Influence of technology-oriented agreements on European policy in the field of carbon capture and storage technologies[1]

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I Introduction

Looking back at the international cooperation aimed at the reduction of greenhouse gas emissions (GHG) it is possible to identify two approaches. The first approach is based on the commitment of the governments to the reduction targets and timeframes under the international law. The adoptions of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and of its Kyoto Protocol in 1997 belong to the highlights of this type of cooperation. The withdrawal of the USA from the Kyoto protocol in 2001, the absence of the GHG top-emitters and the lack of the binding emissions reduction targets of the emerging economies have driven the second approach to the international cooperation. That cooperation is carried out on the voluntary basis that goes without the emission reduction targets and binding timeframes. This approach includes the international cooperation in the framework of transnational networks aimed at the development and deployment of innovative technologies to reduce GHG emissions. Previous research labeled those networks as the technology-oriented agreements (TOA) [de Coninck et al., 2008]. The researchers provided a definition of TOA and discussed their contribution to the overall goal of the GHG reduction [ibid].

This paper scrutinizes the influence of TOA on policy aimed at the support of development and deployment of the innovative technologies. Two research questions are pursued in the framework of the analysis:

What is the scope of influence of TOA?

What accounts for the variations of the influence of TOA?

The study addresses the influence of TOA at policy formulation in the European Union. As the empirical field of application, the study considers the development and deployment of carbon capture and storage (CCS) technologies.

The study defines the universe of TOA 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. The unit of analysis is comprised of three transnational technology-oriented agreements – the Carbon Sequestration Leadership Forum (CSLF), the Implementing Agreement of the International Energy Agency (IEA) Clean Coal Centre, and the Implementing Agreement of IEA Greenhouse Gas R&D Programme (IEAGHG) as well as the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ZEP).

[1] The paper is based on the results of the PhD project [Schenk, 2012] that was carried out in the framework of cooperation between the RWTH-Aachen University (Prof. Ralph Rotte) und Forschungszentrum Jülich (Prof. Jürgen-Friedrich Hake).

The study is comparative in its design. It scrutinizes the influence of four formal organizations that pursue collective action. The dependent variable of the analysis 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. The research contributes to the European interest mediation studies by highlighting the interest mediation processes in the specific policy sector of the EU.

II Research design, hypotheses

The scholars of global environmental governance differ between three approaches to analyze the influence of the transnational networks [Biermann et al., 2009, Szulecki et al., 2011]. *The output level of analysis* studies 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 [Biermann et al., 2009, 41]. *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].

At the early 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. Thus, the study defines the influence of TOA as a work deliverable which finds access to the political decision-making process. "Finding access" means being considered and accepted by political decision-makers. 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. This approach to the influence of TOA corresponds with *the outcome-level of 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. Considering that policymaking activities are dispersed between various levels of decision-making authority, the study gives an overview of CCS policy and regulation that was adopted at the level of the EU.

Then, the study outlines the scope of the influence of the individual TOA on policy formulation in the EU. The study focuses on the access of knowledge produced by TOA to the political decision-making process and examines the alternative perspectives on the output of TOA. Methodologically the section draws from the research results gained from the document analysis, the expert interviews, and the minutes of TOA. The sample for the document analysis includes the output of the legislative process in the EU and the documents which prepare and accompany the legislation – the total of 74 documents during the time period from 2005 to May 2011. In addition to the results of the document analysis, the research results draw on the data from 13 structured expert interviews with the representatives of the TOA and of the Commission.

Finally, the study discusses the variations of the influence of the individual TOA. 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. 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.

Following the analytical framework of the administrative interest mediation approach [Lehmbruch, 1987], the study considers the level of the organizational development of TOA as an explaining variable for 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. Against this background, the following hypothesis highlights the relation between the level of the organizational development of TOA and their influence.

