Governance in Global Policy Networks

Individual Strategies and Collective Action in Five Sustainable Energy-Related Type II Partnerships

Dissertation

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„We are caught in a network of interdependence. We can be free only together. We can be safe only together. We can be prosperous only together. We can be human only together."

Desmond Tutu,
former Archbishop of Cape Town, South Africa,
Nobel Peace Prize laureate 1984

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Acronyms

ACORE	American Council On Renewable Energy
ACP	African, Caribbean and Pacific Group of States
AEI	Asian Energy Institute
AFREPREN	African Energy Policy Research Network
AIT	Asian Institute of Technology
ASE	Alliance to Save Energy
BCSE	Business Council on Sustainable Energy
BIREC 2005	Beijing International Renewable Energy Conference 2005
BMU	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
BMZ	German Federal Ministry for Economic Cooperation and Development
CCS	Carbon, Capture and Storage
CDM	Clean Development Mechanism
CEMAC	Communauté économique et monétaire de l'Afrique Centrale
CIDA	Canadian International Development Agency
COPs	Conferences of the Parties to the UNFCCC
CREIA	Chinese Renewable Energy Industries Association
CSD	United Nations Commission on Sustainable Development
CSR	Corporate Social Responsibility
DEFRA	British Department for Environment, Food and Rural Affairs
DFID	British Department for International Development
DG	Directorate General
DGIS	Netherlands Directorate-General of Development Cooperation
EAC	East African Community
ECN	Energy research Center of the Netherlands
ECOWAS	Economic Community of West African States
EdF	Electricité de France
EDF	European Development Fund
ENDA-TM	Environnement et Développement du Tiers Monde
EPIA	European Photovoltaic Industry Association
ERC	Energy Research Center
EREC	European Renewable Energy Council
ERG	Energy Research Group, American University of Beirut
ERI	Energy Research Institute
ESCO	Energy Service Company
ESKOM	Energy Service Company of South Africa
ESMAP	Energy Sector Management Assistance Program
ESTIA	European Solar Thermal Power Industry Association
EU	European Union
EUEI	European Union Energy Initiative for poverty reduction and sustainable development
GAPfund	GVEP's Action Programme Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFSE	Global Forum on Sustainable Energy
GKP	Global Knowledge Partnership
GNESD	Global Network on Energy for Sustainable Development
GSB	Growing Sustainable Business initiative
GTZ	Gesellschaft für Technische Zusammenarbeit

GVEP	Global Village Energy Partnership
IAEA	International Atomic Energy Agency
IAP	International Action Programme
IEA	International Energy Agency
IEEJ	Institute of Energy Economics, Japan
IEI	International Energy Initiative
IFI	International Financial Institution
IGO	Intergovernmental Organization
IIIEE	International Institute for Industrial Environmental Economics
IISD	International Institute for Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
ISE	Institute for Solar Energy Systems
ITDG	Intermediate Technology Development Group
JI	Joint Implementation
JPoI	Johannesburg Plan of Implementation
JREC	Johannesburg Renewable Energy Coalition
KITE	Kumasi Institute of Technology and Environment
LEPII-EPE	Department of Energy and Environmental Policies (EPE) of the Production and International Integration Economics Laboratory (LEPII)
MDG	Millennium Development Goals
MEDREC	Mediterranean Renewable Energy Centre
NGO	Non-Governmental Organization
NOVIB	Netherlands' Organization for International Development Cooperation
NREL	National Renewable Energy Laboratory
OAS	Organization of American States
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PA	Practical Action
PDF	Partnership Dialogue Facility
PRSP	Poverty Reduction Strategy Paper
R&D	Research and Development
REC	Regional Environmental Center
REEEP	Renewable Energy and Energy Efficiency Partnership
REGPN	Renewable Energy Global Policy Network
REN21	Renewable Energy Policy Network for the 21st Century
RET	Renewable Energy Technology
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SC	Steering Committee
SIDA	Swedish International Development Cooperation Agency
SME	Small and Medium-sized Enterprise
TERI	The Energy and Resources Institute
TNC	Transnational Corporation
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDESA	United Nations Department for Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization

USAID	United States Agency for International Development
VROM	Netherlands' Ministry of Housing, Spatial Planning, and the Environment
WB	Worldbank
WBCSD	World Business Council for Sustainable Development
WEC	World Energy Council
WEHAB	Water, Energy, Health, Agriculture, Biodiversity
WIREC 2008	Washington International Renewable Energy Conference 2008
WSSD	World Summit on Sustainable Development
WWI	World Watch Institute

1. Introduction: Global Governance and Global Policy Networks

"Our involvement with global policy networks has been extensive but largely unplanned. We need a more focussed and systematic approach."

(Kofi Annan: *Renewing the United Nations. We the Peoples. The United Nations in the 21st century*. New York, 2000)

As long as there is no effective international climate and energy regime, voluntary cooperation might pave the way to an international agreement, and spur collective action even after an international agreement could already be reached. Thus, global policy networks of voluntarily committed actors might work as an enabling condition in the process of an international regime, not as an alternative to a regime. Research must elicit if and under which circumstances global policy networks achieve to establish effective network governance on global issues. Networks help to develop individual solutions for failures to generate sustainable outcomes, and to disseminate model solutions developed by individual partners, by providing flexible mechanisms to collect resources and connect partners for effective action. Thereby, networks scale up sustainable solutions. Hence, networks can work as a leveraging instrument, which, however, can reach maximal effectiveness only as complementary mechanism to an international regime.

1.1 Relevance of Networks For Sustainable Development

In the wake of an era of global development, with the biggest countries on earth transforming to industrialized economies, it appears that we are not only experiencing an ongoing gradual change in global economies. It appears that what Rudyard Kipling called a hundred years ago in his novel *Kim* the 'Great Game' is in the process of a complete change. Then, Kipling was referring to the competition for world domination and the activities of the Secret Services of Great Britain and Russia in the region of India, and China. Today, fossil fuel resources have become the prize of the 'Great Game'. Under the auspices of globalization, the prospects of development of national economies all over the world are at stake in the 'New Great Game'[1] for energy commodities. Power politics, thereby, have become 'Petro Politics'.[2]

Energy cannot be substituted and will continue to be necessary for all physical activities of all sectors of social and economic development. The hunger for energy of the biggest emerging economies has driven the oil price from one peak to another. The price of gas has followed. The dangers and future costs of nuclear energy are uncertain and hard to calculate, but will certainly impose burdens on future generations, and represent a high risk technology in times of international terrorism. After all, availability of these energy sources will decrease. The costs of their exploitation as well as of their external effects on the global climate, for instance, will go up. Today's energy economy is therefore "compromising the ability of future generations to meet their own needs", (Brundtland-Report 1987) thereby violating the very essence of sustainable development as defined by the World Commission on Environment

[1] The term 'New Great Game', following Kipling's novel, stems from the Pakistani journalist Ahmed Rashid and his book *Taliban: Islam, Oil and the New Great Game in Central Asia*, London, Tauris, 2001.

