflated into a broader category according to the country groupings, cf source of data

♦ less than 0.05% ¹ as of February 2011 ² oil and gas production and consumption - million tons; coal production and consumption - million tons oil equivalent

Source: author, source of data [BP, 2010]

The CSLF consists of the Policy Group and the Technical Group whereas the former has a strategic role of governing the work of the CSLF and the latter exercises the advisory functions to the Policy Group in technical matters. Each CSLF member can appoint up to two representatives for each Group [CSLF, 2003, section 3.1]. The CSLF framework documents do not specify any requirements regarding the *status of the participants representing the CSLF members* [cf CSLF, 2003, CSLF, 2010b].

Regarding *a variety of the interests represented at the CSLF*, on the one hand it is possible to differentiate between the interests of the government representatives and the interests of the stakeholders. On the other hand, the government representatives encompass the interests of the developed countries and the emerging economies as well as various sector-specific interests. Therefore, the diversity of the CSLF membership can be described according to three aspects.

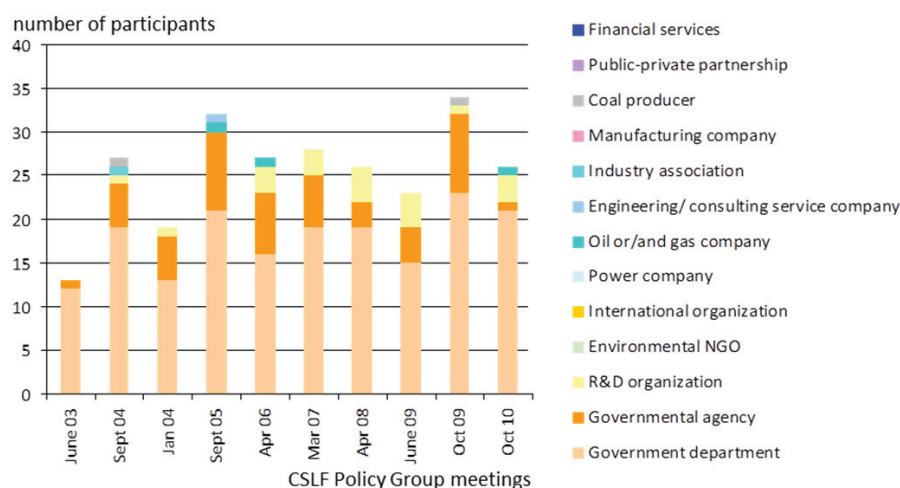
First, the *sector-specific diversity* of the Policy Group and the Technical Group varies in its pattern. The criteria for the admission of the potential members to the Policy Group do not differ from the general membership criteria as formulated by the CSLF Charter [CSLF, 2003, sections 3 & 4] and Terms of Reference [CSLF, 2010b, sections 2 & 3.1]. It is a general CSLF membership policy to keep the access for the new members as open as possible [CSLF, 2005, 4]. An initiative aimed at sharpening the membership criteria and thus limiting the number of the members in the Policy Group failed [ibid, 3f]. The membership pattern of the Policy Group is not heterogeneous¹¹⁰ and shows a dominant share of the participants seconded from the government departments or governmental agencies (Figure 6). Such composition can be interpreted as a reflection of the strategic policy-oriented nature of the Policy Group.

The criteria for the admission of the potential members to the Technical Group also follow the general membership criteria as formulated by the CSLF Charter [CSLF, 2003, sections 3 & 4]. Compared to the Policy Group, the pattern of the members' representatives in the Technical Group is heterogeneous (Figure 7). It encompasses the stakeholders from CCS-related business and international organizations whereas a considerable share of the participants consists of the members' representatives seconded from the R&D organizations.

During the period under study the pattern of the CSLF members' representatives in total can be considered as heterogeneous from the *sector-specific perspective*. It encompassed the representatives from governmental departments and agencies, academia, industry associations, oil and / or gas companies, manufacturing companies, coal producers, power companies, engineering / consulting service companies, and international organizations.

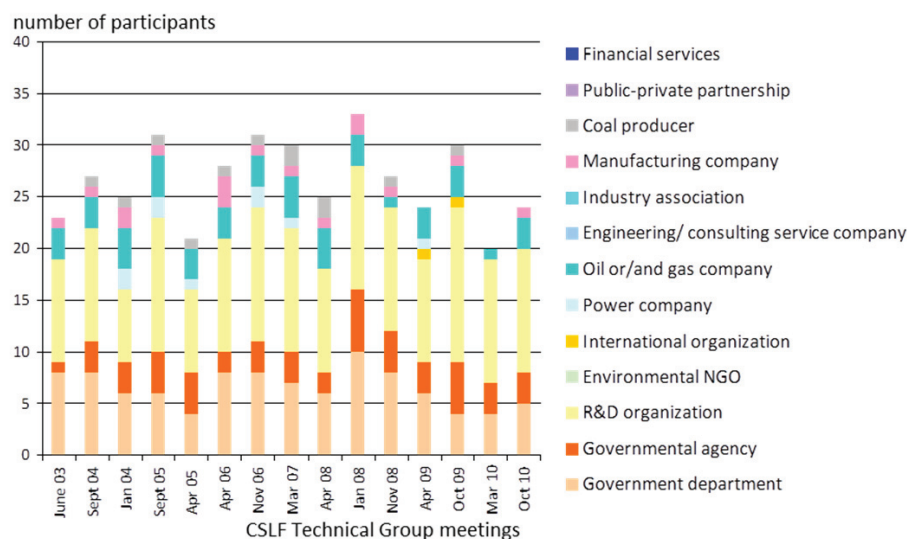
¹¹⁰ According to the criteria set in the section IV.2.3.1.

Figure 6: CSLF Policy Group delegates breakdown¹¹¹, 2003-2010



Source: author, source of data: CSLF Policy Group minutes

Figure 7: CSLF Technical Group delegates breakdown, 2003-2010



Source: author, source of data: CSLF Technical Group minutes

¹¹¹ The Figures 6-7, 9, 12-13, 15-16 show the sector-related breakdown of the participants in the meetings of the respective TOA. The source of the data is the lists of the participants recorded in the minutes of the respective TOA. The absent delegates are not included.

Second, the membership criteria of the CSLF allow for the participation of the OECD non-member countries. As of October 2010, the ratio of the OECD member and non-member countries represented at the CSLF amounted to 16 / 8 respectively, without counting the Commission. The analysis of the minutes shows that the specific interests related to the participation of the OECD non-member countries in the work of the CSLF encompass the issues of technology transfer and capacity building in the developing countries. Those are reflected in the specific issue-oriented subunits formed within the Policy and Technical Groups (see Table 16). Thus, the membership of the CSLF can be considered as heterogeneous from the *region-specific perspective*.

Finally, the diversity of the actors represented in the CSLF is also reflected in the membership categories. The CSLF *membership criteria* allow only the government representatives to acquire the member status. Hence, the interaction with the stakeholders over their role in achieving the CSLF goals and the possible forms of cooperation presents an important thread in the work of the Policy Group. Whereas the Policy Group was involved in a process of reaching the consensus on the scope and depth of stakeholders' participation in the work of the CSLF [cf CSLF, 2008b, 6], the Technical Group approached the stakeholders as a provider of the resources information (e.g. regular updates on stakeholders' activities) and labor (e.g. participation in the stakeholders' survey [CSLF, 2008a, 6] and participation in the work of task forces).

The *common interest* which unites the members of the CSLF on its goals, structures, and the work procedures is identified in a range of framework and strategic documents. These are the CSLF *Charter* [CSLF, 2003], the CSLF *Terms of Reference* (initial version of 2004), the CSLF *Policy Group Action Plan* (2004), the *Project Recommendation Guidelines* (2004), the *Terms of Reference* for the CSLF Project Interaction and Review Team (PIRT) (2005), the *Guidelines for Involvement of Stakeholders* (2005), and the *CSLF Strategic Plan* (first version 2006). The intra-organizational structure reflects the diversity of the interests represented within the CSLF.

The *intra-organizational structure* encompasses the Policy Group and Technical Group, issue-oriented subunits, and the professional staff unit. The principal *membership categories* of the CSLF are the Policy Group or Technical Group members. Both Groups are differentiated in terms of activities performed. The Policy Group addresses the issues of strategic orientation of the CSLF. The Technical Group advises the Policy Group on the matters related to the technology issues. The membership categories of Chairs and Vice-Chairs of both Groups reflect the region-specific heterogeneity of the CSLF membership (Figure 8). It is also possible to participate in the CSLF meetings in the categories of observers, invited speakers, and stakeholders whereas only the CSLF members have the voting rights. The meetings of both – the Policy and the Technical Groups – are held twice a year.

There are established mechanisms of interaction between both Groups. Since 2005, joint Policy and Technical Group meetings have been conducted on a regular basis. The work of the CSLF is steered by the Ministerial meetings which overview the activities accomplished

by the CSLF and give impulses for further development. The Ministerial meetings do not have a regular schedule. Since 2003 until 2010 three Ministerial meetings were held in 2003, 2004, and 2009.

Since the foundation of the CSLF, its work has been organized in *specific issue-oriented subunits*. Those are temporary in their nature, consist of the volunteering CSLF members and registered stakeholders and report to the Group which initiated the respective task force. The Table 16 gives an overview of the task forces that were active during the time period from 2003 until 2009. Against the background of the research interest that investigates the influence of the TOA on the *European* policy formulation, the table highlights those task forces in which the Commission took part. This overview shows the particular interests pursued by the Commission in the framework of the CSLF.

Table 16: Overview of the CSLF task forces, 2003-2009

Task Force	CSLF Body	Timeframe
Legal, Regulatory and Financing Task Force	Policy Group	2003 - 2004
Financing in Developing Countries Task Force*	Policy Group	2004 - ongoing
Public Awareness Outreach Task Force*	Policy Group	2004 - ongoing
G8 Task Force	Policy Group	2005 - ongoing
Capacity Building for Carbon Sequestration in Emerging Economies Task Force*	Policy Group	2005 - 2008
CSLF Strategic Plan Task Force*	Policy Group	2005 - ongoing
CSLF Technology Roadmap ad hoc Task Force	Technology Group	2004 - ongoing
Identifying Gaps in CO ₂ Capture and Transport Task Force*	Technology Group	2005 - 2006
Task force to Review and Identify Standards for CO ₂ Storage Capacity Estimation*	Technology Group	2005 - 2008
Identifying Gaps in CO ₂ Measurement, Monitoring and Verification of Storage Task Force*	Technology Group	2005 - 2006
Task Force to Explore the Potential for Sequestration in Developing Countries*	Technology Group	2005 - ongoing
Task Force to Examine Risk Assessment Standards and Procedures	Technology Group	2006 - ongoing
Task Force on "Communication of Risk" (subgroup to Communication Task Force)	Technology Group	2009 - ongoing
Task Force to Examine Societal Issues Impacting CCS Deployment	Joint Task Force	2007 - ongoing
Membership Criteria Task Force*		2005 - ongoing
Task Force to update the CSLF Strategic Plan*		2008 - ongoing
Task Force on Communication of CSLF activities		2008 - ongoing
Geological Storage Co-existence Task Force (planned)		2008 - ongoing

* Participation of the Commission in the activities of the task force

Source: author, source of data: the CSLF minutes

Further, the structure of the CSLF includes a *professional staff unit* in form of the Secretariat associated with the US DOE. The CSLF Charter ascribes the Secretariat predominantly administrative functions [CSLF, 2003, section 3.7]. The analysis of the minutes shows that the Secretariat also contributes to the production of work deliverables (see section *Autonomy*). The Figure 8 shows the structure of the CSLF as of December 2010.

Figure 8: CSLF Structure



Source: [CSLF, 2010d]

As it follows from the Figure 8, the Technical Group reports and advises the Policy Group whereas the latter *coordinates* the activities of the CSLF bodies and governs the work of the CSLF. Although the Policy Group can be identified as a central unit within the intra-organizational structure of the CSLF which determines the work of other units, the level of the coordination cannot be clearly defined.

At the top of the decisional authority in the CSLF are the decisions taken during the Ministerial meetings. As those usually outline the direction of the activities but do not determine the specific actions, the Policy Group coordinates the daily business and decides on the issues in focus. For instance, the Policy Group decides upon the acceptance of the work deliverables produced by both Groups. The dominating position of the Policy Group is defined by the CSLF Charter and not by its specific position to supply the CSLF with the resources funding, labor, and information. The task forces report to the Group which

established them and may issue recommendations on the specific issue. The Secretariat reports and provides services to both the Policy and the Technical Groups.

Summary Box 13

The CSLF can be considered as complex because it encompasses large heterogeneous membership. The CSLF can be considered as less organized as the intra-organizational structure reflects the complex membership pattern via the large number of specific issue-oriented subunits which pursue particular interests of the members.¹ The variety of the particular interests is not coordinated toward common objectives to the extent required to manage the specific interests of highly heterogeneous membership.

Autonomy

The main source of *funding* for the CSLF activities is the voluntary contributions of the CSLF membership. According to the CSLF Charter, any costs resulting from the members' involvement in its activities bear the members [CSLF, 2003, section 5]. The costs for the Secretariat are provided by the US DOE. Thus, the CSLF relies on the support of the US DOE to carry out the administrative functions associated with the work of the organization.

Since the decision-making procedure of the CSLF is consensus [ibid, section 3.1], following the administrative interest mediation approach, it can be suggested that the variety of the interests represented in the CSLF will make it for the advocates of particular interests difficult to attract funding from the ranks of the CSLF membership to carry out specific projects. The analysis of the minutes supports this suggestion. For instance, the chair of the Financing Issues Task Force founded within the Policy Group twice made a proposal to create a fund which would amount to 100 million US Dollars [CSLF, 2005, 6, CSLF, 2006a, 6]. The fund was proposed to be comprised of the contributions by the CSLF members based on per-capita CO₂ emissions [ibid, ibid]. The suggested purpose of the fund was to finance the CCS projects in developing countries. Both times the proposal failed to reach consensus, although the importance of the technology transfer to the developing countries was considered to be crucial among the CSLF members generally and the Policy Group delegates specifically [ibid, ibid].

Since recently, the alternative sources of funding were attracted to finance the specific activities. However, these had an ad-hoc character and usually depended on the effort by the individual delegates or the Secretariat. First, in 2009 a range of the activities was co-sponsored or funded by the international organizations that share the particular interests with the CSLF. Whereas the CSLF does not have a fund to finance its activities, the GCCSI – an international organization founded by the Australian government in 2009 – was provided by the latter with 100 million Australian Dollars on a yearly basis for the support of the initiatives which foster the commercialization of CCS. The GCCSI provided the CSLF with 1.2 million Australian Dollars over two years for the capacity building activities developed by the

Policy Group [CSLF, 2009a, 7]. Further, several studies on the topics of interest for the CSLF were funded by the Asian Development Bank [CSLF, 2009a, 6f] and the IEAGHG [CSLF, 2010e, 7]. The CSLF, the IEA Working Party on Fossil Fuels, the GCCSI and the IEA Coal Industry Advisory Board (CIAB) co-sponsored a workshop on the issue of bridging the commercial gap to CCS deployment [CSLF, 2009b, 5].

Second, a recent development refers to a cooperation of several members driven by particular interest within the CSLF. Thus, in 2009 the UK, Norway, and the US committed funding for the Capacity Building Program which was adopted by the CSLF members [CSLF, 2009b, 3f]. The goal of the program is to identify and spread the best practice regarding the development of tools, skills, expertise and institutions required to pursue the demonstration and subsequent commercialization of CCS [ibid].

There are three types of contributors to the CSLF activities which provide the resource *labor*:

- professional staff in form of the CSLF Secretariat,
- CSLF members, and
- cooperations with the stakeholders and other international organizations.

An important contributor of the resource labor is the CSLF Secretariat. It accomplishes the administrative functions; drafts the agenda and the minutes of the meetings which are thereafter being adopted by the Policy and Technical Groups members; drafts the CSLF framework and strategic documents; prepares reports and papers on particular issues for both the Policy and the Technical Groups; and executes and coordinates the CSLF communication efforts.

The role of the Secretariat as the source of labor is more important with respect to the Policy Group as the Secretariat usually drafts the strategic documents and their updates which are then being adopted by the Policy Group delegates. As the work deliverables of the Technical Group encompass technical studies, the role of the Secretariat as the provider of the resource labor there is limited. In this respect, the Secretariat rather plays a role of the mediator by informing the Technical Group on the decisions taken by the Policy Group.

A common way for the Policy and Technical Groups' delegates to provide the resource labor is to volunteer for the participation in the task forces. Further, a delegate may contribute to the CSLF activities by individually drafting a paper. A delegate may also provide the resource labor by representing the CSLF at the events.

Since the very beginning of the CSLF activities, the Policy and the Technical Groups have cooperated in producing the work deliverables with other international organizations, notably the IEA bodies and later the GCCSI. An important thread in common activities between the IEA and the CSLF is a response to the request of the G8 which invites the IEA and the CSLF to work together in producing the range of work deliverables which would contribute to the timely deployment of CCS on a global scale. Table 17 gives an overview of the G8 Summit conclusions on measures to promote development and deployment of CCS

and the work deliverables which resulted from the cooperation between the IEA and the CSLF in providing a response to the G8 request.

Further, the CSLF has worked together with IEAGHG mainly in the framework of the various task forces established by the Technical Group. Since 2008, the informal cooperation between the CSLF and IEAGHG was institutionalized by reaching a mutual representation agreement [CSLF, 2008b, 3f]. In this regard, the Technical Group is represented at the IEAGHG Executive Committee meetings and the IEAGHG is invited to participate in the Technical Group meetings.

The main contributor of the resource *information* in the CSLF is the membership. First, the information-sharing is an essential element accompanying the process of production of the written work deliverables and during the subsequent feedback to the deliverables produced by the task forces. Second, regarding specific work deliverables, the Secretariat relies on the information input by the individual members. Further sources of information are the stakeholders and other international organizations. The stakeholders are involved in information-sharing activities via their contribution to the work of the task forces and via the stakeholder sessions. Since 2005, those sessions take place as an integral part of the CSLF Policy Group meetings [CSLF, 2005, 8]. The involvement of the stakeholders in the CSLF activities aims at contributing to the identification of the strategic issues and research gaps [CSLF, 2006b, 3]. Finally, the information-sharing with the international organizations usually is based on the presentations of the recent work deliverables in the framework of the “invited speaker”-talks which target the information dissemination and the avoidance of effort duplication.

The CSLF has increasingly diversified the *target group for the work deliverables* beyond the membership. Since the beginning of the activities of the CSLF, the government representatives were the focus of the activities. The government representatives were accessed via the Ministerial meetings, in the framework of the G8 process, and via the delegates to the CSLF meetings. Several work deliverables were addressed at the general public with the purpose to enhance the understanding of CCS and enable the public acceptance.

The stakeholders as the target group of the work deliverables gained in importance. Since 2005, the CSLF eliminated the Members-Only Area of the Website giving the stakeholders and the academic community full access to the written output [CSLF, 2005, 8]. The access to the stakeholders was pursued not only by communicating the written work deliverables but also during the workshops and in the framework of the CSLF meetings. The stakeholders together with the CSLF members present the target groups for an important work deliverable of the CSLF activities – the recognition of the demonstration projects by the CSLF. This instrument is considered to enhance the prestige of the project and therefore facilitate funding and search for cooperation partners.

Table 17: The IEA – CLSF cooperation in response to the G8 Leaders’ Summit request on accelerating development and deployment of CCS

G8 Summit	Summary of the G8 Summit Conclusions on CCS	IEA-CSLF work deliverables in the response to the G8
2005 Gleneagles, Great Britain	The G8 countries target acceleration of the development and commercialization of CCS by endorsing the activities of the CSLF; inviting the IEA and the CSLF to held a workshop on short-term opportunities for CCS in the fossil fuel sector and to study definitions, costs, and scope for capture ready plant; collaborating with the developing countries; and working with industry and with national and international research programs and partnerships [cf G8 Gleneagles, 2005].	
2006 Saint-Petersburg, Russia	The G8 countries encourage the activities of the CSLF aimed at preparing and implementing demonstration projects on CCS [cf G8 Saint-Petersburg, 2006].	
2007 Heiligendamm, Germany	The G8 countries target acceleration of the development and deployment of CCS by: - prioritizing national and international research and encouraging international cooperation on CCS; encouraging RD&D of CCS in developed and developing countries; - supporting national and international efforts in the field of CO ₂ storage safety and the development of legal frameworks; - reinforcing the commitment made under the Gleneagles and St. Petersburg Plans of Action to support the initiatives taken by IEA and CSLF; - developing mechanisms to stimulate the large-scale demonstrations of sustainable fossil fuels technologies in commercial power generation; - encouraging industry to consider the concept of capture ready when developing new fossil fuel power plant [G8 Heiligendamm, 2007].	
2008 Hokkaido, Japan	The G8 countries target the establishment of an international initiative with the support of the IEA to develop roadmaps for CCS and other advanced energy technologies; support launching of 20 large-scale CCS demonstration projects globally by 2010 to enable broad deployment of CCS by 2020 [G8 Hokkaido, 2008].	Three joint IEA-CSLF “Early opportunities for CCS” workshops: identification of the issues (2006, San-Francisco) [IEA/CSLF, 2006]; assessment of the issues (2007, Oslo) [IEA/CSLF, 2007a]; providing recommendations on near-term opportunities (2007, Calgary) [IEA/CSLF, 2007b]. The results of the workshops have been incorporated in the IEA report to the G8 Leaders Summit in Hokkaido, 2008 [IEA, 2008d].
2009 L’Aquila, Italy	The G8 countries reaffirm the commitment to the launch of 20 large-scale CCS demonstration projects globally by 2010 by accelerating policy and regulatory frameworks development; working on the identification of sources for funding CCS demonstration; supporting the work of the IEA, CSLF, and GCCSI; identifying potential partnerships with multilateral financial institutions to curb the investment in CCS [G8 L’Aquila, 2009].	
2010 Muskoka, Canada	The G8 countries reaffirm the commitment to the launch of 20 large-scale CCS demonstration projects globally by 2010 and achievement of the broad deployment of CCS by 2020, in cooperation with developing countries. Several of the G8 countries commit to accelerate the CCS demonstration projects and set a goal to achieve their full implementation by 2015 [G8 Muskoka, 2010].	A joint IEA-CSLF report on the progress toward the achievement of the G8 2008 recommendation to launch 20 large-scale CCS demonstration projects globally by 2010 [IEA/CSLF, 2010].

Source: author

Against the background of the activities driven by the particular interests within the CSLF, the developing countries have been identified as an important target group for the activities. The latter fact led to the efforts to attract additional funding to support the CSLF initiatives due to the lack of funding from the CSLF membership.

According to the administrative interest mediation approach, the strategy of the diversification of the target groups for the output is interlinked with the search for new potential funding possibilities [Schmitter & Streeck, 1981, 130]. The latter allows the organization to become more independent from its membership with regard to the process of setting the goals and choosing the means of achieving them. Although the analysis shows that the CSLF has expanded the number of target groups for its work deliverables, this approach did not lead to the establishment of the additional funding on a long-term predictable basis.

The *decision-making* procedure is consensus [CSLF, 2003, section 3.2]. A large part of the decision-making concerns working procedures of the Policy Group, e.g. adoption of the agenda and minutes as well as the approval of the reports composed by the Technical Group and by the Secretariat. The analysis of the Policy Group minutes shows that the matters on which the Policy Group did not find consensus relate to the fulfillment of the particular interests, e.g. funding CCS in the developing countries, and to the management of the diversity of the membership, e.g. the conditions of the involvement of the stakeholders.

According to Schmitter & Streeck, this study defines *selective goods* as the incentives produced by the TOA exclusively for its members. The written work deliverables of the CSLF are available to the general public via the web site. Thus, those cannot be defined as the selective goods for the CSLF membership. The analysis of the minutes did not provide clear evidence on the exclusive benefits which result from the CSLF membership. It can be suggested that a possibility to nominate CCS projects for recognition by the CSLF presents a selective good. The recognition of the specific project requires a nomination of the project by at least two CSLF members. Although theoretically the members can nominate any project to be recognized by the CSLF, an overview of the recognized projects shows that their location corresponds with the geographical breakdown of the CSLF membership [CSLF, 2008c]. Against the background of the heterogeneous membership, the information exchange can be considered as a selective good.

Summary Box 14

Both the resource autonomy and the strategic autonomy of the CSLF can be considered as low due to the voluntary contribution of the resources, consensus as the decision-making procedure, and not clearly defined benefits of the membership. However, it is possible to indicate the dynamics toward the development of the higher level of the CSLF resource autonomy that is emerging via the growing scope of the target groups and the additional funding possibilities.

VI.2 European Technology Platform for Zero Emission Fossil Fuel Power Plants

ZEP was established as the European Technology Platform (ETP). The latter is an instrument developed by the Commission to support the cooperation between the industry, the European institutions, and the member states with regard to the development and deployment of strategically important technologies. As of February 2011, 36 ETP were running in five fields – energy, information and communications technologies (ICT), bio-based economy, production and processes, and transport¹¹². The ETP “[...] focus on areas of significant economic impact and high societal relevance where there is high public interest and scope for genuine value added through a European level response” [Commission, 2005a, 4]. The role of the Commission is to accompany the set-up of the Platform and to ensure that “the European dimension” is adequately addressed by the operation of the Platform [Commission, 2005a, 7]. The structural composition of the ETP enables institutionalized interaction between the stakeholders, the Commission, and the member states. However, the ETP are primarily understood and designed as the stakeholder organizations. Thus, a feature shared by all Platforms concerns the involvement in the activities of the Platform of a broad variety of the stakeholders responsible for technological innovation within a specific sector and requires from them to reach a consensus with regard to a common vision and long-term Strategic Research Agenda. It is a primary purpose of the ETP to influence the European and national policies in a way to enable the implementation of the agreed Strategic Research Agenda [Commission, 2007h, 1].

The ETP ZEP was founded in 2005. The aim of the Platform which was laid down in the Vision document is to enable European fossil fuel power plants to have zero CO₂ emissions by 2020 [ZEP, 2006c, 20]. This overall goal refers to the implementation of the integrated CCS process chain.

Organized Complexity

ETP ZEP is a formal organization with a rotating membership and a document describing the working procedures and the organizational structure of the Platform [ZEP, 2009d]. Among the official documents of all TOA that are considered in this study, the ZEP Bylaws contain the most comprehensive requirements regarding the membership number and pattern. Although ZEP consists of several bodies¹¹³, the analysis focuses mainly on the characteristics of the Advisory Council as it presents the main decision-making unit of the Platform.

As of September 2010, the Advisory Council consisted of 40 members which is a maximum number as determined by the ZEP Bylaws [ZEP, 2009d, section 3.2.4]. Compared with other ETP in the field of energy [Commission, 2011d], the *number of members* in the Advisory

¹¹² For an overview of the ETP see [CORDIS, 2011a].

¹¹³ See Figure 10 in the current section.

Council can be considered as large¹¹⁴. The Advisory Council appoints its members and defines the membership selection criteria [ibid, section 3.2.2]. As a guiding principle, at least one third of the membership of the Advisory Council should be replaced every three years [ibid].

The Bylaws require that the selection of the members for the Advisory Council considers the geographical diversity and various groups within the stakeholder community, e.g. industry sectors, NGOs, academia [ibid, sections 3.2.2, 3.3.2]. The analysis of the minutes shows that the composition of the Advisory Council is a subject of decision-making by its members. On a regular basis the members discuss the kind of expertise that is lacking with regard to the specific tasks addressed by the Advisory Council and invite individuals with the matching profiles.

During the period under study, the *sector-specific pattern* of the Advisory Council membership can be considered as heterogeneous (Figure 9). It has encompassed the representatives from the government departments, academia, environmental NGO, oil and / or gas companies, manufacturing companies, financial services, public-private partnerships, and coal producers (cf Figure 9).

The members participate in the work of the Advisory Council in a personal capacity and not as the representatives of their companies [ibid, section 3.2.6]. Regarding the *unit of representation*, the Bylaws require that the members of the Advisory Council fill high-level positions in their companies, are well-networked internationally, and are in a position to influence the stakeholders in their countries [ibid, section 3.3.5]. Further, it is required that the members participate in the meetings of the Advisory Council in person. The Advisory Council meeting should not take place, if more than 50% of the members indicate that they are unable to attend in person [ibid, section 3.2.6].

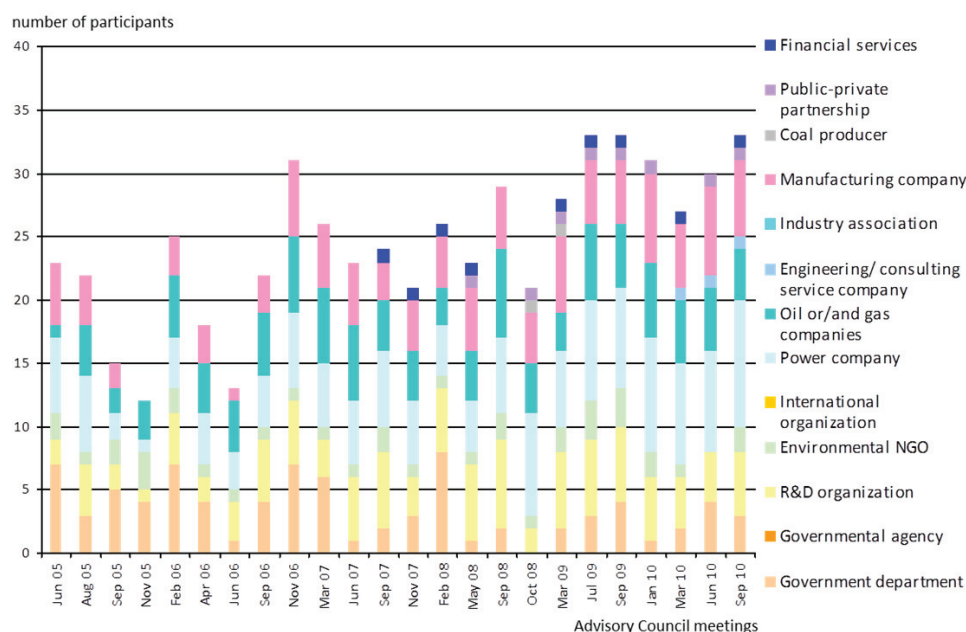
The membership pattern of the Advisory Council cannot be evaluated from the *region-specific aspect* as ZEP encompasses only the European countries interested in CCS. In this respect it is more appropriate to speak of the *country-specific heterogeneity* which relates to the scope of the EU member countries represented in the ZEP. Although, it is not always easy to determine stakeholder's country of origin, especially with regard to the global corporations and the NGOs which are usually located in Brussels, the analysis of the membership indicates that the stakeholders from the following countries were continuously¹¹⁵ represented in the meetings of the ZEP Advisory Council from its foundation until 2010: Denmark, France, Germany, Italy, Norway, Poland, Spain, Sweden, and the

¹¹⁴ The Steering Committee of the ETP Biofuels counts 21 members [EBTP, 2011]; the SmartGrids ETP Forum counts 12 members [SmartGrids, 2011]; the Steering Committee of the European Wind Energy Technology Forum is composed of 27 members [TPWind, 2011]; the Steering Committee of the European PhotoVoltaic Technology Platform consists of 20 members [PV TP, 2011]; The Governing Board of the Sustainable Nuclear energy Technology Platform consist of 27 members [SNETP, 2009]. At the time of writing no data could be found on the Renewable Heating & Cooling Platform [CORDIS, 2011b].

¹¹⁵ Following the membership rotation principle, a continuous representation is defined as longer than three years.

United Kingdom. As this sample presents 1/3 of 27 European countries, during the period under study the membership pattern of the ZEP can be considered as less heterogeneous from the country-specific perspective.

Figure 9: ETP ZEP Advisory Council membership breakdown, 2005-2010



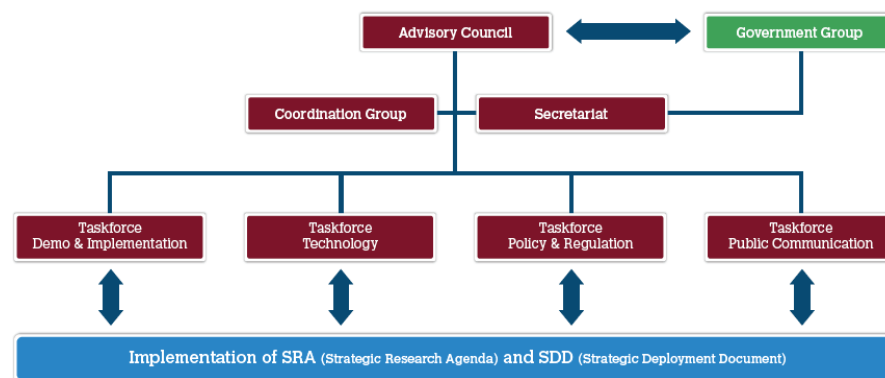
Source: author, source of data: ZEP Advisory Council minutes

In the beginning of the operation of the Platform, the members of the ZEP produced a series of documents outlining the mid-term goals and recommendations for CCS development and deployment. These documents are addressed at the policy-makers of the European and national levels and present a *collective interest* shared by the members of ZEP. The agreement on the goals shared by the participants of the Platform is a precondition for a successful operation of the Platform as required by the Commission. For instance, the Vision document contains a goal of achieving zero emission power plants by 2020 [ZEP, 2006c]. The Strategic Research Agenda outlines a collaborative research program for CCS development [ZEP, 2006b]. The Strategic Deployment Document and its recent update identify the policies which can accelerate the commercialization of CCS [ZEP, 2006a, ZEP, 2010a].

The *structural composition* of ZEP represents the main *categories of the members* – the stakeholders, the Commission, and the member states. The interests of the stakeholders are represented in the Advisory Council whereas the interests of the member states are represented in the Government Group. The Commission has a permanent observer status in the Advisory Council [ZEP, 2009d, section 3.3.4] and is fully associated with the Government Group.

The main decision-making body of the ZEP is the Advisory Council. Therefore, both the units formed according to the members' categories and the issue-oriented subunits report to the Advisory Council. The units that are formed according to the members' categories encompass the Government Group, the Coordination Group, and the Advisory Council Executive Committee. The particular interests of the members of the Advisory Council are reflected in the work of the task forces. The Figure 10 summarizes the structure of the ZEP. The remainder of the section on the organized complexity elaborates on the composition and the tasks of the individual ZEP units as well as on the hierarchical relations between them.

Figure 10: ZEP Structure



Source: [ZEP, 2010b].

The *Government Group*, former Mirror Group, includes the representatives of the member states and operates independently from the Advisory Council [ZEP, 2009d, section 7]. The primary objective of the Government Group is to influence the members of the Advisory Council in a way that the Advisory Council considers the views of the member states representatives in its recommendations to the Commission [ZEP, 2007b, 1]. For this purpose, the members of the Government Group need to coordinate their views in order to reach a consensus [ibid]. The members of the Government Group participated in the formulation of the background documents¹¹⁶ for the Advisory Council. However, as of February 2011, the Government Group did not work out a document specifying a common goal which would lead and structure its activities.

Originally the membership structure of the then Mirror Group was based on the FENCO-ERA¹¹⁷ project which encompassed mainly the representatives of the governmental agencies and the R&D organizations. In an effort to attract high-level officials, the name of the Group

¹¹⁶ Strategic Research Agenda and the Strategic Deployment Document.

¹¹⁷ FENCO-ERA - the Fossil Energy Coalition – is a pan-European R&D activity directed at the coordination of the national R&D programs in the field of fossil fuels, cf section V.4.3.

was changed to the Government Group [ZEP GG, 2007, 3, ZEP, 2007a, 5]. Further, to strengthen the resources of the Group, it was decided that each country can send two representatives which have competencies in the policy and technology fields respectively [ZEP, 2007a, 5]. However, both goals – increasing a geographic variety of the members represented at the Government Group and attracting high-level officials – proved to be difficult to achieve. Regarding the former, those countries which are not interested in CCS do not have an incentive to participate in the work of the Group. With respect to the latter, the member states' high-level officials do not require the Government Group as a communication channel as they can speak directly to the Commission [ZEP GG, 2007, 5f].

The main output produced by the members of the Government Group is the information on national programs and activities. The intra-organizational structure of the Group is simple – there are no issue-specific subunits and the work deliverables result from voluntary contributions by the individual members.

The resource autonomy of the Group is low – the resources for the development of the outputs are provided only by the members. In the beginning of the activities of the Group, there was information and labor-sharing with the FENCO-ERA initiative. It declined reflecting the re-orientation of the strategy to focus on high-level officials. The strategic autonomy is low as the activities of the Government Group react to the decisions and activities taken by the Advisory Council and the Commission. The members of the Government Group can attend the meetings of the Advisory Council as observers, participate in the work of the specific issue-oriented subunits subordinate to the Advisory Council, and take part in the work of the Coordination Group. The Commission is fully associated with the Government Group and provides input to the work process from its perspective [ZEP, 2007b, 3].

The Coordination Group consists of the co-chairs of each of the task forces, the members of the ACEC, and co-chairs of Government Group. It is an important body within the ZEP as it liaises with all ZEP bodies, bundles the work undertaken in the specific issue-oriented subunits, has the agenda-setting and structuring functions with regard to the work of the Advisory Council, and is responsible for the formulation and update of the Strategic Research Agenda and the Strategic Deployment Document [ibid, section 5].

*The Advisory Council Executive Committee (ACEC)*¹¹⁸ is comprised of the Chairperson and the Co-Chairs of the Advisory Council and has limited decision-making powers to act on behalf of the Advisory Council on urgent matters, e.g. between the AC meetings [ZEP, 2009d, section 4]. During a subsequent meeting the Advisory Council can reverse the decisions of the ACEC by 2/3 majority [ibid]. The ACEC was founded in 2008 with a purpose of speeding up the process of formulating a response of the ZEP to the developments in the European CCS policy and regulation [ZEP, 2008b, 5].

A large variety of interests required to be represented in ZEP is reflected in the organizational structure as it results in the internal differentiation and building of the

¹¹⁸ The ACEC is not pictured at the Figure 10 in the current section.

subunits according to the specific interests. Thus, the work of ZEP is organized into *specific issue-oriented subunits* – the working groups. To streamline the work process, the latter have been integrated in the task forces oriented toward a broader issue. The European stakeholders can apply for the participation in the work of the task forces, the task force co-leads decide about the admission basing on the principles of the broad geographical representation and the varying fields of expertise. The task force co-leads are appointed by the Advisory Council. The task forces actively contribute to the work of the ZEP. For instance, the specific issue-oriented subunits delivered input to the formulation of the background documents. Regarding the daily work of the ZEP, the task forces prepare decision proposals which are then being discussed at the CG meetings and decided upon by the plenum of the Advisory Council.