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

The empirical analysis of the organizational development of the individual TOA refers to the content analysis of the official documents and the minutes of TOA. It draws on the operationalization of the dimensions of the organizational development suggested by Schmitter & Streeck [1981]. The interpretation of the results of the analysis follows the analytical approach of the administrative interest mediation.

III European CCS Policy Framework

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 CO_2 emissions cuts beyond 2020 [COM(2006) 105, 2006].

Among the issues that can be identified as policy relevant with regard to the development and deployment of CCS (Tab.1), the supranational bodies of the EU addressed the majority of the issues. From those few issues that remain untouched by the EU legislation, the CO_2 storage in the international waters is not covered by the competences of the supranational bodies of the EU and the pipeline siting is traditionally regulated by the member states (Tab.1).

What is remarkable about the CCS policy and regulation at the level of the EU is the speed of the legislation. Considering the scope of policy and regulation needed for the deployment of new technology, the initial policy formulation cycle was completed within less than five years (cf. Fig 1). In 2005 CCS was first mentioned in the Commission’s Communication as a potential climate change mitigation option. The strategic positioning of CCS as a climate change mitigation option in the EU was introduced with the integrated climate and energy package in 2007. The climate and energy package issued in 2008 contributed to the

development of the long-term incentives for CCS deployment via the Proposal for the amendment of the EU ETS Directive and the Proposal for a CCS Directive (cf. Fig.1). With the development of the European Strategic Energy Technology Plan (SET-Plan) [COM(2007) 723, 2007, COM(2009) 519, 2009] the integrated climate and energy package was completed by a "technology pillar" aimed at boosting the effort of CCS research and development (R&D). In 2009 the EU introduced two instruments to subsidize CCS demonstration at the Community. The NER300 mechanism sets aside up to 300 million emissions allowances from the New Entrants Reserve[2] 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 [2009/29/EC, 2009, Article 10a (8)]. Besides the NER300 mechanism introduced in the framework of the climate and energy package 2008 (cf. Fig.1), 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 [663/2009, 2009].