[2] Thomas Friedman, columnist of the New York Times, calls the negative correlation of crude oil price and the pace of freedom 'The First Law of Petropolitics' in an article in *Foreign Policy*, May/June 2006. The term 'petropolitics' refers to the political power gained from petroleum deposits on the side of autocrats and to policy strategies, considering oil import independence or energy security and climate change on the side of oil importing, democratic societies.

and Development. Energy policies, traditionally a national issue, have entered the agenda of international policies, and energy policies must consider completely new questions. The 'Great Game' has turned into a fierce competition for energy as the driving force of social and economic development as well as the key to sustainability of development in global markets.

The game itself changes, the rules of the game change as – in terms of game theory – does the pay-off matrix. The 'Tragedy of the Commons' (Hardin 1968) applies to what happens to humankind when environment and particularly climate issues interfere with development issues. Nicholas Stern, former chief economist of the World Bank, rated this situation of climate change as "(…) a unique challenge for economics: it is the greatest and widest-ranging market failure ever seen." (Stern 2006: 1) However, to recognize the change in the game our understanding of the game must change. The dilemma is that, as Paul Valéry put it, that 'We enter the future backwards'.[3] We understand what happens today on the grounds of the experience we gained yesterday, but that does not necessarily tell us what will happen tomorrow. Therefore, we have to explore the new rules of the game afresh without determination by the rules for energy and development that have dominated so far. Traditional approaches of international politics to erect an international regime failed so far, negotiations came to a deadlock.

In order to change the path of global development, the world needs leadership. However, without support in international cooperation and strategic alliances, leaders might be helpless. This situation calls for a **new governance model of global politics**, and particularly climate politics. This governance model must reflect the situation of the system of international relations where no superordinate authority can govern and yet interventions in global market failures are badly needed. This model can neither be about setting the right incentive structures and letting the market rule, nor about empowering agencies to command and act, but both: the process in which agencies and structures, organizations and markets develop global environmental governance: "Partnerships basically serve to connect the dynamism that we see at the local level with the commitments that Governments need to make. We need both. Not one or the other – both." (WSSD: 2002) While top-down governmental regimes can leverage whole industries and economies out of inactivity, the capacities of non-state actors to implement bottom-up actions for sustainable development are ultimately pivotal for the effectiveness of policies. Global policy networks can convene both state and non-state actors and combine their different capacities to increase effectiveness of action, as will be tested.

> "(T)o be effective, efficient, and legitimate, governments and international organizations need to work with partners from all other sectors – business as well as civil society – at a variety of levels – local, national, regional and global", explain Witte, Streck, and Benner, and go on that global environmental governance requires a "new conception that emphasizes a less formal, more collaborative, and integrated approach." (Witte, Streck, Benner 2003: 61)

Indeed, at the WSSD so-called type II partnerships[4] of state and non-state actors were recognized as official conference outcomes. Apart from water, health, agriculture and biodiversity, energy was one major issue those type II partnerships focus on and will be in the context of energy's relevance for climate change in the center of research interest of this thesis.

However, international governance based on networks cannot substitute for conventional intergovernmental negotiation and contract based governance. Both must play complementary roles. **Regimes and contracts** are no substitute for trusted social relations and knowledge, they are founded on these resources, which have to be built, managed, and distributed by networks. Formal contracts cannot build partnerships for sustainable development without these resources. Legal accountability of contracts even tends to crowd out individual initiatives, as an interviewee

[3] Original quote in French: 'Nous entrons l'avenir à reculons.', Paul Valéry.

[4] Type II Partnerships refer to networks and partnerships of state and non-state actors as opposed to Type I Partnerships, the usual outcome of international conferences: agreements between governments of different countries.

from the civil society observed. The IAP[5], for instance, was a race to the top propelled by the publicity of the renewables2004 conference, whereas the Kyoto process distributes costs and burdens by contract, resulting in a race to the bottom.

> "The WSSD Secretariat's initiative to call for 'Type II' partnerships between governments, local authorities, business, and civil society organizations was based on the recognition that international treaties and regimes can only set the framework for sustainable development initiatives." (Müller-Kränner 2003: 55)

The new governance model roots in **global policy networks** and their governance through *self-organizing dynamics* and *strategic management* interventions. Thereby, these networks promise to organize *knowledge* and *social capital* as managerial resources for action for sustainable development more effectively and efficiently.

The question is *if* global policy networks might be able to keep the promise of organizing effective global governance and global policies, and if yes *how* they achieve that. Therefore a decentralized **network governance strategy**, which is missing so far, (Ibarra 1992: 166) will attain to reflect the final outcome. The analysis of this thesis is supposed to develop a *microeconomic, decentralized strategy* to deal with *macroeconomic failures* to produce sustainable outcomes. This link of micro- and macro-level is what networks are able to provide as Granovetter argued. (Granovetter 1973: 1360)

This thesis combines different theoretical approaches to develop a decentralized network governance strategy and analyzes what makes networks effective instruments of governance. The ambition of this thesis is to analyze – at a macro-level – energy market failures and – at a micro-level – incentives of mutual benefits in individual partners' network activities, and to integrate those with theories to international politics and organizational theory. Then, theoretical conclusions will feed into strategies of **network governance**, i.e. both governance *in* global policy networks and governance of global issues *through* functions of global policy networks.

Kanie, Haas and Murphy call for the consideration of actors from all policy levels as necessity for the execution of functions of global environmental governance on sustainable development:

> "Governance occurs through complex synergies between networks of actors across all levels of international politics. (…) more attention (has to) be paid to clarifying the key actors and the governance functions they perform for addressing particular environmental threats. Only then can the environmental, social, and economic aspects of sustainable development be integrated in a concrete manner." (Kanie, Haas, Murphy 2004: 279)

[5] The International Action Programme of the renewables2004 – International Conference for Renewable Energies, Bonn was composed by the voluntary commitments of various conference participants from all sectors.

1.2 Course of Argument

The **ambition** of this thesis is to *systematize* the various theoretical approaches to networks and identify the factors and conditions for effectiveness and efficiency of collective action in practice in networks for sustainable energy and development in international politics. The academic debate on network governance is supposed to harness the distilled knowledge on what has to be considered in network governance and how to deal with certain challenges of network governance in practice.

In order to design a common network governance strategy, to be followed by autonomous network partners, on how to execute certain governance functions three aspects of global policy networks have to be analyzed: (i) the effectiveness of the governance functions of some given networks, (ii) the efficiency of the activities of these given networks, and (iii) the success factors for cooperation among the partners in these networks. The first aspect of analysis is supposed to clarify if global policy networks can effectively contribute to global governance at all – in the sense of effective governance through networks. If they can, the question how networks can achieve that falls into line. However, effective network governance depends not only on if network functions contribute to effective problem solving but also on if networks themselves are governed effectively and efficiently. The second aspect is supposed to provide insights in this governance in networks. Effective mechanisms of governance *in* networks define how to organize effective mechanisms of governance *through* networks on global issues. Both governance in and governance through networks, in fact, cling together and can hardly be separated.