Since the foundation of the ZEP, its work has been supported by the *Secretariat*. The functions of the Secretariat were first carried out by the Commission. After the members agreed on the funding, the functions of the Secretariat moved to the employed staff. The Secretariat carries out administrative functions and assists all ZEP bodies including the Government Group. Since recently, professional staff is employed to contribute to the production of specific work deliverables. Thus, upon a recommendation of the Task Force Public Communication, since 2008 an expert was given a full-time position and a budget for a public communication strategy. The latter is a subject of prior agreement at the Advisory Council. Further, throughout the period under study, specific tasks were transferred to the professional staff, e.g. technical writing of the reports or commissioning of the studies in order to obtain the data.

With respect to the *coordination* between the various bodies within the ZEP, the Advisory Council presents the central unit which determines the activities of other units. On the other hand, the analysis of the minutes shows that the Commission poses specific requirements on the Advisory Council. First, it demands that the membership of the Advisory Council encompasses a broad variety of stakeholders representing different nationalities and fields of expertise and requires high-level representation of the members [ZEP, 2005a, 4, ZEP, 2007a, 6]. Second, the Commission calls for the stakeholders to arrive at the consensus regarding their policy recommendations or feedback to Commission's policy proposals [ZEP, 2005b, 4]. This confirms with the results of previous research which claim that the state actors can incentivize the formation of the groups and influence the composition of the groups (see section IV.2.4). The latter corresponds with the preference of the state actors to interact with the groups which represent a broad variety of aggregated interests. Regarding ZEP, the Commission initiated its formation, initially subsidized the ZEP Secretariat, and influenced the composition of ZEP by persisting on broad variation of sector-specific and country-specific interests.

Summary Box 15

ZEP can be considered as less complex as it has a limited region-specific diversity of the membership. The ZEP can be considered as highly organized.

The intra-organizational structure and management strategies applied by the Advisory Council and its bodies (ACEC, Coordination Group, task forces) are directed toward the optimization of the exchange relations with the main target group – the Commission:

- *centralized control of all units via the Advisory Council (coordination),*
- *regular meetings of the Advisory Council (usually four times a year),*
- *members' selection procedure and required continuity of representation of the Advisory Council members by the same individuals,*
- *possibility for efficient ad-hoc decision-making in a smaller group (ACEC),*
- *regular participation of the Commission members in the meetings of the Advisory Council, and*
- *work proceeding in smaller singular issue-specific hierarchically ordered subunits.*

Against the background of the administrative interest mediation approach, the high level of the internal organization can be interpreted as an effort to fulfil the demands of the logic of membership on the organized complexity thus releasing the resources needed for the effective exertion of political influence.

Autonomy

Regarding the resource *finances*, during the time period under study the funding for the employed professional staff was provided by the members of the Advisory Council on a voluntary basis. With respect to the resources *labor* and *information*, the ability to give away the responsibility for the formulation of the work deliverables to the external professional staff is limited due to the nature of ZEP as the advisory body to the Commission.

It is a central feature of the organizational design of the ZEP that its members serve in personal capacity by providing the resources *information* and *labor* with a purpose of reaching a consensus on the issues relevant for CCS policy formulation on the European and national levels. The professional staff is employed to carry out the administrative functions. Besides, the responsibility for the dissemination and communication strategy was transferred to an employed expert. Both fields of activities – administration and communication to general public – do not belong to the “core” business of the ZEP which covers the provision of recommendations to the Commission and to the member states. The interaction with other European or international organizations takes place with the purpose of information-sharing and dissemination of the output of the ZEP. However, the international cooperation does not contribute resources (labor, finances, information) to the production of the work deliverables.

The *decision-making* procedure stated in the bylaws is consensus [ZEP, 2009d, section 3.2.8]. In case the consensus cannot be reached, the Chairman of the ZEP can call a voting whereas the decisions are taken by a simple majority [ibid]. The analysis of the minutes indicates that voting is a usual element in the meetings of the Advisory Council. The members of the Advisory Council vote on the acceptance of all work deliverables produced by the Coordination Group, task forces, individual Advisory Council members, and professional staff. The voting is also often applied with respect to the membership issues.

The Commission presents the main *target group for the work deliverables* of ZEP. The communication strategy adopted in 2008 shows an effort to disseminate the activities of the ZEP in the international forums, e.g. at the UNFCCC Conference of the Party meetings in Poznań, Poland (2008), and Cancun, Mexico (2010), as well as in the CSLF, and GCCSI meetings. However, the major communication activities such as the yearly General Assembly are primarily directed at the European audience – the member states, stakeholders, and the EU bodies. The predominant type of output produced by the Advisory Council is the papers containing the recommendations for CCS-related policies or views on the policy proposals formulated by the Commission. Thus, the latter can be considered as the main target group for the outputs of the ZEP.

As the ultimate goal of both ZEP and the Commission is to enable the commercial availability of CCS by 2020, the European policy development and technology demonstration program must be accompanied by a corresponding action at the level of the member states. Therefore, the member states were identified by the members of the Advisory Council as a further important target group for the output. Although it is a primary task of the ZEP Government Group to facilitate the dialogue between the member states and the Advisory Council, the analysis of the minutes shows that the Government Group is not actively involved in the dissemination of the messages produced by the ZEP. Although there is a lot of information-sharing on the various approaches taken by the members of the Advisory Council and the Commission, the analysis did not show a consistent strategy to address the member states.

From the analysis of the minutes it is possible to conclude that the main *selective good* available to the members of the Advisory Council is their access to the Commission and a possibility to impact its decisions. The membership in ZEP has an exclusive character and provides a rationale for the members to contribute actively to the production of the work deliverables. The exclusive character of the membership draws not only from the limited possibilities to become a member of the group. There is also an option to be withdrawn as a member. In the beginning of the activities of the Advisory Council, after having consulted the Commission, several members were removed from the membership for their absence in the meetings.

Summary Box 16

The resource autonomy of ZEP is low as the contribution of the resources finances, labor, and information to the production of the work deliverables mostly depends on the members.

The level of the strategic autonomy of the ZEP is difficult to be clearly defined. On the one hand, the majority decision-making procedure allows rejecting short-term particular interests of the members in favor of strategic planning. The access to the Commission as the main target group for the work deliverables presents a powerful selective good. On the other hand, the strongly limited scope of the target groups presents a source of vulnerability in the middle- and long-term.

VI.3 Implementing Agreements of the International Energy Agency

Both IEAGHG and the Clean Coal Centre belong to the multilateral technology initiatives also known as the Implementing Agreements under the IEA [IEA, 2003]. The IEA is an autonomous Agency of the Organisation for Economic Co-operation and Development (OECD). The IEA was established in 1974 in response to the international oil crisis of 1973-1974. The initial focus of the IEA was on the development of the measures in cases of oil supply emergencies. Then the mandate of the Agency was broadened to include aspects of energy policy-making such as energy security, economic development and environmental protection [IEA, 2011]. The global character of the current energy policy challenges led to the development of the framework of the Implementing Agreements which enables cooperation not only between the OECD member but also non-member countries [cf Justus & Philibert, 2005, 15].

An Implementing Agreement is a contractual relationship established by at least two IEA member countries and approved by the Committee on Energy Research and Technology (CERT) as well as by the IEA Governing Board, for the purpose related to the development and deployment of energy technologies [IEA, 2003]. As of January 2011, the IEA counted more than 40 Implementing Agreements addressing various energy technology-related activities in five areas – end-use technologies, cross-cutting agreements, fossil fuels, fusion power, and renewable energy technologies.¹¹⁹

Although the IEA does not have a member status in the Implementing Agreements and also does not finance their activities, the Implementing Agreements are subject of the IEA hierarchies and sets of rules. The IEA Framework for the Implementing Agreements [IEA, 2003] has implications for the organizational development of the TOA in focus. First, the Framework can impact the diversity of the represented actors as it lays down a limited decision-making ability of the Implementing Agreements regarding the admission of the specific categories of the members [ibid, Article 3]. The membership in the Implementing

¹¹⁹ For an overview of the IEA Implementing Agreements see [IEA, 2012].

Agreements is eligible to the governments of the OECD member and non-member countries; the European Communities; international organizations; entities representing the governments of the OECD member and non-member countries or the European Communities; entities of the OECD member or non-member countries that are not designated by the government; as well as non-intergovernmental international entities. However, except for the governments of the OECD member countries, the European Communities and their representatives, the membership of any other entity requires a prior approval by the CERT¹²⁰ and, if sensitive membership issues are concerned, by the Governing Board¹²¹ [ibid]. Further IEA body which can become involved with regard to the membership admission is the Office of Legal Counsel (OLC)¹²².

Second, the framework of the Implementing Agreement has implications for the intra-organizational complexity as it prescribes specific members' categories and allows for a formulation of the hierarchy relations between them. The membership in the Implementing Agreement is divided into two categories – Contracting Party and Sponsor. The status of the Contracting Party is reserved to the governments, the European Communities, and their representatives, as well as to the international organizations. The Sponsor status covers the entities not designated by the governments and non-intergovernmental international entities. The IEA Framework states that each Implementing Agreement may rule the power relations within the membership by allocating different voting rights to Contracting Parties from the OECD non-member countries, international organizations or to Sponsors [IEA, 2007a, 24f]. These could be granted less or no voting rights [ibid]. However, no Contracting Party from an OECD non-member country, international organization or a Sponsor can have greater rights or benefits than the Contracting Parties from the OECD member countries [ibid, 14]. Further, Sponsors may not become a Chair or Vice- Chair of an Implementing Agreement [IEA, 2003, 15]. The Framework also prescribes each Implementing Agreement to have an Executive Committee which consists of the representatives of the participants of the particular Implementing Agreement and acts as its main decision-making body. An Implementing Agreement may designate an Operating Agent (also a Program Manager) – a legal entity to carry out the operational management functions of the Program.

Third, the Framework outlines two types of financing mechanisms for the Implementing Agreements – cost-sharing and task-sharing. A cost-sharing type of international cooperation requires from the participants to pay into a common fund which serves as a budget for a contractor to perform research tasks [ibid 343, cf also IEA, 2003, 5]. A task-sharing form of

¹²⁰ The CERT is one of the IEA Standing Committees responsible for the formulation, implementation and monitoring of the IEA's R&D program [IEA, 2007a, II]. It was established by the IEA Governing Board in 1975 to encourage the cooperation in energy technology research between the IEA member countries. The CERT approves the participation of the OECD non-member countries or international organizations that have never before been member of an Implementing Agreement and the participation of the Sponsors [IEA, 2007a, 41f].

¹²¹ The IEA Governing Board is the top-most decision-making body within the IEA architecture. It consists of the ministers or their delegates from each member country [IEA, 2007a, II].

¹²² The OLC provides legal advice to the Implementing Agreements during all phases of the IA operation – foundation, oversight, amendment and closure [IEA, 2007a, 35].

international cooperation implies that the participants pursue a common project while each country assigns the resources and personnel for carrying out their share of the work [ibid, 343, IEA, 2003, 5]. As each Implementing Agreement is free to decide on the type of the financing mechanism, in this context there is no direct effect on the resource autonomy. However, the Framework can have implications on the resource autonomy via the admission of the Contracting Parties and Sponsors as they usually have varying levels of subscription fees.

Finally, due to the integration of the Implementing Agreements in the IEA architecture, various IEA bodies can have influence on the resource and strategic autonomy. Initially, all new Implementing Agreements must be approved by the Governing Board [IEA, 2007a, 41]. During its operation, each Implementing Agreement reports to the Working Party¹²³ which covers a specific issue-area. The Working Parties report to the CERT and the CERT to the Governing Board [IEA, 2007a, 2]. The CERT and its Working Parties regularly review the activities of the Implementing Agreements using an agreed set of evaluation criteria and decide on the extension of the Agreement [ibid, 8]. The reviews are generally carried out every five years. One of the evaluation criteria is the alignment of the research program of the Implementing Agreement with the strategy of the Working Party responsible for its activities, and the strategy of the CERT.

With respect to the information- and labor-sharing, the IEA Secretariat provides a Desk Officer to each Implementing Agreement who is in charge of the liaison between the IEA bodies and the Implementing Agreement. The Desk Officer participates in the meetings of the Implementing Agreement, informs the IEA Secretariat about its activities, advises the Implementing Agreement on the IEA activities and policies, coordinates the activities of the Implementing Agreements within the work of the CERT and of the Working Parties, and encourages collaborations between the IEA bodies and Implementing Agreements, e.g. publications or workshops [IEA, 2007a, 34f].

Regarding the decision-making, the Implementing Agreements are liable to a set of rules. Next to the Terms of Reference of the particular Implementing Agreement signed by its participants and the decisions of the Executive Committee which acts as a main decision-making body, the Implementing Agreements are subject of the IEA Framework and the decisions taken by the Governing Board and the CERT [IEA, 2007a, 4].

VI.3.1 IEA Greenhouse Gas R&D Programme

IEAGHG is an international collaborative research program established in 1991. The initial focus of the Program was on CCS applied to the coal- and natural gas-fired power plants [cf Philibert & Podkanski, 2005, 12]. Since then, the activities have been broadened to include

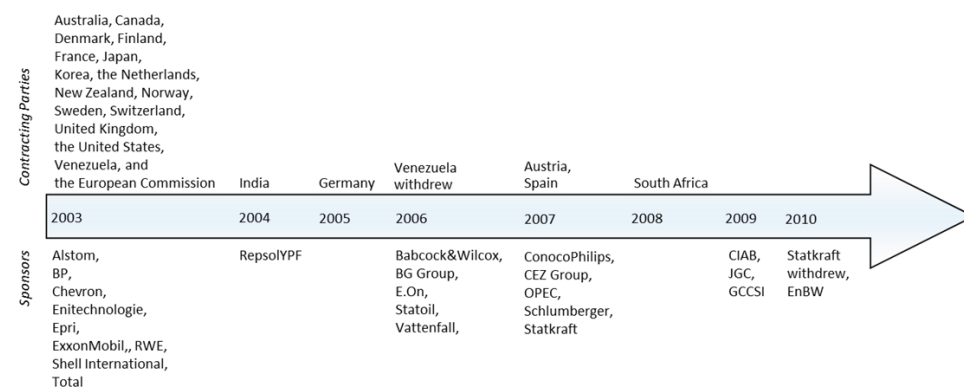
¹²³ The Working Parties are the subunits within the CERT established to carry out activities on specific energy technologies in four areas - end-use technologies, fossil fuels, fusion power, and renewable energy technologies.

other energy technology options for GHG mitigation [ibid]. The aim of the Program is to evaluate technologies aimed at the reduction of GHG from the use of fossil fuels [IEAGHG, 2010a]. The focus of the activities of the Program encompasses technology evaluation and knowledge dissemination, facilitation of the international collaborative research and demonstration of potential technological solutions, as well as facilitation of the deployment efforts [cf IEAGHG, 2010a].

Organized complexity

As of January 2011, the IEAGHG membership consisted of 21 Contracting Parties and 21 Sponsors. The Contracting Parties included 19 member countries, the Commission, and the Organization of Petroleum Exporting Countries (OPEC). As of January 2011, the IEAGHG had the largest *number of members* among the Implementing Agreements in the field of Fossil Fuels [cf IEA, 2010, 84]. The IEAGHG membership can be also evaluated as large, if compared to the average of circa 14 members considered on the basis of all Implementing Agreements.¹²⁴ The IEAGHG grew in size since 2006 mostly due to the increase in the number of Sponsors (cf Figure 11). Figure 11 shows the development of the membership during the period under study.

Figure 11: IEAGHG membership development from 2003 to 2010



Source: author, source of data: IEAGHG minutes

The membership of the IEAGHG is eligible to the OECD member and non-member countries and companies that have an interest in developing and deploying technological options for GHG mitigation [cf IEAGHG, 2010b]. The Terms of Reference of the IEAGHG do not specify

¹²⁴ Source of data: [IEA, 2010, 79-86].

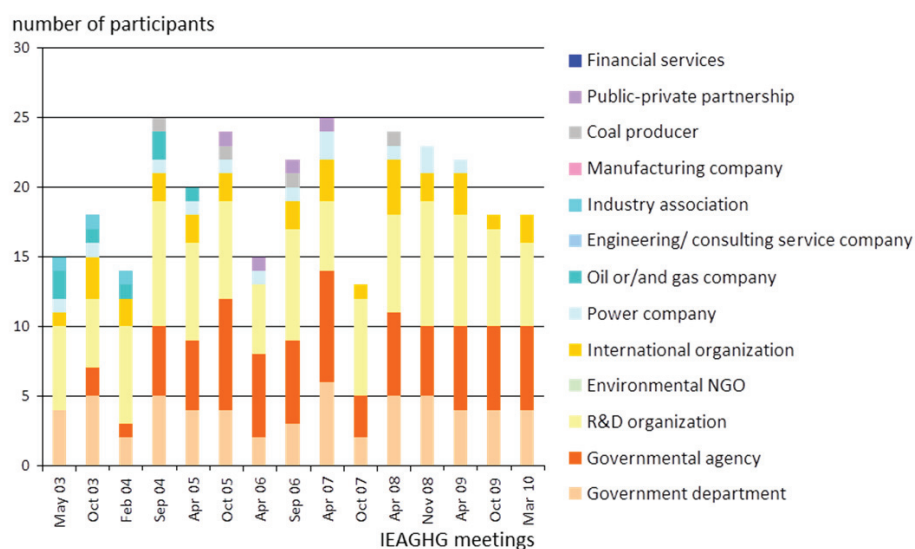
any requirements regarding the *status of the participants* representing the IEAGHG members [cf IEA, 2005a]. The diversity of actors participating in the work of the IEAGHG can be structured along the sector-specific and the region-specific aspects of the diversity.

During the period under study, the *sector-specific pattern* of the Contracting Parties can be considered as heterogeneous until 2008 which marks a decline in a diversity of the delegates (Figure 12). In contrast, the pattern of the IEAGHG sponsorship can be considered as not heterogeneous. It shows a dominant share of the participants which represent the oil and gas industry (Figure 13). As a whole, the membership of the IEAGHG can be considered as heterogeneous during the time period under study. It encompassed the representatives from the government departments and agencies, academia, international organizations, power, oil and / or gas, and manufacturing companies, industry associations, coal producers, and public-private partnerships (cf Figures 12-13).

Although it is a general IEAGHG policy to encourage broad and diverse membership, the Contracting Parties highlighted the growing share of the Sponsors and the need to maintain the balance between the Contracting Parties and Sponsors [IEAGHG, 2010c, 6, 9f]. Further, the OLC required that both Implementing Agreements – the IEAGHG and the Clean Coal Centre – convert those Sponsors that are represented by the state-owned entities to the status of the Contracting Parties. Both Implementing Agreements encouraged by the Executive Committees argued in favor of a broader interpretation of the definition of the category “Sponsor” which would support the existing arrangement [IEAGHG, 2009a, 4, Clean Coal Centre, 2009, 4f]. The dispute between the OLC and the Implementing Agreements concerned was decided by the CERT in favor of the IEAGHG and Clean Coal Centre. Both Implementing Agreements may decide on the admission of Sponsors on case-by-case basis [IEAGHG, 2010c, 6].

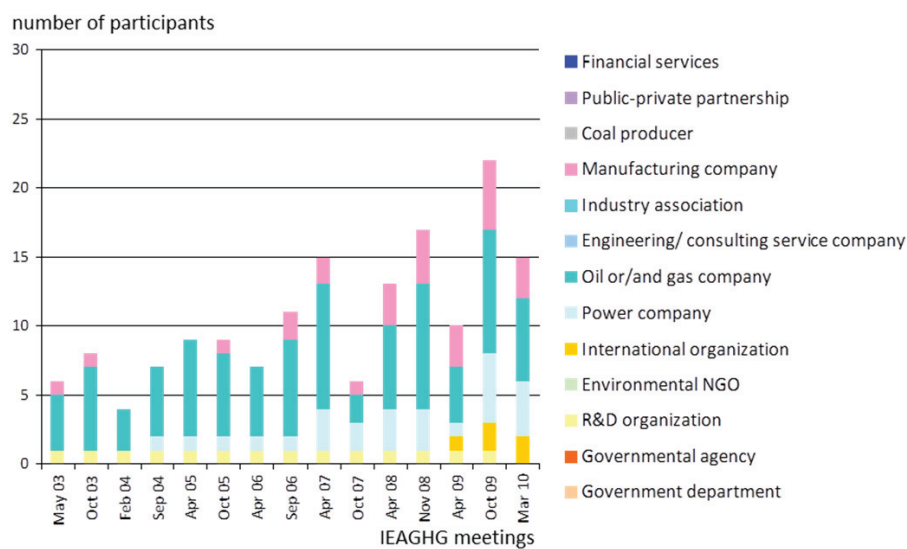
The diversity of the actors represented in the IEAGHG can be also captured in the growing number of observers which attend the meetings. Although “observer” is not a category of participants that is recognized by the IEA Framework and the IEA Secretariat discourages long-term “observers” or “attendees” [IEA, 2007a, 19], the analysis of the minutes shows that this category is an institutionalized form of participation in the IEAGHG meetings. Usually the number of observers from a particular country which hosts the Executive Committee meeting tends to be higher whereas it is also possible to identify the long-term observers. The analysis did not show a particular pattern of sector-specific or region-specific diversity of the IEAGHG observers.

Figure 12: IEAGHG Contracting Parties' delegates breakdown, 2003-2010



Source: author, source of data: IEAGHG minutes

Figure 13: IEAGHG Sponsors breakdown, 2003-2010



Source: author, source of data: IEAGHG minutes

With respect to the *region-specific aspect* of the variety of actors represented in the IEAGHG, the criteria for the admission of the potential Contracting Parties do not differ from the general IEA Framework. However, there is a difference regarding the admission of the Sponsors. In contrast to the IEA Framework which allows the private entities from both the OECD member and non-member countries to become a Sponsor [IEA, 2003, section 3.3, IEA, 2007a, 20], the IEAGHG Terms of Reference invites only the entities from the OECD member countries to join the Program as a Sponsor [IEA, 1991, 18].¹²⁵ Nevertheless, the organizational solutions, e.g. de-rated subscription fees [IEAGHG, 2006b, 4], have been sought to attract the participation of the emerging economies in the Program. However, from 21 Contracting Parties, only India, South Africa, and the international organization OPEC represent the OECD non-member countries. Thus, it can be concluded that at the time of publication, the IEAGHG is less heterogeneous from the region-specific perspective.

The *common interest* which unites the members of the IEAGHG is reflected in the documents which identify the work program and strategic direction for the so-called *phases*. The Phase 4 of the Program continued from 2000-2004. The period under study covers mostly the Phase 5 which began in 2005 and was extended until March 2011.

The main decision-making body within the *intra-organizational structure* of the IEAGHG is the Executive Committee which consists of three *member categories* – Contracting Parties, Sponsors, and observers, whereas only the first two categories have a right to vote. Compared to the CSLF and the ZEP which have an internal division of labor which corresponds with the various members' categories, the classification into Contracting Parties and Sponsors prescribed by the IEA Framework does not result in a differentiation in terms of the activities performed.

The IEAGHG employs *professional staff* in form of the Operating Agent. The Operating Agent is a legal entity which provides a General Manager, permanent staff that composes the technical studies and contributes to other work deliverables of the Program, and staff that fulfills the administrative functions. Within the organizational structure of the Operating Agent there is a clear hierarchy as the staff reports to the General Manager whereas the General Manager reports to the Executive Committee. For instance, the General Manager reports regularly on the progress of the studies and the budget issues.

The particular interests within the IEAGHG are represented in the *specific issue-oriented subunits* which are outlined below (Table 18). These are the international research networks which act as task-sharing agreements¹²⁶ and report to the Executive Committee. The main results of the activities carried out within the networks are summarized by the IEAGHG staff and made accessible to the Executive Committee members. Table 18 shows that the particular interests represented within the IEAGHG rather structure themselves along the CCS process chain than according to the specific interests reflecting the cooperation

¹²⁵ The data collected during the expert interviews indicates that this provision is going to be revised.

¹²⁶ For a definition of the task-sharing agreement see page 141f.

between the OECD member and non-member countries. The issue-specific focus of the networks supports the suggestion that the variety of particular interests represented at the IEAGHG has a sector-specific and not the region-specific character.

Table 18: IEAGHG international research networks (as of January 2011)

Research Network	Focus
Biofixation	Ran for five years, in 2009 closed its activities.
CO ₂ Capture Network	The focus is on capture of CO ₂ using regenerable solvent-based scrubbing systems that have the ability to remove CO ₂ from emissions, although use of membranes and solid sorbents are increasingly being considered.
Monitoring Network	Inauguration in 2004, monitoring CO ₂ injected into geological formations
Oxy-Fuel Combustion Network	Techno-economic feasibility of oxyfueling as a carbon capture option for a power plant in the near future.
Risk Assessment Network	In order to gain public acceptance of CO ₂ capture and storage, two key areas would need to be demonstrated: that the technology is safe and that its environmental impact is limited.
Wellbore Integrity Network	The aim of the network is to further the understanding of the issue of wellbore integrity in general and begin to attempt to develop answers to the main issues and problems identified.
Joint Network Meeting	This Joint Network coordinates the work of three other Networks: Monitoring, Risk Assessment and Wellbore Integrity.
Modeling network	Initial workshop to gauge support for the formation of a modeling network.
High Temperature Solid Looping Cycles Network	The aim of the network is to promote further development and scale-up of processes for CO ₂ capture which involve solid looping cycles operating at elevated temperatures.
Social research network	The major aim of the C2S2RN was: to foster the conduct and dissemination of social science research related to CCS in order to improve understanding of public concerns as well as improve the understanding of the processes required for deploying CCS projects. IEAGHG will utilize its expertise to provide support for this Social Research Network. This support is part of an agreement with GCCSI in Australia. IEAGHG will work with social science researchers from Australia, Europe, United States, Japan and elsewhere to facilitate the sharing of research knowledge and experiences on public perception, engagement and communication around CCS and CCS projects.
Environmental Impacts of Post Combustion Capture	The major topics are to quantify amount and composition of solvent and degradation products in the cleaned flue gas, to understand the atmospheric fate and degradation of these substances and to assess the final impact on the environment. Additional important topics are technical initiatives for reducing the level of solvent and degradation products in the cleaned flue gas.
Related Networks	CO ₂ GeoNet, CO ₂ NET, EuroGeoSurveys, eurogif

Source: author, data cited from [IEAGHG, 2010d]

With respect to the dimension *coordination*, the analysis shows that the Executive Committee acts as a central unit which determines and monitors the activities of other units – professional staff and specific issue-oriented subunits (research networks). However, regarding specific issues such as the membership approval of the entities from the OECD non-member countries, the Executive Committee is dependent on the decisions by the CERT and the OLC.

Summary Box 17

The IEAGHG can be considered as complex due to the large number of members and the large variety of represented interests. The IEAGHG can also be considered as organized due to the internal functional and issue-specific differentiation and coordination via the Executive Committee.

Autonomy

The IEAGHG is a cost-sharing agreement. It means that the main source of *funding* for the IEAGHG activities are the membership fees paid into a common fund. The subscription fees are linked to the level of the GHG emissions of the country [IEAGHG, 2006a, 3] whereas the emerging economies are granted a lower subscription fee depending on the level of the GDP per person. In contrast, the research networks coordinated by the IEAGHG are task-sharing agreements. They are paid by the members of the network.

The analysis of the minutes shows that although several IEAGHG activities were financed by the entities other than the membership (see below) and further alternative sources of financial support are potentially available, during the period under study the members of the Executive Committee did not pursue a strategy of attracting additional sources to finance the IEAGHG activities. The analysis of the minutes does not indicate that the decision to offer the technical reports for purchase after a certain period of time was justified by the search for an additional source of income. Rather, this decision can be interpreted as an element of the strategy aimed at supporting the dissemination activities [IEAGHG, 2004b, 7, IEAGHG, 2005b, 5, 12].

The funding, alternative to the members' fees, usually results from the reimbursements to the IEAGHG professional staff for conducting or reviewing studies by other international organizations, governmental agencies or companies [e.g. IEAGHG, 2009a, 8f, IEAGHG, 2004b, 3]. However, the final decision on the involvement of the IEAGHG staff is met by the Executive Committee. Further alternative sources of funding are the incomes that result from the regular conference series *International Conference on Greenhouse Gas Control Technologies (GHGT)* [IEAGHG, 2009a, 7] and small fees provided by the publishing house for the successful running of *The International Journal of Greenhouse Gas Control* journal [IEAGHG, 2007b, 6]. On the basis of the analysis it can be interpreted that the additional sources of funding increase the autonomy of the professional staff as it gives the Operating

Agent more room to suggest and pursue particular activities [IEAGHG, 2009a, 7]. However, the analysis of the minutes does not show that the increased autonomy of the professional staff leads to the shifts in decision-making authority between the Operating Agent and the Executive Committee. However, the relative autonomy of the Operating Agent is an important development in the organizational structure of the IEAGHG as it allows the professional staff to pursue the production of work deliverables which reflect the strategic considerations as opposed to the short-term needs of the membership.

The main contribution to the work deliverables of the Program is made by the professional staff or by the contractors. The members contribute to the resource *labor* by commenting on the draft reports, reviewing the final versions, and disseminating the results in their own countries. The contribution by the membership should not be underestimated as it is this feedback from the CCS community which constitutes the exclusive character of the IEAGHG technical studies.

Regarding the resource *information*, it has been provided from the various sources on a routine and long-term basis. First, regarding the professional staff, the Program emphasized the importance of the permanent staff as opposed to temporary staff with the purpose of keeping the knowledge “in-house” [IEAGHG, 2004a, 9]. Second, the members provide information on specific activities and programs carried out in their countries or companies. Third, the IEAGHG is very active with respect to the information and sometimes labor-sharing with other international organizations. Thus, the IEAGHG professional staff and members contributed to the Special Report on CCS released by the IPCC in 2005 [IPCC, 2005]. The contribution encompassed the personnel effort and providing the IPCC with the technical studies conducted by the IEAGHG. As the IEAGHG and the Clean Coal Centre have the same Operating Agent, it allows the institutionalization of the information-sharing and coordination of activities between both Implementing Agreements. Similar processes can be recorded with regard to the cooperation with other major international organization in the field of CCS. For instance, in 2009, the IEAGHG became a founding member of the GCCSI. In 2007, the IEAGHG formalized its cooperation with the CSLF by becoming the member of the Technical Group and the PIRT [IEAGHG, 2007b, 8].

Based on the analysis of the minutes, it can be suggested that the main rationale for the active networking is not a search for the additional funding but the effort of increasing the visibility of the Program and disseminating the results of the activities among the new target groups.

The *decision-making* procedure stated in the IEAGHG Terms of Reference allows both the majority voting and unanimous agreement whereas unanimity is applied in cases not specified by the Terms of Reference [IEA, 2005a, 9]. With regard to the daily business of the IEAGHG, the analysis shows that the issues concerning the operation of the IEAGHG, e.g. the adoption of the minutes or the budget, require unanimous decision [IEA, 1991, 9]. Concerning the choice of the topics for the technical studies – the main work deliverable of

the Program – the majority vote is applied. Both the Sponsors and the Contracting Parties represented in the Executive Committee have a single vote at the meetings [ibid].

The characteristic feature of the IEAGHG is the production of the *selective goods*. On the one hand, those justify the membership fees and labor input by the members. On the other hand, according to the administrative interest mediation approach, the focus on the production of selective goods makes the organization less influential as it impedes the dissemination activities and the development of the new target groups. With regard to the selective goods, the only channel for the dissemination of the results of the studies produced by the IEAGHG is the membership. As the status of the participants representing the members in the IEAGHG (unit of representation) is not defined by the background documents, the results of the studies carried out by the IEAGHG may not reach the decision-makers in position to shape the policy in a given area [cf IEAGHG, 2005a, 10f]. In this situation, the influence of the IEAGHG on the state authorities may become limited or non-existent.

The analysis shows that during the Phase 5, the *dissemination activities* of the IEAGHG received special attention. Those may be structured according to three strategies:

- communication of the results of the activities to the policy-makers;
- development of new types of work deliverables, and
- accessing new target groups and attracting new members.

According to the first strategy, the IEAGHG pursues regular cooperation with the IEA Secretariat. This cooperation can be understood as the exchange relations. The IEA provides the access to the policy-makers, in turn the IEAGHG offers the expertise and labor by providing the results of the IEAGHG studies, reviewing the IEA publications, and participating in the events organized by the IEA. Further, because of the high visibility of the IPCC Special Report on CCS, the IEAGHG involvement in the production of the report can be considered as communication to the policy-makers.

The second and the third strategies are interlinked. Since the Phase 5, the IEAGHG attempts to attract new members and access new target groups for the Program's output by pursuing or expanding the following activities:

- publishing summaries of the reports (new type of work deliverables),
- offering the reports for selling to the non-members (new target groups),
- establishing and running a journal *The International Journal of Greenhouse Gas Control* (new type of work deliverables),
- organizing a biennial *International Conference on Greenhouse Gas Control Technologies*¹²⁷ (new target groups), and
- establishing and running an annual students summer school (new target group).

¹²⁷ The GHGT-10 in 2010 attracted over 1500 delegates from 55 countries [GHGT, 2011].

Summary Box 18

The assessment of the resource autonomy of the IEAGHG is difficult to be clearly defined. On the one hand, the IEAGHG is not dependent on labor provided by the membership as the main source of labor is the professional staff. Further, there are various sources of information at the disposal of the Program – from permanent professional staff to membership contributions and information gained from networking with other organizations. On the other hand, the main source of funding is provided by the membership. Moreover, the Executive Committee has a decision-making authority with regard to the additional sources of funding. It can be suggested that the resource autonomy of the IEAGHG is growing although the Program still mainly relies on the contributions from the membership.

The strategic autonomy of the IEAGHG can be estimated as high. The characteristic feature of the Phase 5 of the Program is to expand the types of outputs and the variety of target groups. The decision-making procedure is majority. The provision of the members with the selective goods makes the membership attractive.

VI.3.2 Clean Coal Centre

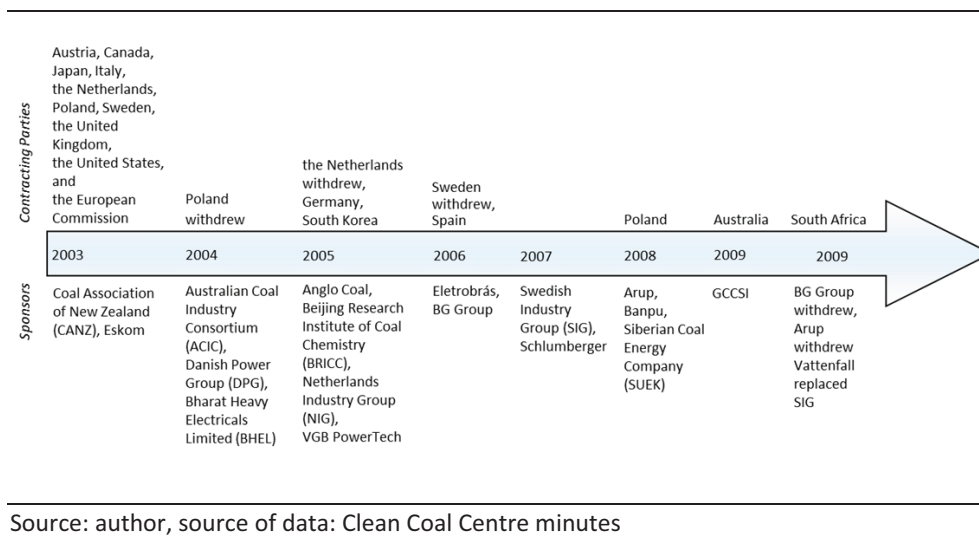
The IEA Clean Coal Centre has its origins back to 1975 when four separate services - the Coal Technical Information Service, the World Resources and Reserves Data Bank Service, the Mining Technology Clearing House Service and the Economic Assessment Service - have been established within the IEA [IEA, 2005b, 4, Clean Coal Centre, 2010]. At the same year, each of the services has been given the status of the Implementing Agreement [IEA, 2005b, 4]. In 1982, the IEA Governing Board unified the services into one Implementing Agreement which from then on has been known as the IEA Coal Research and operated under the Terms of Reference agreed in the Executive Committee [ibid]. In 2002, the Program was renamed into the "Implementing Agreement for the IEA Clean Coal Centre" [ibid].

From the very beginning, the Program was managed by the Operating Agent which provided services and staff under the terms of the Implementing Agreement. The main focus of the Program has shifted from the mapping of the worlds' coalfields, mining techniques and conventional power generation systems analysis to the controls of NO_x, SO_x and particulates, and recently to the advanced high temperature systems incorporating carbon capture [Clean Coal Centre, 2010]. The current focus of the activities encompasses all issues arising from the research, development, and use of clean coal technologies as well as coal-related CO₂ capture [Clean Coal Centre, 2009].

Organized complexity

As of January 2011, the Clean Coal Centre Executive Committee encompassed 13 Contracting Parties including the Commission and 13 Sponsors. All Contracting Parties with the exception of South Africa belonged to the OECD member countries and the majority of the Sponsors to the OECD non-member countries. The *number of Clean Coal Centre members* can be considered as large.¹²⁸

Figure 14: Clean Coal Centre membership development from 2003 to 2010



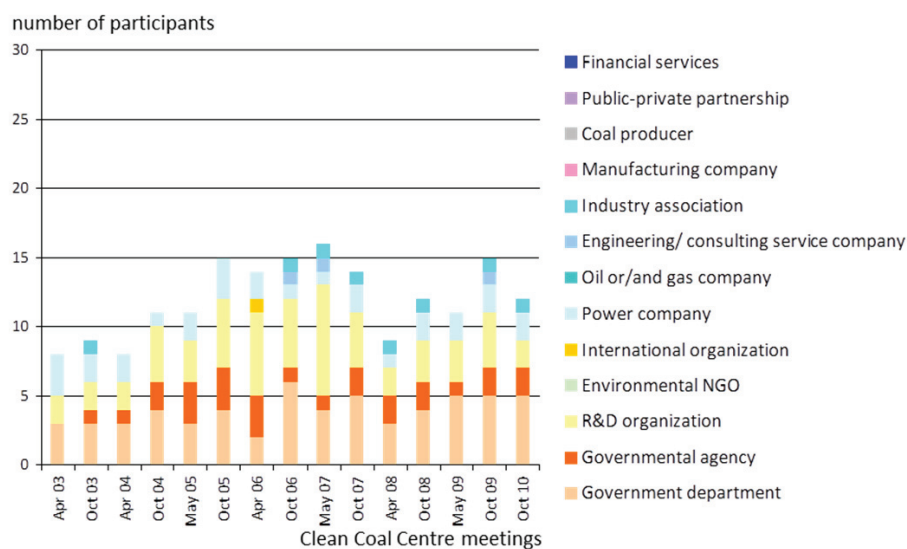
Source: author, source of data: Clean Coal Centre minutes

The membership is open to the OECD member and non-member countries, companies, international organizations, and non-intergovernmental organizations upon the invitation of the Executive Committee [IEA, 2005b, 13]. The Clean Coal Centre Terms of Reference do not determine the *status of the individuals representing the members* [IEA, 2005b].