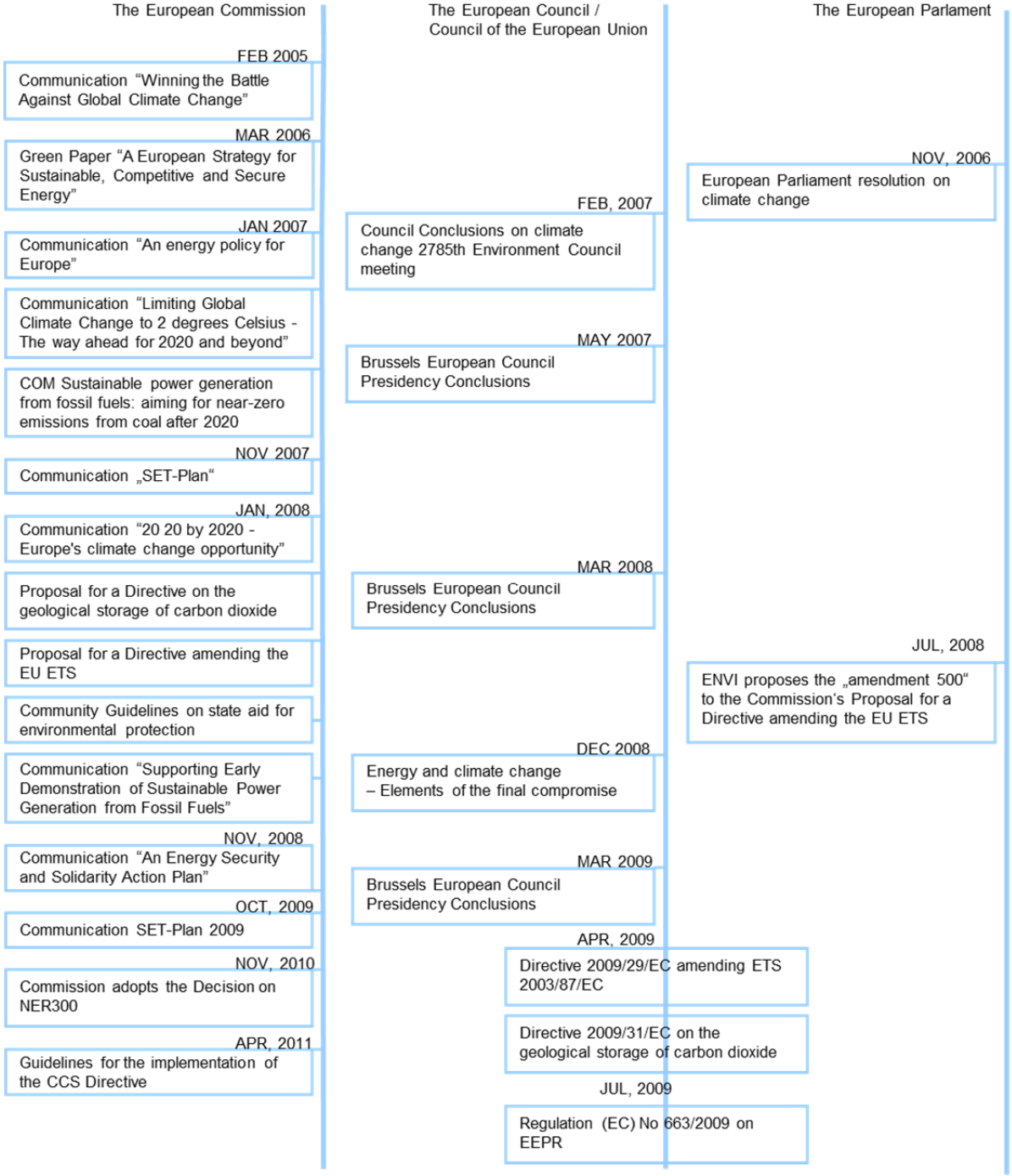
[2] A small amount of emissions rights reserved in each national allocation plan (NAP) for new market participants.

Tab.1: CCS-related policy relevant issues and the European legislation on CCS

Issue	**CO_2 capture**	**CO_2 transport**	**CO_2 storage**
Environmental risks	Integrated Pollution Prevention and Control (IPPC) Directive (2008/1/EC) amended by CCS Directive (2009/31/EC)	IPPC Directive (2008/1/EC) amended by CCS Directive (2009/31/EC)	IPPC Directive (2008/1/EC) amended by CCS Directive (2009/31/EC)
Environmental impact assessment	Environmental Impact Assessment (EIA) Council Directive (85/337/EEC) amended by CCS Directive (2009/31/EC)	EIA Council Directive (85/337/EEC) amended by CCS Directive (2009/31/EC)	EIA Council Directive (85/337/EEC) amended by CCS Directive (2009/31/EC)
Mandatory CCS	x	x	x
Funding R&D	FP6 (1513/2002/EC), FP7 (1982/2006/EC), the Research Program of the Research Fund for Coal and Steel (2008/376/EC)	FP7 (1982/2006/EC)	FP6 (1513/2002/EC), FP7 (1982/2006/EC)
Definition of the CO_2 stream standards	IPPC Directive (2008/1/EC) amended by CCS Directive (2009/31/EC)		
Access to pipelines and storage sites		CCS Directive (2009/31/EC)	CCS Directive (2009/31/EC)
Funding demonstration of the integrated CCS chain	European Economic Recovery Program Regulation (663/2009), Post 2012 EU ETS Directive - NER300 mechanism - (2009/29/EC)		
Mandatory "capture-readiness"	Large Combustion Plants (LCP) Directive (2001/80/EC) amended by CCS Directive (2009/31/EC)		
Definition of "capture-ready"-standard	LCP Directive (2001/80/EC) amended by CCS Directive (2009/31/EC)		
Pipeline siting		x	
CCS and waste legislation		Waste Directive (2006/12/EC) and Shipments of waste Regulation (1013/2006) both amended by CCS Directive (2009/31/EC)	
Incentivizing infrastructure construction		Infrastructure priorities for 2020 and beyond (COM (2010)677)	
Funding infrastructure construction		x	
CO_2 storage offshore in international waters			x
CO_2 storage in saline aquifers			Water Framework Directive (2000/60/EC) amended by CCS Directive (2009/31/EC)
Exploration permits			CCS Directive (2009/31/EC)
Storage permits			CCS Directive (2009/31/EC)
Procedure in case of leakage			CCS Directive (2009/31/EC)
Leakage and ETS-credits			ETS Directive (2003/87/EC)
Monitoring and verification			CCS Directive (2009/31/EC)
Site closure and post-closure obligations			CCS Directive (2009/31/EC)
Financial provisions for closure and post-closure obligations			CCS Directive (2009/31/EC)
Long-term liability issues			CCS Directive (2009/31/EC)