The background to start from is that after the Bali conference in December 2007, an *effective*, *efficient*, and binding international *climate and energy regime* to mitigate climate change and foster sustainable development must find mechanisms *how* to define and reach greenhouse gas emission reduction objectives, "comparable in efforts", (Bali Action Plan 2007: 1) and to organize long-term cooperative action on technology transfer, provision of financial resources and capacity building. While the USA as some other developed countries strongly demanded commitments from developing countries as well, the big emerging economies already demanded the necessary flexibility to keep their economies growing, referring to "common but differentiated responsibilities" at the G-8 leaders' summit in summer 2007 at Heiligendamm, Germany,[6] and committing only to mitigation actions if "bearing in mind different circumstances of developed and developing countries", (Bali Action Plan 2007: 2) as phrased in the Bali Road Map. To that end, strategy and leadership of some actors are needed to make partnerships work, "building on synergies among activities and processes" of "multilateral bodies, the public and private sectors and civil society", (Bali Action Plan 2007: 2) or "concerted international action", in the words of the Plus Five grouping at Heiligendamm[7], and enable countries and industries to achieve emission reduction targets.

The good news is that "(t)echnological solutions to energy problems are available today. We now need the political will and action to implement them," said Klaus Toepfer, then Executive Director of UNEP. (UNEP 2002) Defenses to change international structures or to agree on a regime implying redistributive effects are too strong. This, although an effective climate and energy regime might be badly needed for global sustainable development and the survival of humankind on planet earth. Some kind of effective global environmental governance is necessary to overcome market failures to produce sustainable outcomes. *The way out of the dilemma might be to develop microeconomic strategy for international collective action to address the macroeconomic problems of global environmental commons.* That's why the more flexible forms of international collective action of partnerships or – in a broader sense – of global policy

[6] The final outcome of the G-8 summit was to "seriously consider" a reduction in emissions of 50% until 2050 – without any mandatory commitments – and that climate protection will be negotiated under the umbrella of the UN, leading up to the Bali conference in December that same year.

[7] The Plus Five group includes Brazil, India, China, Mexico, and South Africa, which represent the biggest emerging economies.

networks[8] can become the supplement to fixed international regimes. However, to come to efficient solutions, this global governance must not crowd out the self-organizing dynamics in markets producing spontaneous order. Therefore, the principal hypothesis is that *effective strategic management of global policies on sustainable development must complement efficient self-organizing dynamics*.

There are many theoretical approaches to account for how to implement network governance and how to analyze and learn from former experiences for the practice of network governance. But there is not *the* one theory on network governance. Rather many theories might contribute to a network governance theory, as, for instance, Windeler argues. (Windeler 2001: 37-39) There is neither a comprehensive explanation whether networks are more effective than the process of international conferences and treaties at all, nor – if they are – why they are more effective.

Hence, a double **research gap** remains: a theoretical one on how network governance could contribute to an effective global environmental governance, and a practical one on if and how the actual process of development of global policy networks were indeed effective and efficient in terms of solving problems of global environmental commons. These research questions link into the debate on regime effectiveness from the discipline of international relations and the political science and organizational theory debate on governance which will be briefly introduced. The investigation into these questions will proceed in part two and again in part three of this thesis according to three phases reflecting **three phases in the development of networks[9]** and check what makes governance in and through networks in each of these three phases effective. Nevertheless, a network governance strategy must not differentiate the different phases, for, these phases might overlap and conclusions on each of the phases how to govern networks must apply always to strategic activities to make sure that network managers do not ignore relevant issues, actors, interests, or mechanisms at any time.

The IISD found in its research on networks that three phases can be distinguished in the formation of networks, as Heather Creech explained. (Interview November 16, 2005) The first phase is the start-up when the governance of a network is designed. The second phase often correlates with a lack of funding forcing network partners to start reforming network governance and network activities. Only in the third phase networks start to realize advantages compared to public regimes or private actors in markets.

In phase one, networks must establish a *process-related governance*. Based on general considerations of the compatibility of rationalist and constructivist approaches, the argument unfolds to incorporate both strands of academic debate and will attempt to harness theoretical approaches from both for the development of theses on how network governance functions might be executed effectively and efficiently in practice. This part of the argument will build the paradigmatic groundwork for the basic question how to combine different theoretical approaches in one policy process in order to consider all of them according to the needs of a complex international reality. The theoretical debate if different theoretical approaches and their inferences can be combined at all or if they must exclude one another is not the research interest of this study. The paradigmatic groundwork is supposed to merely deliver the base for a pragmatic use of theories for the empirical focus of this study. Theories will serve to identify situations in global environmental issues and to deduce conclusions how global policy networks can deal with these situations. Hence, different paradigms and theoretical approaches refer to different phases in network governance and policy formation, to different issues addressed by network governance, and to different necessities in the execution of network governance.

[8] The terms and organizational forms of partnerships and networks will be defined and marked off against each other in section 2.3.2.

[9] As the order of three phases plus a preliminary phase one will not include all sections of the course of the argument and as the phases will be iterated in part two and part three of the thesis, the phases and their conclusions are not numbered consecutively like the other sections but capital letters A to D highlight the order of the phases which surfaces in the study and repeat in part three.

In phase two when networks become operational, they must strategically manage the *network resources* in order to address certain market failures. Game theory models serve the purpose to model certain market failures and suggest how rationalist actors, respectively players, and, thereby, which network functions might help to overcome the failures to produce sustainable outcomes. The respective network function highlighted will correspond to certain theoretical approaches to international relations, from which theses will be developed in section 2.9 how the sustainable energy related global policy networks can execute their functions.

The resource dependency theory specifically addresses network situations, modeling rationales of actors to exchange resources for action as reason for the emergence of networks and collaborative activities of network partners. This theory is a rationalist approach to strategic management of interorganizational relations and required resources in networks. (compare Nölke 1995) Though in the special context of global policy networks, partners do not so much exchange but mostly share resources for action due to the nature of the semi-public resources of knowledge and social capital contained in networks. This peculiarity reflects a basic observation in global policy networks. The basic pattern of interaction in networks seems to be one of sharing or managing semi-public resources. Nevertheless, the holders of these resources are the crucial actors in network governance, as resource dependency theory rightly explains for the exchange of resources in networks. Hence, this theory gives reason why rationales and resources of actors must be considered in network governance. The argument goes on to elaborate on strategies to manage the common resources of knowledge and relations in networks.

In phase three long-term developments of networks and how they organize to produce their outputs, i.e. which governance models organize collective action will be subject of analysis. The complex qualities of semi-public resources require particular governance models. Governance according to system theory addresses exactly such complex systems, which cannot be controlled by any form of external government.[10] These circumstances pretty much match the situation of the system of international relations. Governance from within considers relations, constituting the system, and bases strongly on knowledge resources for governance. System theory drags away the perspective from the actors and focuses on the whole rather than on the units. Thus, system theory can play a complementary role to game theory modeling rationalist players' activities.