Similar to the IEAGHG, the classification of the members into Contracting Parties and Sponsors prescribed by the IEA Framework does not result in a differentiation of the activities performed by the member categories. Also, it is eligible to participate in the work of the Clean Coal Centre as an observer whereas only the Contracting Parties and Sponsors have a right to vote. The *variety of actors* represented in the Clean Coal Centre has the sector-specific and region-specific dimensions. The *sector-specific pattern* of the delegates that represent the Contracting Parties can be considered as less heterogeneous. Two large shares of the participants are composed of the delegates affiliated with the government departments or R&D organizations (Figure 15).

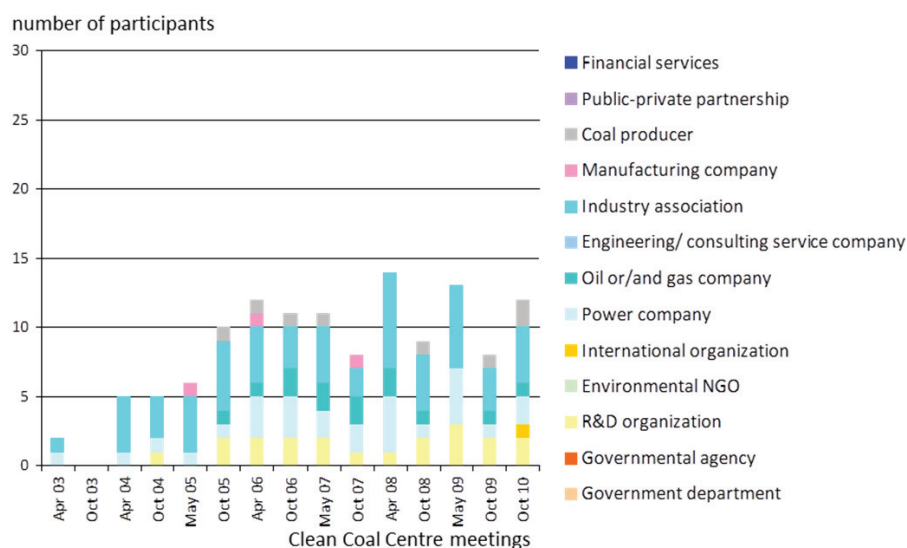
¹²⁸ The average number of members ranging from the existing Implementing Agreements is ca. 14 members, cf page 143.

Figure 15: Clean Coal Centre Contracting Parties' delegates breakdown, 2003-2010



Source: author, source of data: Clean Coal Centre minutes

Figure 16: Clean Coal Centre Sponsors breakdown, 2003-2010



Source: author, source of data: Clean Coal Centre minutes

The characteristic feature of the pattern of Sponsors is the share of the participants that represent the industry associations, mainly from power generating and coal producing industries. The pattern of Sponsors can also be considered as less heterogeneous.

In total, since 2005 the pattern of the Clean Coal Centre members' representatives can be described as heterogeneous. It has encompassed the representatives from the government departments and agencies, academia, power, manufacturing, engineering / consulting service, and oil and / or gas companies, industry associations, international organization, and coal producers.

Further, all Contracting Parties with the exception of South Africa, belong to the OECD-member countries whereas six out of thirteen Sponsors have the OECD non-member country origin. Against this background, the membership of the Clean Coal Centre can be considered as heterogeneous from the *region-specific perspective*.

Although the growing number of members is in line with the Clean Coal Centre strategy to broaden the scope of participants by attracting the emerging economies which strongly rely on coal, occasionally such strategy resulted in an imbalance between the Contracting parties and Sponsors in favor of the latter category. Such development is due to the funding mechanisms underlying the Clean Coal Centre. All Sponsors pay fixed amount of money which is less than the subscription fees paid by the Contracting Parties [Clean Coal Centre, 2006, 7f]. In contrast to the Contracting Parties, the Sponsors cannot become Chair or Vice-Chairs of the Program and their participation requires approval by the CERT. In return, the Sponsor status gives access to all selective goods produced by the Clean Coal Centre and a right to vote in a selection procedure for the technical studies. Against the background of these options, several emerging economies acquired a Sponsor status. The resulting imbalance in favor of the Sponsors led to the discussions about the interpretation of the definition of the Sponsor category underlying the IEA Framework [Clean Coal Centre, 2009, 4f]. Further, the Contracting Parties represented in the Executive Committee argued against the growing number of the Sponsors because of the threat which this arrangement poses to the results of voting for the technical studies [Clean Coal Centre, 2009, 5]. Therefore, an attempt to convert Sponsors to Contracting Parties was pursued by the Operating Agent which is still an ongoing process. The discussion shows the limitations of the strategy of applying different membership categories in order to broaden the diversity of represented actors by attracting the participants from the OECD non-member countries.

The Clean Coal Centre and the IEAGHG share the Operating Agent. However, both Programs have different General Managers and different permanent staff teams. Same as regarding the IEAGHG, the Operating Agent to the Clean Coal Centre provides *professional staff* which composes the technical studies and contributes to other work deliverables of the Program, and staff which fulfills administrative functions. The Operating Agent reports to the Executive Committee on all issues resulting from the work of the Implementing Agreement including the progress of the studies and the budget issues.

In contrast to the IEAGHG, the Clean Coal Centre does not have the *specific issue-oriented subunits* in form of the research networks. The particular interests of the members are reflected in the voting results of technical studies. Further, the particular interests of the members can be pursued via:

- task-sharing in a framework of a workshops series supervised by the Clean Coal Centre staff, e.g. *Mercury Emissions from Coal* workshop Series, *Coal Science* workshop series;
- additional sponsorship or contractual arrangements, e.g. the technical study *Coal Gasification and IGCC in Europe* was sponsored by the New Energy and Industrial Technology Development Organization (NEDO), Japan [Clean Coal Centre, 2006, 3]; *Clean Coal Technology RD&D promotion and dissemination* project was sponsored by the Commission [Clean Coal Centre, 2007, 5]; *Coal Online* – a six-years effort of establishing a database on technologies of coal utilization based on the Clean Coal Centre reports was sponsored by the US DOE, the USA [Clean Coal Centre, 2008, 4].

The *coordination* between the intra-organizational subunits follows the same rules as IEAGHG. The Executive Committee acts as a central unit which determines and monitors the activities by the professional staff and the task-sharing activities which require the effort of the professional staff. For instance, the Executive Committee approves the participation of the staff in contractual arrangements and receives interim and final reports on the activities. However, regarding specific issues related to the OECD non-member countries, the Executive Committee is dependent on the membership approvals by the CERT and on the opinions by the OLC.

Summary Box 19

The Clean Coal Centre can be considered as complex on the grounds of the large number of members and heterogeneity of represented interests. The Clean Coal Centre can be considered as less organized due to the lack of issue-specific organizational differentiation in subunits.

Autonomy

The main source of *funding* is the Clean Coal Centre membership. The Clean Coal Centre policy restricts the amount of the additional income generated from the external contracts and consulting to 10% [Clean Coal Centre, 2004, 5]. Thus, the only perspective to increase the financial resources is a growth of the membership, especially with respect to Contracting Parties because they have higher subscription fees and longer contracts whereas the contracts with the Sponsors are subject of the yearly approval. The analysis of the minutes shows that the decline in subscription rates can lead to the personnel cut-backs and the reduction of the scope of work deliverables [Clean Coal Centre, 2009, 3].

On the other hand, the supply of the resources *information* and *labor* can be compared with the IEAGHG. The main source of information and labor is the professional staff. Regarding the technical studies the membership provides information on an ad-hoc basis depending on the issue in question. Further, the membership provides a regular update on the national activities or the activities of the particular companies in the coal-related fields which can be considered as a selective good due to the topicality and in-depth character of information. With respect to the inter-organizational cooperation, the strongest links exist with the CIAB¹²⁹ and the IEAGHG. Such cooperation encompasses institutionalized information exchange and occasional labor-sharing. The Clean Coal Centre is also regularly involved in cooperation with the IEA with respect to its coal-related activities also in the framework of the response to the G8 request.¹³⁰ The cooperation allows an additional source of income and dissemination of work deliverables to new target groups.

The *strategic autonomy* of the Clean Coal Centre is related to the position of coal. The SWOT-analysis carried out in 2004 evaluated the main focus of the Program on coal as strength and a threat at the same time [Clean Coal Centre, 2004, 6]. The analysis of the minutes shows that the development of the membership structure and the visibility of the Program depend on both the national positions of the state actors toward coal and the use of coal worldwide. Thus, between 2003 and 2006 several Contracting Parties quitted the Program as their national governments stopped funding coal-related activities and re-entered the Program as Sponsors. On the other hand, growing gas and oil prices since 2006 led to the growth of interest in coal. The latter resulted in the increasing interest in the activities of the Clean Coal Centre. The interest was shown in a growing number of visits to the CCC website and a growing number of requests to undertake consultancy work. As the Clean Coal Centre depends on a stability or even growth of the membership, those fluctuations induced by the environment limit the strategic capacity to act as an autonomous actor and increase the pressure to satisfy the particular needs of members. The focus on the membership limits the capacity to diversify the *target groups for the work deliverables* and the work deliverables beyond the technical reports.

The Clean Coal Centre provides its members with a range of *selective goods* which make the membership attractive. The main work deliverables of the Clean Coal Centre are the technical studies and the databases containing abstracts from coal and coal-related literature as well as numerical databases.¹³¹ Further, the heterogeneous membership and the possibility of networking offer the benefits of the membership.

Similar to the IEAGHG, the *decision-making* procedure to choose the topics for the technical studies is majority.

¹²⁹ The CIAB is an IEA body which consists of high-level executives from coal-related industry. It advises the IEA on coal-related issues by providing discussion papers and organizing workshops.

¹³⁰ See Table 17 in the section VI.1.

¹³¹ For an overview see the web page of the Clean Coal Centre.

Summary Box 20

The resource autonomy of the Clean Coal Centre is limited. The conclusion is based on the rules regarding the funding of the Program's activities. Those rules result in Program's dependence on membership funding.

The strategic autonomy can be considered as limited due to the program's focus on the membership as the most important target group for work deliverables. It limits the capacity of the program to pursue strategic action beyond the particular needs of members.

VI.4 Organizational Properties of TOA in Comparison and Individual Hypotheses

Table 19 gives an overview of the organizational properties of TOA followed by a comparative analysis. The section concludes with the development of the individual hypotheses which interlink the level of organizational development of TOA and their influence.

All TOA in focus of the study encompass a large *number of members*. With respect to the *region-specific diversity*, the CSLF and the Clean Coal Centre have an outstanding position as their membership is characterized through a significant share of the OECD non-member countries. IEAGHG can be considered as not heterogeneous from region-specific perspective. ZEP differs from other TOA as it represents only the European stakeholders. Within this scope ZEP can be considered to not have a heterogeneous membership.

Regarding the *sector-specific diversity*, all TOA can be considered to have a heterogeneous membership during the period under study. The ZEP is the only TOA with the position of the delegates (*unit of representation*) defined by the official documents. In contrast to the Implementing Agreements, the membership categories of ZEP and the CSLF are differentiated in terms of the activities performed.

Compared to other TOA in focus of the study, the Clean Coal Centre has the simplest intra-organizational design as its intra-organizational structure does not include *specific issue-oriented subunits*. Although the CSLF has a range of documents which specify the *collective interest* shared by its membership, the intra-organizational structure of the CSLF does not aggregate the particular interests in terms of the overall organizational purpose. Rather, the largest number of the specific issue-oriented subunits that characterizes the CSLF reflects the heterogeneity of the particular interests represented in this organization.

All TOA have *professional staff* which acts on behalf of the whole membership. The official documents of TOA identify the central unit which coordinates the activities of other subunits. However, the empirical analysis showed that all TOA face limitations with regard to a *centralized coordination* of the activities.

Table 19: Overview of the organizational properties of TOA

Dimensions / TOA	CSLF	ZEP Advisory Council	IEAGHG	Clean Coal Centre
organized complexity				
Number of members	25 (large)	40 (large)	42 (large)	26 (large)
Diversity of represented actors:				
<i>region-specific</i>	16 OECD members / 8 OECD non-members (heterogeneous)	European stakeholders represent 1/3 of the EU member countries (not heterogeneous)	Contracting Parties: 18 OECD members / 3 OECD non-members; Sponsors: 21 OECD members (not heterogeneous)	Contracting parties: 12 OECD members / 1 OECD non-member; Sponsors: 6 OECD members / 7 OECD non-members (heterogeneous)
<i>sector-specific</i>	10 (heterogeneous)	10 (heterogeneous)	10 (heterogeneous)	10 (heterogeneous)
Unit of representation	not defined	high-level profile	not defined	not defined
Intra-organizational complexity:				
<i>collective interest</i>	formulated	formulated	formulated	formulated
<i>membership categories</i>	Policy Group member / Technical Group member	Members of the Advisory Council, Coordination Group, ACEC, Government Group	Contracting Party / Sponsor	Contracting Party / Sponsor
<i>issue-oriented subunits</i>	18 task forces	4 task forces	12 research networks	none
<i>professional staff</i>	Secretariat which performs administrative functions and contributes to the work deliverables	Secretariat which performs administrative functions	Operating Agent which performs administrative, management functions and contributes to the work deliverables	Operating Agent which performs administrative, management functions and contributes to the work deliverables
Coordination	Policy Group	Advisory Council	Executive Committee	Executive Committee

autonomy					
Finances	voluntary contributions from the membership	voluntary contributions from the membership	formalized membership fees, additional sources	formalized membership fees, additional sources of funding limited to 10% of a budget	
Information	voluntary contributions from the membership	voluntary contributions from the membership	voluntary contributions from the membership, Operating Agent, additional sources	voluntary contributions from the membership, Operating Agent, additional sources	
Labor	voluntary contributions from the membership / Secretariat	voluntary contributions from the membership / Secretariat	Operating Agent, voluntary contributions from the membership, additional sources	Operating Agent, voluntary contributions from the membership, additional sources	
Decision-making	unanimity	majority	unanimity / majority	unanimity / majority	
Target groups	various	European Commission, member states	various	mainly membership	
Selective goods	not identified	access to the European Commission	technical studies	technical studies	

Source: author

It can be concluded that the ZEP has the highest organized complexity. The official documents of ZEP develop detailed requirements regarding the dimensions underlying the organized complexity – comprehensiveness and structure. ZEP encompasses a large variety of the interests and specifies the unit of representation. Further, the intra-organizational structures are arranged in a way to optimize the influence of the ZEP on the Commission.

In comparison to other TOA, the IEAGHG has the highest *resource autonomy* and *strategic autonomy*. It attracts the resources from various sources on a predictable basis. Concerning the strategic autonomy, the IEAGHG has diversified the work deliverables and the target groups; additional funding beyond the membership fees allows the professional staff to pursue strategic actions; the provision of the members with selective goods makes the membership attractive.

In contrast, the Clean Coal Centre is considered to have the lowest *resource and strategic autonomy*. Due to specific budget regulations, the Clean Coal Centre depends on the growth of the membership as a source of income whereas the lack of funding can result in personnel cutbacks and reduce the number of the work deliverables. The need to satisfy the demands of the membership – as the latter presents the only source of funding – limits the long-term capacity to determine goals and means of achieving them.

The *resource autonomy* of the CSLF can also be considered as low due to its dependence on the voluntary contributions of the membership regarding the provision of the resources funding, information, and labor. However, the CSLF increasingly develops strategies of turning to other “sponsoring environments” and cooperating with the international organizations to acquire additional resources. The *strategic autonomy* of the CSLF is characterized through consensus as the decision-making procedure, and the lack of the clearly defined benefits of the CSLF membership. Although consensus as decision-making procedure prevents the collective action with regard to the fulfillment of particular interests, the heterogeneity of the membership and the intra-organizational structure offer a possibility to form coalitions within the CSLF, provided there are additional resources to carry out those activities.

The formal status of the ZEP as a Technology Platform and an advisory body to the Commission results in the *specific organizational structure*. In the context of the foundation and development of the ZEP, the Commission assisted the emergence of the structures which are characterized through a high level of organized complexity and a low level of autonomy. With regard to the former, the Commission requires country- and sector-specific variety of the represented stakeholders. With regard to the latter, the Commission advocates an arrangement according to which the members serve in personal capacity and provide resources to produce the necessary work deliverables.

On the one hand, this observation confirms the ideas of Lehmbruch [1987] according to which the state actors driven by the logic of governance initiate the exchange relations and establish their rules. On the other hand, following the logic of the administrative interest mediation approach, the consequence of such organizational development characteristics is

low influence due to the necessity to adjust the work of the organization according to the short-term preferences of the members which present the only source of resources. The low resource autonomy and a narrow circle of the target groups for the work deliverables (mainly the Commission) can be considered as factors which limit the influence of the organization. However, the membership in ZEP provides an important selective good – the access to the Commission. The analysis of the minutes shows that this *selective good* is of such importance that it provides rationale for the members of the ZEP to invest enough resources in order to produce work deliverables and to comply with the decisions of the majority voting.

Hypotheses:

AB1: The extent to which the CSLF is expected to have an influence on the EU policy is low due to the low level of its organizational development.

AB2: The extent to which the ETP ZEP is expected to have an influence on the EU policy is high due to its formal status as the advisory body to the European Commission.

AB3: The extent to which the IEAGHG is expected to have an influence on the EU policy is high due to the high level of its organizational development.

AB4: The extent to which the Clean Coal Centre is expected to have an influence on the EU policy is low due to the low level of its organizational development.

The final part of the research project carries out the empirical analysis of the influence of TOA. The results of the analysis will be discussed against the background of the formulated hypotheses.

Summary Box 21

○ *General hypotheses on the influence of TOA:*

A. The more formal the status of the TOA in the decision-making system of the EU, the higher its influence will be.

B. The more developed the organizational structure of the TOA, the higher its influence will be.

○ *Hypotheses on the level of influence of the individual TOA:*

AB1: The extent to which the CSLF is expected to have an influence on the EU policy is low due to the low level of its organizational development.

AB2: The extent to which the ETP ZEP is expected to have an influence on the EU policy is high due to its formal status as the advisory body to the European Commission.

AB3: The extent to which the IEAGHG is expected to have an influence on the EU policy is high due to the high level of its organizational development.

AB4: The extent to which the Clean Coal Centre is expected to have an influence on the EU policy is low due to the low level of its organizational development.

VII Analysis of the Influence of TOA on CCS Policy of the EU

The previous chapters described the CCS policy sector of the EU as a framework for interest mediation activities between TOA and the state actors as well as analyzed the organizational properties of TOA and formulated the hypotheses regarding the level of influence of the individual TOA. Hereafter, the research interest turns to the analysis of the influence of TOA.

First, the study addresses the scope and the focus of the influence of TOA. The section falls into three parts.

In the first step, the study addresses the access of expert knowledge produced by TOA to political decision-making process. Conceptually this part of the analysis follows the definition and the operationalization of influence adopted in this study. The study defines influence as the activities of groups which alter or modify public policy.¹³² In the framework of this general definition, the influence of TOA is understood as the work deliverables which find access to the political decision-making process by being considered and accepted by decision-makers. The concept of influence is operationalized as a reference to the output produced by TOA in the policy documents or regulation formulated by the decision-making bodies of the EU. As the main output of TOA the study considers the expert knowledge. Methodologically this part of the study draws from the document analysis and the results of the expert interviews.¹³³

In the second step, the research broadens the perspective by considering the work deliverables of TOA beyond the expert knowledge. Conceptually this part of the study presents an attempt to reconsider the operationalization of the influence of TOA as a reference to the written reports containing expert knowledge. The analysis draws on the results of the expert interviews.

In the third step, the study reconsiders the definition of influence adopted in the study. The focus of this PhD project is directed at the relation between the output of TOA and policy. This section addresses possibility of conceptualizing influence as the relation between the work deliverables of TOA and the commercialization of CCS. That relation corresponds with the impact level of influence. Against the background of the interview data, the study discusses the benefits of adopting the impact level perspective on influence¹³⁴ for further research.

Then, the study regards the explanatory variables the *formal status of TOA in the decision-making system of the EU* and the *level of organizational development* to discuss the variation of the influence of TOA. The explanatory variables originate from the general hypotheses that were formulated against the background of the theoretical framework that guides in the study.

¹³² For the conceptualization of the concept of influence adopted in the study, see the section III.2.

¹³³ Cf section I.5 "Methodology".

¹³⁴ For a definition of the impact level of influence see section II.3 in the Summary Box 6.

- A. The more formal the status of TOA in the decision-making system of the EU, the higher its influence will be.
- B. The more developed the organizational structure of TOA, the higher its influence will be.

This section combines the data from the document analysis with the results from the expert interviews and the results of the analysis of the minutes of TOA.

VII. 1 Scope and Focus of the Influence of TOA

The results of the analysis show that the activities of TOA influence public policy at the level of the EU. The work deliverables of TOA find access to the political decision-making process by being considered and accepted by political decision-makers. The public actors refer to the expert knowledge produced by TOA in policy and regulation documents which relate to the development and deployment of CCS technologies in the EU.

The results of the analysis indicate that the output of TOA that is accessed by political decision-makers goes beyond the expert knowledge. From the perspective of the Commission, TOA serve as a channel to communicate political message to the international audience and as a source of contacts to political decision-makers and stakeholders in the developed countries and emerging economies.

VII.1.1 Access of the Expert Knowledge Produced by TOA to the Political Decision-Making Process

The document analysis (Table 21 in the Attachment 1) shows that with regard to the supranational decision-making bodies responsible for the formulation of CCS policy at the level of the EU,¹³⁵ *only the Commission draws from the work deliverables developed by TOA.* With the exception of the CCS Directive and the EEPD regulation which present the output of the legislative process, all documents which refer to the work deliverables of TOA encompass the documents issued by the Commission. Those are the Commission Communications, Commission staff working documents, and the documents developed by the Commission to support the implementation of the CCS Directive. These results are not surprising as the Commission is responsible for policy formulation and justification of the chosen policy approaches. Therefore, the Commission is more likely to refer to the documents that contain expert knowledge on CCS.

The analysis shows that the *type of the information*¹³⁶ which is predominantly accessed by the Commission is the expertise in the fields related to technical or economic aspects of CCS. Further, the Commission highlights the technical reports as the most relevant work

¹³⁵ As identified in section V.6.

¹³⁶ See Table 22 in the Attachment 1.

deliverables of TOA from the Commission's perspective. This corresponds with the approach that identifies expert knowledge as the crucial output of TOA and suggests measuring the influence of TOA by studying the access of TOA's publications to the political decision-makers. The finding also corresponds with the results of the analysis carried out in section V.7. That part of the analysis highlighted the importance of the technical expertise as a resource required by the Commission for its policy formulation activities.

The analysis shows that with regard to the *type of the documents*¹³⁷ that refer to the work deliverables of TOA, the majority of the references to the output of both ZEP and IEAGHG were found in the Commission staff working documents and documents which support the implementation of the CCS Directive. This finding is not surprising as the Commission's Communications and the documents that present the output of the legislative process predominantly contain the references to the associated legislation and not to the output of TOA or other sources of expert information.

The results of the document analysis show that the influence of TOA varies. Among TOA that are considered in this study, ZEP and IEAGHG have the highest level of influence on the European CCS policy with 39 and 36 references to their work deliverables respectively.¹³⁸ Twice the Commission referred to the work deliverables of the CSLF. Thus, the CSLF has a clearly lower level of influence as compared to ZEP and IEAGHG. The document analysis did not reveal any signs of influence of the Clean Coal Centre.

The results of the analysis correspond with the hypotheses on the level of influence of the individual TOA developed in the previous part of the research project.

AB1: The extent to which the CSLF is expected to have an influence on the EU policy is low due to the low level of its organizational development.

AB2: The extent to which the ETP ZEP is expected to have an influence on the EU policy is high due to its formal status as the advisory body to the European Commission and the high level of its organizational development.

AB3: The extent to which IEAGHG is expected to have an influence on the EU policy is high due to the high level of its organizational development.

AB4: The extent to which the Clean Coal Centre is expected to have an influence on the EU policy is low due to the low level of its organizational development.

Further, the results of the document analysis show a comparably similar level of influence of ZEP which has a formal status as an advisory body to the Commission, and IEAGHG, which does not have any formal status. This finding indicates that *an organization with a high level of organizational development can be as influential as an organization which has a formal status in the decision-making system.*

IEAGHG

¹³⁷ Cf Table 21 in the Attachment 1.

¹³⁸ Cf Table 21 in the Attachment 1.

With regard to the references to the output of IEAGHG, the CCS Directive adopts the capture-ready concept formulated in the technical study issued by IEAGHG. The information on various economic aspects of CCS development and deployment allocated by IEAGHG – from capture-ready pre-investment costs to electricity costs with CCS – are referred to in the Impact Assessments and other documents accompanying CCS legislation. These documents also refer to the IEAGHG output that focuses on the international experience in the field of CO₂ storage. The Guidance document on the characterization of the storage complex frequently refers to the output of IEAGHG. The document refers to the technical studies, projects reports, and reports of the Modeling and Oxy-Fuel Networks which develop storage site assessment and modeling techniques, as well as provide the technical data on CO₂ stream composition, monitoring strategies, and corrective measures.

CSLF

The references to the output of the CSLF relate to the technical issues in the field of CO₂ storage.

ZEP

Unlike TOA active at the international level, the work deliverables of ZEP which are referred to by the Commission cover not only technical information but also policy recommendations. Policy recommendations can be identified as a distinctive type of the expert knowledge as policy recommendations not only communicate the expertise on technical and economic issues in the field of CCS but derive from the expertise specific policy actions.

The Commission's Communications refer to the Flagship Program in order to highlight the involvement of the European industry in the development and deployment of CCS as well as to ZEP's estimations of the costs of CCS. The Flagship Program is the key work deliverable of ZEP as it contains the recommendation to construct 10-12 CCS demonstration plants in the EU and develops the design of the demonstration program.

The EEPR regulation refers to ZEP as a source of information for the selection of the funded projects.

The Knowledge Sharing Protocol of the European CCS Demonstration Project Network refers to the ZEP document which introduces the categories of knowledge relating to development and deployment of CCS. The Protocol further adopts the matrix of technologies developed by ZEP as a framework for knowledge-sharing activities.

The Impact Assessments and other documents accompanying the EU legislation frequently take account of the Strategic Research Agenda (SRA), Strategic Deployment Document (SDD), and the ZEP Vision document. The Commission refers to the technical and economic data associated with the development and deployment of CCS; the design and cost estimations of the Flagship Program developed by ZEP; recognizes the support of ZEP with regard to the formulation of the work program for the Seventh Framework Program; as well

as takes account of the commitments of the European industry to the development and deployment of CCS.

The research results gained from the expert interviews complement the results of the document analysis by highlighting the influence of ZEP on the formulation of the CCS Directive, development of NER300, and formulation of the project selection criteria for the CCS demonstration program. The output of ZEP in those cases encompasses predominantly policy recommendations. The empirical evidence shows that in those cases the activities of ZEP modified policies. Thus, those exchange processes can be considered as influence.

ZEP stresses its involvement in the discussions of the drafts of the CCS Directive.

[...] the CCS Directive, and again that came about in a close cooperation with ZEP. We constantly looked at drafts, gave comments on drafts and gave advice also and asked when we thought something was not satisfactory. [ZEP]

The analysis of the ZEP Advisory Council's minutes supports this statement. The Commission gave a presentation on the cornerstones of the draft of the Directive [ZEP, 2008a, 4f] and the ZEP members provided their comments as a spoken communication [ibid, ZEP, 2009a, 5] or a report [ZEP Task Force on Policy and Regulation, 2009]. ZEP was further requested by the Commission to provide input to the CCS Guidelines [ZEP, 2010c, 6].

Further, ZEP highlights the importance of the discussions with the Commission regarding the need for an instrument to support the demonstration of CCS in Europe and the design of such program. Previous research [Claes & Frisvold, 2009, 229ff] and the study of the minutes of the ZEP Advisory Council's meetings show a range of the exchange processes between ZEP, the Commission, and the European Parliament with regard to the development of the financing mechanism NER300 (see Table 20). These exchange processes include communication with the representatives of the Commission regarding the draft legislation, participation in the workshops and meetings set up by the decision-makers, and the production of the written work deliverables in form of letters to the decision-makers involved in the legislative process.

Table 20: Legislative process on NER300 and the activities of ZEP

Year	EU legislative procedure	ZEP action
2008	The Commission publishes the legislative proposal on the improvement of the EU ETS [Commission, 2008g]	
	Debates in the Council and referral of the proposal to the Parliament Committees	
	Committee on the Environment, Public Health and Food Safety issues the draft report [European Parliament, 2008a]	
	Committee on the Environment, Public Health and Food Safety proposes the amendment 56 (Article 1 – point 8 Directive 2003/87/EC Article 10a – paragraph 6a (new)) [European Parliament, 2008c]	Composition of the letter from ZEP to the MEPs in support of the amendment [ZEP, 2008b]
	Debates in the Council	
		Letter to the French presidency communicating the project selection criteria in support of the decision to implement the amendment [ZEP, 2008c]
	Decision by the Parliament [European Parliament, 2008b]	
2009	Decision by the Council	
	Chris Davies and CCSA organize a " <i>European CCS Implementation Workshop</i> " to consult the stakeholders on the Commission's proposals for delivering the CCS Flagship Program of 10-12 CCS projects by 2015	ZEP is represented at the workshop [ZEP, 2009a]
		Initiation of the dialogue with the European Investment Bank and ZEP [ZEP, 2009a]
	Comitology	DG ENV gives presentation on the comitology process in the meeting of ZEP Advisory Council [ZEP, 2009a]
	Commission issues a non-paper on the modalities of the implementation of NER300 [Commission, 2009a]	ZEP recommendations to the Commission during the comitology process " <i>Implementation of New Entrant Reserve Funding: ZEP Recommendations</i> " [ZEP, 2009b]
		DG ENV gives presentation on " <i>Modalities for demonstration of CCS and innovative renewables under the Emissions Trading Directive Article 10a paragraph 8</i> " in the ZEP AC meeting. ZEP gives feedback [ZEP, 2009b]
	Commission sets up a stakeholder meeting on the implementation of the NER funding	ZEP participates in the meeting [ZEP, 2009b]
2010		ZEP sends a letter containing remarks on the draft legislation to the decision-makers in the Climate Change Committee [ZEP, 2009c]
	Commission publishes draft decisions taken after the comitology process	ZEP prepares the response to be used in discussions with the Commission and the member states [ZEP, 2010c]
		Decision to set up a telephone conference with DG TREN to discuss the feedback of ZEP to the NER process [ZEP, 2010c]
	Commission adopts Decision on NER300 [Commission, 2010a]	"EC and MS agreed a final proposal at the Climate Change Committee on 2 February 2010, that considers most of ZEP's and other stakeholders' concerns" [ZEP, 2010d].
		ZEP decides to draft a letter to EC to point out the shortcomings of the project selection criteria [ZEP, 2010e]

Source: author, source of data is referenced respectively

Whereas the results of the document analysis include the references to the SRA and the Flagship Program which advocate the European CCS demonstration program, the activities of ZEP listed in the Table 20 do not appear in the results of the document analysis (cf Table

21 in the Attachment 1). However, according to ZEP, the interaction between the Commission and ZEP modified the activities of the Commission and can therefore be considered as influence.

For the NER300 scheme ZEP was almost at the birth of that scheme because we have been advocating this demonstration program. In the beginning nobody wanted such a scheme and they thought it was too expensive. Eventually the European Parliament backed the concept and when we heard about that we did a big study on what the outlines of such a demonstration program should be. First of all we designed the portfolio that you need to de-risk. Then we gave advice to the Commission also what the elements of such a scheme should be. Of course, the Commission took the advice and they have done it independently together with the European Investment Bank. But I think again, we were closely consulted because you need the industry, you need the NGO and the research community in order to have an acceptable demonstration program. [ZEP]

I can remember in the early days of the NER300 that it was the ZEP and people in the ZEP who were saying to the Commission that it was a good idea. And the Commission thought it was a terrible idea. Now the Commission thinks it's their idea. And everybody is happy about that. Nobody says it was my idea. The point is that they now own the idea, in the sense that that's the reference. I know the history of the NER300 and I remember meeting people from the Commission. And I remember arguing with them as to why it was a sound way forward. And now they fight for it as if they invented it which is good. They are not referencing the ZEP work but they are. [ZEP]

[...] I mean, in the lead up to the rules for the submission of the projects to the NER 300, the example of the actions of ZEP is that it ended up in the dialogue mainly through letters to the Commission. We'll often be writing letters to the Commission putting forward its viewpoints, asking the Commission to send a representative to a ZEP meeting to discuss issues. These are the types of action. [ZEP]

In the context of the discussion of the project selection criteria for the CCS demonstration program in the EU, the Commission stresses the importance of the advice of ZEP and generally the European stakeholders. The existing project selection criteria, e.g. developed by the CSLF in the framework of the project recognition activities, were not taken into account.

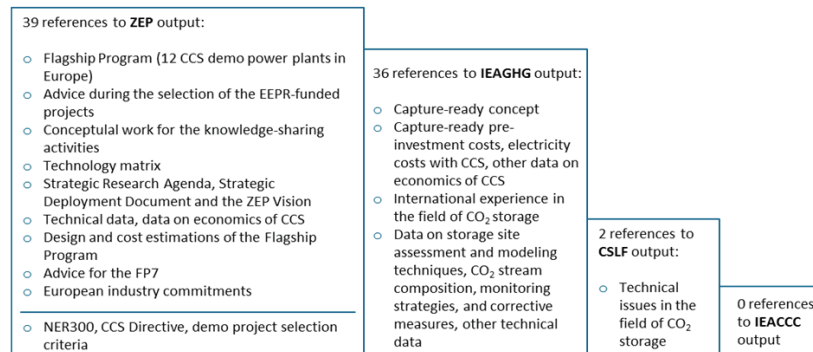
- We designed for the European projects the Terms of Reference or what they had to do was designed within the Commission. Of course with a lot of background information on the projects and the needs from the ZEP Platform, because we already knew what type of portfolio we would like to have, what projects needed to do and what would be a reasonable size for the projects, for instance, the 250 MW that we use. Of course, we had information from the different stakeholders before we got to a certain list of this is what the project should address at least. But the CSLF was not consulted in this process.
- So, the ZEP technology matrix was a relevant document for the creation of the criteria?
- Yes, because it is mainly European projects. So, it is all came out the core of the ZEP Platform. The participants there are the same people who have their stakes in these European projects. So, yes, it's closer to home. We relied more on what was discussed within ZEP than in the CSLF. [Commission]

The existing project selection criteria, e.g. developed by the CSLF in the framework of the project recognition activities, were not taken into account.

Summary Box 22

The analysis shows that the influence of TOA varies according to two aspects.

First, the scope of the influence varies between TOA.



Second, the character of the information accessed by the Commission varies between TOA. The Commission considers both the international (the CSLF, IEAGHG) and the European (ZEP) TOA as a source of technical expertise whereas policy recommendations are provided only by the European stakeholders (ZEP).

VII.1.2 Alternative Approaches to the Output of TOA

The research project defines the influence of TOA as the work deliverables which find access to the political decision-making process by being considered and accepted by political decision-makers. The study highlights the importance of the expert knowledge as the output of TOA. The concept of influence is operationalized as a reference to the work deliverables produced by TOA in the policy documents or regulation formulated by the decision-making bodies of the EU.

According to the administrative interest mediation approach, the state actors pursue the exchange processes with the groups to acquire *governance resources*, i.e. the resources needed to formulate and implement policies. The document analysis identifies the technico-economical expertise and policy recommendations as the governance resources provided by TOA. This section studies the interview data in order to complement the analysis by broadening the understanding of the work deliverables of TOA.

Similar to ZEP, the CSLF produces not only *technical reports* but also *work deliverables that contain policy recommendations*. Whereas ZEP addresses its output to the political decision-makers and stakeholders in Europe, the CSLF directs its work deliverables to the international community. Among the policy-oriented activities of the CSLF it is possible to distinguish the contributions to the identification of the policy and regulatory issues that need to be addressed at the national and international levels of decision-making [IEA, 2007b,

IEA, 2008a, IEA, 2008b, CSLF, 2010c] and the international technology roadmapping activities [CSLF, 2004, CSLF, 2010a].

The document analysis of the influence of TOA showed the low level of influence of the CSLF. This finding corresponds with the results of previous research (section II.1.2.2). The findings of the document analysis show that, with regard to CCS policy formulation, the Commission referred to the technical reports of the CSLF but did not draw from the policy-oriented work deliverables. The document analysis shows that the main resource of TOA that is accessed by the Commission is technical expertise. The interview results confirm this finding by showing that, in contrast to ZEP, the Commission does not consider the transnational TOA such as the CSLF, IEAGHG, and the Clean Coal Centre as a source of information that provides policy recommendations. While designing policy at the level of the EU, the Commission consults those actors which encompass the European, not international, interest. However, the EU has a pioneering role with regard to the major CCS policy developments. *Thus, the activities in the transnational TOA are rather directed at communicating the EU policies than consulting other countries for their experiences in policy formulation.*

The Commission uses its membership in the CSLF to compare the policy-oriented work deliverables issued by the CSLF to the related documents developed at the international level and at the level of the EU. Thus, the Commission can work toward the *harmonization of the political message considering the interests of the EU.*

This Technology Roadmap of the CSLF is a sort of the international document that can be compared to other roadmaps like the IEA also has its Roadmaps now. Recently we tried to merge these or sort of to harmonize and discussed the two roadmaps, so that we are all going into same direction. [...] the IEA and the CSLF countries to see that nothing is done in isolation. When we have the European roadmaps like for instance the European ZEP, we can put them next to each other as well and that can be used as input to the CSLF as well. You bring the best of what everyone does together in those technical documents. So, there you have several technical documents which is important deliverable. [Commission]

The CSLF is a policy group where they talk about regulation and legislation and the technical group would discuss technical issues and they meet a few times a year to communicate. It's not such a day-to-day work as you have it in the IEA [IEAGHG - author]. They have much more technical basis than we have. That's my impression. There must be some degree of duplication but recently over the years we realize that this duplication exist and we need to at least harmonize what we are doing and to inform each other. This is why the IEA is always a part in our meeting. The GCCSI participates in the CSLF meetings and the other way around. At least you got people speak with the same message and we harmonize the message to the audiences. [Commission]

The need to harmonize the political message at the international level results from the multiplicity of multilateral collaboration activities pursued in various frameworks at the international level. Although the exchange between various organizations is growing through mutual membership agreements and cooperative efforts to produce work deliverables, the international institutional landscape in the field of CCS is characterized through the lack of labor-sharing activities.