Source: [Schenk, 2012] with modifications

Fig.1: European CCS policy and regulation – key documents (as of September 2011)



Source: [Schenk, 2012]

IV Scope of influence of TOA

The present study understands the influence of TOA 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. First, the study presents the results of the document analysis that was carried out according to the operationalization of the concept of influence. Then, the study considers the results of the expert interviews to account for the output of TOA beyond the knowledge.

The analysis shows 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 work deliverables of TOA in policy and regulation documents which relate to the development and deployment of CCS technologies in the EU. The knowledge is an important but not the single output of the TOA. Depending on the comprehensiveness and the structure of membership, the political decision-makers benefit from TOA as a platform that provides an access to the international community. That allows spreading the EU's political message with regard to the development and deployment of CCS.

Access of knowledge to the policy-formulating process

With regard to the supranational decision-making bodies responsible for the formulation of CCS policy at the level of the EU, *only the Commission draws from the work deliverables developed by TOA* (cf. Attachment I). This result however is 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.

According to the document analysis, *ZEP and IEAGHG have the highest level of influence on the European CCS policy* with 39 and 36 references to their work deliverables respectively. 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 analysis shows that the *type of the knowledge* 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 deliverables of TOA from the Commission's perspective. This supports 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.

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.[3] 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 CO_2 storage. The Guidance document on the characterization of the storage complex

[3] For more information on the specific EU documents that refer to the output of TOA, the number of references and the issue that was addressed in the referenced work deliverables see the Attachment I.

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 CO_2 stream composition, monitoring strategies, and corrective measures.

The references to the output of the *CSLF* relate to the technical issues in the field of CO_2 storage.

Unlike the transnational TOA, 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 from that they derive 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 related to the development and deployment of CCS. As a framework for knowledge-sharing activities, the Protocol adopts the matrix of technologies developed by ZEP. 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; draws on 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 and the development of the instrument to finance CCS demonstration at the level of the EU (NER300). The output of ZEP in those cases encompasses predominantly policy recommendations. Those were communicated in the framework of:

- discussions of draft legislation with the representatives of the Commission,
- participation in the workshops and meetings set up by the decision-makers, and
- written work deliverables in form of letters to the decision-makers involved in the legislative process.

Thus, the exchange processes between ZEP and the Commission enhance the importance of spoken communication as the type of activities that modify or alter public policy. However, the research results also show 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 analysis shows that with regard to the *type of the documents* 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. In the context of this general trend, eight references (total 39 references) to the policy recommendations of ZEP were found in the content of the Commission's Communications. One reference (total 36 references) to the capture-ready concept developed by IEAGHG was provided by the CCS Directive. The remaining references to the IEAGHG output cover the technical expertise and were identified in the Commission staff working documents and the documents which support the implementation of the CCS Directive (CCS guidelines). The CCS Guidelines also contain the references to the work deliverables of the CSLF that provide technical information.