Systemic organizational theory develops holistic governance approaches based on *self-organizing dynamics* and explains how to complement these dynamics with *strategic management* as required in networks. This governance from within identifies principles how to foster such self-organizing dynamics. These principles must be taken into account when individual activities constitute governance in networks. At this point the gap between organizational theory and political science must be bridged in the debate and application of theories on network governance, as Strulik and Nölke observe. (Strulik 2000: 324; Nölke 1995: 391 and 393)

Game theory and system theory represent meta theories to rationalist and constructivist theories of international politics which explain governance through networks. While the meta theories deduce how to organize governance in networks, defining how to execute governance through networks, theories of international politics outline how global policy networks can address certain situations in international poitics and global environmental governance and how to overcome certain failures to produce sustainable outcomes. In section 2.9, different rationalist and constructivist approaches to international relations will be applied to certain situations of market failures in energy markets, and theses how to manage the execution of network functions to overcome these market failures will be developed. As will be discussed in section 2.4, neither do rationalist and constructivist theoretical approaches necessarily exclude each other nor will they be applied to the same problems in international politics and environmental governance anyway. The theoretical approaches will strictly refer to different situations in different stages of policy formation, and,

[10] Fredmund Malik (1993: 236) gives reason for the fact that complex systems cannot be governed by an actor due to the „Bremermann'sches Limit", which is a limit of matter-based systems to process bits of information.

thus, rationalist and constructivist theoretical approaches are supposed to complement one another.
In the third part of this thesis, the deduced theses will be tested on the cases of five sustainable energy related partnerships. By testing these theses and – as the case may be – modifying, amending, or abolishing them, knowledge from international relations theory will combine with knowledge from organizational theory to design effective and efficient network governance.
To describe the sustainable energy related global policy networks, their development will be categorized again according to the three phases of network development. These phases of the five networks can be partly observed and partly predicted in terms of how those networks might evolve in future and contribute most successfully to climate policies and the development of sustainable energy. In each of the phases, analysis will scan certain features in each of the explored networks for the hypothesized effective mechanisms for governance in networks and check if and how they contribute to effective network governance.
In the first phase the emergence of global policy networks will be described and analyzed if governance design is process-related and which role leadership has played. The second phase focuses on the operational strategic activities of the explored networks and which resources and instruments the networks harness. Finally, the third phase observes factors of long-term outputs and provides an analysis of strategies, stability, effectiveness, and efficiency of network governance and how fostering conditions for self-organizing dynamics and strategic management fit each other.
The research method comprises expert interviews as well as analysis of documents and project reports from the networks. The evaluation of effectiveness of network governance bases on the progress towards a priori set objectives, on the assessments of interviewees of network effectiveness, and on a comparison of what network partners from different sectors consider a success factor anyway. For, only if partners can consider and anticipate one another's action appropriately, successful collective action might emerge. Based on the research on how those networks execute which of their functions and how effective they are, the theses deduced from theoretical approaches to network governance will be compared to the information from expert interviews. Those interviews discussed the effectiveness of networks as counterfactuals with experts from the explored networks and from the wider field of sustainable development and compared the networks' effectiveness to possible alternatives in the international process for sustainable development.
The analysis of effectiveness of the explored networks is supposed to explain which mechanisms contribute how to the overall effectiveness of network governance. The comparison of actual effectiveness with hypothesized mechanisms results in the draft of strategic principles for governance in and through networks combining fostering conditions for self-organizing processes within the network and complementing strategic management of semi-public network resources of knowledge and social capital to execute certain network governance functions. Thereby, the final outcome will be a *common but decentralized strategy* for microeconomic action oriented to *long-term* macroeconomic goals.

1.3 Research Method

1.3.1 Reason for the selection of Five Type II Partnerships

Approximately 40 energy-related type II partnerships of different scope, regional focus, technology focus, and participating sectors were launched as outcome of the WSSD in 2002. Among those 40 partnerships three features separate the GVEP (Global Village Energy Partnership), EUEI (EU Energy Initiative for poverty eradication and sustainable development), GNESD (Global Network on Energy for Sustainable Development), and REEEP (Renewable Energy and Energy Efficiency Partnership) from all others. These networks are the only ones which aim to apply their activities *globally*, have set *technology-neutral* goals to increase access to sustainable energy for the poor, not regarding the particular purpose for energy use, and whose partners come from *all sectors* and *all regions of the world*.

In 2004 another global policy network in the field of sustainable energy was founded at the renewables2004 – International Conference on Renewable Energies, Bonn, and finally launched one year after. This Renewable Energy Network for the 21st century (REN21) will be taken into account additionally as it meets all the criteria of the selected four type IIs, too. Although, due to the special history of REN21, being the outcome of an official Political Declaration of an international conference of the international community of states, it differs from the other global policy networks, and might turn out to be less active at the operational level and rather complementing the activities of the other four networks on sustainable energy. The role of REN21 was much discussed before the actual launch, and future still has to show on what issues REN21 will become effective, however, it appears that the new network will cooperate with the other type IIs and support them from a sort of meta level without taking a somehow hierarchical role.

These five networks differ from all other energy-related type IIs simply by size in terms of participating sectors, including governments, intergovernmental organizations, private companies, NGOs, and the academic community (GNESD comprises only the academic sector but must be understood rather as an epistemic community within a wider network of, for example, the other sustainable energy related networks). They are the biggest initiatives as well in terms of effectiveness and ambitions since they assume a general commitment to energy issues on a *worldwide scale*, which match the interests of this thesis in the effectiveness of networks as a new form of global governance. And these five networks promote sustainable energy for development, including all renewable energy technologies as well as energy efficiency enhancing technologies. They combine, as GVEP phrased it in its Business Plan, "(…) an energy-poverty reduction mission coupled with its global partner presence and commitment." (GVEP 2005a: 8)

Consequently, those five networks are planning to and already do cooperate with one another, while other type II partnerships on energy may cooperate with them only situational, which demonstrates the extraordinary position of those five networks compared to other type II partnerships.

The five type II partnerships differ in their respective foci and which parts of societies in sustainable development they address. Some of their activities overlap but all in all they complement one another to engage in all compartments of societal development quite perfectly. GVEP focuses on social development and immediate poverty reduction through access to sustainable modern energy for communities particularly in rural areas. All partnerships have this focus on poverty reduction but REEEP promotes market development, EUEI fosters dialogue on policies and builds on activities of governments and other already existing actors from the field of sustainable development to attain immediate impacts, and GNESD comprises actors from the academic community to cooperate with the other partnerships, consults on and addresses energy policy reforms. REN21, not holding any hierarchical position to the other networks, embarks to work at a sort of superordinate level on strategic issues in the field of partnership action for sustainable energy, offers opportunities for exchanges among the actors from those partnerships, and cooperates with the other four networks.

REEEP as well as REN21 have been more renewable energy oriented than the other networks, while GNESD focuses on energy access and in a second frame on renewable energies but, in general, prioritizes the effects of energy for poverty reduction. GVEP combines that poverty reduction focus with an explicit commitment to problems of rural energy, though GVEP supports as well urban and peri-urban energy services. Thus, GVEP's action is more oriented to small scale projects to provide poor with sustainable energy access, and intends to instigate the up-scaling of projects, whereas REEEP focuses more on policies and regulatory frameworks of markets, which does EUEI, too, but sponsors partnership projects also.
Taken together, the five type II partnerships are supposed to represent sort of a complete sample for network activities on issues relating to sustainable energy for development.