Depending on the comprehensiveness of the membership, TOA present *a valuable resource for contacts to the international political decision-makers in the industrialized countries and emerging economies*. The Commission pursues a range of bilateral and multilateral international activities in the field of CCS. Unlike the United States and Australia which claimed the leading role with regard to development and deployment of CCS at the international level by setting up the CSLF and GCCSI respectively, the Commission does not pursue a leading role on CCS in the relevant international organizations or initiatives. The Commission highlights the importance of the transnational TOA because they establish access to the policy-makers and stakeholders in developed and developing countries.

Due to the membership structure of the CSLF which includes policy-makers, it is considered by the Commission as a valuable channel to promote the research and policy development in the field of CCS additionally to the activities carried out on a bilateral basis.

- The EU is quite a front-runner in terms of the policy, legislation and already long-term research programs. So we present what we are doing there [*in the CSLF - author*], it is being discussed there, financing CCS for instance, and this is also a very good way to show what we are doing, trying to share our knowledge on regulations, on those issues with the CSLF. [...] And on the policy side we can again learn from the dialogue and try to push CCS further. And it's a very good vehicle to push other countries who are not as far as we are to proceed as well.
- How can you push other countries?
- Well, not so much by telling them what to do but by showing what can be done and how we are doing things and what is possible and what isn't. It is up to the countries themselves to implement CCS at the speed they want to. But at least we can show what we have done in terms of legislation, the CCS Directive, how we have a research program, how we work with research funding for instance and what we do with international collaboration and to see how we deal with public acceptance. We have regular meetings where you can have presentations, where you can show European projects to see how it's being done in Europe and that can be a very good example for other countries who are not as far advanced to see, ok, this is a way to go. It's more like showing examples to push people there. [Commission]

In this context, the Commission values the *access to the decision-makers that provide the resource relevance for political decision-making*. The Commission favors the access to those decision-makers that have the competence to influence policy-making in the respective country. Therefore, in the context of the Implementing Agreements IEAGHG and the Clean Coal Centre, the Commission highlights the importance of the Contracting Parties represented by the ministry officials.

Similarly, the analysis of the organizational properties of TOA showed that, in the case of ZEP, the Commission assisted the formation of the body which encompasses a variety of stakeholders in senior positions with the competence to influence decision-making regarding the research programs and leverage of the resources. Thus, ZEP provides contacts to the high-level officials of the European stakeholders in the field of CCS.

And what's also important is that once we have Contracting Party, the person to whom you talk is responsible for the whole country. You can understand, not only understand but influence what happens in the country. While when you speak with the company, they are usually multinational

companies which have views from the different parts of the world but they can go and choose to develop projects where it is the easiest for them to develop projects in the field of CCS. We would like to see global commitment to development in this area. And one way to get that is basically to disseminate and to promote this kind of technical information in the countries themselves. If we have a Contracting Party, the Contracting Party usually comes with the representative of the Ministry – either the Environment or Energy or Trade and Industry. So, you have some sort of commitment which is fed back to that country. [Commission]

For the demonstration project network, we recognize that ZEP has done a lot of good work on knowledge-sharing and represents the group of stakeholders. So, when we wanted to create a body that wanted to provide the stakeholder input to this, we asked ZEP to nominate one person from oil & gas, one person from NGO, one person from research organizations for the Advisory Forum. So, they provide good access to key people in different stakeholder groups. And then, we can have a look and say, well actually this is not complete, we personally will invite other NGO or something. But as a first step and one point of contact ZEP is useful. [Commission]

Besides the contacts to political decision-makers in the framework of the regular CSLF meetings, the Commission values the *access to high-level decision-makers*. In this context, the Commission highlights the importance of the CSLF Ministerial meetings due to the window of opportunity which can be established during the meeting of the high-level decision-makers. Similar windows of opportunity were created with the adoption of the G8 goals on CCS in Gleneagles (2005) and Hokkaido (2008). The Commission considers the Ministerial meeting as the important work deliverable of the CSLF due to the opportunity to accelerate research and policy development in the field of CCS, to show the commitment of the EU by promoting the EU CCS policies, and to engage the emerging economies.

It is a relatively important meeting because there you really have many ministers from many countries who will sit together and agree on the Communiqué that they will present that they will subscribe to and the certain message that they want to give. So, this is mainly political message that they will give. This is always a good opportunity for the ministers to meet and also for the ministers to listen to stakeholders because there is also always an industrial stakeholder forum on a Ministerial. So, it brings these two groups together. [...] CCS is still on many peoples' agenda but progress is not as far as you want or as we thought we could have because of many issues: because of financing, because of slow regulation, sometimes adoption of the regulation – you see how slowly it goes in Europe now with the regulations – public acceptance. Now, if you have at least that ministers agree on certain issues, then hopefully you can speed up a few issues there in terms of financing, in terms of regulation, well, the way it works is that politics goes slowly here, certainly in these areas but this is one of the rare occasions where policy-makers at the high level meet. [Commission]

We don't travel internationally unless there is some political benefit. If you take the example of the CSLF, we had to make a decision, because the meeting is in Beijing this year. Should we send a Commissioner to Beijing? Our opinion was yes, we think it is a good signal to our international partners, if the DG Energy goes and speaks positively about CCS. It shows that Europe is committed. It's a better signal than if you just have somebody from DG Research or policy officer from DG Energy present - better to have the Commissioner there. [Commission]

Then, due to the membership structure that includes policy-makers and technical experts, the CSLF is considered to be a suitable *framework for knowledge-sharing activities*. Particularly, the Commission highlights the role of the CSLF for the dissemination of the

results of the European R&D and demonstration projects. A range of the European projects were proposed by the Commission for the recognition of the CSLF against the background of the benefits of information-sharing between the projects at the global level. However, the level of knowledge-sharing with the projects at the global level cannot be compared to that on the European level. The European projects which receive the support of the EU have a contractual obligation to share specific information between each other. The CSLF-recognized projects share the information on a voluntary basis. The asymmetry in the level of information-sharing hinders the integration of the CSLF with the EU CCS Network knowledge-sharing events. However, the recent in-depth workshops among the CSLF-recognized projects increase the importance of the CSLF as a framework for knowledge-sharing activities at the global level. This development corresponds with the understanding that the demonstration program in Europe might be not as encompassing as it was intended to be. Therefore, the importance of the institutional frameworks for knowledge-sharing between the projects at the global level is growing.

The Commission puts a particular emphasis on the *access to the emerging economies* via the membership in the CSLF and the Clean Coal Centre. On the one hand the membership of the emerging economies is perceived as a channel to promote CCS and research on CCS, on the other hand the contacts from the emerging economies can be accessed to support the activities initiated by the Commission, e.g. workshops and bilateral cooperation activities.

Well, we try it [*cooperating with the emerging economies - author*] separately of course as well, research program etc. But since it is so difficult to work with the developing countries, those like India and China, on promoting CCS and promoting research – because we can only work with our research budget – the CSLF provides us with another channel to work with such countries as India and China because they are also member to the CSLF. So, this is for us I would say an advantage. You get your contacts through the CSLF: at the technical level and at the policy level. Also, if you want to organize a workshop in India like we did on research collaboration, you need to get some permission and some interest from the policy-makers as well to get the right people around the table. So, there you work through your contacts. And that works very well. In China, we also work in the international collaboration with China in field of research [...]. We try to push that more and more and for instance what the CSLF was now able to do is to ask China to be the host of the next Ministerial conference in September. So, this is one way where we say, ok, we would like China to be a bit more strongly involved, also in the CSLF. They are doing their thing but we would like China to be a bit more involved also in the CSLF and then the CSLF in their discussions got the idea, well, why don't we ask China to organize the next conference, then we'll get a little bit more involvement from China. These are the ways that you can try to progress on the international collaboration through different routes. So, what we already do with our research money and what you can do in the CSLF. [Commission]

These are really professionals with very good knowledge and many years of experience who lead the Clean Coal Centre. But the contacts to other countries are really important for us. The contacts which I have, I use them directly, if I need to prepare for example my working group meeting in South Africa or in India or in China. So, these direct contacts are very important for us. [Commission]

Analogous to the preference to have one point of contact representing the variety of the stakeholders at the level of the EU, *the Commission highlights the value of a single*

organization which manages to engage the decision-makers and stakeholders from the developing countries and emerging economies at the international level.

Summary Box 23

The Commission considers TOA active at the international level as platforms for access to the international community. Those TOA – predominantly the CSLF – serve as a platform for communicating the EU policies and R&D as well as for establishing contacts to the international political decision-makers. Regarding the contacts to the emerging economies, the Commission values the heterogeneity of the memberships of the CSLF and the Clean Coal Centre.

VII.1.3 Alternative Approaches to the Influence of TOA

The definition of the influence suggested in this research project focuses on the access of the written work deliverables produced by TOA to the state actors. The data gathered during the expert interviews shows that TOA consider those work deliverables of particular importance that are produced in collaboration with the international organizations and initiatives. Several such activities in the portfolio of the work deliverables of IEAGHG and the CSLF are identified by the respondents as crucial due to their influence on political decision-makers that resulted in significant advancements to the overall goal of global deployment of CCS as a climate change mitigation option. The “visibility” of such work deliverables is considered to facilitate their access to the high-level political decision-makers.

Thus, IEAGHG considers the involvement in the UN process which culminated in the publication of the IPCC Special report on CCS as an important work deliverable because of the impact the report had on the establishment of CCS as a climate change mitigation option.

And that led to the process of writing the IPCC Special Report on carbon capture and storage. And that was a very key event in getting this to the attention of international policy-makers. And that report was mainly founded on the information it was gained in all the studies that the IEA Greenhouse Gas Program did. [IEAGHG]

The CSLF regards the activities in the framework of the G8 as an important work deliverable because of its impact on the recognition of the need for a demonstration program for CCS. In this context, the main deliverable achieved by the CSLF in cooperation with the IEA is the development of the policy recommendations to G8 which aim at the commercial deployment of CCS by 2020.¹³⁹ These policy recommendations were developed throughout a series of workshops and reports before they were adopted by the G8 leaders at the summit meeting in 2008.

The CSLF further highlights the importance of the Ministerial meetings for knowledge-sharing between the developed countries and emerging economies. Such exchange between

¹³⁹ See also section VI.1, Table 17.

the high-level decision-makers is considered to contribute to the general goal of development and deployment of CCS.

There is a high-level political audience - the ministers in the countries - is extremely important that they are on board with CCS. Many of our ministers of our 24 are new and so we need to share information with them. And we will be doing that at the ministerial in China in September.
[the CSLF]

The scholars of political science introduced three perspectives to study the influence of the organizations on state actors – the output, outcome, and the impact perspectives¹⁴⁰. According to the definition adopted in the study, this research project examines the influence at the outcome level. The approach to study the outcome level of influence investigates the relationship between the output of the organizations and its adoption by the political decision-makers.

The interview data indicates that TOA highlight particularly those work deliverables that were considered to contribute to the overall advancement of CCS. The development of the causal relation between the work deliverable and the progress of the technology development in the international context corresponds with the impact level of influence. It presents an alternative approach to the study of the influence of organizations at the outcome level that was adopted in the research project.

Regarding CCS, the identification of the impact level of influence of an organization requires an assessment of the linkage between the broader target of commercial availability of CCS and the activities of an organization. The example of the IPCC Special Report on CCS suggests that there are limitations to considering the impact level for studying the influence of TOA.

The IPCC Special report on CCS was not only highlighted as important by IEAGHG but was also identified as a milestone in the development of CCS as a climate change mitigation option by previous research (section V.1). The literature agrees that the Special report confirmed the possibility of the geological storage of CO₂ and therefore introduced CCS as a climate change mitigation option. However, the IPCC Special report on CCS is considered not to have exerted an impact level influence on the CCS policy-making process of the EU. The Commission regards the report as an important event but in the framework of the European CCS policy development, the IPCC Special report confirmed what was already known and accepted by the decision-makers at the EU level. Thus, the report cannot be considered influential with regard to the CCS policy development at the level of the EU.

It [IPCC SR - author] was kind of the confirmation of the same conclusion which scientific and technical community already reached more or less at that time. It was a natural outcome of what it was expected to be seen. So, that was a very good reaction, very good outcome. We completely agreed. [Commission]

In order to narrow down the focus of analysis and investigate the impact level of influence, one could argue in favor of the case study. In this context, ZEP points out the limitations that face its activities toward the commercial availability of CCS in Europe by highlighting the

¹⁴⁰ See section II.3 in the Summary Box 6.

importance of the general political developments. Those can be decisive for the achievement of commercial availability of CCS. However, their progress is beyond the scope of the activities of ZEP.

The main objective of the ZEP has always been to enable the commercial availability of CCS by 2020 and the activities have been described in two strategic plans. [...] Commercial availability is a rather awkward thing because it depends, for example, on the prize of emissions certificates at the time. So, it is a very general objective. To get there, of course, you need to de-risk the technology and you need to lower the cost of the technology. Those are the main underlying objectives. [ZEP]

Therefore, a case study that would consider the impact level of influence of ZEP on the development of CCS in Europe faces similar limitations. At the time of publication, it cannot be clearly defined whether a certain event had an impact level influence on the development of CCS because the development and deployment of the technology is still “work-in-progress”. Even in case of a successful CCS demonstration program in Europe, it remains unclear whether CCS will be commercially available by 2020 due to the uncertain prices for the EU ETS-certificates (see section V.4.2).

Those examples correspond with the findings from the literature that stress the difficulties resulting from an attempt to develop a causal relationship between the influence of an organization and the profound change in the parameters within the empirical field of application [cf Biermann et al., 2009a, 42]. Although the data indicates that the impact level of influence is a category applied by TOA, the examples stated above prevent the argument in favor of future research addressed at the analysis of the impact level of influence.

Summary Box 24

TOA consider those work deliverables as the most important that in their view contributed to the overall goal of the commercialization of CCS technology. This account presents an alternative approach to one adopted in this study. While recognizing that TOA highlight the importance of the linkage between the work deliverables and the overall progress of CCS, the project argues in favor of the approach to study the relation between the output of TOA and policy formulation.

VII.2 Explaining the Variation in Influence

VII.2.1 Formal Status

The study understands the rationale for state-group cooperation as the exchange of the resources. The formal status of ZEP as the Technology Platform and the advisory body to the Commission is considered to facilitate the exchange of resources as compared to TOA without the formal status. The analysis of the interview data and the minutes investigates whether and how the formal status facilitates the exchange of the resources and under what

conditions the formal status of TOA can be applied as an explanatory variable for the influence.

VII.2.1.1 Access to the Decision-Makers

The formal status as an advisory body to the Commission provides ZEP with the access to the representatives of the DGs relevant for policy formulation in the field of CCS. The formal status facilitates the exchange of the resources through regular and – compared to other TOA – frequent contacts to the Commission.

The data indicates that the formal status as a Technology Platform relates to the influence of ZEP. The examples of the interaction between the Commission and ZEP that include the formulation of the CCS Directive, introduction of the financing mechanism NER300, and the formulation of the project selection criteria indicate that the type of information that was provided by ZEP encompassed the policy recommendations (section VII.1.1). The exchange processes between the Commission and ZEP were driven by the need of the Commission to acquire the resources *information* and *political support*. The former refers to the information which has a clear European dimension; the latter concerns policy implementation that involves stakeholders' engagement.

The interview data indicates the importance of the formal status of ZEP due to the exchange processes which do not result in the written output. Due to the operationalization of the concept of influence suggested in the study, the results of the document analysis carried out in this research project blind out the exchange processes which do not result in the documented reference of the state actors to the work deliverables of the groups. Predominantly, those exchange processes refer to the spoken communication that falls into the realm of collective action.

The results of the document analysis indicate that the operationalization of the influence of TOA worked out in the study need to be improved to cover the exchange processes that are of particular importance for the organizations with the formal status in the political decision-making system. The formal status enhances the importance of the work deliverables beyond the written reports. Further, the example of the interaction between ZEP and the Commission with regard to the formulation of the NER300 mechanism (Table 20) shows the difficulty to establish a linkage between the output of TOA and its access and adoption by the political decision-makers. It can be concluded that the formal status enhances the intransparency of interest mediation between the TOA and the political decision-makers.

Summary Box 25

The formal status of ZEP facilitates the exchange of the resources through regular and frequent contacts to the Commission. The formal status enhances the importance of the work deliverables beyond the written reports and enhances the intransparency of the exchange processes between the TOA and the political decision-makers.

VII.2.1.2 Legitimacy

The formal status of ZEP does not lead to the position of an exclusive provider of the resources. Both the Commission and ZEP highlight the contractual relationship established with the status of ZEP as the EU Technology Platform. This status delivers the foundation for the exchange relations between the Commission and the members of ZEP.

I'm not sure they [*the Commission - author*] approach us. They partly fund us, so they work with the ZEP, don't they? Recent example would be ZEP put all the work together on the cost of CCS. And hopefully then the Commission uses that work. So, it's partly not so much an approach, it's as an agreement as to the agenda. [ZEP]

ZEP gives us information because it is contracted to give us information. [Commission]

ZEP is a good network of industry and stakeholders in Europe that works for the advancement of CCS and it's set up to provide input to us. We give it some support. It's really, I think where it performs its function well - it is an advisory body. [Commission]

The ZEP has the obligation as the other Technology Platforms to hand a strategic research agenda and also a deployment strategy document. These documents were the beginning of the contribution of the ZEP to us. They have provided what kind of research is needed for the next few years but also how this research leads to next generation technologies which of course need to be demonstrated at the later stage. [Commission]

The formal status of ZEP is reflected in its primary function to advise the Commission on the research priorities in the field of CCS in the EU. The main instrument to support R&D on CCS at the level of the Union is the Framework Programs. The formulation of the SRA by ZEP is an important part of the advice on the research priorities. The analysis shows that the SRA was frequently referred to by the Commission in the policy documents. However, the influence of ZEP and other TOA in framework of the formulation of the yearly calls for the Framework Programs could not be traced in the document analysis due to the operationalization of the concept of influence.

The interview data shows that both ZEP and the Commission confirm that there is an exchange relationship in the framework of formulation of the research priorities in the field of CCS. The advice of ZEP contributes to the process of formulation of the Framework Program themes. This process includes public consultations in which every stakeholder in the field of CCS can submit its opinion as well as the Commission-internal consultation procedures carried out by the responsible DGs RTD and Energy.

And in DG Research you have got the ongoing calls for research projects. [...] And I think for each of these DGs they have always consulted ZEP when they designed their policy actions. So, for example, DG Research recently launched an FP7 call for large CCS pilots. Initially they thought about a number of call themes. Then they asked us to check with the members of ZEP and also the non-members of ZEP. So, we basically launched a questionnaire among our members asking what kind of projects they would be prepared to co-finance because FP7 basically is a co-financing program. So, that led a whole different identification of themes of this FP7 call. It's a clear example that ZEP is consulted in policy. [ZEP]

They [ZEP - *author*] produce reports on a regular basis which highlight the different areas of CCS and what the research needs are. It's different from the deployment documents, it's really the research needs. DG Research funds the Framework Program research projects on the storage side and CCS technologies transport for instance. DG Energy funds the Framework Program on the integration of CCS parts and better coal combustion for CCS and so that we integrate some of the ZEP recommendations. [Commission]

However, the Commission stresses that ZEP provides just one of many sources of technical expertise which are accessed in the context of the formulation of the framework programs. The data indicates that the Commission perceives ZEP as an industry body. Thus, the advice of ZEP lacks the resource *legitimacy* as it does not encompass the variety of different interests concerned by the problem (cf section II.2.4).

According to the requirements of the Commission to the composition of the European Technology Platforms, ZEP must encompass a geographical and sectoral variety of stakeholders. This requirement corresponds with the results of previous research which highlight the preference of the state actors to interact with the groups which represent a broad variety of aggregated interests. The analysis of the organizational properties of ZEP does not show a major shift in the membership structure during the period under analysis (see section VI.2, Figure 9). Although in its documents the Commission highlights the encompassing nature of ZEP membership (i), the Commission characterizes ZEP as an industry body (ii).

- (i) However, the European Technology Platform for Zero Emission Fossil Fuel Power Plant (ETP-ZEP), gathering European energy companies, equipment suppliers and oil / gas businesses as well as NGOs, estimates that with a focused R&D and demonstration effort, costs of CCS can be brought down by 50% between now and 2020, facilitating commercial deployment [...]. [Commission, 2008d, 4]

The Zero Emission Power European Technology Platform (ETP ZEP), whose Secretariat is currently co-funded by the Commission, established itself in 2006 as a wider group of stakeholders sharing a high interest in the development and use of CCS technologies. There are five groups of stakeholders represented in the ETP ZEP: energy companies, power plant operators, power plant equipments suppliers, research institutes and non-governmental environmental organisations. [Commission, 2008a, 11]

- (ii) The output of the European Technology Platform for Zero-Emission Fossil Fuel Power Plants, ZEP, an industry initiative supported by the Commission, provided, amongst others, a vital source of information and external expertise. [Commission, 2006a, 6]

A different composition of members can be observed in the Advisory Council of the Technology Platform of Zero Emission Fossil Fuel Power Plants. Here, power companies are strongly represented, but it includes also oil companies and power plant equipment manufacturers. [Commission, 2007c, 72]

[...] they have not just the energy industry but also financial institutions and NGOs. But mainly it's an industry body. We should be honest and look at the membership. It's mainly the industry body. [Commission]

It cannot be identified whether the lack of the resource *legitimacy* diminishes the influence of ZEP. The analysis carried out in the study shows that ZEP is influential. As highlighted

above, the Framework Programs present a co-financing instrument. Therefore, the advice on the research focus from the members of ZEP indicates the areas in which the Commission can count with the political support from the European stakeholders.

However, the statements by the representatives of the Commission show that the resource *legitimacy* is important. In the context of the advisory functions of ZEP, it increases the demand of the Commission for alternative opinions.

[...] we are in a very close discussion [with ZEP - *author*]. We participate in the meetings. Sometimes, if you have a particular problem, particular issue, you get the advice. But it doesn't mean that their advice is the only advice we get. We get advice from other people. It's only part of the advice. [Commission]

When we receive input or submission of ZEP, it's useful to have reports. But we consider this to be alongside with other reports of other people. The specific role they have on research. And that's great. We set them up. Because we didn't know ourselves exactly what the industry needed. And they perform that task. [Commission]

I don't think we refer so much to the ZEP papers. I can't think of any. The official documents by the Commission don't refer directly to ZEP. We don't take only the advice from ZEP. We take advice from other organizations, so it wouldn't be fair to only mention ZEP. But for the SET Plan and the EII the ZEP mainly contributed and it will be mentioned there. [Commission]

The influential position of IEAGHG can be then interpreted by its positioning as an organization which produces purely technical information from an international perspective. The status of the provider of "policy-relevant but not policy prescriptive information", the composition (government representatives and stakeholders), and the international scope of membership make IEAGHG a relevant source of independent opinion to the Commission and governments which are the members of IEAGHG.

The IEAGHG is an important international forum [...]. It is somewhat unique in the field of international organizations because it encompasses the Contracting Parties which are basically countries and also Sponsors which are various industrial enterprises. And all of them have pretty much the same rights and obligations. And this form allows that industry representatives and countries can sit together and talk. But the talks, they are purely technical. They are not political. The idea of the IEAGHG is not to produce political messages. It is to produce technical evidence to support the political decisions. Actually this is a very good forum where we can share notes and check whether the rest of the world thinking or developing the same way that we are doing in Europe. And it has been so far very complementary to our work. Because the main activities of the IEAGHG is to commit studies which is not real research, it is more gathering the results from research which is something we as DG RTD are not focusing on. We rather finance or support the research than gather the data. Through our participation there we can first get the results from all these studies and second lead the forum to commission different studies. So, it has been and it is a very good forum, a very good way of basically harness the global resources and the global interests in the field of development of CCS. [Commission]

The EU uses us quite often as a sort of independent reviewer resource. So, we often have pieces of information like the guidelines they sent to us for independent comment. They drew on us for CCS CDM, so we do get pooled into that area as an independent. [IEAGHG]

The Commission refers to the technical information provided by IEAGHG, the CSLF, and the Clean Coal Centre to improve the CCS research program in the EU and compare the research

focus in the EU with the global developments. In this context, the Commission highlights the comprehensive nature of the CSLF membership which provides not only policy but also the technical perspective.

And for us the good thing about the CSLF I would say the way it is constructed you have both policy-makers and technical people there which is very useful, which allows us to learn from the technical side, to see what other countries are doing in terms of research, so that can give us a sort of the feedback on what we are doing and we can get inspiration for these as well to see, well, we should be doing similar research or we can try to cooperate with certain countries in the CSLF on certain issues. So, it improves our research agenda. [Commission]

Further, the Commission highlights the importance of the technical studies produced by the Clean Coal Centre because those cover not only CCS but also the issues related to the clean coal technologies.

We are interested in various technologies – in CCS technologies, in various technologies. There is a broad range of technical studies on post combustion, gasification that are interesting for us because we have the research topics in our work programs. And it is always helpful, if we can use those studies. [Commission]

The Commission highlights the multiplicity of sources of technical information relevant for policy-making in the field of CCS. The technical information on CCS-related issues is produced by the firms, think-tanks and research facilities in the member states and at the level of the EU, in the bilateral frameworks for cooperation as well as in the international organizations (e.g. the IEA).

In general, indeed, studies are one of the sources of information which we use in order to develop our work programs. Those are work programs for each year. It's one of our responsibilities as so-called research program officers in the field of CCS. In order to do that we need our own judgment but we also need information. So, we need to consult the stakeholders such as ZEP, ERA, member states representatives as well as to consult international press and studies like those of IEAGHG or our commitment on international level – bilateral, multilateral including CSLF. So, that is a part of this process but we are not obliged [...] that we must take into account this or that study. That is informative for us. That is one of piece of information which we will use for the development of our work program. Usually we try to when we propose something we would like it to be topics which are most important for the moment, which really focus on the key issues. In order to do that we would like to have more than one confirmation, not only ZEP suggesting, well, we would like to see development in this field but also to see whether anybody else feels that way, because otherwise ZEP will be like a lobby to us. That's why we cannot have one single sort of information. And it is another way to see, if we are going into the right direction of the development of the work program. And of course it [IEAGHG-author] gives you a broader horizon because it is not focused on Europe. It is focused on the world. So, that helps. [Commission]

Well, we receive a number of reports. If it's a credible document, if the authors have access to good information and there is a good piece of analysis and the conclusions provide the indication what the problem is and what can be done. The IEA CCS Roadmap was quite a powerful report and there are other reports on specific areas. Some of the research projects that we fund on the costs of technical aspects of pipeline transport have been very useful. And we also fund particular studies, if we see a gap in knowledge. Last year we funded a study on potential CO₂ transport infrastructure. [Commission]

ZEP is different. ZEP is a good network of industry and stakeholders in Europe that works for the advancement of CCS and it's set up to provide input to us. [...] Then you have political bodies that we support internationally: the IEACCC, the IEAGHG, the IEA themselves, the GCCSI, the CSLF, the Major Economies Forum which has the Clean Energy Ministerial. [Commission]

The multi-level system of governance is considered to contribute a variety of sources of technical information on CCS that act as countervailing forces. Thus, the multi-level system of governance in the EU can be considered to constitute a system of “checks-and-balances” with regard to the supply of the technical information [cf Greenwood, 2011, 3f]. The account of the multiplicity of sources of technical information relevant for policy-making in the field of CCS in the EU shows the importance of the international level of decision-making. The pattern of interaction between TOA and the Commission described above reflects the pluralistic setting of interest mediation.¹⁴¹ It is based on the competition between the large variety of groups which result in an equal representation of all interests. According to the account of the process to formulate the themes for the Framework Programs given above, the results of this process present pluralistic “checks-and-balances” outcomes.

Summary Box 26

The formal status of ZEP does not enhance its influence, if the exchange processes between the Commission and groups are driven by the need of the state actors to acquire the resource input legitimacy. Among the transnational TOA, IEAGHG benefits from its positioning as the provider of “policy-relevant but not policy prescriptive information” that reflects the international perspective and contains only technical issues.

VII.2.1.3 Reciprocity in the Supply of the Resources

The formal status can be applied as an explanatory variable for the level of influence, if both the groups and the state actors are capable of offering the resources for the exchange. The formal status of ZEP as an advisory body to the Commission allows regular contacts between the Commission and the members of ZEP. Further, ZEP identifies the Commission as the main target group for the work deliverables. The influential position of ZEP which is reflected in the adoption of its concepts and ideas by the Commission provides a powerful selective good for the members of ZEP to contribute the resources for further production of work deliverables.

It [CCS-author] is an extremely important issue for industry, for society and for the European Commission. We [ZEP-author] are trying to reach a favorable outcome which meets the targets set by the Commission. [ZEP]

¹⁴¹ The account of the interest mediation system in the CCS policy sector as pluralistic corresponds with the results of previous research on the patterns of interest mediation in the EU, cf section II.2.2.

I think the second part which is crucial is that the recommendations and proposals which are made are listened to and acted upon by the European Commission. So, we can see clear evidence of ZEP having a profound impact on what's happening in Europe on the matters of CCS. [ZEP]

The formal status of ZEP as an advisory body to the Commission also provides the regular contacts to the representatives of the EU member states via the Government Group. However, the level of exchange between the members of the Advisory Council of ZEP and the Government Group cannot be compared to that of the Commission [ZEP, 2009a]. Despite the formalized contacts, the members of the Advisory Council lack the incentive to produce the work deliverables to influence the members of the Government Group because those are not in the position to influence the decision-making in their countries. In contrast to the representatives of the DGs which are responsible for policy formulation in their issue areas, the members of the Government Group lack the resource *relevance for decision-making* (cf section II.2.3.1).

- The function of the Government Group is to make sure that we [*the Advisory Council of ZEP - author*] get the input from the member states and also we are able to consult with them and to find out what would work on a country basis as well.
- Do you get this input?
- It's variable.
- Could you please elaborate on "variable"?
- So, I think we have very good connections with the European Commission. I guess the connection with each of the member state countries is not as good as with the members of the Commission.
- Why?
- It's just less direct because we only have one person from the Government Group on the Advisory Council. We don't actually interface with each of the member state countries [...]. The other thing is that the people who are involved from the member state countries from that group are not particular senior administrators. So, they are not able to make commitment to decisions.
- So, they don't have a mandate?
- They have a weak mandate. It would be helpful to have access to more senior members of government. [ZEP]

The formal status provides the groups with the access to the state actors (Commission, member states' representatives) however an important precondition for the exchange relations is the reciprocal capability to supply the resources.

The crucial resource that can be offered by the state actors is their relevance for political decision-making. The formal status that provides a group with a privileged access to the state actors that possess decision-making competences in the relevant policy field indicates that there is a powerful selective good for the group to produce work deliverables and foster the exchange processes with the state actors. In this case, it can be assumed that such group will be influential. In turn, the formal status does not lead to the influence of the group that provides privileged access to the decision-makers without the mandate to shape policy in the respective field.

The document analysis of the organizational properties of ZEP showed that due to the formal status as an advisory body to the Commission, the level of organizational development of ZEP is characterized through the limited resource autonomy. The members of ZEP contribute the resources needed for the production of the work deliverables on a voluntary basis. Without the powerful selective good that provides a rationale for the members to contribute their time and money to the production of work deliverables, the formal status of TOA will not outweigh its inability to act.

Summary Box 27

The example of ZEP shows that formal status can be applied as an explanatory variable for the level of influence of the groups, if both the groups and the state actors offer the resources for the exchange.

VII.2.2 Level of Organizational Development

The document analysis of the influence of TOA showed a variation among TOA which are the focus of the analysis. The administrative interest mediation approach claims that the organizational properties of an association relate to its influence.

An organization that pursues the goal of influencing the political decision-makers will structure itself in a way that improves the exchange processes with the state actors. According to the approach, the associations are driven by two sets of contradictory logic – the logic of membership and the logic of influence. The former drives the exchange relationship between the organization and its members with the purpose to enable the survival of the organization or its growth. The latter drives the exchange processes between the organization and the state actors whereas groups must offer sufficient incentives to be able to access state authorities and influence them. The logic of membership requires that the organization satisfy the needs of the membership and thus ensure the stability of the organization. The logic of influence requires the organization to reject short-term demands of the members in favor of strategic planning. In order to do so, the organization driven by the logic of influence seeks to diversify its supply of resources in order to reduce the dependence from the membership (resource autonomy) and to acquire enough autonomy to be able to set strategic goals and identify means of achieving them (strategic autonomy). The associations are always driven by both sets of logic whereas either of the sets can dominate. Both sets pose contradictory demands on the level of organizational development of an association.

The concept of organizational development introduced by the administrative interest mediation approach relates to the importance of the collective action for an association. The organizational development of TOA encompasses the aspects that refer to the scope of the interests represented by the participants in an association (comprehensiveness) and the way these interests are structured to contribute to the collective interest (structure), the

structure behind the supply of the resources needed to produce the work deliverables (resource autonomy) and the capacity of the association to set goals and means of achieving them (strategic autonomy). Figure 2 outlines the relationship between the characteristics of the organizational development and the influence of an association.

VII.2.2.1 Target Groups for the Work Deliverables - Satisfying the Needs of the Membership vs. Dissemination

An inquiry to the representatives of TOA to identify the most important work deliverables indicates whether the production of work deliverables in TOA predominantly addresses the needs of its membership or is rather driven by the strategic considerations to satisfy the demand for information of policy-makers. According to the administrative interest mediation approach, the former pattern of the exchange processes is driven by the logic of membership and the latter by the logic of influence.

ZEP, IEAGHG and the CSLF identify as the most important work deliverables those which find access to the political decision-making process by being considered and accepted by political decision-makers.

One of them [*most important work deliverable - author*] undoubtedly was the capture ready piece of work that we did. Because [...] it was quoted and used extensively by the European Commission as it was then in the CCS Directive and it's been used by the number of national governments, by the UK government in their consultation plans on the implementation of the CCS Directive. [IEAGHG]

I think the work that we did with the G8 to accelerate the research, development, and demonstration of CCS. And this work went to the heads of states and it laid out all of the issues and made recommendations for resolving them. [CSLF]

Well, I guess what has been was the funding mechanism, so the NER 300 was the major policy objective of the ZEP and others as well but ZEP was the major player in that discussion. [...] I think early on, the really big focus was to get CCS actually recognized as a key part of the energy future of the EU. So, it was establishing its credibility. [ZEP]

ZEP, IEAGHG, and the CSLF relate the importance of their work deliverables to their influence on political decision-makers. This indicates that the activities of these TOA are driven by the logic of influence. It means that those TOA aim at influencing the state actors.

The Clean Coal Centre differs from other TOA with regard to the definition of the most important work deliverables. It identifies the important work deliverables on the basis of the membership's ranking in the framework of topic selection for technical reports.

- Against the background of the goals of the Clean Coal Centre what are the most important work deliverables or what have been the most important work deliverables?
- I don't think that the members have ever set down and done a rating like this. But if you look at the selection of topics they come up with that would give you an indication what they see as the most important. [Clean Coal Centre]

The reference to the membership's ranking with regard to the identification of the most important work deliverables indicates that the members present the primary audience for

the output of the Clean Coal Centre. The orientation toward the fulfilling of the needs of the members suggests that the exchange processes in the Clean Coal Centre are dominated by the logic of membership. This argumentation supports the results of the document analysis that shows the lack of influence of the Clean Coal Centre on European CCS policy.

According to the administrative interest mediation approach, an organization that produces its work deliverables for the members resembles a company that sells its services to satisfy the needs of the customers. Such work deliverables will respond to the short-term needs of the members and acquire little visibility. An organization that seeks to exchange the resources with the state actors will develop strategies that overcome the short-term needs of the members in favor of strategic planning and action. In the portfolio of such strategies, the dissemination of the work deliverables beyond the membership plays an important role.

The identification of political decision-makers as a target group for the work deliverables of the Clean Coal Centre is a new development which is expected to gain in importance. Thus, the Clean Coal Centre highlights the importance of the contribution to the work deliverables produced by the IEA as a means of communication to the policy-makers. In this context, the Clean Coal Centre identifies the contribution to the IEA yearly World Energy Outlook as influential due to Outlook's role as the flagship publication of the IEA.

- Do the members sometimes suggest producing certain work deliverables in order to influence policy-makers?
- Very occasionally. But I think that might become more common. We have from time to time selected studies which are clearly policy orientated rather than technical. That's not always easy for us to do because we are mostly technically orientated but we usually managed to do it. And sometimes the value of review is quite important. We concentrate on doing reviews. So for instance we might look at carbon management approach in the EU and contrast them with the USA, that type of thing. And that's helpful for policy-makers. [Clean Coal Centre]

So for instance, this year the World Energy Outlook, which is the signature publication that everybody uses, this every year focuses on something and this year it's going to focus on coal. Not surprisingly [...] several staff [...] [is] contributing to that, so we have an influence through that indirect route. [Clean Coal Centre]

An alternative explanation for the lack of influence of the Clean Coal Centre at European CCS policy can be considered on the basis of the focus of the work program of the Clean Coal Centre. CCS has only recently become the focus of the activities.

Well, what I'm saying is that the actual ranking of the topics for reports and reviews would give you an indication on... [*the most important work deliverables* - author]. And now it's nearly all carbon capture and storage comes out near the top. Five years ago it wouldn't have been true. It would have been a mixture. In fact it has got to the point where I'm actually reminding members that we are not just doing carbon capture and storage we have to also cover other areas. [Clean Coal Centre]

Going right back to 2003, it was obvious that the Clean Coal Center would have to start getting involved in some CCS related activities because as you had just pointed out it started growing important - the governments have started taking it into policy. Whereas up to that point it has just been a technical curiosity. And so we have a problem in the Clean Coal Center in the fact that the IEAGHG, the sister organization, which is focused entirely on CCS, well, almost entirely on

CCS. Nevertheless we couldn't see any way in which we could do coal, particularly the coal-fired power, which is the major activity that we do without looking in some sense on carbon. And so we decided that we would concentrate on carbon capture rather than looking on the transport and storage side which was left to the Greenhouse Gas Program. [Clean Coal Centre]

Regarding the decision to address CCS-related topics, the Clean Coal Centre faces limited strategic autonomy, i.e. the Clean Coal Centre cannot independently set goals and define means of achieving them due to the necessity of coordinating the activities with IEAGHG, which is focused only on CCS.