Access to the international community

According to the results of the document analysis, the knowledge developed by the CSLF and the Clean Coal Centre has not been accessed by the supranational bodies of the EU in the policy documents. However, the Commission highlights the importance of the transnational TOA because they establish access to the policy-makers and stakeholders in developed and developing countries. In this context, the Commission values those TOA that give access to the decision-makers that have the competence to influence policy-making in the respective country and, thus, provide the resource *relevance for political decision-making.*[4]

Due to the membership of policy-makers, the CSLF 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. Due to the membership of the 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.

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. 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

[4] 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.

international level and at the level of the EU. Thus, the Commission can work toward the harmonization of the political message contained in the CSLF documents considering the interests of the EU.

Besides the contacts to political decision-makers in the framework of the regular CSLF meetings, the Commission values the access to the high-level decision-makers. In this context, the Commission highlights the importance of the CSLF Ministerial meetings due to a 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.

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.

Having outlined the scope of the influence of TOA, the research interest turns to the explanation of the variations in the influence of TOA.

V Variation of influence of TOA

Level of organizational development

The level of the organizational development can be related to the level of influence, particularly if applied to the analysis of the influence of TOA without formal status in the decision-making system. The formal status within the decision-making system impacts the organizational structure of TOA and its strategies.

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). The characteristic features of the highly developed organizational structures are identified below (cf. also Attachment II).

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

Among the TOA which are comprised into the unit of analysis, *ZEP* has the highest organized complexity. The intra-organizational structure and management strategies applied by the ZEP Advisory Council and its bodies 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.

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, 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. On the other hand, the membership in the 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.

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.

Compared to other TOA in focus of the study, the *Clean Coal Centre* has the simplest intra-organizational design as it lacks the specific issue-oriented subunits as a mechanism of the representation of particular interests within an organization. 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. Due to the focus on coal, the Clean Coal Centre is exposed to the short-term fluctuations regarding its membership's approach to coal. Thus, a long-term capacity to determine goals and means of achieving them can be considered as limited.

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 heterogeneity of the particular interests is reflected in the largest number of specific issue-oriented subunits compared to other TOA. The resource autonomy of the CSLF can also be considered as low due to its dependence on 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.

It can be assumed that the extent to which ZEP and IEAGHG are expected to have an influence on the EU policy is high due to the high level of their organizational development. The extent to which the CSLF and the Clean Coal Centre are expected to have an influence on the EU policy is low due to the low level of their organizational development. The assumptions correspond with the results of the analysis of the influence of TOA.

Formal status

Political science refers to the decision-making system of the EU as the multi-level governance. On the one hand, the concept of multi-level governance highlights the dispersion of the decision-making authority between various territorial levels in the EU. Those characteristics of the political system of the EU lead the scholars of political science to the adoption of the sectoral approach to policy analysis in order to account for the variation in the dispersion of decision-making authority. On the other hand, the concept of multi-level governance highlights the importance of non-state actors in the policy-making process, given that governance is defined as the total of the coexistent forms of intentional regulation of

public policy issues [Mayntz, 2008, 45]. Although TOA do not have a formal decision-making authority in the political system of the EU, together with the state actors TOA are involved in the process of governance. 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.

The formal status of ZEP as an advisory body to the Commission facilitates the exchange of the resources through regular and – compared to other TOA – frequent contacts to the Commission. 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. 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 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. Both the Commission and ZEP highlight the contractual relationship established with the status of ZEP as the EU Technology Platform. 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 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 input legitimacy as it does not encompass the variety of different interests concerned by the problem. It cannot be identified whether the lack of the resource input legitimacy diminishes the influence of ZEP. However, it increases the demand of the Commission for the alternative opinions.