1.3.2 How to Collect Information on Networks

The research will be based partly on documents and project reports of the different networks and partly on semi-structured expert interviews with network members, and staff and experts from the network secretariats as well as with external experts. This method to collect information is in line with the suggested method of the Monitoring & Evaluation Initiative of the explored networks themselves to evaluate partnership activities. (GVEP Interest Group 2003: 11) As such evaluation of network activities is necessary to justify expenses but difficult to carry out and to quantify, the type II partnerships collaborated in the M&E Initiative to design a tool box for the evaluation of partnership projects. Much of the work of this initiative provides a useful general knowledge base for the choice of the method of research on the effectiveness of networks. However, in the end this tool box generated a list of indicators to evaluate the effectiveness of specific energy projects, which can only insufficiently evaluate the effectiveness of the overall network governance. (M&EED 2006)
In principle the problem of rating the effectiveness of network governance comes from two angles: (i) due to countless intervening factors and the young age of the type IIs, it is difficult to ascribe any impact clearly to their activities, and (ii) as type IIs emerged in a situation when no international sustainable energy regime could be established, there is nothing the effectiveness of network governance can be compared to.
Both problems are addressed by harnessing expert knowledge accessed through qualitative, open, and semi-structured interviews. Those experts provide knowledge and experiences on if and how the networks in question contribute to effective global environmental governance and energy policies for sustainable development. And they will sort of generate from their expertise a counterfactual to compare the actual network governance and the effects thereof to.
The expert interviews-based research basically evolved in three steps:

1. Contact: The interviewees were selected as representatives from three spheres of global policy networks in the sustainable energy and development community: The inner circle comprises interviewees from the secretariats as the core of the networks of the study. The wider circle contains network partners, who are partners of at least two of the scrutinized networks. In the outer circle are experts from the field of sustainable development, or sustainable energy, who are experienced with partnerships and networks in global environmental governance.[11] The selection of interviewees should represent the public sector, the private sector, the civil society, academic community, and intergovernmental organizations in approximately the same variety and number of considered organizations, but the selection is by no means representative in terms of quantitative studies. The networks, which represented the interviewees' backgrounds, were partly very diverse. Although all networks in consideration had in common that they represent voluntary collective commitments and that their governance always had to face the challenge to

[11] See Annex II.

promote collective action for sustainable energy, and at the same time to consider individual interests of the autonomous actors.

When the interviewees were selected and contacted for conducting an interview, they were first asked to describe the following: a collective strategy, how they acted in the network, and the strategic action of the respective organization, which the interviewee represented. In that first contact the interviewees were provided with a scheme of possible network activities to execute certain network functions, deduced from network literature and theoretical approaches in the academic debate. The interview questions would address the network functions and possible activities from the scheme. This scheme might have been helpful for the interviewee to prepare for the interview and have served as well as a cornerstone for the discussions. They also steered the open interview towards the network action and functions, which the network activities focus on. Strategic action of partners and networks, and the significance of social and cognitive resources were thus discussed with regards to market failures and postulated network functions. The focus of research had to be on strategies, for, if there were no strategies, there could not be identified any patterns of partnership action, but only ad hoc action.[12] Only strategy and strategic action allow coming to general terms. Those strategies do not need to be formulated explicitly, only the individual contributions to network action must follow certain patterns in order to match the activities of other network actors.

2. Interview: The interviews were open and semi-structured in order not to bias the interviewee's answers towards the theses on strategic action deduced from theories. The interview guideline[13] was only meant to assist the selection of topics, it did not refer to the scheme of activities but put forward open questions on how certain functions were executed and what the effects of that action were. The interview guideline was supposed to produce validity and comparability of results, so that the hypothesis can be tested on the ground of the interviews. (Schnell, Hill, Esser 1995: 144) On the other hand the openness of the interview guideline should not distort those results. During the interviews as well as in the analysis there had to be awareness about the research to avoid reactivity, i.e. replies biased through the interviewer's questions. (Schnell, Hill, Esser 1995: 347) Such open interviews, while at the same time an awareness of the intention of the research is necessary, are particularly adequate when experts are interviewed. For, they are hardly motivated to fill out closed questionnaires. However, such open interviews put high demands on the abilities of the interviewer, who is forced to operationalize his theory spontaneously and analyze replies to prepare for the next question all at the same time. (Schnell, Hill, Esser 1995: 351-354)

   Hence, the interviews were supposed to characterize as discussions in which information is exchanged and ideas are put forward for debate in order to instigate critical and innovative thoughts and reflections. [14] Therefore the interviews were not taped to allow the interviewees to come up anonymously with new and not yet completely worked out ideas and opinions. This proceeding proved successful as most issues related to networks entail in parts personal relations, which interviewees do not like to talk about when being taped. The propositions, how actors can act strategically and contribute to sustainable development, should be discussed openly, which would have not been possible in closed questionnaires but needed the exchange of ideas and the personal backgrounds of interviewees. And the study was supposed to clarify if certain strategic action was carried out and whether those actions are effective.

[12] Ad hoc action would hurt the scientific requirement of reliability to any research. Research outcomes must be reliable and reproducible. (Schnell, Hill, Esser 1995: 141)

[13] See Annex I.

[14] Actually that style of research is a "participatory action research" approach, (Obser 1999: 86) comparable to the participating observation method.

The interest in effectiveness of governance may underpin the relevance of those questions for development practice as well as the scientific debate. If the number of interviews and the plurality of backgrounds of the interviewees are sufficient, all relevant arguments for the practice should be included in the discussion of this thesis.[15]

3. Analysis: The analysis of the collected information will show if and how the networks in question achieve to organize intervening strategic action, complementing self-organizing processes, and, thereby, enhance the dependent variable effectiveness of collective action forming network governance. To this end, the information from interviews, project reports, strategy papers, and documents of the networks must be examined from different angles.

   Basically, the collected information is scanned for which governance functions networks execute and how they do that. These questions are always related to the question if the networks achieve to execute their functions effectively. The focus on network functions addresses the effectiveness of governance through networks. However, governance through networks will only be effective and efficient if the governance in networks is. Therefore, additionally to the scan of effectiveness of network functions, the analysis will look for mechanisms and features of networks how to organize effective and efficient governance in networks.

   Technically, the analysis of the information from interviews and network documents will test – and modify – the set of postulated functions and theses, distilled from network literature and theoretical approaches to governance, on how strategic activities can execute those functions. Hence, conclusion on **effectiveness** of network governance will be based on anecdotal evidence drawn from the qualitative interviews. "Results which satisfy many actors and as a consequence accommodate several goals are characterized (…) as a rich result. The process is defined as enriching and therefore effective." (Klijn, Teisman 1997: 114) Additional information on the effectiveness of governance of the explored networks can be derived from the analysis of project reports. An internal study of – among others – the networks in focus from the World Bank can serve as a backing for findings.

   Starting from my basic assumption regarding **efficiency** of network governance that management interventions must not crowd out self-organizing dynamics to keep the system working efficiently, the analysis will examine constitutive features and mechanisms of networks and the strategy how to execute network functions. If the overall network governance in general and the effective execution of network functions in specific applies to the characteristics of self-organizing dynamics, network governance is likely to be efficient. The analysis of collected information on the explored networks will test if self-organizing processes and a spontaneous order emerge, by asking whether the potential to organize strategic action is distributed over the whole system or whether a central hub has an overruling leadership role, and whether the strategies of the individual actors connect their individual activities so that these activities complement one another in overcoming market failures.

   This method is again a counterfactual test. For, one cannot know if the execution of the tested functions would have been more efficient if partners had followed another strategy.