Whereas CCS is growing in importance in the activities of the Clean Coal Centre, the CSLF, ZEP and IEAGHG focused on CCS since their foundation. The results of the document analysis show that, among the supranational decision-making bodies of the EU, only the Commission refers to the work deliverables of TOA. The interview data indicates that, among TOA, only ZEP identifies the Commission as a target group for its output. The CSLF, IEAGHG and the Clean Coal Centre do not explicitly address their work deliverables to the policy-makers in the European context.

[...] we tend to do it [*produce the work deliverables - author*] in the international context. Although sometimes they are more appropriate for different regions than the other. [IEAGHG]

Not necessarily in the European context. We have all of these members as you know and so we have them located all over the world. They really are on all continents that are inhabited. [CSLF]

Thus, it can be concluded that the Commission is not regarded by TOA as a provider of the specific resources other than those that can also be supplied by other members. *The lack of the clearly defined target group for the work deliverables besides the membership has implications for the organizational properties of TOA that seek to produce work deliverables that are relevant for policy-makers. It enhances the importance of the strategies to disseminate the work deliverables beyond the membership.*

Although IEAGHG does not particularly consider the Commission as a target group for the work deliverables, the document analysis of the influence of TOA shows that the Commission draws from the work of IEAGHG. The work deliverables of IEAGHG address political decision-makers and stakeholders relevant for the development and deployment of CCS in the international context. In order to access those, the activities of IEAGHG encompass the strategy of proactive dissemination of the work deliverables beyond the membership (cf section VI.3.1). On the one hand, it is achieved through the institutionalized cooperation with other TOA, international organizations and organizations in the IEAGHG member-countries; on the other hand, through strategies to facilitate the dissemination of technical reports.

We sit on a technical group of the CSLF. We are the only non-member organization there, non-country member. We have a research provider agreement with the GCCSI. I sit on the technical advisory committee of the GCCSI. Tim has been seconded to GCCSI to help them in various areas. We sit on the technology group of the EU ZEP, the policy group of the EU ZEP [...] boards like CATO, we sit on the advisory board of CATO which is a Dutch national program on CCS. [...] We have an arrangement with the US DOE in that we undertake an independent peer review every two years of their original carbon sequestration program. That's their flagship R&D program we

sit on that and advise them on their direction and strengths and weaknesses and that and help that program to refine it over the years. [IEAGHG]

We did restructure the dissemination strategy and as I recall at that time it was led by us [*Operating Agent - author*] because we had concerns that the results were not getting out as broadly as we wanted. Previous project director was keen on the members doing the work. And we now take much more the lead of getting the information out, you know, by conferences, the Greenhouse Gas issues, the websites, etc. I believe that worked. I believe that profile has gone up. [IEAGHG]

The members have recently voted to change the policy on the dissemination of the reports. The reports have been originally restricted in order to be sold to the non-member countries. We would hold them for a year before we could sell them and now they are taking away the sale so after six months we can give them to anybody so we give them away free. In the past it was seen as something of a club and the price for being in the club was that we kept the reports but now we want to disseminate the information as much responsible. [IEAGHG]

The interview data shows that IEAGHG emphasizes the importance of disseminating its technical reports beyond the membership. This emphasis distinguishes IEAGHG from other TOA as the focus of the analysis. The decision to abandon the technical reports as a selective good that is available only to the members of IEAGHG in favor of the widespread dissemination pursues the goal of communicating the work deliverables to political decision-makers.

Important audiences for most of those studies were actually the policy-makers, I guess. For those particular studies. That's quite interesting because we actually say that our primarily audience is the technical area. [...] Because these are technical reports. We don't produce policy prescriptive material. We provide technical studies that we hope will be used by the policy-makers we don't have a deliberate intent to influence the policy-makers. [IEAGHG]

According to the administrative interest mediation approach, the strategy to diversify the target groups for the work deliverables beyond the membership is driven by the logic of influence and reflects a high level of organizational development of TOA. Thus, the level of influence of IEAGHG corresponds with the causality developed in hypothesis B¹⁴².

Both ZEP and IEAGHG are considered to have a high level of influence on European CCS policy according to the document analysis. In contrast to IEAGHG, ZEP does not pursue active international cooperation and focuses at the CCS policy sector in the EU. Two factors would facilitate international cooperation – the overlapping memberships between ZEP and the transnational TOA such as the CSLF, the GCCSI, and IEAGHG, and the growing importance of the international cooperation for the fulfilment of ZEP's targets. Although ZEP recognizes the importance of the international cooperation, the focus of the activities was predominantly directed at Europe. The lack of resources is considered to impede a comprehensive collective action in this field.

- I think in the first period of ZEP's existence the focus was mainly on getting the thing going in the European Union itself. The demonstration program, the legal framework and so on. There was interest in other countries but only when we had time or opportunity for that. It's

¹⁴² Cf Summary Box 21.

now becoming clear that the demonstration program that we think is necessary is not going to come fully about in Europe. We thought we needed 10-12 projects, it looks now that we are getting 5 or 6. That forces you to think about cooperating with other countries. In order to create some sort of the global knowledge-sharing. So, in that sense, the cooperation with other countries is becoming increasingly important. And it goes specifically for the US and for Australia, that kind of countries that have the volume to complement to the demonstration effort. But other countries like China are a different topic. Everybody recognizes, that if you really want to do something about CO2 emissions, you need to focus on countries like China because they are building coal-plants at a very fast pace. But we are only able to do that when we have the opportunity. Two years ago we had a Chinese delegation coming, we explained them how it works in Europe, they seemed very interested. It appears now that they set up something similar in China, the same concept of stakeholders together trying to find a common view on the ways forward. But we really haven't engaged with them afterwards, after this meeting.

- Why not?
- There is only so much we can do. We've got overloaded agendas. It is important but we'll take it up when we get an opportunity. We got too much to do. [ZEP]

There hasn't been very close cooperation with the GCCSI by the way. At our meetings we connect with agenda setting but we don't do very much with them. [...] I think ZEP is trying to get things working in Europe, European level and GCCSI is a bit broader. There have been excellent connections though. The CEO of the GCCSI for a long time has been Nick Otter. Before he joined the GCCSI he was the chairman of the ZEP Coordination Group. But we've never exploited this to the full extent. [ZEP]

The goal of ZEP is to contribute to the commercial availability of CCS as a climate change mitigation option in the EU [ZEP, 2009d, section 2.1]. The formal status of ZEP that provides a privileged access to the Commission and the reciprocal availability of the resources between the members of ZEP and the Commission enable the effective exchange of resources. The example of the strategic action of ZEP in the case of the development of NER300 (Table 20) shows that the Commission is not the only target of ZEP's activities. However, the interview data indicates that the cooperation between ZEP and policy-makers at the international level as well as between ZEP and the EU member states did not develop to the level comparable to the cooperation with the Commission. It remains an open question, whether the institutional framework of ZEP which is directed at the efficient exchange of resources with the Commission provides for the overall goal of CCS development and deployment, if it does not likewise pursue the resource exchange with the EU member states that are responsible for the technology implementation.

Summary Box 28

Clean Coal Centre differs from other TOA in its identification of the membership as the most important audience for the work deliverables.

Among TOA, only ZEP identifies the Commission as a target group for its output. The CSLF, IEAGHG and the Clean Coal Centre do not explicitly address their work deliverables to the policy-makers in the European context. The lack of the clearly identified target group for the work deliverables enhances the importance of the dissemination strategy. Among TOA, IEAGHG has the strongest emphasis on dissemination of its work deliverables beyond the membership.

VII.2.2.2 Relative Autonomy, Consensus, and the Availability of Resources

Despite the formal status of ZEP that provides privileged access to the Commission, the exchange of the resources requires from ZEP the capability for the effective production of work deliverables. The interview data indicates that both TOA, which are considered as influential basing on the results of the document analysis, developed the organizational properties that allow a timely supply of work deliverables relevant for political decision-makers. The organizational properties that enhance the influence of TOA encompass:

- the relative autonomy of the professional staff unit or a small group of the elected leaders that allows suggesting strategic action,
- the organizational strategies to manage heterogeneity, and
- the availability of the resources that allow pursuing the strategic action.

The timely production of the work deliverables is important for fulfilling the current demand for information by the state actors or for introducing a new topic into the ongoing discussion. IEAGHG and ZEP provide the professional staff unit or the small group of elected leaders respectively with enough autonomy to be able to suggest strategic action and to coordinate the supply of resources toward common objectives.

IEAGHG highlights the importance of the work deliverables which respond to the current demand on information about particular CCS-related issues that are not directly related to the needs of the members. Due to the strategic considerations those work deliverables can be initiated by the IEAGHG professional staff.

Another big deliverable we produced is our work on CCS in CDM. We have done a lot of background work on that providing information on the cost of how CCS, if it was included into CDM, will affect the markets for CERs actually and feeded it into COP. It was produced before Copenhagen. It was designed to offset some of the NGO responses at the time which were saying it was going to have a disastrous effect on the cost of CERs. [IEAGHG]

Well, this [*CCS in CDM study* - author] was actually a very good piece of work and it was a very positive outcome that CCS finally was considered as a part of the CDM. Of course, we praised this development. The IEAGHG had prepared the work by themselves but of course all members agreed with that. So, it was not against our will. [Commission]

Similarly to the relative autonomy of the professional staff of IEAGHG which allows it to react quickly, the organizational structure of ZEP gives a small group of members' representatives the relative authority to make quick decisions (see section VI.2).

Maybe you know the structure of ZEP. It's called the Advisory Council that meets every four months. There is an Executive Committee that will only make decisions, if urgency is required, and if issues are non-contentious. If we feel that the decision could receive a bad reception by any of the 40 members, then this Executive Committee won't take any decisions. [...] Although in practice, we are able to make quick decisions. Those contentious issues, we know how to avoid these issues. The speed of the decision is determined by the Executive Committee and that's a group of six people that have to react in a time period of three days. So, we can take very quick decisions. [ZEP]

Having suggested the strategic action, it is a matter of management of the heterogeneity of interests of the members for an idea to be approved. Based on the interview data, it can be concluded that the management of the heterogeneity in all TOA does not draw from the possibility of rejecting the minor opinions by means of majority decision-making procedure. Therefore, the decision-making dimension of the organizational development¹⁴³ cannot be applied to TOA to identify the level of strategic autonomy as suggested by the administrative interest mediation approach. The approach assigns the organizations with the majority voting procedure a higher level of strategic autonomy. In contrast to the consensus-oriented decision-making, the majority voting allows rejecting the short-term demands of the membership and therefore contributes to strategic planning. Although the official documents of ZEP, IEAGHG, and the Clean Coal Centre allow for majority voting, the working procedure of all TOA is clearly consensus-oriented. The diverging opinions among the members are sought to be integrated not only in IEAGHG and ZEP but also in the CSLF and the Clean Coal Centre.

It's normally consensus. Kelly [*chairman of IEAGHG - author*] will ask for any members who object. And very rarely do we get an objection. So, the members around the table will vote in one accord. And that's both country members and sponsors. Formal voting happens only with regard to the admission of new members. [IEAGHG]

[...] We normally talk it through among ourselves. Where we have the technical studies, of course, members have to vote on the technical studies. And so we propose something like 12 or 13 technical studies to them, all members vote. So, we then go to the executive committee meeting for approval. In those cases they would debate around the table and we had cases when one of the top studies wouldn't go forward. For example the study on capture, [*the name of the Sponsor – deleted by the author*] opposed, the study didn't go forward - something goes through that is in everybody's interest. [IEAGHG]

[...] how do we get consensus, I'm afraid that is really in the hands of someone like the chairman of ZEP because the consensus is essential. We don't work on the basis of the majority votes, very rarely. It has to be a consensus decision. We've had a few really difficult decisions. One of them was the knowledge-sharing proposal the ZEP made. Once the demonstration program was sort of in place, the Commission asked us to develop a proposal for knowledge-sharing. And there we got two constituency groups that were very different in debate. So, the equipment manufacturers [...] they consider the intellectual property as their key competitive advantage that they would never give that away. And the NGOs think of a wider societal importance. There are developing countries, China and so on, and if the price is too high for technology they won't implement the technology. So, they wanted a sort of forced deployment of the technology. ZEP refused to act on a majority basis there. Eventually in the long sessions we were able to reach a consensus formulation that was satisfactory to all. And that has worked. So, that's how we deal with these issues. It's just a lot of talking. [ZEP]

- [...] it's all done by consensus around the table and that works very well by the way. Try to avoid formal voting, if you run one of these things.
- IEAGHG or Clean Coal Centre?
- Well, either of these. Formal voting is divisive. It's all right, when we are talking about selecting topics and taking them for further discussion. But you really want to try and avoid

¹⁴³ Cf section IV.2.2.

formal voting. [...] Because it could lead to the bad feelings. It's much better to get consensus, if you can, around the table to get people say, well, that's reasonable. [Clean Coal Centre]

Well, we don't really make very tough decisions there [CSLF-author]. It's mainly consensus that you reach. We never vote. We don't have to vote because there are no issues around the table that need voting. The decision-making is normally done on "Should we ask the Policy Group to extend the term for the next period?", "Do we accept the new strategic plan?", etc. I never in all our meetings came across to someone who wants to block this. You can have a discussion, you can say, well, I like the document but we still have some problems with this and this and this. Then the Secretariat can work with those people and propose new wording, etc. until everyone agrees. It's normally the way we work. It's very much consensus-oriented. No one needs any voting because voting leads to winners and losers. If you vote, then some people vote against, then they are overruled, they are not happy and this is not what you want. [Commission]

The section on the organizational properties of TOA characterized ZEP as a TOA with the highest level of organized complexity (section VI.4). The structure of ZEP is optimized toward an effective exchange of resources with the Commission. The interview data highlights the specific organizational structure that facilitates the process of arriving at a consensus.

The structure is rather complex. One of the strengths of the ZEP are the constituency groups within the organization. So, we have the equipment suppliers, utilities, oil and gas companies, NGOs as well, academics. [...] And we have a very particular structure that we operate within the program. So that all the constituent groups are represented at the AC level and at the Executive Group level. Where any decisions need to be made, we do that by voting. And each constituency group has an equal vote. We strive for unanimity but sometimes we have to go with majority. We have a very particular structure. Achieving consensus and unanimity is quite hard given diversity of the stakeholders involved. So, we have very lengthy sessions on particular issues which are quite tricky to get to a consensus given the variety of stakeholders involved. [ZEP]

Most of the activities are done in the task forces. So, we have structure of the task forces focused at the specific work. We have a policy taskforce, a technology taskforce, a communication taskforce – five or six taskforces. And we invite all the companies who are participants to ZEP to engage in taskforces and do the work. So, they feel that they contribute to the results. And the taskforces produce work to the Advisory Council. And the Advisory Council has all the stakeholders involved. And when it comes to voting, we have divided all constituencies into groups. So, we have somebody here to represent the European coal and fuel companies, some of the vice chairs represent oil and gas and fossil fuels companies in Europe. We have somebody here to represent power utilities. We have somebody who represents all equipment suppliers. We have somebody here who represents all the NGOs and somebody who represents all the academics in Europe. So they bring it to a head where at least four or five people are able to negotiate where we can achieve the consensus rather than having 1500 people involved in the negotiation. [ZEP]

The autonomy of the professional staff or a distinguished group of members to pursue activities that reflect strategic considerations depends on the availability of sufficient resources to produce the respective work deliverable. Concerning the activities of IEAGHG, the interview data did not indicate a gap between the strategic objectives and the resources needed to achieve them. The analysis of the organizational properties of TOA characterized the resource autonomy of ZEP as limited due to a voluntary supply of the resource funding, information, and labor by the ZEP membership (section VI.2). While recognizing the

limitations of ZEP, the interview data shows that the members of ZEP contribute the resource finances, labor and information in a way that allows pursuing the objectives of the organization.

The main objective of the ZEP has always been to enable the commercial availability of CCS by 2020 and the activities have been described in two strategic plans. All these Technology Platforms do this. They write the strategic research agenda and the deployment document. In fact, the objective was translated into the number of actions. You can see it in the structure of ZEP. There are actions in the field of demonstration. So right from the start, we tried to get the demonstration program off the ground. Part of the activities was aimed at the technology development itself. So it advocates the boost of the research program. Right from the start, ZEP was worried about the public acceptance. Therefore, slowly working towards public acceptance has become part of the activities, although ZEP is of course a small organization. They could never deal with public opinion at large. They have tried to put the issue on the agenda. And the fourth action line was policy and regulation. So making sure, for example, the legal framework is in place. And those activity lines can be recognized right from the start. [ZEP]

The Commission also highlights the availability of the resources in ZEP that allows it to pursue various goals.

I would say that ZEP still provides the functions it was set up for which is giving technical input into our research programs but at the same time ZEP became a bigger organization. It expanded its role through use of industry money and contributions of its members. So, it allows it to pursue other things as well. The recent cost report is an example. They did a report on knowledge-sharing. [Commission]

The data shows that the drivers for the voluntary engagement of the ZEP members are considered to be the business interests of various sector-specific groups involved in the work of ZEP¹⁴⁴, the personal driver to be involved in the development of measures to mitigate climate change, and the experience that the recommendations of ZEP are considered by the Commission.

The importance of the resources can be further demonstrated by the example of the capacity-building program of the CSLF. It highlights the importance of financial resources in order to pursue strategically important activities.

It's extremely important issue [*engagement of the emerging economies - author*]. As you know China and India will be using significant amounts of fossil fuel coal and they have very large population. So, the energy demand is increasing which means that for those of us who believe in mitigating climate change or helping to mitigate global warming that it is important to work with countries like China and India and the developing countries like India and South Africa. We have the five sort of emerging economies that we are working with. We have over the 10 years had the capacity building activity which involved those countries. Now however we are getting ready to go to a sort of a broader program. I would describe it as a broader program because now we have some funding. In the past we did so that the countries had to help fund this, now we have funding. We have about I would say 3 million dollars which have been given to the CSLF by Norway, United Kingdom, Australia, and Canada. [CSLF]

¹⁴⁴ Cf section VI.2, Figure 9.

The Clean Coal Centre demonstrates how the shifts in the availability of the resources impact the strategic planning of TOA.

[...] it's not the accident that we have seven of our members from developing countries from this sector. Because it is clear that the interesting and the better use of coal is going to be more there [*non-OECD countries - author*] than it is here [*OECD countries - author*]. But that creates a conundrum, the riddle, a problem for us because, although all these countries [*non-OECD - author*] are interested in what we do, they don't want to pay. These people [*OECD countries - author*] broadly speaking have a lessening interest over time but that's where the money comes from. So with 80% of our income comes from the USA, UK, Germany, Japan, and Australia, those five. So any one of those defaulting, changing its position, deciding it's no longer interested putting money in the Clean Coal Centre causes a major problem. Lose one or two sponsors from this area [*non-OECD*], it is actually in the operational terms not the problem. So, I have this problem of knowing from the global perspective where the effort needs to go, but knowing equally that these guys are not paying for it. [Clean Coal Centre]

According to the administrative interest mediation approach, the lack of the resources that impacts the organizational growth or survival limits the capacity of an association to strategic action and long-term planning. It disposes an organization to the fulfillment of the short-term preferences of the members that are the major providers of the resources. The limited resource autonomy and strategic autonomy are considered to relate to the low level of influence.

Summary Box 29

According to the results of the analysis, ZEP and IEAGHG are considered to be the most influential. Both TOA share specific organizational strategies. They provide relative autonomy to the professional staff or to a group of the elected leaders for suggesting strategic action. They develop organizational strategies to manage heterogeneity. They acquire enough resources for pursuing the strategic action.

VII.3 Summary of the Findings

The results of the analysis show that TOA have influence on policy-making in the EU. The work deliverables of TOA find access to political decision-making process by being considered and accepted by political decision-makers. Among the European institutions only the Commission refers to the work deliverables of TOA in its documents. With the exception of the CCS Directive and the EEP regulation, the references to the output of TOA were found only in the documents issued by the Commission.¹⁴⁵

Regarding the access of knowledge to political decision-making process, the influence of TOA varies according to two aspects. First, the scope of the influence of TOA varies. ZEP and IEAGHG have a comparatively high level of influence. The CSLF has a low level of influence. The document analysis did not reveal any influence of the Clean Coal Centre. Second, the

¹⁴⁵ Cf Table 22 in the Attachment 1.

kind of information that was accessed by the Commission from TOA varies. The Commission considers both the transnational (the CSLF, IEAGHG) and the European (ZEP) TOA as a source of technical expertise whereas for policy recommendations the Commission accesses the work deliverables provided by the European stakeholders (ZEP).

Regarding TOA active at the international level, the results of the interviews highlight the importance of the work deliverables beyond the expert knowledge. The Commission regards the transnational TOA as the channels for accessing the international community with the purpose of communicating the European CCS R&D and policy as well as establishing contacts to political decision-makers and stakeholders in the developed and developing countries.

TOA define those work deliverables as important which find access to political decision-makers. Thus, their understanding of the influence reflects the definition adopted in this research project. However, TOA highlight particularly those work deliverables that were considered to contribute to the overall advancement of CCS. While recognizing that TOA consider the linkage between the work deliverables and the overall progress of CCS, the project argues in favor of the approach to study the outcome level of influence.

The formal status of a group facilitates the exchange of the resources through the institutionalized form of regular contacts between the state and non-state actors. Thus, the formal status of ZEP as the Technology Platform and the advisory body to the Commission enhances the importance of spoken communication as the type of activities that modify or alter public policy. However, the example of NER300 shows that the written work deliverables – letter and recommendations – were frequently used as a tool for interest mediation, with the difference that those work deliverables were not referenced by the political decision-makers during the policy formulation process. Therefore, in order to account for those patterns of interaction, we are confronted with the common problem facing the scholars studying interest mediation processes – how do we measure the change, if we want to encompass the greatest possible variety of activities that alter or modify public policy into the concept of influence?

The formal status as a factor facilitating the exchange of the resources faces limitations, if the group does not provide the resource legitimacy. The Commission highlights the role of ZEP as one of many providers of the resources relevant for CCS policy formulation. The complexity of the multi-level governance system of the EU is considered to provide a broad variety of opinions. Therefore, with regard to the supply of policy-relevant information, those characteristics of the multi-level governance of the EU allow comparing it with the system of “checks-and-balances.” The transnational TOA IEAGHG, the CSLF, and the Clean Coal Centre are considered to form part of this system.

The formal status of a group facilitates the exchange of the resources between the state actors and groups, given the reciprocal capability to supply the resources. Despite the formal status that provides the members of ZEP with access to the EU member states, the analysis of the organizational properties of TOA and the interview data let us conclude that the level of the exchange processes between these groups is beyond the level of cooperation

between ZEP and the Commission. The EU member states do not provide the resource *relevance for political decision-making* to the same extent as the representatives of the DGs relevant for CCS policy formulation in their fields of concern.

The identification of the most important work deliverables indicates that the activities of the CSLF, IEAGHG, and ZEP are driven by the logic of influence as these TOA relate the importance of work deliverables to their influence on decision-makers. The Clean Coal Centre refers to the membership's ranking of the topics for technical reports. The administrative interest mediation approach understands the orientation toward the needs of the membership with regard to the production of the work deliverables as a domination of the logic of membership.

Among TOA which are the focus of the analysis, only ZEP has a clearly defined target group for the work deliverables – the Commission. For TOA that do not have a clearly defined target audience for the work deliverables beyond the membership and that are driven by the logic of influence, the dissemination strategies gain in importance. In this context, IEAGHG emphasizes the importance of a variety of dissemination strategies to access political decision-makers beyond the membership. According to the administrative interest mediation approach, the strategies to diversify target groups and the types of the work deliverables are indicative of an organization with a high level of influence. The lack of the comparable dissemination activity by ZEP indicates the importance of the Commission as the main target audience for ZEP's work deliverables.

The document analysis showed a comparably similar level of the influence of ZEP and IEAGHG. The analysis of the interview data indicates the similarities in the organizational strategies of both TOA. IEAGHG and ZEP developed the organizational structures that allow a small group of professional staff or elected leaders initiate the work deliverables. Whereas all TOA pursue consensus-oriented management of heterogeneity, ZEP develops specific organizational properties that facilitate consensus. The availability of the resources is highlighted by all TOA as an important precondition to produce strategically important work deliverables that go beyond the needs of the particular members.

VIII Conclusions and Outlook

The pursuit of the climate change mitigation policy in the framework of the technology-oriented approach led to the development of the specific forms of transnational cooperation between the state and non-state actors. These forms of cooperation aim at the support of development and deployment of innovative technologies for the reduction of GHG emissions. In the literature, they have been referred to as the transnational TOA. The research interest of this PhD project focused at the influence of the transnational TOA on policy formulation in the EU. As the empirical field of application, the project considered the development and deployment of CCS technologies. In the framework of the comparative analysis, the study investigated the scope of influence of TOA and accounted for the factors which explain the variation of influence. The focus of the research project was directed at the analysis of the collective action. The research project contributed to the study of interest mediation processes between the public actors and groups in the context of multi-level governance system of the EU.

The analytical framework encompassed an understanding of the decision-making system of the EU as the multi-level governance system and applied the administrative interest mediation approach to account for the rationale and the strategic considerations underlying the exchange processes between the state actors and groups.

The research project developed two hypotheses that guided the analysis. The level of influence of TOA was claimed to vary:

- with the formal status in the decision-making system of the EU, and
- with the level of the organizational development.

The research project addressed both hypotheses in the framework of the systematical analysis that was structured in three major parts – the analysis of CCS policy sector of the EU, the analysis of the organizational properties of TOA, and the analysis of the influence of TOA.

The question whether transnational TOA have influence on policy formulating process leads to an affirmative answer. The work deliverables of TOA find access to the political decision-making process by being considered and accepted by political decision-makers.

The hypotheses on the variation of influence can be conditionally confirmed by the results of the analysis.

The formal status relates to the influence of the group, only if the formal status provides the group with an access to a resourceful state actor. If the state actor is not capable to provide the resources for the exchange, the group will lack an incentive for the collective action and will not be influential. Thus, in order to indicate the level of influence of the group with a formal status, it is important to determine, whether the state actor, which is the target group for the work deliverables of TOA, is capable of providing the resources. The privileged

access to the resourceful state actor is a powerful selective good for the group to organize itself in a way to enable the most effective exchange of resources.

The relation between the level of the organizational development and the influence is particularly evident, if applied to the analysis of the influence of TOA without formal status in the decision-making system. The formal status of TOA impacts its organizational structure and strategies. The formal status provides the group with a privileged access to a distinctive state actor. The influence of the group depends then on the reciprocal ability to supply the resources. In contrast to this, TOA without the formal status in the decision-making system lack a clearly identified target group for the work deliverables beyond the membership. That enhances the importance of the management strategies described by Schmitter & Streeck [1981].

The analysis of the CCS policy sector of the EU identified the Commission as the driver of CCS policy and regulation. The results of the analysis carried out in the study do not support the understanding of the Commission as a resource-poor bureaucracy. The analysis of the CCS policy sector of the EU showed that besides the regulative, the Commission also exercised the distributive functions. Further, the funding and the monitoring of the CCS R&D projects provided the Commission with the resource information.

The analysis of the influence of TOA shows the importance of the international level for policy-making in the EU. The Commission considers the international TOA as the provider of the resources technico-economical expertise, political recommendations addressed at the international community, and as the provider of the access to the decision-makers of the developed and developing countries. The technico-economical expertise developed by TOA active at the international level is considered to present an international consensus. Therefore those TOA are considered as the provider of the resource legitimacy.

As the concept of multi-level governance originates from the studies of the European integration, it usually refers to the dispersion of the authority for binding decision-making between the European, national, and local territorial levels. The results of the research project show that a comprehensive account of policy-making in the EU calls for the modification of the concept of multi-level governance in order to include the international level of decision-making.

The following factors limit the explanatory power of the results achieved in the project.

First, the analysis showed that the precise operationalization of the concept of influence did not account for:

- the adoption of knowledge developed by TOA that was not referenced in policy documents by political decision-makers,
- the resources of TOA that go beyond expert knowledge.

The results of the documents analysis and expert interviews show that the former weakness of the operationalization of the concept of influence particularly refers to the discussion of policy recommendations in the framework of ZEP. While studying the collective action, the

formal status of an organization faces the researcher with a greater intransparency of interest mediation processes. Future work on interest mediation between TOA and state actors can aim at the improvement of our understanding of the variety of interest mediation patterns. Considering the example of interest mediation in the case of the development of the financing mechanism NER300, the research gaps in this field can be addressed by providing a detailed account of the reciprocal interest mediation processes between the public actors and TOA involved in the development and implementation of a concrete policy mechanism.

The latter weakness of the operationalization of the concept of influence particularly concerns the international policy-related TOA. The example of the CSLF showed that the Commission participated in the work of CSLF to access governance resources that go beyond the expert knowledge. Systematic research is needed to account for the contribution of governance resources that are accessed by the Commission from the policy-oriented TOA for policy formulation in the EU.

Second, the account of the CCS policy sector in the EU did not include the comitology. The comitology is a complex process of decision-making that makes specific requirements on the research design of the project. The example of the development of NER300 mechanism shows that comitology was an important stage of decision-making that required specific interest mediation activities of ZEP. Therefore, interest mediation of TOA during the comitology presents a research gap.

Finally, it is important to highlight that the interview data makes no claim to systematic analysis but contributes to the results of the document analysis.

Beyond the research gaps that result from the limitations of the research design of the current study, the analysis revealed the following analytical puzzles that can trigger further research:

- The Commission highlighted the multiplicity of the sources of information that it drew on in order to formulate the themes for the Framework Programs. The Commission portrays the organizations that supply the information as the agents exercising accountability pressures upon each other. Thus, the multi-level structure of the EU is considered to allow the wide range of interests to contribute to policy-making and thus to provide the pluralistic “check-and-balances” policy outcomes. The analysis of the membership structure of TOA and the interview data indicate the overlapping nature of the memberships of TOA at the European and at the international level. Further research is required to identify, to what extent TOA differ with regard to the membership pattern, and if the exchange processes between TOA and the Commission meet the requirements of the system of check-and-balances.
- The analysis of CCS policy sector in the EU showed that the Commission initiated the variety of forums for the exchange with the European stakeholders. The recent EII sets the goals similar to those of ZEP. As the Commission seeks the exchange with the European stakeholders, due to the limited scope of the European stakeholders

interested in CCS, the membership structure as well as the individual representatives in the EII can be expected to be similar to ZEP, if not equal. Olson's theory of collective action highlights the start-up and the fixed costs that are linked to the establishment of a new organization which seeks to pursue collective interest [Olson, 2004 (1968), 21]. Those costs make the first unit of a public good produced by the new organization relatively expensive. Therefore, it is not rational to establish new organization which pursues the same collective interest as an already existing organization. Systematic research is required to explain the driving forces behind the fluidity of the organizational landscape of interest mediation system in the EU.

- The time frame considered in the project corresponds with the CCS policy formulation phase at the level of the EU. Beginning with the publication of the Green Paper on Energy in 2006 on, the EU was effective in formulating CCS policy and regulation and developing the financial mechanisms to support the demonstration of CCS. The analysis of the CCS policy sector of the EU showed that the exchange of resources between the Commission and the stakeholders played an important role in fostering the development and deployment of CCS technologies. The analysis showed how ZEP developed the organizational properties directed at the improvement of the effective exchange of the resources between the European stakeholders and the Commission. Further, the study indicated the secondary role that the representatives of the member states played in the framework of ZEP. The empirical evidence shows that the transition to the policy implementation phase slowed down the development and deployment of CCS in the EU as compared to the rapid legislation process of the past years. The implementation of the EU CCS legislation into the member states law and the implementation of the CCS demonstration program face obstacles in the EU member-states. Systematic research is needed to investigate the impacts of the effective exchange of resources between the stakeholders and the Commission on the policy implementation stage.
- The study demonstrated the importance of the technical expertise provided by TOA for policy formulation in the EU. Greenwood claims that the influence of the groups depends on the coincidence of their message with the EU policy [Greenwood, 2011, 71]. Further research is needed to investigate whether the work deliverables of TOA contribute to an open-ended search for the policy solutions or are deployed to legitimize fixed policy outcomes. From this perspective, the focus of the research addresses the relation between the science-based knowledge and policy formulation process [cf Jacob & Jörgens, 2011, 16f].

TOA in the field of CCS which were the focus of this PhD project are not an isolated phenomenon. Previous research on TOA identified a variety of frameworks for international cooperation aimed at the development and deployment of a range of technologies that reduce GHG emissions (section II.1.2). At the time of publication, 36 Technology Platforms in five technology fields are active at the level of the EU. Therefore, the research interest pursued in this project is relevant not only with regard to CCS but concerning all those policy

sectors aimed at the support of the environmental technology innovations. Against the background of the difficulties to achieve an international agreement with binding emissions reduction targets that would succeed the UNFCCC Kyoto Protocol, it can be expected that the technology-oriented approach to climate change will gain in importance at the international level, as well as at the level of the EU and nation-states. Thus, the study of TOA as autonomous actors that influence policy and politics in the policy sectors related to environmental policy innovations will emerge as the focus of environment and climate policy analysis.

Attachment 1

Table 21: Overview of the scope of influence of TOAs

Document Number	Document Title	Number of references			
		CSLF	ZEP	IEAGHG	Clean Coal Centre
The European Council Presidency conclusions					
7880/1/09	Brussels European Council, 19/20 March 2009, Presidency Conclusions				
7652/1/08	Brussels European Council, 13/14 March 2008, Presidency Conclusions				
17215/08	Council of the European Union, Energy and climate change – Elements of the final compromise				
7224/1/07	Brussels European Council, 8/9 March 2007, Presidency Conclusions				
The Council meetings					
14825/10	3036th Council meeting, Environment				
13857/08	2898th Council Meeting, Environment				
6272/07	2785th Council Meeting, Environment				
Roadmap 2050					
COM(2011) 112	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions A Roadmap for moving to a competitive low carbon economy in 2050				
SEC(2011) 288	Commission staff working document, Impact Assessment accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions A Roadmap for moving to a competitive low carbon economy in 2050				
Energy infrastructure					
COM(2010) 677	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Energy infrastructure priorities for 2020 and beyond - A Blueprint for an integrated European energy network				
SEC(2010) 1395	Commission staff working document, Impact Assessment accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Energy infrastructure priorities for 2020 and beyond - A Blueprint for an integrated European energy network		1		

<i>Energy 2020</i>					
COM(2010) 639	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Energy 2020 - A strategy for competitive, sustainable and secure energy				
SEC(2010) 1346	Commission staff working document State of play in the EU energy policy accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Energy 2020 - A strategy for competitive, sustainable and secure energy				
<i>Options to move beyond 20%</i>					
COM(2010) 265	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Analysis of options to move beyond 20% greenhouse gas emission reductions and assessing the risk of carbon leakage				
SEC(2010) 650	Commission staff working document accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Analysis of options to move beyond 20% greenhouse gas emission reductions and assessing the risk of carbon leakage Background information and analysis Part I				
<i>Copenhagen</i>					
COM(2010) 86	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions International climate policy post-Copenhagen: Acting now to reinvigorate global action on climate change				
SEC (2010) 0261	Commission staff working document accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions International climate policy post-Copenhagen: Acting now to reinvigorate global action on climate change				
<i>CCS Network</i>					
Knowledge Sharing Protocol (2010)	European CO2 Capture and Storage (CCS) Demonstration Project Network Knowledge Sharing Protocol		2		
<i>EEPR COD/2009/0010</i>					
COM(2009) 35	Proposal for a Regulation of the European Parliament and of the Council establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy				

A6-0261/2009	Report on the proposal for a regulation of the European Parliament and of the Council establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy (COM(2009)0035 – C6-0049/2009 – 2009/0010(COD)) Committee on Industry, Research and Energy				
T6-0366/2009	Text adopted by Parliament , 1st reading/single reading, summary				
CES0873/2009	Opinion of the European Economic and Social Committee on the Proposal for a Regulation of the European Parliament and of the Council establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy COM(2009) 35 final – 2009/0010 (COD)				
663/2009	Regulation (EC) No 663/2009 of the European Parliament and of the Council of 13 July 2009 establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy		1		
COM(2010)191	Annex To the Report from the Commission to the Council and the European Parliament on the implementation of the European Energy Programme for Recovery				
COM(2011) 217	Report from the Commission to the Council and the European Parliament on the implementation of the European Energy Programme for Recovery				
<i>EU ETS COD/2008/0013</i>					
COM(2008) 16	Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community				
SEC(2008)52	Commission staff working document, Impact Assessment accompanying document to the Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emission allowance trading system				
SEC(2008) 85	Commission staff working document, Impact Assessment , Document accompanying the Package of Implementation measures for the EU's objectives on climate change and renewable energy for 2020				
PE407.778	Draft report on the proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend greenhouse gas emission allowance trading system of the Community (COM(2008)0016 – C6-0043/2008 – 2008/0013(COD)) Committee on the Environment, Public Health and Food Safety				
CES1201/2008	Opinion of the European Economic and Social Committee on the Proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community COM(2008) 16 final – 2008/0013 COD				

A6-0406/2008	Report on the proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community (COM(2008)0016 – C6-0043/2008 – 2008/0013(COD)) Committee on the Environment, Public Health and Food Safety				
P6_TA(2008)0610	European Parliament legislative resolution of 17 December 2008 on the proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community (COM(2008)0016 – C6-0043/2008 – 2008/0013(COD))				
2009/29/EC	Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community				
C(2010) 7499	Commission Decision of 3 November 2010 laying down criteria and measures for the financing of commercial demonstration projects that aim at the environmentally safe capture and geological storage of CO ₂ as well as demonstration projects of innovative renewable energy technologies under the scheme for greenhouse gas emission allowance trading within the Community established by Directive 2003/87/EC of the European Parliament and of the Council				
<i>CCS Directive COD/2008/0015</i>					
COM(2008) 18	Proposal for a Directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006				
SEC(2008) 54	Commission staff working document accompanying document to the Commission to the Council and the European Parliament Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020 Impact Assessment		1	3	
PE407.716	Draft report on the proposal for a directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006 (COM(2008)0018 – C6-0040/2008 – 2008/0015(COD)) Committee on the Environment, Public Health and Food Safety				
CES1203/2008	Opinion of the European Economic and Social Committee on the Proposal for a Directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006 COM(2008) 18 final – 2008/0015 (COD)				

A6-0414/2008	Report on the proposal for a directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006 (COM(2008)0018 – C6-0040/2008 – 2008/0015(COD)) Committee on the Environment, Public Health and Food Safety				
P6_TA(2008)0612	European Parliament legislative resolution of 17 December 2008 on the proposal for a directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006 (COM(2008)0018 – C6-0040/2008 – 2008/0015(COD))				
2009/31/EC	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006			¹⁴⁶ 1	
Guidance Document 1 (2011)	Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide Guidance Document 1 CO ₂ Storage Life Cycle Risk Management Framework	1		1	
Guidance Document 2 (2011)	Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide Guidance Document 2 Characterisation of the Storage Complex, CO ₂ Stream Composition, Monitoring and Corrective Measures	1		17	
Guidance Document 3 (2011)	Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide Guidance Document 3 Criteria for Transfer of Responsibility to the Competent Authority				
Guidance Document 4 (2011)	Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide Guidance Document 4 Article 19 Financial Security and Article 20 Financial Mechanism				
<i>SET-Plan 2009</i>					
COM(2009) 519	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Investing in the Development of Low Carbon Technologies (SET-Plan)				

¹⁴⁶ The EU CCS Directive does not explicitly refer to the IEAGHG while it introduces the „capture-ready“-concept. However, the Impact Assessment [Commission, 2008b] which accompanies the Directive and the information gathered during the expert interviews let conclude that the “capture-ready“-concept as introduced in the EU CCS Directive draws from the IEAGHG study [IEAGHG, 2007a]. Thus, the analysis counts the introduction of the “capture-ready“-concept in the EU Directive as a reference to the IEAGHG output.