In this context 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, in the international organizations (e.g. the IEA), and in the TOA. The Commission considers this variety of sources of technical information on CCS to act as countervailing forces. Thus, the results of this process are reflected upon as pluralistic "checks-and-balances" outcomes [cf Greenwood, 2011, 3f].

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 also provides the regular

contacts to the representatives of the EU member states via the Government Group. However, 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*. Thus, 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 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.

VI Conclusions

The analysis of the influence of TOA contributes to the study of policy-making in the EU. The analysis of policy-making in the CCS policy sector of the EU shows the importance of the international level of decision-making. The Commission considers the international TOA as the provider of the technico-economical expertise, as the multiplicator of the political message related to CCS, 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 input legitimacy. As the concept of multi-level governance originates form 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 analysis of the organizational properties of TOA contributed to the interest mediation studies by focusing on the relationship between the organizational properties of the groups and their influence. The results of the analysis support the hypothesis that the level of the organizational development of TOA relates to its influence. The hypothesis is particularly valid, 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 influence of TOA that has a formal status in the decision-making system depends on the reciprocal capability of TOA and the state actors to exchange the resources. 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.

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 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 "checks-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 checks-and-balances.

- 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, 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 relationship between science-based knowledge and the policy formulation process [cf Jacob & Jörgens, 2011, 16f].

Attachment I: References to the work deliverables of TOA in the EU policy and regulation documents

EU Document	Number of references to the output of TOA			
	CSLF	ZEP	IEAGHG	IEACCC
Environmental risks				
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			
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 (SEC(2006) 1722)			1	
CO_2 stream characteristics				
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			6	
Incentivizing RD&D				
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 (SEC(2009) 1296)		2		
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		
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 (SEC(2009) 814)		1		
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 (COM(2008) 13)		5		
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)		8		
Communication from the Commission to the European Parliament and the Council An Energy Policy for Europe (COM(2007) 1)		2		
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 (COM(2006) 843)		1		
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 (SEC(2006) 1722)		9		
Definition of "capture-ready"-standard				
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 (SEC(2008) 54)			2	

EU Document	CSLF	ZEP	IEAGHG	IEACCC
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 (2009/31/EC)			1	
Incentivizing infrastructure construction				
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 (SEC(2010) 1395)		1		
Procedure in case of leakage				
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			6	
Monitoring and verification				
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		3	
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	
Knowledge sharing				
Knowledge Sharing Protocol (2010)		2		
Incentivizing CCS				
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 (SEC(2008) 54)		1		
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 (SEC(2006) 1722)		4		
Public acceptance				
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 (SEC(2006) 1722)		1		
Storage capacity estimation / site characterization criteria				
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 (SEC(2006) 1722)		1		
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			2	
Costs of CCS				
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 (SEC(2008) 54)			1	

EU Document	CSLF	ZEP	IEAGHG	IEACCC
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 (SEC(2009) 814)			1	
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 (SEC(2008) 2872)			7	
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)			1	
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 (SEC(2006) 1722)			2	
Data on CCS projects worldwide				
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 (SEC(2006) 1722)			2	
Total	2	39	36	0

Source: [Schenk, 2012] with modifications

Attachment II: Dimensions of the organizational development

Characteristics of organizations with the low level of organizational development	*Dimensions*	Characteristics of organizations with the high level of organizational development
	number of members & diversity of represented interest	
small and homogeneous		large and heterogeneous
not specified	*unit of representation*	high entrepreneurial status of managers representing the members
	intra-organizational complexity	
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
	coordination	
weak unity of command		unity of command centered at one subunit
	finance	
funding is provided only by the members		various sources of funding on a routine, predictable, and long-term basis
	labor	
contributed by the members on a voluntarily basis		provided by the employed labor recruited from market and not from the membership
	information	
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
	target groups	
exclusively the membership		diversification of outputs, customers, and target groups
	decision-making	
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
	selective goods	
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: [Schenk, 2012] after [Schmitter & Streeck, 1981] with modifications

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