After all, network governance is a new approach to questions of global governance and allows as well as forces doing research off the beaten track. The research will focus on the processes of how the networks develop and how they work, because in highly complex social systems the interactions of partners are more important for the effectiveness of policies than single variables and than the usual hard factors or the sum thereof. (compare Probst 1987: 36) Network governance is still in its infant years and is still developing. Hence, from all collected and

[15] The interviews will neither in number nor in selection of interviewees be representative. Even if the interviews will cover perspectives from all sectors, the interviewees will rather represent only their individual perspective and hardly a common perspective for the whole of the respective sector.

analyzed information a new picture of governance, of which only the outlines become bit by bit recognizable, must be drawn. What this picture might show in future will disclose slowly like a jigsaw puzzle.

2. The Academic Debate on Network Governance

"We actually made a map of the country, on the scale of a mile to the mile!"
"Have you used it much?" I enquired.
"It has never been spread out, yet," said Mein Herr: "the farmers objected: they said it would cover the whole country, and shut out the sunlight! So we now use the country itself, as its own map, and I assure you it does nearly as well.

(Lewis Carrol: *Sylvie and Bruno*, 1889)

"A model which took account of all the variegation of reality would be of no more use than a map at the scale of one to one."

(Joan Robinson: *Essays in the Theory of Economic Growth*, 1962, p. 33)

"Working successfully with and through partnerships is not simply a function of existing resource endowment." (Witte, Streck, Benner 2003: 77) It is not sufficient to name independent factors of international cooperation and which impact they have in order to explain or recommend strategic action, since that action is a **dynamic process** while simple factors are static. Hence, theories on network governance need to consider processes within these networks and in the field where networks foster partnership activities in order to be able to reflect feedback loops caused by as well as affecting the network activities themselves. In fact, the argument will claim that networks might only be effective as leverages for individual network partners' activities depending on the development of the field of the respective network's activities. Such a theory must conclude which strategic action can organize effective network governance.
This part is supposed to connect the argument of this thesis to the academic debate on network governance and to deduce from different theories strategic activities which might contribute to address certain situations which network governance has to face.

2.1 Effectiveness of Network Governance: How To Measure?

This section will briefly present the debate on methods and models for measuring regime effetiveness and define several central terms of the debate on network governance. In the end the argument will go on to reason the qualitative research design of this thesis to identify causal links of strategic activities with enhanced network governance effectiveness.

2.1.1 Defining Effectiveness

The effectiveness of international regimes and how to measure it is subject of a long-winded academic debate in which even the fact that regimes are effective at all is questioned. For, to measure levels of effectiveness requires identifying and understanding causal links in very complex systems which affect very large numbers of people, long periods of time, and changes in the ecological and social environment under various boundary conditions. These causal connections may simply be far beyond the limits of our current knowledge. (Young 1996: 6/7) That's why Young suggests differentiating six dimensions of regime effectiveness: (Young 1996: 8- 16)
(i) Problem-solving effectiveness addresses immediately the problem, the regime is made for, without considering any proxy variable or somehow aiming to reduce complexity; (ii) goal attainment effectiveness measures effectiveness in terms of the progress towards the explicit goals of the regime which are related to the problem; (iii) behavioral effectiveness measures regime

effectiveness in terms of successful alterations of behavior of actors from international politics; (iv) process effectiveness measures the compliance of actors and if the regime is implemented in domestic legal and political systems; (v) constitutive effectiveness measures the change of social practices and norms ruling these practices; (vi) evaluative effectiveness refers to the performance of a governance system and measures efficiency, equity, sustainability, and robustness of regime outcomes in economic terms. (compare also: Young, Levy, Osherenko 1999) In this context, Underdal opposes 'behavioral effectiveness', which is significant in changing behaviour but hardly making an impact, to 'functional effectiveness' of regimes, which are effective but need leverage to be of significance. (Underdal 2002b: 454)

The effect which global network governance through global policy networks is supposed to have for sustainable development is best reflected by Young's concept of problem-solving effectiveness. (compare Sprinz 2003: 260) Thus **effectiveness** depends on needs of recipients which are sustainably satisfied, or on resources which recipients are sustainably provided with. Effectiveness of sustainable energy policies or partnership action is defined by the contribution of the provided sustainable energy to satisfaction of – not only basic – needs. However, people do not need energy in itself but energy services or energy for certain uses. Therefore, sustainable energy is only one factor among many. In fact, there are too many intervening variables to operationalize these various factors and quantify effectiveness. (GVEP Interest Group 2003: 6; and compare Young 1994: 160)

Due to the character of effectiveness depending on many contributing independent variables, Keohane calls this effectiveness "aggregate effectiveness", referring to "the extent to which environmental programs fulfill their potential ability to solve or alleviate environmental problems." (Keohane 1996: 15) He opposes that effectiveness to "project effectiveness" referring to "how well, relative to costs, a single financial transfer or set of transfers contributes to solving a particular environmental problem or set of problems (…)." (Keohane 1996: 15) The latter definition corresponds with a definition of **efficiency** as the ratio of resources, which recipients are sustainably provided with through policies, to resources, which are transfered by donors. This understanding of efficiency will be considered later on in the analysis of the explored networks' effectiveness and resource use. Effectiveness as well as efficiency need both to be considered when network governance is compared to other governance systems as, for instance, international regimes.

Apart from the effectiveness and efficiency of international regimes or governance systems, in general, the academic debate is concerned with the legitimacy of different governance arrangements. All cooperative activities in global policy networks are voluntarily undertaken by network partners. Hence, these activities need no legitimation by external actors or network partners not involved in the respective activity. Due to the voluntary and predominantly informal nature of global policy networks, the legitimacy of these networks is, in fact, not in question. For, as long as network activities are legal there is no reason to control or prohibit individual actors from their free and voluntary action. Such limitation of individual freedom would lack itself legitimacy. Nevertheless, there is an extended debate on the legitimacy of partnerships and networks in international politics. (Dingwerth 2004) For, if networks are not transparent or not open to every actor, or if certain actors do not have the capacities to adequately represent their interests, or if within the network certain powerful actors can dominate other ones, there might arise deficits in legitimacy because of the inability of certain actors to participate and own strategic action although networks are open to these actors. [16] The question of **legitimacy** of global policy networks then transforms into a question of responsible use of capacities and resources of individual actors. Global policy networks have the purpose to level playing fields, to even out differences in capacities to participate, and close the "participatory gap" (Witte,

[16] Lobbyist networks of vested interests are an example for closed networks, which do not meet both in fact and by definition the criteria of decentralized and horizontal global policy networks. (see section 2.3.2 on Defining Networks)

Reinicke, Benner 2000) – almost by definition. With regard to concerned stakeholders, effective network governance must aim to address and consider interests of marginalized and not represented groups. If networks and the activities of the partners exclude certain actors, outcomes will hardly be sustainable.[17]
Effectiveness, efficiency, and legitimacy are the three measures for governance systems. In the context of global network governance, legitimacy only applies to a limited degree and will not be focused on in this study. Effectiveness and efficiency sort of cling together and will be in the center of interest for global network governance through global policy networks.