SEC(2009) 1295	Commission staff working document accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Investing in the Development of Low Carbon Technologies (SET-Plan) A Technology Roadmap				
SEC(2009) 1296	Commission staff working document accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Investing in the Development of Low Carbon Technologies (SET-Plan) R&D investment in the priority technologies of the European Strategic Energy Technology Plan		2		
SEC(2009) 1297	Commission staff working document accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Investing in the Development of Low Carbon Technologies (SET-Plan) Impact Assessment				
<i>NZEC</i>					
COM(2009) 284	Communication from the Commission to the European Parliament and the Council Demonstrating Carbon Capture and Geological Storage (CCS) in emerging developing countries: financing the EU-China Near Zero Emissions Coal Plant project				
SEC(2009) 814	Commission staff working document accompanying the Communication from the Commission to the European Parliament and the Council Demonstrating Carbon Capture and Geological Storage (CCS) in emerging developing countries: financing the EU-China Near Zero Emissions Coal Plant project Impact Assessment		1	1	
<i>Investing today for tomorrow's Europe</i>					
COM(2009) 36	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Investing today for tomorrow's Europe				
<i>Community guidelines on state aid for environmental protection</i>					
2008/C 82/01	Notices from European Union institutions and bodies – Commission Community guidelines on state aid for environmental protection				
<i>EU Energy Security and Solidarity Action Plan</i>					
COM(2008) 781	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Second Strategic Energy Review An EU Energy Security and Solidarity Action Plan				
SEC(2008) 2870	Commission staff working document accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Second Strategic Energy Review, An EU Energy Security and Solidarity Action Plan The Market for Solid Fuels in the EU in 2004-2006 and Trends in 2007				

SEC(2008) 2871	Volume I Commission staff working document accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Second Strategic Energy Review, An EU Energy Security and Solidarity Action Plan Europe's current and future energy position Demand – resources - investments				
SEC(2008) 2872	Commission staff working document accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Second Strategic Energy Review, An EU Energy Security and Solidarity Action Plan Energy Sources, Production Costs and Performance of Technologies for Power Generation, Heating and Transport			7	
<i>20 20 by 2020</i>					
COM(2008) 30	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 20 20 by 2020 Europe's climate change opportunity				
<i>Supporting early demonstration</i>					
COM(2008) 13	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Supporting Early Demonstration of Sustainable Power Generation from Fossil Fuels		5		
SEC(2008) 47	Commission staff working document accompanying document to the Communication from the Commission to the European Parliament and the Council Supporting Early Demonstration of Sustainable Power Generation from Fossil Fuels Impact Assessment		8	1	
<i>SET-Plan 2007</i>					
COM(2007) 723	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions A European Strategic Energy Technology Plan (SET-Plan) 'Towards a low carbon future'				
SEC(2007) 1508	Commission staff working document accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A European Strategic Energy Technology Plan (SET-Plan) Full Impact Assessment				
SEC(2007) 1510	Commission staff working document accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A European Strategic Energy Technology Plan (SET-Plan) Technology Map				

SEC(2007) 1511	Commission staff working document accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, A European Strategic Energy Technology Plan (SET-Plan) Capacities Map				
<i>Energy policy for Europe</i>					
COM(2007) 1	Communication from the Commission to the European Parliament and the Council An Energy Policy for Europe		2		
SEC(2007) 12	Commission staff working document EU energy policy data				
<i>Limiting climate change</i>					
COM(2007) 2	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond				
SEC(2007) 8	Commission staff working document accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond Impact Assessment				
<i>SET-Plan 2006</i>					
COM(2006) 847	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Towards a European Strategic Energy Technology Plan				
<i>Sustainable power generation from fossil fuels</i>					
COM(2006) 843	Communication from the Commission to the Council and the European Parliament Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020		1		
SEC(2006) 1722	Commission staff working document accompanying document to the Commission to the Council and the European Parliament, Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020 Impact Assessment		15	5	
<i>Green paper</i>					
COM(2006) 105	Green Paper A European Strategy for Sustainable, Competitive and Secure Energy				
SEC(2006) 317	Commission staff working document What is at stake - Background document on the Green Paper - A European Strategy for Sustainable, Competitive and Secure Energy				

Winning the Battle Against Global Climate Change					
COM(2005) 35	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Winning the Battle Against Global Climate Change				
Total: 74 documents		2	39	36	0

Source: author

Table 22: Overview of the work deliverables of TOA and their citation in the EU policy documents

EU document number	EU document title	Referenced work deliverable of TOA	Citation from the EU document	Total of references in a given document
CSLF				
Guidance Document 1 (2011)	Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide Guidance Document 1 CO ₂ Storage Life Cycle Risk Management Framework	Bachu, 2008, Comparison between Methodologies Recommended for Estimation of CO ₂ Storage Capacity in Geological Media. Report by the CSLF Task Force on CO ₂ Storage Capacity Estimation and the US DOE Capacity and Fairways Subgroup of the Regional Carbon Sequestration Partnerships Program - Phase III Report.	"The pore and reservoir scale trapping mechanisms that may secure the CO ₂ over differing timescales are well understood (IPCC, 2005; Bachu, 2007): buoyancy trapping, residual saturation trapping, dissolution, mineralisation and adsorption."	1
Guidance Document 2 (2011)	Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide Guidance Document 2 Characterisation of the Storage Complex, CO ₂ Stream Composition, Monitoring and Corrective Measures	CSLF: 2009. CSLF Task Force to Examine Risk Assessment Standards and Procedures Phase I Final Report: 2009, CSLF-T-2009-04 October 2009 http://www.csforum.org/publications/document/s/RATF_PhaseIFinalReport.pdf	"To date, there is limited practical experience with use of corrective measures in geological storage of CO ₂ , although there is experience in well integrity corrections. The methods and approaches are, therefore, based on relevant experience in other sectors including gas storage, oil and gas industry (e.g. well control incidents) and environmental clean up and remediation. The status and learning from other sectors has been reviewed and summarised in several reports (CSLF, 2009; IEAGHG 2007). Any plans and assessments of corrective measures that takes place in the future should be based on the experience available at the time, new scientific knowledge, and improvements in best available technology."	1
ZEP				
SEC(2010) 1395	Commission staff working document: Impact Assessment accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Energy infrastructure priorities for 2020 and beyond - A Blueprint for an integrated European energy network	Letter of 30 June 2010 addressed to the Energy Commissioner	"Moreover, ZEP's Chairman in his letter of 30 June 2010 addressed to the Energy Commissioner stressed that the policy objective of ensuring the development of networks to permit the achievement of the EU's energy and climate objectives should explicitly be extended to include the development of new CO ₂ pipeline infrastructure."	1

Knowledge Sharing Protocol (2010)	European CO ₂ Capture and Storage (CCS) Demonstration Project Network Knowledge Sharing Protocol	'Maximising the benefits of knowledge sharing' (http://www.zeroemissionsplatform.eu/information/publication/55-zep-ccs-knowledge-sharing.html).	'These categories are largely based on work by the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP) and published in the document 'Maximising the benefits of knowledge sharing' (http://www.zeroemissionsplatform.eu/information/publication/55-zep-ccs-knowledge-sharing.html).'	2
		Matrix of Technologies 'Technology Blocks', 15 October 2008, Final (V9). Downloadable from: http://www.zeroemissionsplatform.eu/library/publication/4-matrix-technologies.html .	'The 'Matrix of Technologies' by the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP) provides a sound framework for sharing technical set-up and performance of the various 'technology building blocks' included in there. These technology blocks (capture), technical aspects (transport) and technology block functions (storage) are listed and described in: CO ₂ Capture and Storage (CCS) – Matrix of Technologies 'Technology Blocks', 15 October 2008, Final (V9). Downloadable from: http://www.zeroemissionsplatform.eu/library/publication/4-matrix-technologies.html .'	
663/2009	Regulation (EC) No 663/2009 of the European Parliament and of the Council of 13 July 2009 establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy	General reference to ZEP	"In the case of carbon capture and storage, the list should be largely established on the basis of information gathered from stakeholders in the framework of the Fossil Fuel Forum, the Zero Emissions Fossil Fuel Power Plants Technology Platform and other sources."	1
SEC(2008) 54	Commission staff working document accompanying document to the Commission to the Council and the European Parliament Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020 Impact Assessment	General reference to technical and economic data developed by ZEP	"The model is designed to assess the impacts of specific climate change targets and renewable policies and to provide impact assessment of CCS deployment within this context. Technical and economic data have been recently updated and revised. The revised data reflect new information generated from the EC Technology Platforms (CCS data reflect the 'Zero Emission Platform')."	1

SEC(2009) 1296	Commission staff working document accompanying the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Investing in the Development of Low Carbon Technologies (SET-Plan) R&D investment in the priority Technologies of the European Strategic Energy Technology Plan	ZEP (Technology Platform for Zero Emission Fossil Fuel Power Plants) (2008a): Zero Emission fossil fuel Power plants. Country profile UK. May 2008 update.	"Alstom is a major component supplier for power generation and transport. R&D activities in the power sector are carried out through the two sub-sectors "Power Systems" (mainly CCS and gas/steam turbines R&D) and "Power Services". Wind energy would classify under the first. An analysis based on the number of researcher, the split of turnover between the various financial sectors and literature (ZEP, 2008a), leads to an estimated R&D investments within "Power Systems" in the order of €200-220m. Out of this, some share would be dedicated to wind energy. As a rough guess, we assume that some 10% of the 'Power Systems R&D' would go to wind energy research (ca. €20m). Moreover, the Alstom Group acquired 100% of Ecotecnía in 2007, a Spanish wind turbine company. From a newspaper article (El País) we know that Ecotecnía will invest around 2% of its turnover in R&D (ca. €5m). In total, we thus assume that some €25m are dedicated to wind energy R&D."	2
		ZEP (2008b): The European energy industry commits to the costs and risks of an EU Industrial Initiative on CCS. Letter to Commissioner Piebalgs from 21. February 2008.	"Nevertheless, corporate CCS-related R&D investments are of the same order of magnitude as information provided by the Technology Platform for Zero Emission Fossil Fuel Power Plants in a letter to Commissioner Piebalgs from February 2008 (ZEP, 2008b), according to which the "corporate commitments" of the companies signed "to the early development of CCS, as well as the achievement of CCS-related efficiency-increase, already amount to a total of more than €635 million over the past five years in aggregate". This figure would more or less confirm the estimation of the present report when considering that the research efforts in later years have probably been more intense than those in earlier years given the increasing importance of CCS, and considering further that the present assessment is based on a group of EU-based companies that is (slightly) larger than the signees to the letter."	
SEC(2009) 814	Commission staff working document accompanying the European Parliament and the Council Demonstrating Carbon Capture and Geological Storage (CCS) in emerging developing countries: financing the EU-China Near Zero Emissions Coal Plant project Impact Assessment	ZEP Analysis of funding options for CCS demonstration plants, 2007;	Table 2: Specific capital investment for coal power plants with and without CCS	1

COM(2008) 13	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Supporting Early Demonstration of Sustainable Power Generation from Fossil Fuels	Reference the ZEP web site	5
			"However, the European Technology Platform for Zero Emission Fossil Fuel Power Plant (ETP-ZEP), gathering European energy companies, equipment suppliers and oil/gas businesses as well as NGOs, estimates that with a focused R&D and demonstration effort, costs of CCS can be brought down by 50% between now and 2020, facilitating commercial deployment [...]. Incremental capital and operating costs associated with CCS are expected to drop further thereafter through learning curve effects and economies of scale as generally observable in industrial technology development. "Economic hurdles for CCS will take more time to overcome. Even with the cost reductions expected from research and demonstration, the deployment of CCS will mean increased fixed as well as variable costs compared to power generation without CCS. However, industry and independent expert opinions concur [...] that at CO₂ prices around or even below 35€/tCO₂, and assuming full recognition of CCS in ETS, power plants using CCS after 2020 will not be at a competitive disadvantage vis-à-vis standard power plants [...] because the costs of CO₂ avoidance through CCS will be at least equal if not lower than the cost of acquiring emission rights." "CCS technologies are already used in industry but will need to be adapted for use in large-scale power plants and improved through advanced R&D. European industry is clearly involved [...] and strategic research needs are well defined [...]" "Over 20 potential demonstration projects have been signalled by European industry in the past 12-18 months [...]" "The energy industry has demonstrated through the ETP-ZEP a vital initiative on CCS and has been devoting resources to R&D and pilot projects for several years. However, clear commitments of substantial resources to large-scale demonstration have been scarcer. ETP-ZEP published in October 2007 its vision of a Flagship Programme, aiming in particular at the coordinated construction and operation of a set of CCS demonstration projects by 2015. The programme specifications identified the need for financial support but most industry players have yet to define the size and timing of own financial commitments to individual projects."
		General reference to ZEP	
		General reference to ZEP	
		General reference to ZEP	
		Flagship Programme (2007)	

SEC(2008) 47	Commission staff working document accompanying document to the Communication from the Commission to the European Parliament and the Council Supporting Early Demonstration of Sustainable Power Generation from Fossil Fuels Impact Assessment	CCS cost estimations in the SRA	8
			"R&D work undertaken in EU-supported projects (through FP5, FP6, Carnot, ECSC Research Fund) and through national and industrial initiatives brought CCS technologies to a point where they are currently applied in a number of industrial processes. They will however need to be adapted for the use in large-scale power generation. The European Technology Platform for Zero Emission Fossil Fuel Power Plant (ETP-ZEP) in its Strategic Research Agenda estimates that this will require €1bn R&D money between now and 2020."
		Flagship Program (2007)	"During 2007, the activities of the ETP ZEP focussed, inter alia, on the preparation of their views on how to organise a Flagship CCS Demonstration Program."
		Technology matrix of ZEP	"Aware of this risk, the ZEP European Technology Platform has been developing a technology matrix indicating which CCS technologies need to be demonstrated in order to cover the various combinations of CO₂ capture technologies, storage sites and geographical locations that need to be demonstrated."
		SRA	"In addition to this technology matrix for demonstration, the priorities for European R&D in relation to CCS have been clearly identified on the basis of the results of EU-supported R&D and knowledge and experience accumulated in the Zero Emission Power European Technology Platform (ZEP). In particular, the Strategic Research Agenda for CCS adopted by the ZEP in 2006 has been the subject of further discussions between Commission services and the ZEP in the context of the preparation of the current work program for FP7 in this area."
		Flagship Program (2007)	"In this context, the Commission can take into account the knowledge and experience accumulated in the Zero Emission Power European Technology Platform and, in particular, its recommendations on the need for a CCS Flagship Program [...]."

		Flagship Program (2007)	"The Commission would at the same time continue the close cooperation with the ZEP TP and in particular could focus the discussion on clarifying the possible terms of a "Flagship Programme", its potential for the advancement of CCS and its possible interaction with the Network. The Network could represent a broader base for linking all relevant CCS demonstration projects while the Commission and the industry could aim to develop the Flagship Programme on the top of the Network as a selective European programme for the most innovative, pioneering, promising and complex CCS projects with the highest potential of cross-benefits for all the EU, and possibly also with higher than usual needs for the involvement of the public sector."	
		Flagship Program (2007)	"An explanation of the concept of the Flagship Programme as circulated by ZEP."	
		Flagship Program (2007)	"The ETP-ZEP estimates that a "Flagship Programme" of a dozen large scale CCS demonstration projects would require the capitalization of €9-16bn. This would correspond to a contribution from EU public funds in the order of magnitude of €5 billions or more."	
COM(2007) 1	Communication from the Commission to the European Parliament and the Council An Energy Policy for Europe	Reference to the recommendation developed by ZEP	"As set out in its Sustainable Power Generation Communication [...], the Commission will in 2007 start work to: • Design a mechanism to stimulate the construction and operation by 2015 of up to 12 large- scale demonstrations of sustainable fossil fuels technologies in commercial power generation in the EU [...]."	2
		Key Recommendations of the SRA	"The European Technology Platform for Zero-emission fossil fuels power plant (ZEP TP) includes in the Key Recommendations of its Strategic Research Agenda (SRA) adopted in late 2006 a call for early implementation of 10-12 integrated, large-scale CCS demonstration power plants in Europe."	

COM(2006) 843	Communication from the Commission to the Council and the European Parliament Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020	General reference to the ZEP goals	"A very positive signal in this area came in 2006 from industry through the Zero Emission Fossil Fuel Power Plant Technology Platform (ZEP TP). Major energy companies involved in coal-fired generation announced their plans to build 10-12 large-scale demonstration plants testing various ways of integrating CCS in coal- and gas-fired power generation. Once commissioned, these plants will need to be operated for at least five years before the tested solutions are considered to be fully demonstrated and ready for standard investment in zero-emission power plants, in 2020 and after."	1
SEC(2006) 1722	Commission staff working document accompanying document to the Commission to the Council and the European Parliament, Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020 Impact Assessment	General reference to the ZEP goals	"Assuming the results of the current industry efforts, both as regards the activities of the Zero-emission fossil fuel Power Plant Technology Platform and the announced pilot and demonstration projects of European leading companies, are completed within estimated timeframes and perform satisfactorily for at least several years."	15
		Vision for Zero Emission Fossil Fuel Power Plants (2006)	"Several such projects are ongoing or have been announced in 2006 in Europe by large industrial players. These intend to test and demonstrate the available technologies in combinations allowing zero emission power generation. These projects are mostly in the development phase, but provide a valuable indication of the positive outlook given to these technologies by industrial organisations. Moreover, a European Technology Platform on Zero Emission Fossil Fuel Power Generation (ZEP) was launched in December 2005 and has been actively working since then [...]."	
		The Vision document	"This Technology Platform has delivered in 2006 a vision paper for zero emission power generation in Europe as well as a Strategic Deployment Document (SDD) and a Strategic Research Agenda (SRA) identifying the innovative technologies to be developed in the areas of clean coal and CO₂ capture and storage technologies [...]."	
		SDD	"This Technology Platform has delivered in 2006 a vision paper for zero emission power generation in Europe as well as a Strategic Deployment Document (SDD) and a Strategic Research Agenda (SRA) identifying the innovative technologies to be developed in the areas of clean coal and CO₂ capture and storage technologies [...]."	

	SRA	"This Technology Platform has delivered in 2006 a vision paper for zero emission power generation in Europe as well as a Strategic Deployment Document (SDD) and a Strategic Research Agenda (SRA) identifying the innovative technologies to be developed in the areas of clean coal and CO₂ capture and storage technologies [...]"
	Key Recommendations of the SRA	"One of ZEP's key recommendations is the construction of 10-12 industrial-scale power plants with CCS for demonstration by 2015."
	General reference to the ZEP output	"The output of this Technology Platform constitutes a valuable contribution to defining the overall work programme of the 7th Framework Programme for research, technological development and demonstration activities (FP7) in these areas."
	Reference to the ZEP estimations	"It is important to consider the seriousness of public acceptability of CCS: so far less than 10% of European population has heard of CCS; of those, only 13% feel positive about it right away – this increases to 55% following an explanation of the concept [...]"
	Reference to the ZEP recommendations	"To demonstrate zero-emissions technologies for coal-fired power generation on a commercial scale by 2020. This objective and its timing dovetail with processes already under way in the EU and undertaken by the European industry with the support of the Commission (the Zero-Emission Fossil Fuel Power Plant Technology Platform, ZEP TP) [...]"
	SRA	"This impact assessment takes account of other European initiatives in this area, such as the Hypogen initiative [...] and the Dynamis project [...] and investigates the likely impacts of action over and above their current scope. It also recognizes the work of the Zero-emission Fossil Fuel Power Plant Technology Platform (ZEP TP), which has recently adopted important documents on the future of zero-emission power generation from fossil fuels in Europe (a strategic research agenda and a deployment document were proposed by the ZEP Technology Platform in the autumn of 2006)."

		SDD	"This impact assessment takes account of other European initiatives in this area, such as the Hypogen initiative [...] and the Dynamis project [...] and investigates the likely impacts of action over and above their current scope. It also recognizes the work of the Zero-emission Fossil Fuel Power Plant Technology Platform (ZEP TP), which has recently adopted important documents on the future of zero-emission power generation from fossil fuels in Europe (a strategic research agenda and a deployment document were proposed by the ZEP Technology Platform in the autumn of 2006)."
		Reference to the ZEP estimations	"Available models and studies looking at the long end of coal-based power generation with CCS thus allow for estimates of increases in the costs of power generation in the range of 10% or even on a par with the current levels by 2020 or soon afterwards. The ZEP Technology Platform indicates commercial deployment by 2020."
		SRA	"R&D therefore focuses on reducing the costs of power generation with CO₂ capture by: – reducing the energy consumption of oxygen production (in oxy-fuel combustion). It is considered that, with further intensive development, optimisation and experience, the three main technology options are capable of reaching CO₂ avoidance costs of €15 – €25/t CO₂ (for coal). This could lead to zero emissions power from coal at the cost of €45 – €55/MWh (calculated with current fuel prices) [...]."
		A Vision for Zero Emission Fossil Fuel Power Plants (2006)	"It is estimated that by 2050, it could be used for the removal of 2 billion tonnes of CO₂ each year from the atmosphere [...] (assuming CCS technology is established by 2015-20). To put this into perspective, this means that from 2050, utilising this formation alone, the volume of CO₂ from EU sources over 300 years (at current emissions levels) could be stored there. (This time horizon twice surpasses the expected lifetime of available global coal reserves, believed to be around 150 years!)"
		Reference to the ZEP estimations	"ANNEX II : CHOICE OF POLICY FOCUS: BACKGROUND AND CALCULATIONS FOR THE ASSESSMENT OF THE THREE GENERIC TECHNOLOGY ROUTES Route A can achieve a substantial reduction of the specific CO₂ emission from coal fired power generation, in the medium term (through upgrading and reconstruction using each time the "best of the art" technology) and in the longer term (with the perspective

				of reaching much higher energy efficiencies in the coal-fired power plants). However, even when reaching the technical limits of the improved energy efficiency, this route can not offer near zero CO ₂ emissions from coal-fired power plants. This route is considered to be a 'no-regret' option by the Zero Emission Technology Platform."
IEAGHG				
SEC(2008) 54	Commission staff working document accompanying document to the Commission to the Council and the European Parliament Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020 Impact Assessment	IEA-GHG (2007) CO ₂ Capture Ready Plants. Technical Study Report Number: 2007/4	"While minimal capture-ready pre-investments are expected to have low costs and high potential benefits (IEA-GHG, 2007; MIT, 2007), in practice it is expected that many operators will fail to make such pre-investments."	3
		IEA-GHG (2007) CO ₂ Capture Ready Plants. Technical Study Report Number: 2007/4	"In order to meet the first criteria operators can use studies on capture ready power plant considerations [...], reports that assess the options for capture ready pre-investments at power plants [...], and studies on the availability of geological storage sites and potential transport routes for CO ₂ in the EU. [...] Such information is easily accessible. For this reason it has been assumed that the cost for an operator associated with the fulfilment of the first criteria corresponds to the time spent collecting and processing the relevant information, and drafting the assessment report for the competent authority."	
		IEA (2006) Estimating the future trends in the costs of CO ₂ capture technologies, Technical Study, Report Nr. 2006/6, IEA Greenhouse Gas R&D program, Paris.	"For these purposes, we have assumed that for each doubling of installed capacity a cost reduction occurs. The model assumes cost reductions based on common agreement by major experts on the development of the costs. Components of CCS are well known. Cost savings are possibly only in the assembly of them and the optimization of the performance of the system as a whole and scaling up the dimension. For CCS these cost reductions are expected to be limited to 3% for each doubling of capacity. [...]"	
2009/31/EC	Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC , European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006	IEA-GHG (2007) CO ₂ Capture Ready Plants. Technical Study Report Number: 2007/4	The Directive applies the definition of capture-ready power plants developed by the IEAGHG without an explicit citation of the IEAGHG study.	1
Guidance Document 1	Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide Guidance Document 1 CO ₂	IEAGHG Quantification Techniques for CO ₂	"There are limitations in regard to quantitative approaches as follows: - Research on quantification of leakage pathways and flux	1

(2011)	Storage Life Cycle Risk Management Framework	Leakage' study and the EU FP7 RISCs project.	rates is still ongoing, and therefore these assessments are likely to be of qualitative/semi-quantitative nature, until experienced is gained. Further research studies are underway, with an aim to provide more quantitative approaches/data for such assessments. [...]"	
Guidance Document 2 (2011)	Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide Guidance Document 2 Characterisation of the Storage Complex, CO ₂ Stream Composition, Monitoring and Corrective Measures	IEA Greenhouse Gas R&D Programme (IEA GHG), "CCS Site Characterisation Criteria", 2009/10, July 2009.	"Over the last decade, there have been a number of articles published that describe approaches for assessment ranging in scale from a local site to regional and country assessments. Each have emphasised various aspects of the characterisation process, with some others only describing the technical disciplines and issues that may need to be addressed. Some, such as IEA GHG (2009), have provided prescriptive measures and acceptable ranges in table format of what the authors believe may or may not constitute a favourable or desirable site; e.g. be it onshore or offshore or poor or good reservoir quality."	17
		IEA Modelling Network 2010	"1.7.3 Gridding the 3D Model In the development of the geological model, it is necessary to establish the scale at which the model is processed and utilised in the dynamic reservoir simulation. The gridding of the models can be done at either a coarse or fine scale, depending on the requirements of the outputs and the stage of the modelling in the characterisation process (see Figure 2). At an early stage in the iterative process of reservoir simulations, coarse scaled models can be run, to get an idea of what parameters are going to be sensitive in future models, and so focus attention on ensuring those aspects are as accurate as possible. Generally speaking geologists tend to want to work in fine detail, and engineers then take that information and run much coarser outcomes of the original models. Care needs to be taken in using coarse scaled models for sensitivity analyses, because the effects of coarse grids can be to distort flow rates, travel times and saturation (IEAGHG Modelling Network 2010)."	
		Stanley Santos, IEA GHG R&D Programme: "Development in Carbon Capture Technologies for Power Generation Industry". Presentation at the Institute of Air Quality Management (IAQM) Workshop on CCS, London, UK, 14th November 2007, http://www.ieagreen.org.uk/presentations.html	"Also air ingress (tramp air) downstream of the oxy-fuel combustion influences the resulting flue gas composition. About 1% (based on the total mass of flue gas from boiler) of air ingress is reported to yield to about 3-5% decrease in CO ₂ concentration (depending on the amount of flue gas recirculation, excess oxygen for combustion and oxygen purity). [...]"	
		Cited in: ICF International	"Table 2: Industrial Process CO ₂ Concentration in the raw flue gas,	

			IEA GHG estimates [...], except where noted"
		Stanley Santos and Jinying Yan, "CO ₂ Processing Unit - Challenges in Meeting the Required CO ₂ Quality", Presentation at the Oxy-Fuel Combustion Network - 2nd Working Group Meeting on CO ₂ Quality and other Relevant Issues, September 7th, Cottbus, Germany, 2009..	"Water was removed from the CO ₂ streams to meet US CO ₂ pipeline specification of 640 ppm (see below) using glycol-based dehydration. Note that during the compression stage, water, as well as SOx, NOx, and Hg, can be removed from the CO ₂ stream. [...]"
		Stanley Santos and Jinying Yan, "CO ₂ Processing Unit - Challenges in Meeting the Required CO ₂ Quality", Presentation at the Oxy-Fuel Combustion Network - 2nd Working Group Meeting on CO ₂ Quality and other Relevant Issues, September 7th, Cottbus, Germany, 2009..	"Dependent on the cooling water available, a water removal using the knockout drum of the compression train could achieve as low as 600 ppm. [...]"
		IEA GHG, 2004. Impact of impurities on CO ₂ capture, transport, and storage, Report PH3. IEA Greenhouse Gas R&D programme, 2004.	"A key concern with O ₂ in CO ₂ streams used for EOR is that it reacts with oil and can cause overheating of injection equipment (IEA GHG, 2004; DYNAMIS, 2007). "
		Santos, St.; Haines, M.: "Oxy-fuel Combustion Application on Coal Fired Power Plants – What is the Current State of Knowledge?". Inaugural Workshop of the IEA Greenhouse Gas International Oxy-Fuel Combustion Network, Cottbus, Germany, 29th November 2005. (http://www.co2captureandstorage.info/docs/oxvfuel/w1/03W1Santos.pdf)	"If SOx and NOx are not removed from the CO ₂ streams from oxy-fuel combustion, oxy-fuel combustion will be the source of most of the SOx and NOx. If the oxy-fuel CO ₂ streams are cleaned up as suggested by Santos and Haines (2005), then SOx and NOx are less of an issue."
		IEA GHG (Greenhouse Gas Programme), 2004, Overview of Monitoring Requirements for Geologic Storage Project PH4/29.	Reference in the bibliography, no corresponding text passage found.
		Wilson, M. & Monea, M. (editors), 2005, IEA GHG Weyburn CO ₂ Monitoring and Storage Project Summary Report, 2000-2004, Petroleum Technology Research Center, Regina SK, Canada. In proceedings of the 7th International Conference on Greenhouse Gas Control Technologies, (GHGT-7), Vol. III, September 5–9, Vancouver, Canada.	"Strategies for monitoring in the deep subsurface have been applied at the Weyburn oil field and Sleipner CO ₂ storage site. [...]"
		White et al., 2004, Methods for the Prediction, Monitoring and Verification of CO ₂ Movement:	"Strategies for monitoring in the deep subsurface have been

		The IEA GHG Weyburn Monitoring and Storage Project. Presented at Third Annual Carbon Capture and Sequestration Conference, Alexandria, Virginia, May 3-6.	applied at the Weyburn oil field and Sleipner CO ₂ storage site. [...]"
		IEA GHG Report: Remediation of Leakage from CO ₂ storage reservoirs. Report 2007/11, September 2007	"A corrective measures plan needs to be submitted by the operator with the storage permit application and will need to be approved by the CA as part of the storage permit. Plans need to be "ready to use" [...] immediately in case of leakage or significant irregularities."
		IEA GHG Report: Remediation of Leakage from CO ₂ storage reservoirs. Report 2007/11, September 2007	"The first step is assessing the corrective measures methods and determining the specific corrective measures for an identified risk in any situation. The nature of the significant irregularity or leakage will dictate the method and type of remediation required. [...]"
		IEA GHG Report: Remediation of Leakage from CO ₂ storage reservoirs. Report 2007/11, September 2007	"To date, there is limited practical experience with use of corrective measures in geological storage of CO ₂ , although there is experience in well integrity corrections. The methods and approaches are, therefore, based on relevant experience in other sectors including gas storage, oil and gas industry (e.g. well control incidents) and environmental clean up and remediation. The status and learning from other sectors has been reviewed and summarised in several reports. [...]"
		IEA GHG Report: Remediation of Leakage from CO ₂ storage reservoirs. Report 2007/11, September 2007	"There are other techniques for addressing near surface leakage and CO ₂ accumulation [...]"
		IEA GHG Report: Remediation of Leakage from CO ₂ storage reservoirs. Report 2007/11, September 2007	"The main leakage reasons that well integrity may be compromised are summarised in a report for IEA GHG [...]"
		IEA GHG Report: Remediation of Leakage from CO ₂ storage reservoirs. Report 2007/11, September 2007	"Initial corrective measures plans need to be submitted with the storage permit application and will need to be approved as part of the storage permit. While based on site specific risks, the corrective measures included may be somewhat generic at this stage because the location and nature of leakage mechanisms and pathways may not be pinpointed. Nevertheless it is important that minimum requirements are put in place. The plans need to be "ready to use" [...] immediately in case of leakage or significant irregularities."

SEC(2009) 814	Commission staff working document accompanying the Communication from the Commission to the European Parliament and the Council Demonstrating Carbon Capture and Geological Storage (CCS) in emerging developing countries: financing the EU-China Near Zero Emissions Coal Plant project Impact Assessment	IEA GHG: Potential for improvement in gasification combined cycle power generation with CO ₂ capture. Report 4/19, 2003.	Table 2: Specific capital investment for coal power plants with and without CCS	1
SEC(2008) 2872	Commission staff working document accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Second Strategic Energy Review. An EU Energy Security and Solidarity Action Plan Energy Sources, Production Costs and Performance of Technologies for Power Generation, Heating and Transport	IEA GHG: CO ₂ capture from medium scale combustion installations. Report 2007/7, 2007	Table 3-2: Overnight specific capital investment and O&M costs of power generation technologies, and assumed fuel prices	7 ¹⁴⁷
		IEA GHG: Improvement in power generation with post-combustion capture. Report PH4/33, 2004.	Table 3-1: Technology description, installation size, and current and future conversion efficiency; Table 3-2: Overnight specific capital investment and O&M costs of power generation technologies, and assumed fuel prices	
		IEA GHG: Retrofit of CO ₂ capture to natural gas combined cycle power plants, Report 2005/1, 2005	Table 3-1: Technology description, installation size, and current and future conversion efficiency; Table 3-2: Overnight specific capital investment and O&M costs of power generation technologies, and assumed fuel prices	
		IEA GHG: Potential for improvement in gasification combined cycle power generation with CO ₂ capture. Report 4/19, 2003	Table 3-1: Technology description, installation size, and current and future conversion efficiency; Table 3-2: Overnight specific capital investment and O&M costs of power generation technologies, and assumed fuel prices	
SEC(2008) 47	Commission staff working document accompanying the Communication from the Commission to the European Parliament and the Council Supporting Early Demonstration of Sustainable Power Generation from Fossil Fuels Impact Assessment	IEA GHG R&D Programme (2007)	"A very comprehensive analysis done by the investment firm Climate Change Capital Ltd (CCC) in the summer of 2007 collected the costs of electricity generation with and without CCS from publicly available sources, such as the DOE /NETL (2007), the IEA GHG R&D Programme (2007) and the IPCC (2005). Ranges are given for the CCS costs, as additional capital and operational costs	1

¹⁴⁷ The data from the IEA GHG reports PH4/33 (2004), 2005/1 (2005), 4/19 (2003) was used in two different tables respectively. Thus, the study counts these references as two positions.

SEC(2006) 1722	Commission staff working document accompanying document to the Commission to the Council and the European Parliament, Sustainable power generation from fossil fuels: aiming for near-zero emissions from coal after 2020 Impact Assessment	IEA GHG, 2002 : Building the cost curves for CO ₂ storage, Part 1: Sources of CO ₂ , PH4/9, July, 48pp.	depend on the type of power plant, on the CCS technologies used and on other assumptions actually chosen by each source."	5
		E.g. the IEA Greenhouse Gas R&D Programme 2001 study « Putting Carbon back into Ground ».	"Other estimates [...] come to similar conclusions, putting the cost of CCS at €c 2.5/KWh (i.e. on top of the current cost of €c 5-6/KWh from coal without CCS)."	
		Reference to the IEAGHG web site	"Experts already agree [...] that storing CO ₂ underground should pose no health, safety or environmental hazard - either over the short- or long-term. Indeed, CO ₂ is essentially benign – it will neither burn nor explode and is even normally part of the air we breathe."	
		Reference to the IEAGHG web site	"For example, the Utsira geological formation in the Norwegian part of the North Sea which has been used by Statoil since 1996 to store around 1 million tonnes/y CO ₂ removed from gas production, stands at over 400 km by 50-100 km and stretches over 26,000 km ² . It is capable of storing up to 600 billion tonnes of CO ₂ . [...]"	
		Reference to the IEAGHG web site	"Currently, more than 110 research, development and demonstration projects on CO ₂ capture and storage are being conducted worldwide. In geographic terms, the focus is in Europe, Northern America and Japan. More details on individual projects are available via the data base of IEA Greenhouse Gas R & D Programme, which can be accessed through. [...]"	

Source: author

Attachment 2

I Key questions to the representatives of TOA

What issues are currently the focus of the activities of TOA?

Against the background of the goals of TOA, what are in your opinion the most important work deliverables of the TOA?

What are the most important audiences for the work deliverables of the TOA?

What are the most important strategies to disseminate the work deliverables to the audiences beyond the membership of the TOA?

Does it happen that the TOA cooperates with other organizations to communicate the work deliverables to the political decision-makers? If so, on which occasions?

Do the political decision-makers approach TOA to draw on the expertise of your organization? If so, on which occasions?

Does it happen that the members of TOA suggest producing certain work deliverables which are relevant for policy-making in the field of CCS in the European context?

If so, against the background of the heterogeneity of the membership of TOA, in what way is this request usually implemented? What is then the usual way to communicate the work deliverables to the European institutions?

If not, does it happen that the members of TOA suggest producing specific work deliverables which are relevant for political decision-making outside of the European context?

To your knowledge, did the European Commission refer to the work deliverables of TOA in its policy documents? If so, in what context?