2.1.2 Models for Measuring Effectiveness of Governance

In order to determine the effectiveness of certain governance systems, causal links must be established. (Young 1996: 5) Hence, different approaches to measure effectiveness base on different causal models.
Young supports a "social-practice perspective", (Young 1999: 270) which says that international regimes affect individual behaviour through social practices which lead actors to engage in certain ways without utilitarian incentives or coercion. Therefore, approaches of bounded rationality such as social constructivism and cognitivism are needed to supplement utilitarian-rationalist explanations, as will be argued in section 2.4.
Keohane considers concern of actors, the contractual environment of an issue of a regime, and capacity of actors as the conditions which determine whether international environmental institutions become effective. These three clusters of factors again comprise both constructivist and rationalist approaches, as well as structure and agency.
Underdal explains effectiveness of environmental regimes with the level of collaboration which could be reached. He differentiates as dependent variable the regime, its output which is the agreed upon action, the outcome which is the virtual action, and the impact of that action. Thus regimes can spur behavioral changes of as well as coordination among actors. The effectiveness of the regime, in turn, will be determined by all four dependent variables, their actual significance and impact. (Underdal 2002a: 5-8)
In order to quantify regime effectiveness, Underdal, Sprinz, and Hovi developed the Oslo-Potsdam Solution. (Hovi, Sprinz, Underdal 2003) To evaluate the actual performance of a regime, it needs to be compared to a state of affairs where no regime is established, as well as to a state where an optimal regime could be established. Both states to compare the actual regime to are counterfactuals. Such counterfactuals might entail speculative elements but are necessary to come to conclusions on causal links of unique processes and can be well-founded. Environmental thresholds may represent such well-founded "logical upper bound(s)". (Hovi, Sprinz, Underdal 2003: 93) Thereby, the quantitative measure of effectiveness relates the actual regime to counterfactual states, which can be subject to debate but may nevertheless work as measures for comparison. (Sprinz 2003: 260) In order to answer the question if a regime, an institution, an organization, a function or a program has a certain impact as to overcome a market failure "one needs to know what would have happened without the programme (i.e. the counterfactual)." (GVEP Interest Group 2003: 7) The counterfactual may come from an observation of the situation before the impact, or from a control group. In the first case it is hard to differentiate the effects of the action in question and intervening variables; the second case has the problem to find a really comparable group, because again intervening variables can hardly be controlled.

[17] Compare definition of social sustainability in section 2.2.2.1.

The measure of effectiveness in the Oslo-Potsdam solution is calculated then by

$E = (AP - NR) / (CO - NR)$, with E: effectiveness, AP: actual performance, NR: no-regime counterfactual, CO: collective-optimum counterfactual. (Hovi, Sprinz, Underdal 2003: 76)

This measure for regime effectiveness, however, is hardly applicable to the effectiveness of global policy networks although they sometimes fulfil regime functions. For, global policy networks are not immediately effective in terms of problem solving but have merely leveraging effects, as will be argued later on, and hardly any effectiveness on its own. Hence, the quantitative measure for effectiveness of global policy networks will systematically underestimate their true value, as Young criticized with regards to the Oslo-Potsdam solution. (Young 2001: 113/114)

To operationalize and measure effectiveness and efficiency quantitatively is hardly possible due to the variety of what effectiveness actually is, (compare Young 1999: 260 and 271/272) and due to multiple intervening variables. (compare Young 1994: 160) "Effectiveness has to be dealt with in a multi-actor setting in which a number of actors achieve different targets." (Klijn, Teisman 1997: 114) Therefore the overall setting is too complex to quantify the dependent variable of effectiveness.

Type II partnerships face that problem, and four of the five explored networks – GVEP, EUEI, GNESD, and REEEP – launched, therefore, a Monitoring & Evaluation Initiative. According to the results of this initiative, effectiveness of international cooperation should reflect "(…) the progress towards attainment of the Millenium Development Goals (MDG). However, these sort of 'distant' impacts are neither easy to demonstrate nor easy to understand. However, the contribution to these indirect effects can be evaluated thanks to the observation of the direct effects." (GVEP Interest Group 2003: 6)

In the context of measuring, monitoring and evaluating knowledge management activities, which are an essential part of network activities, indicators are supposed to allow quantifiable results. Though "(i)ndicators are underdeveloped but would need to be quite complex and rich to capture the nature of much of what is going on." (King, McGrath 2003: 12) Nevertheless, the Monitoring & Evaluation Initiative of the explored networks developed exactly this: a "quite complex and rich" catalogue of indicators to evaluate effectiveness of network action, (GVEP Interest Group 2003) and later on indicator-based tools and methodologies to evaluate energy projects. (M&EED 2006) As the effectiveness of partnership projects is not identical with governance of a more complex global policy network, this method does not apply to the measuring of effectiveness of network governance.

Partnership action in global policy networks is an evolutionary process. Effective problem solving or goal attainment can therefore not be quantified alone by ex ante goals as a yardstick. Goals, which are defined in dependence on identities of actors, are formed in the process of strategic action by social relations. Objectives depend on opportunities and partners for action. (Kickert, Klijn, Koppenjan 1997b: 171/172) According to Messner, the effectiveness of networks depends on the ability of network partners to change strategic goals and adjust flexibly. (Messner 1995: 300) The effectiveness of network action, hence, depends on how partners interact strategically if they achieve to identify opportunities for positive-sum games and for strategic collective action, and if they successfully contribute to the collective execution of certain functions to solve problems. This strategic interaction to execute certain network governance functions will be the yardstick for effectiveness of governance in this study.

From an epistemological point of view, quantitative research, which implies relatively high costs, (GVEP Interest Group 2003: 15) cannot explore the reasons for the success or failure of strategic action. "Quantitative approaches (…) are useful in supporting conclusions drawn from more indepth study but on their own do not lead to understanding of why changes have occurred. Qualitative approaches are useful for understanding the reasons for events described in research or

impact assessment. Qualitative tools generally do not gather enough information for general patterns to be described statistically." (GVEP Interest Group 2003: 8, referring to Simanowitz 2001) For, the causal connection between a certain activity or strategy and its effects requires interpretation due to its qualitative – and hardly quantifiable – nature. Only after having arrived at a holistic understanding of the processes, quantifiable hypotheses can be formulated and tested to give proof or falsify the so far merely qualitative theory about the causal connections. If one quantifies and tests first, one does not know what has been tested. Only correlations will be the outcome. For all causal connections are interpretative. That is the principal problem of all qualitative research, while quantitative research never reaches the final proof for any theory, according to Popper's Critical Rationalism.

Therefore, a qualitative research design, based on expert interviews, better fits the research question for strategies of network governance and, hence, will test if and how the explored global policy networks achieve to organize effective network governance and to execute certain functions effectively to overcome market failures through strategic cooperation. The empirical exploration of global policy networks will look for causal links of the postulated strategic activities as independent variables with enhanced effectiveness and efficiency of network governance as dependent variables contributing to problem solving.

2. A Phase 0: Why Global Policy Networks Came Into Being

This phase describes the situation and necessities in the international negotiation process on sustainable development when global policy networks became a promising opportunity for various actors to support their commitment to sustainable energy for development. Basically, the background of energy and environment issues for sustainable development and the possibilities for macroeconomic regimes governing these issues will be briefly presented. The macroeconomic solutions will be discussed with particular respect to the chances to implement them at global level and how network governance might complement them. The argument will turn then to the academic debate on governance and delineate the argument of the following sections from theories dominating the debate on network governance so far.

2.2 Energy Matters in Global Environmental Governance

This section approaches the empirical background on which the scrutinized global policy networks act bringing together issues from the environment as well as the development agenda.