Could you state other examples of the cooperation with the European Commission or other European institutions?

II Key questions to the representatives of the Commission

What issues in the field of CCS have been the focus of the activities of your DG?

You represent the [DG] in the [TOA]. How important is in your opinion the dialogue with the TOA against the background of the goal to support the development and deployment of CCS?

What work deliverables of TOA are especially relevant for the work of your DG?

On what occasions does your DG approach TOA?

Do the representatives of TOA approach your DG? On what occasions and how?

Besides the TOA [CSLF, ZEP, IEAGHG, Clean Coal Centre], your DG is also active in other international networks. Are various thematic focus being pursued in the framework of these activities? If so, what are these?

In what way is TOA involved in the preparation of the measures or decisions in the field of CCS on the European level, e.g. via hearings or consultations?

Could you give some examples of the Commission referring to the work deliverables of TOA in its policy documents?

Bibliography

- ANDERSON, J. (2002a) *Questions of democracy, territoriality and globalisation*. In ANDERSON, J. (Ed.) *Transnational democracy: Political spaces and border crossings*. 6-38, London ; New York, Routledge.
- ANDERSON, J. (2002b) *Transnational democracy: Political spaces and border crossings*. London ; New York, Routledge.
- ANDONOVA, L. B. (2010) Public-Private Partnerships for the Earth: Politics and Patterns of Hybrid Authority in the Multilateral System. *Global Environmental Politics*, 10:2.
- ANDONOVA, L. B. & LEVY, M. A. (2003) *Franchising Governance: Making Sense of the Johannesburg Type II Partnerships*. In STOKKE, O. S. & THOMMESSEN, Ø. B. (Eds.) *Yearbook of International Co-operation on Environment and Development*. 19-31, London, Earthscan Publications.
- ATKINSON, M. M. & COLEMAN, W. D. (1992) Policy networks, policy communities and the problems of governance. *Governance: An International Journal of Policy and Administration*, 5:2, 154-180.
- BACH, L. & MATT, M. (2005) *From economic foundations to S&T policy tools: A comparative analysis of the dominant paradigms*. In LLERENA, P. & MATT, M. (Eds.) *Innovation policy in a knowledge-based economy*. Berlin Heidelberg, Springer.
- BACHE, I. & FLINDERS, M. (2004) *Themes and issues in multi-level governance*. In BACHE, I. & FLINDERS, M. (Eds.) *Multi-level governance* 1-12, New York, Oxford University Press.
- BACHRACH, P. & BARATZ, M. S. (1962) Two faces of power. *American Political Science Review*, 56 December.
- BÄCKSTRAND, K. (2006) Multi-Stakeholder Partnerships for Sustainable Development: Rethinking Legitimacy, Accountability, and Effectiveness. *European Environment*, 16, 290-306.
- BÄCKSTRAND, K. (2008) Accountability of networked climate governance: The rise of transnational climate partnerships. *Global Environmental Politics*, 8:3.
- BALDWIN, R. & CAVE, M. (1999) *Understanding regulation: Theory, strategy, and practice*. Oxford ; New York, Oxford University Press.
- BAUMGARTNER, F. R. & JONES, B. D. (1993) *Agendas and instability in American politics*. Chicago, University of Chicago Press.
- BAUMGARTNER, F. R. & LEECH, B. L. (1998) *The importance of groups in politics and in political science*. Princeton, Princeton University Press.
- BENSON, K. J. (1982) *A framework for policy analysis*. In ROGERS, D. L. (Ed.) *Interorganizational coordination: Theory, research, and implementation*. Ames, Iowa State University Press.
- BERNAUER, T. (1995) The Effect of International Environmental Institutions - How We Might Learn More. *International Organization*, 49:2, 351-377.

- BETSILL, M. M. & BULKELEY, H. (2004) Transnational networks and global environmental governance: The Cities for Climate Protection program. *International Studies Quarterly*, 48:2, 471-493.
- BEYERS, J. (2002) Gaining and seeking access: The European adaptation of domestic interest associations. *European Journal of Political Research*, 41:5, 585-612.
- BEYERS, J. (2004) Voice and access - Political practices of European interest associations. *European Union Politics*, 5:2, 211-240.
- BEYERS, J. (2008) Policy issues, organisational format and the political strategies of interest organisations. *West European Politics*, 31:6, 1188-1211.
- BIERMANN, F., CHAN, M., MERT, A. & PATTBERG, P. (2007a) *Multi-stakeholder partnerships for sustainable development: Does the promise hold?* In GLASBERGEN, P., BIERMANN, F. & MOL, A. P. J. (Eds.) *Partnerships, Governance and Sustainable Development*. Cheltenham, Edward Elgar.
- BIERMANN, F., MOL, A. P. J. & GLASBERGEN, P. (2007b) *Conclusion: partnerships for sustainability - reflections on a future research agenda*. In GLASBERGEN, P., BIERMANN, F. & MOL, A. P. J. (Eds.) *Partnerships, Governance and Sustainable Development*. Cheltenham, Edward Elgar.
- BIERMANN, F. & PATTBERG, P. (2008) Global Environmental Governance: Taking Stock, Moving Forward. *The Annual Review of Environment and Resources*, 22, 277-94.
- BIERMANN, F., SIEBENHÜNER, B., BAUER, S., BUSCH, P.-O., CAMPE, S., DINGWERTH, K., GROTHMANN, T., MARSCHINSKI, R. & TARRADELL, M. (2009a) *Studying the influence of international bureaucracies: A conceptual framework*. In BIERMANN, F. & SIEBENHÜNER, B. (Eds.) *Managers of global change: The influence of international environmental bureaucracies*. Cambridge, Mass., MIT Press.
- BIERMANN, F., SIEBENHÜNER, B. & SCHREYÖGG, A. (2009b) *Global environmental governance and international organizations. Setting the stage*. In BIERMANN, F., SIEBENHÜNER, B. & SCHREYÖGG, A. (Eds.) *International organizations in global environmental governance*. Abingdon, Oxon ; New York, NY, Routledge.
- BIERMANN, F., SIEBENHÜNER, B. & SCHREYÖGG, A. (2009c) *International organizations in global environmental governance*. Abingdon, Oxon ; New York, NY, Routledge.
- BLAVOUKOS, S. & PAGOULATOS, G. (2008) 'Enlargement waves' and interest group participation in the EU policy-making system: Establishing a framework of analysis. *West European Politics*, 31:6.
- BMW (2010) *Policies for innovation and technology*
<http://www.bmw.de/English/Navigation/technology-policy.html>. October 22: 2010.
- BÖRZEL, T. A. (1998) Organizing Babylon - On the different conceptions of policy networks. *Public Administration* Vol. 76:Summer 1998, 253-273.
- BÖRZEL, T. A. & RISSE, T. (2005) *Public-Private Partnerships: Effective and Legitimate Tools of International Governance?* In GRANDE, E. & PAULY, L. W. (Eds.) *Complex Sovereignty: On the Reconstitution of Political Authority in the 21st Century*. 195-216, Toronto, University of Toronto Press.

- BOUWEN, P. (2002) Corporate lobbying in the European Union: The logic of access. *Journal of European Public Policy*, 9:3, 365-390.
- BOUWEN, P. (2004) Exchanging access goods for access: A comparative study of business lobbying in the European Union institutions. *European Journal of Political Research*, 43:3, 337-369.
- BP (2010) BP Statistical Review of World Energy June 2010.
<http://www.bp.com/statisticalreview>.
- BRINKERHOFF, J. M. (2007) *Partnerships as a means to good governance: Towards an evaluation framework*. In GLASBERGEN, P., BIERMANN, F. & MOL, A. P. J. (Eds.) *Partnerships, Governance and Sustainable Development*. Cheltenham, Edward Elgar.
- BUCHNER, B. & CARRARO, C. (2005) Modelling climate policy: Perspectives on future negotiations. *Journal of Policy Modeling*, 27:6, 711-732.
- CHRISTIANSEN, T. (2006) *The Council of Ministers. Facilitating interaction and developing actorsness in the EU*. In RICHARDSON, J. (Ed.) *European Union. Power and policy-making*. Oxon, New York, Routledge.
- CLAES, D. H. & FRISVOLD, P. (2009) *CCS and the European Union: Magic bullet or pure magic?* In MEADOWCROFT, J. & LANGHELLE, O. (Eds.) *Catching the carbon. The politics and policy of carbon capture and storage*. Cheltenham, Edward Elgar.
- CLEAN COAL CENTRE (2004) *The IEA Clean Coal Centre minutes of the forty-second Executive Committee meeting held at the Rembrand Hotel, London on 21 & 22 October 2004*. Not accessible to the public.
- CLEAN COAL CENTRE (2006) *The IEA Clean Coal Centre minutes of the forty-sixth Executive Committee meeting held at the Rembrand Hotel, London on 19 & 20 October 2006*. Not accessible to the public. January 20: 2012.
- CLEAN COAL CENTRE (2007) *The IEA Clean Coal Centre minutes of the forty-eighth Executive Committee meeting held at the Rembrand Hotel, London on 25 & 26 October 2007*. Not accessible to the public. January 20: 2012.
- CLEAN COAL CENTRE (2008) *The IEA Clean Coal Centre minutes of the forty-ninth Executive Committee meeting held at the Rembrand Hotel, London on 17 & 18 April 2008*. Not accessible to the public. January 20: 2012.
- CLEAN COAL CENTRE (2009) *The IEA Clean Coal Centre minutes of the fifty-second Executive Committee meeting held on 29-30 October 2009 at the Rembrand Hotel, London*. Not accessible to the public.
- CLEAN COAL CENTRE (2010) *History of the IEA Clean Coal Centre*. <http://www.iea-coal.org.uk/site/2010/home-section/origin?LanguageId=0>. January 26: 2011.
- CLEAN COAL CENTRE (2012) *Publications*. <http://www.iea-coal.org.uk/site/2010/publications-section/our-publications?LanguageId=0>. March 22: 2012.
- CLEMENTE, J. (2009) Transporting CO₂ by pipeline: US issues and opportunities. *Carbon Capture Journal*, July-August 2009, 27-30.
- CO2NET (2011) *About CO2NET*. <http://www.co2net.eu/public/about.asp>. December 22: 2011.

- COM(2008) 13 (2008) *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Supporting Early Demonstration of Sustainable Power Generation from Fossil Fuels*. Commission of the European Communities.
- COMMISSION (2010) *The climate and energy package*.
http://ec.europa.eu/clima/policies/package/index_en.htm. 7. April: 2011.
- COMMISSION (2000) *Green Paper - Towards a European strategy for the security of energy supply*. Office for Official Publications of the European Communities, COM(2000) 769, August 10: 2010, http://ec.europa.eu/energy/green-paper-energy-supply/doc/green_paper_energy_supply_en.pdf.
- COMMISSION (2004a) *European CO₂ capture and storage projects* Commission of the European Communities, Directorate-General for Research, Directorate J – Energy, Unit J2 – Energy production and distribution systems, February 27: 2012, http://ec.europa.eu/research/energy/pdf/co2capt_en.pdf.
- COMMISSION (2004b) *Green paper - On public-private partnerships and Community law on public contracts and concessions* Commission of the European Communities, COM(2004) 327, March 8: 2011, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2004:0327:FIN:EN:PDF>.
- COMMISSION (2005a) *Commission staff working document. Report on European Technology Platforms and Joint Technology Initiatives: Fostering public-private R&D partnerships to boost Europe's industrial competitiveness*. SEC(2005) 800, February 7: 2011, ftp://ftp.cordis.europa.eu/pub/technology-platforms/docs/tp_report_council.pdf.
- COMMISSION (2005b) *Winning the battle against global climate change*. COM(2005) 35, September 18, 2011, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2005:0035:FIN:EN:PDF>.
- COMMISSION (2006a) *Commission staff working document accompanying document to the Commission to the Council and the European Parliament Sustainable power generation from fossil fuels: Aiming for near-zero emissions from coal after 2020 - Impact Assessment*. Commission of the European Communities, SEC(2006) 1722, October 14, 2011, http://ec.europa.eu/governance/impact/ia_carried_out/docs/ia_2007/sec_2006_1722_en.pdf.
- COMMISSION (2006b) *Green Paper - A European strategy for sustainable, competitive and secure energy* Commission of the European Communities, COM(2006) 105, February 27: 2012, http://europa.eu/documents/comm/green_papers/pdf/com2006_105_en.pdf.
- COMMISSION (2007a) *CO₂ capture and storage projects*. August 17: 2010, http://ec.europa.eu/research/energy/pdf/synopses_co2_en.pdf.
- COMMISSION (2007b) *Commission proposes an integrated energy and climate change package to cut emissions for the 21st century*. IP/07/29, September 18, 2011, <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/29&format=HTML&aged=1&language=EN&guiLanguage=en>.

- COMMISSION (2007c) *Commission staff working document accompanying document to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A European Strategic Energy Technology Plan (SET-Plan) - Capacities map* Commission of the European Communities, SEC(2007) 1511, October 24, 2011, http://rp7.ffg.at/upload/medialibrary/5_capacity_Map_of_Energy.pdf.
- COMMISSION (2007d) *Communication from the Commission to the Council and the European Parliament. Sustainable power generation from fossil fuels: Aiming for near-zero emissions from coal after 2020*. Commission of the European Communities, COM(2006) 843, February 27: 2012, http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0843en01.pdf.
- COMMISSION (2007e) *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. A European strategic Energy Technology Plan (SET-Plan). 'Towards a low carbon future'*. Commission of the European Communities, COM(2007) 723, February 27, 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0723:FIN:EN:PDF>.
- COMMISSION (2007f) *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Limiting global climate change to 2 degrees Celsius - The way ahead for 2020 and beyond*. Commission of the European Communities, COM(2007) 2, February 23: 2012, http://eur-lex.europa.eu/LexUriServ/site/en/com/2007/com2007_0002en01.pdf.
- COMMISSION (2007g) *An energy policy for Europe*. Commission of the European Communities, COM(2007) 1, February 27, 2012, http://ec.europa.eu/energy/energy_policy/doc/01_energy_policy_for_europe_en.pdf.
- COMMISSION (2007h) *Third status report on European Technology Platforms - At the launch of FP7*. European Commission, Directorate-General for Research, Information and Communication Unit, Brussels.
- COMMISSION (2008a) *Commission staff working document accompanying document to the Communication from the Commission to the European Parliament and the Council Supporting - Early Demonstration of sustainable power generation from fossil fuels - Impact assessment* SEC(2008) 47, October 24, 2011, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2009:0047:FIN:EN:PDF>.
- COMMISSION (2008b) *Commission staff working document accompanying document to the Proposal for a Directive of the European Parliament and of the Council on the geological storage of carbon dioxide Impact Assessment*. SEC(2008) 54, October 14, 2011, http://ec.europa.eu/clima/policies/lowcarbon/ccs/docs/sec_2008_54_en.pdf.
- COMMISSION (2008c) *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Second strategic energy review. An EU energy security and solidarity action plan* Commission of the European Communities, COM(2008) 781, April 4: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0781:FIN:EN:PDF>.

- COMMISSION (2008d) *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Supporting early demonstration of sustainable power generation from fossil fuels*. Commission of the European Communities, COM(2008) 13, April 4: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0013:FIN:EN:pdf>.
- COMMISSION (2008e) *Notices from European Union institutions and bodies. Commission. Community guidelines on state aid for environmental protection*. Official Journal of the European Union, 2008/C 82/01, February 24: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:082:0001:0033:EN:PDF>.
- COMMISSION (2008f) *Proposal for a Directive of the European Parliament and of the Council on the geological storage of carbon dioxide and amending Council Directives 85/337/EEC, 96/61/EC, Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC and Regulation (EC) No 1013/2006*. COM(2008) 18, August 17: 2010, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0018:FIN:EN:PDF>.
- COMMISSION (2008g) *Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community*. Commission of the European Communities, COM(2008) 16, February 27: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0063:0087:en:PDF>.
- COMMISSION (2009a) *Commission non-paper : Modalities for co-financing of CCS and innovative renewables demonstration projects under Article 10a paragraph 8 of Directive 2003/87/EC (Emissions Trading Directive) ("NER 300")*. Key elements of draft Commission Decision. Commission of the European Communities, February 27: 2012, <http://www.ucl.ac.uk/ccip/pdf/Commissionnon-paper-1.pdf>.
- COMMISSION (2009b) *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions. Investing in the development of low carbon technologies (SET-Plan)*. Commission of the European Communities, COM(2009) 519, February 27, 2012, http://www.eusscienceandtechnology.eu/uploads/docs/2009_comm_investing_development_low_carbon_technologies_en.pdf.
- COMMISSION (2010a) *Commission Decision of 3.11.2010 laying down criteria and measures for the financing of commercial demonstration projects that aim at the environmentally safe capture and geological storage of CO₂ as well as demonstration projects of innovative renewable energy technologies under the scheme for greenhouse gas emission allowance trading within the Community established by Directive 2003/87/EC of the European Parliament and of the Council C(2010) 7499,, December 2: 2011,* http://ec.europa.eu/clima/funding/ner300/docs/c_2010_7499_en.pdf.
- COMMISSION (2010b) *Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide. Guidance Document 1 - CO₂ Storage Life Cycle Risk Management Framework. Draft document for consultation*. European Commission, September 7, 2010, <http://ec.europa.eu/environment/climat/ccs/pdf/GD1-CO2%20storage%20life%20cycle%20risk%20management-consultation.pdf>.
- COMMISSION (2010c) *Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide. Guidance Document 2 - Site Characterisation, CO₂ Stream*

- Composition, Monitoring and Corrective Measures. Draft document for consultation.*
European Commission, September 7, 2010,
<http://ec.europa.eu/environment/climat/ccs/pdf/GD2-site%20characterisation-co2%20stream-monitoring-corrective%20measures-consultation.pdf>.
- COMMISSION (2010d) *Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide. Guidance Document 3 - Criteria for Transfer of Responsibility to the Competent Authority. Draft document for consultation.* European Commission, September 7, 2010, http://ec.europa.eu/environment/climat/ccs/pdf/GD3-transfer%20of%20responsibility_consultation.pdf.
- COMMISSION (2010e) *Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide. Guidance Document 4 - Article 19 Financial Security and Article 20 Financial Contribution. Draft document for consultation.* European Commission, September 7, 2010, http://ec.europa.eu/environment/climat/ccs/pdf/GD4-financial%20security-financial%20contribution_consultation.pdf.
- COMMISSION (2011a) *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A roadmap for moving to a competitive low carbon economy in 2050.* European Commission, COM(2011) 112, February 23: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0112:FIN:EN:PDF>.
- COMMISSION (2011b) *EU support for CCS.*
http://ec.europa.eu/research/energy/eu/research/ccs/support/index_en.htm.
December 22: 2011.
- COMMISSION (2011c) *European Research Area.*
http://ec.europa.eu/research/era/index_en.htm. December 22: 2011.
- COMMISSION (2011d) *European Technology Platforms - Energy.*
http://cordis.europa.eu/technology-platforms/energy_en.html. February 28: 2011.
- COMMISSION (2011e) *Fossil Fuels Forum Berlin.*
http://ec.europa.eu/energy/oil/berlin_forum/berlin_forum_en.htm. December 22: 2011.
- COMMISSION (2011f) *NER300 call.*
http://ec.europa.eu/clima/funding/ner300/index_en.htm. March 26: 2012.
- CORDIS (2011a) *European technology platforms - Individual platforms.*
http://cordis.europa.eu/technology-platforms/individual_en.html. February 7: 2011.
- CORDIS (2011b) *Renewable heating and cooling - RHC.* http://cordis.europa.eu/technology-platforms/rhc_en.html. March 1: 2011.
- COUNCIL (2006) *Corrigendum to Council Decision 2006/971/EC of 19 December 2006 concerning the specific programme 'Cooperation' implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013).* 2006/971/EC, December 20: 2011, ftp://ftp.cordis.europa.eu/pub/fp7/energy/docs/cooperationsp_en.pdf.
- COUNCIL (2007) *Council conclusions on climate change. 2785th Environment Council meeting.* 6272/07, August 5: 2010,
http://ec.europa.eu/environment/climat/pdf/future_action/feb20draft.pdf.

- COUNCIL (2009) *Council adopts climate-energy legislative package*. Council of the European Union 8434/09, February 24: 2012, http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/misc/107136.pdf.
- CROMBEZ, C. (2002) Information, lobbying and the legislative process in the European Union. *European Union Politics*, 3.
- CSLF (2003) *Charter for the Carbon Sequestration Leadership Forum (CSLF): A carbon capture and storage technology initiative*
- CSLF (2004) *Carbon Sequestration Leadership Forum technology roadmap. Obsolete*. Carbon Sequestration Leadership Forum Technical Group.
- CSLF (2005) *Carbon Sequestration Leadership Forum minutes of the Policy Group meeting - Berlin, Germany, 27-28 September, 2005*. http://www.cslforum.org/publications/documents/pg_MinutesfromBerlinMeetingfinal.pdf. January 18: 2012.
- CSLF (2006a) *Carbon Sequestration Leadership Forum draft minutes of the Policy Group meeting - Delhi, India, Monday April 3 and Tuesday, April 4, 2006*. http://www.cslforum.org/publications/documents/Delhi/pg_MinutesfromDelhiMeetingfinal3.pdf. January 18: 2012.
- CSLF (2006b) *Carbon Sequestration Leadership Forum strategic plan - Final proposed draft, 4 April 2006*. http://www.cslforum.org/publications/documents/Delhi/pg_MinutesfromDelhiMeetingfinal3.pdf. January 19: 2012.
- CSLF (2008a) *Carbon Sequestration Leadership Forum (CSLF) minutes of the Technical Group business meeting - Al Khobar, Saudi Arabia, 27-28 January 2008*. http://www.cslforum.org/publications/documents/tg_MinutesAlKhobar0408Final.pdf. January 18: 2012.
- CSLF (2008b) *Carbon Sequestration Leadership Forum minutes of the Policy Group business meeting - Cape Town, South Africa, Wednesday, April 16, 2008*. http://www.cslforum.org/publications/documents/pg_MinutesCapeTown0408Final.pdf. January 18: 2012.
- CSLF (2008c) *CSLF projects* http://www.cslforum.org/projects/index.html?cid=nav_projects. January 19: 2012.
- CSLF (2009a) *Carbon Sequestration Leadership Forum minutes of the Policy Group business meeting - San Francisco, California, 29-30 June 2009*. http://www.cslforum.org/publications/documents/SanFrancisco2009/pg_MinutesSanFrancisco0609Final.pdf. January 18: 2012.
- CSLF (2009b) *Minutes of the Policy Group meeting - London, United Kingdom, 12 October 2009*. http://www.cslforum.org/publications/documents/London2009/pg_MinutesLondon1009Final.pdf. January 18: 2012.
- CSLF (2010a) *Carbon Sequestration Leadership Forum technology roadmap. A global response to the challenge of climate change*.

- CSLF (2010b) *Carbon Sequestration Leadership Forum terms of reference and procedures (revized as of October 07, 2010)*.
- CSLF (2010c) *CSLF incentives registry*
http://www.cslforum.org/publications/index.html?cid=nav_publications?cid=nav_publications. February 15: 2012.
- CSLF (2010d) *CSLF organization*.
http://www.cslforum.org/organization/index.html?cid=nav_organization. December 20: 2010.
- CSLF (2010e) *Minutes of the Technical Group meeting - Pau, France, 15-16 March 2010*.
http://www.cslforum.org/publications/documents/Pau2010/tg_MinutesPau0310Final.pdf. January 18: 2012.
- CSLF (2012) *Publications*.
http://www.cslforum.org/publications/index.html?cid=nav_publications. March 22: 2012.
- DE CONINCK, H. (2008) The international race for CO₂ capture and storage: And the winner is...? *FACET*. <http://www.aicgs.org/documents/facet/coninck.facet12.pdf>, July 14: 2009.
- DE CONINCK, H. & BÄCKSTRAND, K. (2011) An International Relations perspective on the global politics of carbon dioxide capture and storage. *Global Environmental Change*, 21:2, 368-378.
- DE CONINCK, H., FISCHER, C., NEWELL, R. G. & UENO, T. (2008) International technology-oriented agreements to address climate change. *Energy Policy*, 36, 335-356.
- DELEON, P. (1999) *The stages approach to the policy process. What has it done? Where is it going?* In SABATIER, P. A. (Ed.) *Theories of the policy process*. 19-32, Boulder, Westview Press.
- DESOMBRE, E. R. (2007) *The global environment and world politics*, Continuum International Publishing Group.
- DIEZ, T. & WIENER, A. (2004) *Introducing the mosaic of integration theory*. In WIENER, A. & DIEZ, T. (Eds.) *European integration theory*. 1-21, New York, Oxford University Press.
- DUFF, A. (2007) *True guide to the Lisbon Treaty*.
<http://www.eurointelligence.com/article.581+M5aca4ee4d7b.0.html#>. August 10: 2010.
- DÜR, A. (2008a) Interest groups in the European Union: How powerful are they? *West European Politics*, 31:6, 1212-1230.
- DÜR, A. (2008b) Measuring interest group influence: A note on methodology. *European Union Politics*, 9.
- EASTON, D. (1965) *A systems analysis of political life*. New York,, Wiley.
- EBTP (2011) *EBTP Steering Committee (SC)*. <http://www.biofuelstp.eu/steering.html#mems>. February 28: 2011.

- ECR (2009) *Public consultation on the future EU 2020 strategy. Response by the European Conservatives and Reformists Group*. <http://www.ecrgroup.eu/download/publications/ecreu-2020.pdf>. October 22: 2010.
- EERA (2011) *Coordinating energy research for a low carbon Europe*. <http://www.eera-set.eu/>. December 22: 2011.
- EIA (2011) *Total carbon dioxide emissions from the consumption of energy (million metric tons)* U.S. Energy Information Administration. <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=90&pid=44&aid=8>. February 23: 2012.
- EIB (2007) *Clean energy for Europe: A reinforced EIB contribution*. European Investment Bank.
- EISING, R. (2004a) Der Zugang von Interessengruppen zu den Organen der Europäischen Union: eine organisationstheoretische Analyse. *Politische Vierteljahresschrift*, 45:4, 494-518.
- EISING, R. (2004b) Multilevel governance and business interests in the European Union. *Governance - An International Journal of Policy and Administration*, 17:2, 211-245.
- EISING, R. (2007a) The access of business interests to EU institutions: Towards élite pluralism? *Journal of European Public Policy*, 14:3, 384-403.
- EISING, R. (2007b) Institutional context, organizational resources and strategic choices. Explaining interest group access in the European Union. *European Union Politics*, 8:3, 329-362.
- EISING, R. (2007c) *Politische Interessenvermittlung*. In BENZ, A., LÜTZ, S., SCHIMANK, U. & SIMONIS, G. (Eds.) *Handbuch Governance. Theoretische Grundlagen und empirische Anwendungsfelder*. Wiesbaden, VS Verlag für Sozialwissenschaften.
- EISING, R. & KOHLER-KOCH, B. (2005) *Interessenpolitik im europäischen Mehrebenensystem*. In EISING, R. & KOHLER-KOCH, B. (Eds.) *Interessenpolitik in Europa*. Baden-Baden, Nomos.
- ENTMAN, R. M. (1993) Framing: Toward clarification of a fractured paradigm. *Journal of Communications and Networks*:43(4), Autumn.
- EPP GROUP (2009) *Ten priorities for the EPP Group 2009-2014. Putting people at the heart of Europe*. <http://stream.epp-ed.eu/Activities/docs/year2009/2009-2014group-priorities-en1.pdf>. October 22: 2010.
- EUROPA (2009) *List of 15 energy projects for European economic recovery* MEMO/09/542. <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/542&format=HTML&aged=0&language=en&guiLanguage=en>. October 27: 2010.
- EUROPA (2010a) *Decision-making in the European Union*. http://europa.eu/institutions/decision-making/index_en.htm. August 2: 2010.
- EUROPA (2010b) *European Council*. http://ec.europa.eu/archives/european-council/glance/index_en.htm. August 25: 2010.
- EUROPEAN COUNCIL (2007) *Brussels European Council 8 / 9 March 2007 - Presidency conclusions*. Council of the European Union, 7224/1/07 February 24: 2012, <http://register.consilium.europa.eu/pdf/en/07/st07/st07224-re01.en07.pdf>.

- EUROPEAN COUNCIL (2008) *Energy / Climate change - Elements of the final compromise*
Council of the European Union 17215/08, February 24: 2012,
http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/104672.pdf.
- EUROPEAN COUNCIL (2009) *Brussels European Council 29/30 October 2009 - Presidency conclusions*. 15265/09, 18 September: 2011,
<http://register.consilium.europa.eu/pdf/en/09/st15/st15265.en09.pdf>.
- EUROPEAN PARLIAMENT (2006) *Common policies. Policy for research and technological development*.
http://www.europarl.europa.eu/parliament/expert/displayFtu.do?id=74&ftuId=FTU_4.14.html&language=en. August 24: 2010.
- EUROPEAN PARLIAMENT (2008a) *Draft Report on the proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend greenhouse gas emission allowance trading system of the Community (COM(2008)0016 – C6-0043/2008 – 2008/0013(COD))*. European Parliament. Committee on the Environment, Public Health and Food Safety, 2008/0013(COD), April 11: 2011,
<http://www.europarl.europa.eu/sides/getDoc.do?type=COMPARL&mode=XML&language=EN&reference=PE407.778>.
- EUROPEAN PARLIAMENT (2008b) *European Parliament legislative resolution of 17 December 2008 on the proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community (COM(2008)0016 – C6-0043/2008 – 2008/0013(COD))*. P6_TA(2008)0610, February 5: 2012,
<http://www.europarl.europa.eu/sides/getDoc.do?type=TA&language=EN&reference=P6-TA-2008-0610>.
- EUROPEAN PARLIAMENT (2008c) *Report on the proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading system of the Community (COM(2008)0016 – C6-0043/2008 – 2008/0013(COD))*. European Parliament. Committee on the Environment, Public Health and Food Safety, A6-0406/2008, February 5: 2012, <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A6-2008-0406+0+DOC+PDF+V0//EN>.
- EUROPEAN PARLIAMENT (2011) *European Parliament - Composition*.
http://europa.eu/about-eu/institutions-bodies/european-parliament/index_en.htm. December 22: 2011.
- EUROPEAN PARLIAMENT & COUNCIL (2001) *Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants*. Official Journal of the European Communities, 2001/80/EC, February 28: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2001:309:0001:0001:EN:PDF>.
- EUROPEAN PARLIAMENT & COUNCIL (2003) *Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC*. Official Journal of the European Union, 2003/87/EC,

- September 18: 2011, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:275:0032:0032:EN:PDF>.
- EUROPEAN PARLIAMENT & COUNCIL (2006) *Decision No 1982/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007-2013)*. 1982/2006/EC, December 20: 2011, <http://cordis.europa.eu/documents/documentlibrary/90798681EN6.pdf>.
- EUROPEAN PARLIAMENT & COUNCIL (2008) *Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control*. 2008/1/EC, August 17: 2010, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:024:0008:0029:EN:PDF>.
- EUROPEAN PARLIAMENT & COUNCIL (2009a) *Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community*. 2009/29/EC, February 24: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0063:0087:en:PDF>.
- EUROPEAN PARLIAMENT & COUNCIL (2009b) *Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006*. Official Journal of the European Union, 2009/31/EC, April 4: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0114:0135:EN:PDF>.
- EUROPEAN PARLIAMENT & COUNCIL (2009c) *Regulation (EC) No 663/2009 of the European Parliament and of the Council of 13 July 2009 establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy*. Official Journal of the European Union, 663/2009, February 27: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:200:0031:0031:EN:PDF>.
- EUROSTEP - EEPa (2008-2009) *The Lisbon Treaty - Ratification*. <http://www.lisbon-treaty.org/wcm/ratification.html>. August 9: 2010.
- EZRAHI, Y. (1971) Political resources of American science. *Science Studies*, 1:2.
- FAGERBERG, J. (2005) *Innovation. A guide to the literature*. In FAGERBERG, J., MOWERY, D. C. & NELSON, R. R. (Eds.) *The Oxford handbook of innovation*. pp.1-26, Oxford, Oxford University Press.
- FAGERBERG, J., MOWERY, D. C. & NELSON, R. R. (Eds.) (2005) *The Oxford handbook of innovation*, New York, Oxford University Press.
- FALKNER, R., HANNES, S. & VOGLER, J. (2010) International climate policy after Copenhagen: Towards a 'building blocks' approach. *Global Policy*, 1.
- FISCHER, W., HOLTRUP, P. & SCHENK, O. (2008) Der „Klimakiller“ denkt um. *Internationale Politik (IP)* 4/2008, 72-81.
- FREEMAN, E. R. (2004) The stakeholder approach revisited. *Zeitschrift für Wirtschafts- und Unternehmensethik*, 5:3.

- G8 GLENEAGLES (2005) *The Gleneagles Communiqué*.
http://www.unglobalcompact.org/docs/about_the_gc/government_support/PostG8_Gleneagles_Communique.pdf. December 14: 2010.
- G8 HEILIGENDAMM (2007) *Growth and responsibility in the world economy. Summit declaration*.
<http://portal3.sre.gob.mx/groupfive/images/Heiligendamm/CumbreG8Heiligendam.pdf>. December 14: 2010.
- G8 HOKKAIDO (2008) *G8 Hokkaido Toyako summit leaders declaration*.
http://www.mofa.go.jp/policy/economy/summit/2008/doc/doc080714__en.html.
 August 16: 2010.
- G8 L'AQUILA (2009) *Responsible leadership for a sustainable future*.
http://www.g8italia2009.it/static/G8_Allegato/G8_Declaration_08_07_09_final,0.pdf.
 December 20: 2010.
- G8 MUSKOKA (2010) *G8 Muskoka declaration - Recovery and new beginnings*
http://www.bundesregierung.de/nsc_true/Content/DE/StatischeSeiten/Breg/G8G20/Anlagen/G8-erklaerung-muskoka-en,property=publicationFile.pdf/G8-erklaerung-muskoka-en. December 20: 2010.
- G8 SAINT-PETERSBURG (2006) *St Petersburg plan of action on global energy security*.
<http://en.g8russia.ru/docs/11.html>. December 14: 2010.
- GEELS, F. W. (2004) From sectoral systems of innovation to socio-technical systems - Insights about dynamics and change from sociology and institutional theory. *Research Policy*, 33:6-7, 897-920.
- GEELS, F. W. & KEMP, R. (2007) Dynamics in socio-technical systems: Typology of change processes and contrasting case studies. *Technology in Society* 29, 441-455.
- GEORGE, S. (2004) *Multi-level governance and the European Union*. In BACHE, I. & FLINDERS, M. (Eds.) *Multi-level governance*. 107-126, New York, Oxford University Press.
- GHGT (2011) *GHGT10 - Overview*. <http://www.ghgt.info/index.php?/Content-GHGT10/overview.html>. December 22: 2011.
- GLASBERGEN, P., BIERMANN, F. & MOL, A. P. J. (2007) *Partnerships, governance and sustainable development: Reflections on theory and practice*. Cheltenham, UK ; Northampton, MA, Edward Elgar.
- GRANDE, E. (1996) The state and interest groups in a framework of multi-level decision-making: The case of the European Union. *Journal of European Public Policy*, 3:3.
- GREENWOOD, J. (2007) *Organized Civil Society and Input Legitimacy in the EU*. In DEBARDELEBEN, J. & HURRELMANN, A. (Eds.) *Democratic Dilemmas of Multilevel Governance. Legitimacy, Representation and Accountability in the European Union*. Houndmills, Palgrave Macmillan.
- GREENWOOD, J. (2011) *Interest representation in the European Union*. Basingstoke, Palgrave Macmillan.
- GREENWOOD, J., GROTE, J. & RONIT, K. (Eds.) (1992) *Organized interests and the European Community*, London, Sage.

- HAAS, E. B. (1958) *The uniting of Europe; political, social, and economical forces, 1950-1957*. London,, Stevens.
- HAAS, E. B. (1964) *Beyond the nation-state: Functionalism and international organization*. Stanford, Calif., Stanford University Press.
- HAAS, P. M. (1992) Introduction: Epistemic communities and international policy coordination. *International Organization*, 46:Winter 1992, 1-35.
- HAKE, J.-F. & SCHENK, O. (2010) Zuversichtlich in die Zukunft. Erforschung und Demonstration von CCS. *politische ökologie*, 123:Dezember 2010.
- HALE, T. N. & MAUZERALL, D. L. (2004) Thinking Globally and Acting Locally: Can the Johannesburg Partnerships Coordinate Action on Sustainable Development? *The Journal of Environment Development*, 13.
- HASENCLEVER, A., MAYER, P. & RITTBERGER, V. (2004) *Theories of international regimes*. Cambridge, Cambridge University Press.
- HAWKINS, D. G., LASHOF, D. A. & WILLIAMS, R. H. (2008) *Clean coal technology is the future of energy*. In LOGAN, M. (Ed.) *Coal*. pp. 62-74, Farmington Hills, The Gale Group.
- HECLO, H. (1978) *Issue networks and the executive establishment*. In KING, A. (Ed.) *The new American political system*. Washington D.C., American Enterprise Institute.
- HEINELT, H. (2008) *Politikfelder: Machen Besonderheiten von Policies einen Unterschied?* In SCHUBERT, K. & BANDELOW, N. C. (Eds.) *Lehrbuch der Politikfeldanalyse 2.0*. München, Oldenburg Verlag München.
- HELD, D. (2004) Democratic accountability and political effectiveness from a cosmopolitan perspective. *Government and Opposition*, 39:2, 364-391.
- HIX, S. (2005) *The political system of the European Union*, Palgrave Macmillan.
- HLG (2006) *Mandate*. September 19: 2011, http://ec.europa.eu/enterprise/policies/sustainable-business/files/environment/hlg/doc_06/mandate_group_6_en.pdf.
- HOFFERT, M. I., et al. (2002) Advanced technology paths to global climate stability: Energy for a greenhouse planet. *Science*, 298:5595, 981-987.
- HOFFMANN, S. (1964a) The European Process at Atlantic Crosspurposes. *Journal of Common Market Studies*, 3.
- HOFFMANN, S. (1964b) Europes Identity Crisis - between the Past and America. *Daedalus*, 93:4, 1244-1297.
- HOFFMANN, S. (1966) Obstinate or Obsolete? The Fate of the Nation-State and the Case of Western Europe. *Daedalus. Journal of the American Academy of Arts and Sciences*, 95.
- HOOGHE, L. (2001) *The European Commission and the integration of Europe: Images of governance*. Cambridge, New York, Cambridge University Press.
- HOOGHE, L. & MARKS, G. (2001) *Multi-level governance and European integration*. Lanham, MD, Rowman & Littlefield Publishers.
- HOOGHE, L. & MARKS, G. (2003) Unravelling the central state, but how? Types of multi-level governance. *American Political Science Review*, 97, 233-243.

- HOWLETT, M., RAMESH, M. & PERL, A. (2009) *Studying public policy. Policy cycles & policy subsystems*. Ontario, Oxford University Press.
- IEA (1991) *Implementing Agreement for a Co-operative Programme on Technologies Relating to Greenhouse Gases Derived from Fossil Use* Paris.
- IEA (2003) *IEA Implementing Agreements. Background and framework as of 2003* OECD/IEA, Paris.
- IEA (2005a) *Implementing Agreement for a Co-operative Programme on Technologies Relating to Greenhouse Gases Derived from Fossil Use*
- IEA (2005b) *Implementing Agreement for the IEA Clean Coal Centre*. amended to 27th October 2005, Annex to EC/P (05)10.
- IEA (2007a) *Handbook. Guidance and tools for IEA Implementing Agreements*. Paris.
- IEA (2007b) *Legal aspects of storing CO₂. Update and recommendations*. OECD/IEA, February 15: 2012, http://www.iea.org/textbase/nppdf/free/2007/legal_aspects.pdf.
- IEA (2008a) *CO₂ capture and storage. A key carbon abatement option*. OECD/IEA, Paris.
- IEA (2008b) *Energy technology perspectives. In support of the G8 plan of action. Scenarios and strategies to 2050*. OECD/IEA, Paris.
- IEA (2008c) *IEA energy policies review. The European Union*. OECD/IEA, Paris.
- IEA (2008d) *Towards a sustainable energy future - IEA programme of work on climate change, clean energy and sustainable development. In support of the G8 plan of action*. Paris.
- IEA (2010) *Energy technology initiatives - Implementation through multilateral co-operation*. OECD/IEA.
- IEA (2011) *About the IEA*. <http://www.iea.org/about/index.asp>. January 14: 2011.
- IEA (2012) *Current Implementing Agreements*. <http://www.iea.org/techno/ia.asp>. April 10: 2012.
- IEA/CSLF (2006) *Near-term opportunities for carbon dioxide capture and storage. Issues identification workshop. In support of the G8 plan of action*. Paris.
- IEA/CSLF (2007a) *Near-term opportunities for carbon dioxide capture and storage. Global assessments workshop. In support of the G8 plan of action*. Paris.
- IEA/CSLF (2007b) *Results from the Calgary workshop, November 27 & 28 2007. 3rd workshop on near-term opportunities for carbon capture and storage. Recommendations on near-term opportunities for carbon dioxide capture and storage to the G8 summit Hokkaido*. Paris.
- IEA/CSLF (2010) *IEA/CSLF report to the Muskoka 2010 G8 summit - Carbon capture and storage - Progress and next steps*. OECD/IEA, CSLF, prepared with the co-operation of the Global CCS Institute, August 16: 2010, http://www.iea.org/papers/2010/ccs_g8.pdf.
- IEAGHG (2004a) *IEA Greenhouse Gas R&D Programme minutes of the 25th Executive Committee meeting*. Christchurch, New Zealand, 20th-21st February 2004. Not accessible to the public.

- IEAGHG (2004b) *IEA Greenhouse Gas R&D Programme minutes of the 26th Executive Committee meeting* Vancouver, Canada, 3rd -4th September 2004. Not accessible to the public.
- IEAGHG (2005a) *IEA Greenhouse Gas R&D Programme minutes of the 27th Executive Committee meeting*. Växjö, Sweden, 21st - 22nd April 2005. Not accessible to the public.
- IEAGHG (2005b) *IEA Greenhouse Gas R&D Programme minutes of the 28th Executive Committee meeting*. London, UK, 25th- 26th October 2005. Not accessible to the public.
- IEAGHG (2006a) *IEA Greenhouse Gas R&D Programme minutes of the 29th Executive Committee meeting* Buenos Aires, Argentina, 5th - 6th April 2006. Not accessible to the public.
- IEAGHG (2006b) *IEA Greenhouse Gas R&D Programme minutes of the 30th Executive Committee meeting*. Vaasa, Finland, 12th - 13th September 2006. Not accessible to the public.
- IEAGHG (2007a) *CO₂ capture ready plants. Technical Study Report Number: 2007/4.*
- IEAGHG (2007b) *IEA Greenhouse Gas R&D Programme minutes of the 32th Executive Committee meeting* Daejeon, Korea, 17th - 18th October 2007. Not accessible to the public.
- IEAGHG (2009a) *IEA Greenhouse Gas R&D Programme minutes of the 35th ExCo meeting*. Gold Coast, Australia, 21st - 22nd April 2009. Not accessible to the public.
- IEAGHG (2009b) *What have we learned from CCS demonstrations?* IEAGHG Report 2009-TR6.
- IEAGHG (2010a) *Aims and objectives*. <http://www.ieaghg.org/index.php?/2009120353/aims-and-objectives.html>. November 4: 2010.
- IEAGHG (2010b) *Guide to membership*. <http://www.ieaghg.org/index.php?/2009120355/guide-to-membership.html>. November 4: 2010.
- IEAGHG (2010c) *IEA Greenhouse Gas R&D Programme minutes of the 37th ExCo meeting* Leon, Spain, 10th - 11th March 2010. Not accessible to the public.
- IEAGHG (2010d) *Networks*. <http://www.ieaghg.org/index.php?/networks.html>. December 23: 2011.
- IEAGHG (2012) *Publications*. <http://www.ieaghg.org/index.php?/publications.html>.
- IMO (2007) *New international rules to allow storage of CO₂ under the seabed* London. http://www.imo.org/Newsroom/mainframe.asp?topic_id=1472&doc_id=7772. April 30: 2010.
- IPCC (2005) *IPCC Special Report on carbon dioxide capture and storage*. New York, Intergovernmental Panel on Climate Change, Cambridge University Press.
- JACHTENFUCHS, M. & KOHLER-KOCH, B. (2004) *Governance and institutional development*. In WIENER, A. & DIEZ, T. (Eds.) *European integration theory*.97-115, New York, Oxford University Press.

- JACOB, K., BIERMANN, F., BUSCH, P.-O. & FEINDT, P. H. (Eds.) (2007) *Politik und Umwelt*, Wiesbaden, VS Verlag für Sozialwissenschaften.
- JACOB, K. & JÖRGENS, H. (2011) *Wohin geht die Umweltpolitikanalyse? Eine Forschungsagenda für ein erwachsen gewordenes Politikfeld*. Forschungszentrum für Umweltpolitik, Freie Universität Berlin, Fachbereich Politik- und Sozialwissenschaften, Otto-Suhr-Institut für Politikwissenschaft, FFU-Report 02-2011, Berlin.
- JANNING, F. (2006) *Politikfeldanalyse. Akteure, Diskurse und Netzwerke in der öffentlichen Politik*. Wiesbaden, VS Verlag für Sozialwissenschaften.
- JANSEN, D. & SCHUBERT, K. (1995) *Netzwerkanalyse, Netzwerkforschung und Politikproduktion: Ansätze zur "cross-fertilization"*. In JANSEN, D. & SCHUBERT, K. (Eds.) *Netzwerke und Politikproduktion. Konzepte - Methoden - Perspektiven*. Marburg, Schüren.
- JENKINS, W. I. (1978) *Policy analysis. A political and organisational perspective*. New York, St. Martin's Press.
- JOHN, P. (2000) *Analyzing public policy*. London, Continuum.
- JORDAN, A. J. (2001) The European Union: An evolving system of multi-level governance... or government. *Policy and Politics*, 29:2, 193-208.
- JORDAN, G. & SCHUBERT, K. (1992) A preliminary ordering of policy network labels. *European Journal of Political Research*, 21, 7-27.
- JUSTUS, D. & PHILIBERT, C. (2005) *International energy technology collaboration and climate change mitigation. Synthesis report*. OECD/IEA, Paris.
- KENIS, P. & RAAB, J. (2008) *Politiknetzwerke als Governanceform. Versuch einer Bestandsaufnahme und Neuausrichtung der Diskussion*. In SCHUPPERT, G. F. & ZÜRN, M. (Eds.) *Governance in einer sich wandelnden Welt*. Wiesbaden, VS Verlag für Sozialwissenschaften.
- KENIS, P. & SCHNEIDER, V. (1991) *Policy networks and policy analysis: Scrutinizing a new analytical toolbox*. In MARIN, B. & MAYNTZ, R. (Eds.) *Policy networks. Empirical evidence and theoretical considerations*. 25-59, Boulder, Westview Press.
- KNODT, M. & GROßE HÜTTMANN, M. (2006) *Der Multi-Level Governance-Ansatz*. In BIELING, H.-J. & LERCH, M. (Eds.) *Theorien der Europäischen Integration*. 2nd edition ed., Wiesbaden, VS Verlag für Sozialwissenschaften.
- KOHLER-KOCH, B. (1994) Changing patterns of interest intermediation in the European Union. *Government and Opposition*, 29:2.
- KOOB, D. (1999) *Gesellschaftliche Steuerung. Selbstorganisation und Netzwerke in der modernen Politikfeldanalyse*. Marburg, Tectum Verlag.
- KRIESI, H., TRESCH, A. & JOCHUM, M. (2007) Going public in the European Union: Action repertoires of Western European collective political actors. *Comparative Political Studies*, 40.
- KÜTTING, G. (2000) *Environment, Society and International Relations. Towards more effective international environmental agreements*. London and New York, Routledge.

- LANG, A. & LEIFELD, P. (2008) *Die Netzwerkanalyse in der Policy-Forschung: Eine theoretische und methodische Bestandsaufnahme*. In JANNING, F. & TOENS, K. (Eds.) *Die Zukunft der Policy-Forschung. Theorien, Methoden, Anwendungen*. Wiesbaden, VS Verlag für Sozialwissenschaften.
- LEHMBRUCH, G. (1987) *Administrative Interessenvermittlung*. In WINDHOFF-HÉRITIER, A. (Ed.) *Verwaltung und ihre Umwelt. Festschrift für Thomas Ellwein*. Opladen, Westdeutscher Verlag.
- LEHMBRUCH, G. (1991) *The Organization of Society, Administrative Strategies, and Policy Networks. Elements of a Developmental Theory of Interest Systems*. In CZADA, R. M. & WINDHOFF-HERITIER, A. (Eds.) *Political Choice. Institutions, Rules, and the Limits of Rationality*. Frankfurt am Main, Boulder, Campus Verlag, Westview Press.
- LIESE, A. & BEISHEIM, M. (2011) *Transnational Public-Private Partnerships and the Provision of Collective Goods in Developing Countries*. In RISSE, T. (Ed.) *Governance Without a State? Policies and Politics in Areas of Limited Statehood*. New York, Columbia University Press.
- LIJPHART, A. (1999) *Patterns of Democracy. Government Forms and Performance in Thirty-Six Countries*. New Haven and London, Yale University Press.
- LOWERY, D. (2007) Why do organized interests lobby? A multi-goal, multi-context theory of lobbying. *Polity*, 39:1.
- LOWI, T. (1964) American business, public policy, case studies and political theory. *World Politics*, 16, 677-715.
- LOWI, T. J. (1972) Four systems of policy, politics, and choice. *Public Administration Review*, 32:4, 298-310.
- MAHONEY, C. (2004) The power of institutions - State and interest group activity in the European Union. *European Union Politics*, 5:4, 441-466.
- MAHONEY, C. & BAUMGARTNER, F. (2008) Converging perspectives on interest group research in Europe and America. *West European Politics*, 31:6.
- MARCH, J. G. (1955) An introduction to the theory and measurement of influence. *American Political Science Review*, 49.
- MARGOLIS, R. & KAMMEN, D. (1999) Underinvestment: The energy technology and R&D policy challenge. *Science*, 285:5428, 690-692.
- MARIN, B. & MAYNTZ, R. (Eds.) (1991) *Policy networks. Empirical evidence and theoretical considerations*, Boulder, Westview Press.
- MARKS, G. & HOOGHE, L. (2004) *Contrasting visions of multi-level governance*. In BACHE, I. & FLINDERS, M. (Eds.) *Multi-level governance*. Oxford, Oxford University Press.
- MARKS, G., HOOGHE, L. & BLANK, K. (1995) European integration and the state. *EUI Working Papers*, 95:7.
- MARKS, G., NIELSEN, F., RAY, L. & SALK, J. E. (1996) Competencies, cracks, and conflicts: Regional mobilization in the European Union. *Comparative Political Studies*, 29.

- MARSH, D. & RHODES, R. A. W. (1992a) *Policy communities and issue networks. Beyond typology*. In MARSH, D. & RHODES, R. A. W. (Eds.) *Policy networks in British government*. Oxford, Clarendon Press.
- MARSH, D. & RHODES, R. A. W. (Eds.) (1992b) *Policy networks in British government*, Oxford, Clarendon Press.
- MARTINSEN, D., LINSEN, J., MARKEWITZ, P. & VOGEL, S. (2007) CCS: A future CO₂ mitigation option for Germany? A bottom-up approach. *Energy Policy*, 35:4, 2110-2120.
- MAYNTZ, R. (1993) *Policy-Netzwerke und die Logik von Verhandlungssystemen*. In HERITIER, A. (Ed.) *Policy-Analyse. Kritik und Neuorientierung*. Politische Vierteljahresschrift 34.
- MAYNTZ, R. (2008) *Von der Steuerungstheorie zu Global Governance*. In SCHUPPERT, G. F. & ZÜRN, M. (Eds.) *Governance in einer sich wandelnden Welt*. pp. 43-60, Wiesbaden, VS Verlag für Sozialwissenschaften.
- MAYNTZ, R. & SCHARPF, W. (1995) *Steuerung und Selbstorganisation in staatsnahen Sektoren*. In MAYNTZ, R. & SCHARPF, W. (Eds.) *Gesellschaftliche Selbstregulierung und politische Steuerung*. Frankfurt/Main; New York, Campus Verlag.
- MAZEY, S. & RICHARDSON, J. (2006) *Interest groups and EU policy-making: Organisational logic and venue shopping*. In RICHARDSON, J. (Ed.) *European Union. Power and policy-making*. Oxon, Routledge.
- MCLAUGHLIN, A. M. & GREENWOOD, J. (1995) The management of interest representation in the European Union. *Journal of Common Market Studies*, 33:1, 143-156.
- MEADOWCROFT, J. (2007) *Democracy and Accountability: The challenges for cross-sectoral partnerships*. In GLASBERGEN, P., BIERMANN, F. & MOL, A. P. J. (Eds.) *Partnerships, Governance and Sustainable Development*. Cheltenham, Edward Elgar.
- MEADOWCROFT, J. & LANGHELLE, O. (2009a) *The politics and policy of carbon capture and storage*. In MEADOWCROFT, J. & LANGHELLE, O. (Eds.) *Catching the carbon. The politics and policy of carbon capture and storage*. Cheltenham, Edward Elgar.
- MEADOWCROFT, J. & LANGHELLE, O. (2009b) *The politics and policy of CCS: The uncertain road ahead*. In MEADOWCROFT, J. & LANGHELLE, O. (Eds.) *Catching the carbon. The politics and policy of carbon capture and storage*. Cheltenham, Edward Elgar.
- MICHALOWITZ, I. (2007) What determines influence? Assessing conditions for decision-making influence of interest groups in the EU. *Journal of European Public Policy*, 14:1, 132-151.
- MILLS, S. J. (2004) *Coal in an enlarged European Union*. CCC/85, IEA Clean Coal Centre.
- MILLS, S. J. (2010) *Prospects for coal, CCTs and CCS in the European Union*. CCC/173, IEA Clean Coal Centre.
- MITRANY, D. (1966) *A working peace system*. Chicago,, Quadrangle Books.
- MOL, A. P. J. (2007) *Bringing the environmental state back in: partnerships in perspective*. In GLASBERGEN, P., BIERMANN, F. & MOL, A. P. J. (Eds.) *Partnerships, Governance and Sustainable Development*. Cheltenham, Edward Elgar.

- MORAVCSIK, A. (1993) Preferences and power in the European Community: A liberal intergovernmentalist approach. *Journal of Common Market Studies*, 31:4, 473-524.
- NELKIN, D. (1975) Political impact of technical expertise. *Social Studies of Science*, 5:1, 35-54.
- NULLMEIER, F. (1993) *Wissen und Policy-Forschung. Wissenspolitologie und ein rhetorisch-dialektisches Handlungsmodell*. In HERITIER, A. (Ed.) *Policy-Analyse. Kritik und Neuorientierung*. Opladen, Westdeutscher Verlag.
- OBERTHÜR, S. & KELLY, C. R. (2008) EU leadership in international climate policy: Achievements and challenges. *The International Spectator*, 43:3, 35-50.
- OEMER-RIEDER, B. & TOETZER, T. (2004) *Umweltinnovation als spezieller Innovationstyp*. ARGE Innovationsorientierte nachhaltige Regionalentwicklung.
- OGUS, A. I. (1994) *Regulation: Legal form and economic theory*. Oxford / New York, Clarendon Press / Oxford University Press.
- OLSON, M. (2004 (1968)) *Die Logik des kollektiven Handelns. Kollektivgüter und die Theorie der Gruppen*. Tübingen, Mohr Siebeck.
- OSPAR (2007) *OSPAR Decision 2007/2 on the storage of carbon dioxide streams in geological formations*. OSPAR Convention for the protection of the marine environment of the North-East Atlantic, Decision 2007/2, August 13: 2010, http://www.ospar.org/content/content.asp?menu=00810305320000_000000_000000.
- PACALA, S. & SOKOLOW, R. (2004) Stabilization wedges: Solving the climate problem for the next 50 years with current technologies. *Science*, 305:August 13: 2004.
- PAPPI, F. U. (1987) *Die Netzwerkanalyse aus soziologischer Perspektive*. In PAPPI, F. U. (Ed.) *Methoden der Netzwerkanalyse* 11-37, München, R. Oldenbourg Verlag München.
- PAPPI, F. U. (1993) *Policy-Netze, Erscheinungsform moderner Politiksteuerung oder methodischer Ansatz?* In HÉRITIER, A. (Ed.) *Policy Analyse. Kritik und Neuorientierung*. 84-94, PVS Sonderheft 24, Opladen: Westdeutscher Verlag.
- PATTBERG, P. (2005) The Institutionalization of Private Governance: How Business and Nonprofit Organizations Agree on Transnational Rules. *Governance: An International Journal of Policy, Administration, and Institutions*, 18:4.
- PAVITT, K. (2005) *Innovation process*. In FAGERBERG, J., MOWERY, D. C. & NELSON, R. (Eds.) *The Oxford handbook of innovation*. New York, The Oxford University Press.
- PENA, N. (2009) CCS in the United States 1998-2008: From Resistance to Support. *CCT2009*. Dresden, IEA CCC.
- PETERS, G. B. & PIERRE, J. (2004) *Multi-level governance and democracy: A faustian bargain*. In BACHE, I. & FLINDERS, M. (Eds.) *Multi-level governance*. Oxford, Oxford University Press.
- PETERSON, J. (1995) Policy networks and European Union. Policy making: A reply to Kassim. *West European Politics*, 18:2, 389-407.
- PETERSON, J. (2004) *Policy networks*. In WIENER, A. & DIEZ, T. (Eds.) *European integration theory*. New York, Oxford University Press.

- PETERSON, J. & BOMBERG, E. (1999) *Decision-making in the European Union*. New York, St. Martin's Press.
- PHILIBERT, C. (2003) *Technology innovation, developement and diffusion*. OECD/IEA, Paris.
- PHILIBERT, C. (2004a) *International energy technology collaboration and climate change mitigation*. OECD/IEA, Paris.
- PHILIBERT, C. (2004b) Lessons from the Kyoto Protocol: Implications for the future. *International Review for Environmental Strategies*, 5:1.
- PHILIBERT, C. & PODKANSKI, J. (2005) *International energy technology collaboration and climate change mitigation - Case study 4: Clean coal technologies*. OECD/IEA, Paris.
- PRINCEN, S. & KERREMANS, B. (2008) Opportunity structures in the EU multi-level system. *West European Politics*, 31:6, 1129-1146.
- PUTNAM, R. D. (1988) Diplomacy and domestic politics - The logic of 2-level games. *International Organization*, 42:3, 427-460.
- PV TP (2011) *Steering committee*. <http://www.eupvplatform.org/about-pv-platform/steering-committee.html>. February 28: 2011.
- RAI, V., VICTOR, D. G. & THURBER, M. C. (2009) *Carbon capture and storage at scale: Lessons from the growth of analogous energy technologies*. PESD Stanford, Freeman Spogli Institute for International Studies.
- RHODES, R. A. W. & MARSH, D. (1992) *Policy networks in British politics. A critique of existing approaches*. In MARSH, D. & RHODES, R. A. W. (Eds.) *Policy networks in British government*. Oxford, Clarendon Press.
- RICHARDSON, J. (2006) *Policy-making in the EU. Interests, ideas and garbage cans of primeval soup*. In RICHARDSON, J. (Ed.) *European Union. Power and policy-making*. Oxon, New York, Routledge.
- RITTBERGER, B. (2006) Lobbying in the European Union: From sui generis to a comparative perspective. *Journal of European Public Policy*, 13:3.
- SABATIER, P. A. (1993) *Advocacy-Koalitionen, Policy-Wandel und Policy-Lernen: Eine Alternative zur Phasenheuristik*. In HÉRITIER, A. (Ed.) *Policy-Analyse. Kritik und Neuorientierung*. 116-148, Opladen, Westdeutscher Verlag.
- SABATIER, P. A. (1999) *The need for better theories*. In SABATIER, P. A. (Ed.) *Theories of the policy process*. Boulder, Westview Press.
- SABATIER, P. A. (2007) *Theories of the policy process*. Boulder, Colo., Westview Press.
- SABATIER, P. A. & JENKINS-SMITH, H. C. (Eds.) (1993) *Policy change and learning. An advocacy coalition approach*, Boulder, Westview Press.
- SABATIER, P. A. & JENKINS-SMITH, H. C. (1999) *The advocacy coalition framework. An assessment*. In SABATIER, P. A. (Ed.) *Theories of the policy process*. 117-165, Boulder, Westview Press.
- SAURUGGER, S. (2007) Collective action in the European Union - From interest group influence to participation in democracy. *Comparative Politics*, 39:4, 481-500.
- SAURUGGER, S. (2008) Interest groups and democracy in the European Union. *West European Politics*, 31:6, 1274-1291.

- SCHARPF, F. W. (1999) *Governing in Europe: Effective and democratic?* Oxford ; New York, Oxford University Press.
- SCHARPF, F. W. (2000) *Interaktionsformen. Akteurzentrierter Institutionalismus in der Politikforschung*. Opladen, Leske + Budrich.
- SCHARPF, F. W. (2010) *Multi-level Europe - The case for multiple concepts*. In ENDERLEIN, H., WÄLTI, S. & ZÜRN, M. (Eds.) *Handbook on multi-level governance*. Cheltenham, Edward Elgar.
- SCHMITTER, P. C. (1974) Still the century of corporatism? *Review of Politics*, 36:1.
- SCHMITTER, P. C. & STREECK, W. (1981) *The organization of business interests. A research design to study the associative action of business in the advanced industrial societies of Western Europe*. Berlin, discussion papers, IIMV / Arbeitsmarktpolitik - IIM / Labour Market Policy. Wissenschaftszentrum Berlin.
- SCHNEIDER, A. M. (2009) *EU-Kompetenzen einer Europäischen Energiepolitik*. Baden-Baden, Nomos.
- SCHNEIDER, G. & BALTZ, K. (2003) The power of specialization: How interest groups influence EU legislation. *Rivista Di Politica Economica*:January-February.
- SCHNEIDER, V. & JANNING, F. (2006) *Politikfeldanalyse. Akteure, Diskurse und Netzwerke in der öffentlichen Politik*. Wiesbaden, VS Verlag für Sozialwissenschaften.
- SCHREURS, M. A. & TIBERGHIE, Y. (2007) Multi-level reinforcement: Explaining European Union leadership in climate change mitigation. *Global Environmental Politics*, 7:4:November 2007, 19-45.
- SCOTT, J. (2009) *Social network analysis. A handbook*. London, SAGE Publications Ltd.
- SEBALDT, M. & STRÄßNER, A. (2004) *Verbände in der Bundesrepublik Deutschland*. Wiesbaden, VS Verlag für Sozialwissenschaften.
- SEBENIUS, J. K. (1983) Negotiation arithmetic - Adding and subtracting issues and parties. *International Organization*, 37:2, 281-316.
- SELSKY, J. W. & PARKER, B. (2005) Cross-sector partnerships to address social issues: Challenges to theory and practice. *Journal of Management*, 31:6, 849-873.
- SMARTGRIDS (2011) *SmartGrids ETP Forum*. <http://www.smartgrids.eu/?q=node/160>. February 28: 2011.
- SMITH, K. (2005) *Measuring innovation*. In FAGERBERG, J., MOWERY, D. C. & NELSON, R. (Eds.) *The Oxford handbook of innovation*. New York, The Oxford University Press.
- SNETP (2009) *Members of SNETP bodies: Governing Board, Executive Committee and Secretariat*. http://www.snetp.eu/www/snetp/images/stories/Docs-AboutSNETP/snetp_bodies_june2009.pdf. February 28: 2011.
- STEPHENS, J. C. & VAN DER ZWAAN, B. (2005) The case for carbon capture and storage. *Issues in Science and Technology*, Fall 2005, 69-76.
- STIGLITZ, J. E. (1988) *Economics of the public sector*. New York ; London, Norton.
- STONE SWEET, A., SANDHOLTZ, W., (1997) European Integration and Supranational Governance. *Journal of European Public Policy*, 4:3:September 1997, 297-317.

- STREECK, W. (1991) *Interest Heterogeneity and Organizing Capacity. Two Class Logics of Collective Action?* In CZADA, R. M. & WINDHOFF-HERITIER, A. (Eds.) *Political Choice. Institutions, Rules, and the Limits of Rationality*. Frankfurt am Main, Boulder, Campus Verlag, Westview Press.
- STREECK, W. & SCHMITTER, P. C. (1991) From national corporatism to transnational pluralism - Organized interests in the single European market. *Politics & Society*, 19:2, 133-164.
- SZULECKI, K., PATTERBERG, P. & BIERMANN, F. (2011) Explaining Variation in the Effectiveness of Transnational Energy Partnerships. *Governance: An International Journal of Policy, Administration, and Institutions*, 24:4.
- TAYLOR, M. R., RUBIN, E. S. & HOUNSHELL, D. A. (2005) Regulation as the mother of innovation: The case of SO₂ control. *Law & Policy*, 27:2.
- TEU (2010) *Consolidated version of the Treaty on European Union* Official Journal of the European Union, February 27: 2012, http://europa.eu/lisbon_treaty/full_text/index_en.htm.
- TEU / TEC (2006) *European Union - Consolidated versions of the Treaty on European Union and of the Treaty Establishing the European Community* Official Journal of the European Union, August 10: 2010, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2006:321E:0001:0331:EN:PDF>.
- TFEU (2010) *Consolidated version of the Treaty on the Functioning of the European Union* Official Journal of the European Union, February 27: 2012, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:115:0047:0199:en:PDF>.
- THIELE, A. (2010) *Europarecht*. Altenberge, niederle media.
- TÖMMEL, I. (2008) *Governance und Policy-Making im Mehrebenensystem der EU*. In TÖMMEL, I. (Ed.) *Die Europäische Union. Governance und Policy-Making*. Wiesbaden, VS Verlag für Sozialwissenschaften.
- TPWIND (2011) *Steering Committee*. <http://www.windplatform.eu/5.0.html>. February 28: 2011.
- TRAXLER, F. & SCHMITTER, P. C. (1995) The emerging Euro-polity and organized interests. *European Journal of International Relations*, 1.
- TRUMAN, D. B. (1951) *The governmental process; political interests and public opinion*. New York, Knopf.
- US DOE (2009) *Enhanced oil recovery / CO₂ Injection*. Washington D.C., U.S. Department of Energy. <http://fossil.energy.gov/programs/oilgas/eor/>. March 2: 2009.
- VOLLMER, D. (2009) *Enhancing the Effectiveness of Sustainability Partnerships. Summary of a Workshop*. Washington, D.C., National Research Council of the National Academies.
- WIETSCH, M., ARENS, M., DÖTSCH, C., HERKEL, S., KREWITT, W., MARKEWITZ, P., MÖST, D. & SCHEUFEN, M. (Eds.) (2010) *Energietechnologien 2050 - Schwerpunkte für Forschung und Entwicklung. Technologiebericht*, Stuttgart, Fraunhofer Verlag.
- WINDHOFF-HÉRITIER, A. (1983) "Policy" und "Politics". Wege und Irrwege einer politikwissenschaftlichen Policy-Theorie. *Politische Vierteljahresschrift*, 4, 347-360.

- ZEP (2005a) *Technology Platform for Zero Emission Fossil Fuel Power Plants draft minutes of the 3rd meeting of the Advisory Council* Brussels, 9th September 2005.
<http://www.zeroemissionsplatform.eu/advisory-council.html?plimitstart=24>. January 19: 2012.
- ZEP (2005b) *Technology Platform for Zero Emission Fossil Fuel Power Plants minutes of the 1st meeting of the Advisory Council* Brussels, 21st. June 2005.
<http://www.zeroemissionsplatform.eu/advisory-council.html?plimitstart=24>. January 19: 2012.
- ZEP (2006a) *Strategic Deployment Document*. February 8: 2011, <http://www.zero-emissionplatform.eu/website/docs/ETP%20ZEP/ZEP%20SDD%20-%20draft%2012.pdf>.
- ZEP (2006b) *Strategic research agenda*. The European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP), August 17: 2010, <http://www.zero-emissionplatform.eu/website/docs/ETP%20ZEP/ZEP%20SRA%20-%20draft%2012.pdf>.
- ZEP (2006c) *A vision for zero emission fossil fuel power plants. Report by the Zero Emission Fossil Fuel Power Plants Technology Platform*.
- ZEP (2007a) *Technology Platform for Zero Emission Fossil Fuel Power Plants draft minutes of the 10th meeting of the Advisory Council* Brussels, 14th March 2007.
<http://www.zeroemissionsplatform.eu/advisory-council.html?plimitstart=18>. January 19: 2012.
- ZEP (2007b) *Terms of reference and rules of procedure for the Government Policy and Technology Group of the Technology Platform for Zero Emission Fossil Fuel Power Plants*.
- ZEP (2008a) *Draft minutes of the 14th meeting of the Advisory Council* Brussels, 28th February 2008. <http://www.zeroemissionsplatform.eu/advisory-council.html?plimitstart=12>. March 3: 2012.
- ZEP (2008b) *Draft minutes of the 16th meeting of the Advisory Council* European technology platform for zero emission fossil fuel power plants, September 10: 2008, Brussels.
- ZEP (2008c) *Draft minutes of the 17th meeting of the Advisory Council* European technology platform for zero emission fossil fuel power plants, October 27: 2008, Brussels.
- ZEP (2009a) *Draft minutes of the 18th meeting of the Advisory Council* European technology platform for zero emission fossil fuel power plants, March 10: 2009, Brussels.
- ZEP (2009b) *Draft minutes of the 19th meeting of the Advisory Council* European technology platform for zero emission fossil fuel power plants, July 1: 2009, Brussels.
- ZEP (2009c) *ZEP Advisory Council meeting #20 - Minutes of meeting*. European technology platform for zero emission fossil fuel power plants, September 16: 2009, Brussels.
- ZEP (2009d) *ZEP bylaws (draft)*.
- ZEP (2010a) *Strategic Deployment Document II. Moving forward with CO₂ capture and storage (CCS)*. European Technology Platform for Zero Emission Fossil Fuel Power Plants.

- ZEP (2010b) *ZEP's structure*. <http://www.zeroemissionsplatform.eu/about-zep.html>. November 3: 2010.
- ZEP (2010c) *ZEP Advisory Council meeting #21 - Minutes of meeting*. European technology platform for zero emission fossil fuel power plants, January 13: 2010, Brussels.
- ZEP (2010d) *ZEP Advisory Council meeting #22 - Minutes of meeting*. European technology platform for zero emission fossil fuel power plants, March 10: 2010, Brussels.
- ZEP (2010e) *ZEP Advisory Council meeting #23 - Minutes of meeting*. European technology platform for zero emission fossil fuel power plants, June 10: 2010, Brussels.
- ZEP (2012) *ZEP CCS library*. <http://www.zeroemissionsplatform.eu/library.html>. March 22: 2012.
- ZEP GG (2007) *Minutes European Technology Platform on "Zero Emission Fossil Fuel Power Plants" (ETP ZEP), 8th meeting of the ZEP Government Group (GCG) – formerly Mirror Group (MG) Vienna, 16th April 2007*. <http://www.zeroemissionsplatform.eu/government-group.html?plimitstart=12>. January 19: 2012.
- ZEP TASK FORCE ON POLICY AND REGULATION (2009) *Proposal for ZEP comments to Commission's mandate to guide Member States on certain articles of Directive on Geological Storage of CO₂. Final draft of 13 February 2009*. <http://www.zeroemissionsplatform.eu/advisory-council.html?plimitstart=12>. March 3: 2012.

Acknowledgements

Having searched for an allegory for my PhD time I keep coming up with groping around in a dark room, walking through a desert or beating an extremely hard piñata not knowing, if there are any treats inside. It is the right time to remember those people who lit up my way, handed me water, and cheered me up.

I owe my academic supervisors Professor Ralph Rotte and Professor Emanuel Richter from the Institute for Political Science, RWTH-Aachen University for their feedback and guidance.

Professor Jürgen-Friedrich Hake, the head of the Systems Analysis Department at the Forschungszentrum Jülich, made the project possible by providing the funding, highlighting the research idea, and supporting the project. I especially appreciate our arrangement towards the end of the PhD that made it possible for me to quickly finish the work.

I wish to thank the interview partners who took their time and provided me with valuable information.

I would like to thank Wolfgang Fischer, my supervisor at Forschungszentrum Jülich for his advice and for providing the environment in which I could easily benefit from the exchange with the colleagues. I especially appreciate the support of my colleague Dr. Diana Schumann during the whole project. Dear Diana, thank you.

My mentor Professor Sebastian M. Schmidt motivated me through the then seemingly endless progress of the PhD. “To boldly go where no man has gone before” – this quote will always be my inspiration. Thank you.

To my coffee break company Holger Schlör and Stefan Vögele, my Berlin connection Berit Ebert, my friends from Studium Universale and from the Rurtalbahn – thank you for all the fun, laugh, encouragement, and great memories.

I thank Michael Braunstein for proof-reading the work and for always being a good friend. Love and duets.

To my parents Pashkova Ludmila Aleksandrovna and Pashkov Igor Anatolyevich who were not allowed to ask questions and to the end of the PhD even pronounce certain words – thank you for having made all this possible.

I am happy to have the unconditional support and the encouragement from my husband Bernhard Schenk. Thank you.

Olga Schenk,

January, 2013

Band / Volume 151

Stratospheric ClOOCl chemistry at high solar zenith angles

O. Suminska-Ebersoldt (2012), VI, 126 pp

ISBN: 978-3-89336-817-4

Band / Volume 152

Keramiken und Keramikkombinationen zur Feinstpartikelabscheidung mit Hilfe thermisch induzierter Potentialfelder und Elektronenemissionen

D. Wenzel (2012), XXV, 155 pp

ISBN: 978-3-89336-820-4

Band / Volume 153

Bildung von sekundären Phasen bei tiefengeologischer Endlagerung von Forschungsreaktor-Brennelementen – Struktur- und Phasenanalyse

A. Neumann (2012), 329 pp

ISBN: 978-3-89336-822-8

Band / Volume 154

Coupled hydrogeophysical inversion for soil hydraulic property estimation from time-lapse geophysical data

M. Cho Miltin (2012), xi, 79 pp

ISBN: 978-3-89336-823-5

Band / Volume 155

Tiefentschwefelung von Fluggasturbinenkraftstoffen für die Anwendung in mobilen Brennstoffzellensystemen

Y. Wang (2012), 205 pp.

ISBN: 978-3-89336-827-3

Band / Volume 156

Self-consistent modeling of plasma response to impurity spreading from intense localized source

M. Koltunov (2012), V, 113 pp.

ISBN: 978-3-89336-828-0

Band / Volume 157

Phosphorsäureverteilung in Membran-Elektroden-Einheiten dynamisch betriebener Hochtemperatur-Polymerelektrolyt-Brennstoffzellen

W. Maier (2012), VI, 105 pp.

ISBN: 978-3-89336-830-3

Band / Volume 158

Modellierung und Simulation von Hochtemperatur-Polymerelektrolyt-Brennstoffzellen

M. Kvesic (2012), ix, 156 pp.

ISBN: 978-3-89336-835-8

Band / Volume 159

Oxidation Mechanisms of Materials for Heat Exchanging Components in CO₂/H₂O-containing Gases Relevant to Oxy-fuel Environments

T. Olszewski (2012), 200 pp.

ISBN: 978-3-89336-837-2

Band / Volume 160

Ice Crystal Measurements with the New Particle Spectrometer NIXE-CAPS

J. Meyer (2013), ii, 132 pp.

ISBN: 978-3-89336-840-2

Band / Volume 161

Thermal Shock Behaviour of Different Tungsten Grades under Varying Conditions

O. M. Wirtz (2013), XIV, 130 pp.

ISBN: 978-3-89336-842-6

Band / Volume 162

Effects of ¹³⁷Cs and ⁹⁰Sr on structure and functional aspects of the microflora in agricultural used soils

B. Nidré (2013), XII, 92 pp.

ISBN: 978-3-89336-843-3

Band / Volume 163

Lidar observations of natural and volcanic-ash-induced cirrus clouds

C. Rolf (2013), IX, 124 pp.

ISBN: 978-3-89336-847-1

Band / Volume 164

CO₂-Abscheidung, -Speicherung und -Nutzung:

Technische, wirtschaftliche, umweltseitige und gesellschaftliche Perspektive

Advances in Systems Analysis 2

Kuckshinrichs, W.; Hake, J.-F. (Eds.) (2012), iv, 354 pp.

ISBN: 978-3-89336-850-1

Band / Volume 165

Interest Mediation and Policy Formulation in the European Union

Influence of Transnational Technology-Oriented Agreements on European Policy in the Field of Carbon Capture and Storage

Advances in Systems Analysis 3

Schenk, O. (2013), XIII, 253 pp.

ISBN: 978-3-89336-852-5