While environmental issues clearly need some governance to be dealt with, it is very unclear how governance could effectively and efficiently deal with those issues. There are smart macroeconomic proposals how market mechanisms can produce sustainable and efficient outcomes and provide environmental commons. However, unfortunately those macroeconomic market-based solutions do not tell how to get there, how to establish those mechanisms in global markets. For, as environmental issues themselves are often international by nature or environmental governance has repercussions on the international competitiveness of national economies, the call for environmental governance becomes all-too easy the call for Global Environmental Governance. Whatever one actor does to protect environmental commons, all other actors shall do, too, in order to avoid economic disadvantages compared to free-riders from countries competing with social and environmental dumping prices. This situation of demanding global solutions, however, can block developments and lead to a stalemate in international politics, as observed, for instance, in the years of the George Bush jr. administration willing only to comply with an international climate regime if the big transitional countries like China and India comply, too.

Energy is as a matter of fact needed for all kinds of activities in society. That's why sustainable energy is relevant for all development, what DFID considers vital to understand, (DFID 2002: 6) as well as the World Bank does. (Worldbank Energy and Mining Sector Board The World Bank Group 2002: 2) Due to the outstanding role energy systems[18] play for climate change as well as development, the climate issue touches directly or indirectly on various other issues and, hence, climate policies imply various redistributive effects for development and economic growth of different countries. Thus, it was no wonder that global environmental governance hardly became effective. In 2002, the stalemate led at the WSSD to the innovation of partnerships which are, in fact, 'coalitions of the willing'. Partnerships allow integrating all actors including non-governmental ones when taking action for sustainable development. Nevertheless, most activities of those partners in the sustainable development field still address governments and demand legislative and regulatory action, although the task of partnerships which they are dedicated to is to overcome the stalemate of governments and their international negotiations of global agreements. The role, which is more promising to play for global policy networks, is to implement action, provide access to knowledge, contained in networks, held by the partners, and necessary for better informed and effective policies, rather than merely to recommend on and frame national policies.

[18] The term energy system was defined by Edenhofer (2008) as "the transformation of primary energy to energy services."

2.2.1 The Role of Sustainable Energy For Development

Certain general **trends** are salient in the field of sustainable development, the external environment of the sustainable energy-related networks. The relevance of energy for other development issues like the MDGs, gender, health, or poverty is acknowledged widely. Energy for productive uses propels SMEs and creates, thereby, local markets for energy service companies (ESCOs). In turn, the local SMEs can pay for the energy services. Thus, in the long-term industrial development can be set up. The provision of energy services is in the process of changing its nature. It becomes more decentralized, consideration of least cost technologies and the sustainability of renewable energies are taken into account, and the competition of independent power producers will shape future energy systems. (Matinga, Ballard-Tremeer 2006)

> "There is growing evidence that RETs can spur the creation of micro-enterprise, stimulating economic development by engaging local people in harnessing energy and providing energy services. Experience shows that the ability of RETs to fight poverty is enhanced when linked with income-generating uses of energy." (REN21 2005c: 39)

In order to develop sustainable energy infrastructure, development policies must connect investments in infrastructure with activities which make **productive use** of the developed infrastructure. (compare GNESD secretariat 2004: 3)

> "Access to modern energy by itself is not enough to facilitate economic and social development: it is necessary, but not sufficient. Co-investments in health and educational services and telecommunications are needed, as are investments in productive enterprises and infrastructure, to make access to energy a more potent element for development." (World Bank 2004: 12)

Therefore networks must integrate actors coming from other sectors than the energy sector as partners.

Affordable and sustainable energy access through renewable and efficient energies contributes not only to poverty reduction and related development goals. Energy is a critical input to growth, productivity, and economic output of small businesses. The provision of modern energy, which is defined by the World Bank as electricity and clean fossil fuels, reduces time spent for collecting wood for cooking and heating, improves indoor air quality, which is a wide-spread reason for respiratory diseases in developing countries. The time saved as well as the improved indoor air quality benefit mainly women and girls and is, therefore, a gender issue. Modern energy is necessary for health services like the cooling of vaccinations, as well as for lighting allowing longer working hours after sunset and enhancing educational opportunities. Telecommunications depend on modern energy, they help to build and maintain relations and offers business opportunities. Transport depends on energy, too, and cleaner fuels improve the air quality in large cities eminently. (DFID 2004; World Bank 2004; Worldbank – Energy Mining Sector Board 2002)

A diversified energy system including a larger share of sustainable energy contributes to independence of volatile fuel prices, thereby increasing energy security and price stability, and creates local value chains and jobs directly in the local manufacturing sector as well as indirectly in other sectors through the provision of energy for various services. These new industries can spur export growth in developing countries and benefit at least in early stages of economic development from lower wage costs. Another market might evolve for developing countries through trade and businesses in carbon. (REN21 2005c: 23, 27 and 36)

The lack of access to modern energy has not only the described negative effects on the poor, but preserves poverty by a self-reenforcing mechanism. "The cost of obtaining energy for the poor is more than the cost of electricity for higher-income groups." (REN21 2005c: 14) For, the poor cannot afford large quantities of energy at lower prices, but must buy less efficient fuels and pay, thereby, higher prices for their energy.

> "From a total cost perspective, biofuels are expensive. The quality of energy is low, a great deal of time is required for gathering fuel, and combustion for cooking and heating has

> significant health impacts, mostly from indoor air quality. The effective cost of energy for poor households, therefore, is in the range of 10-20 percent of income, while higher-income households in the same country, using commercial fuels, will typically spend only 2-3 percent of their income on energy."[19] (Jaccard, Mao 2002: 49)

While in developing countries the energy issue is mainly a question of affordable access to modern energy, in transitional countries the development of energy policies means to switch from conventional to more sustainable energies, including an increasing share of renewable energies.
Renewable energies must be embedded in an overall energy concept (compare World Bank 2004; Worldbank – Energy Mining Sector Board 2002) to meet rising expectations in developing countries. The power sector in developing countries is often characterized by monopolies and distorting subsidies, which benefit urban elites, but not the poor. (Worldbank – Energy Mining Sector Board 2002: 7) Renewable energies of independent power producers – in combination with mini grids – can enforce competitive market prices for energy due to their decentralized technical nature, which creates competition with grid monopolists or monopolies of companies in the energy commodity industry.
Today renewable energies must be pushed by OECD countries. They can not yet cover the global demand.

> "Renewable energy does not present solutions for all problems, but it increases the menu of possible options. It is important to note that renewable energy technologies should not be force-fitted on developing countries that are least able to pay for them." (World Bank 2004: 34)

Nevertheless *renewable energies need to be pushed in international cooperation* with developing countries, too. (compare also the critique of John Christensen, GNESD, in panel discussion in Schmid, Wienges, Stadermann 2004)
In a few decades the peak oil is expected, and so are nuclear resource commodities finite, but the transition of the energy system takes several decades. We simply do not have the time to develop renewable energy technologies in OECD countries first and launch them only afterwards in developing countries' markets.

> "Due to the long time lags, the next 10 to 20 years are the decisive window of opportunity for transforming energy systems. If this transformation is initiated later, disproportionately high costs must be expected." (German Advisory Council on Global Change (WBGU), cited after: REN21 2006a: 9)
>
> "While it is evident global energy demand will gradually be met with an increasing share of renewable energy, the challenge is that this will only happen at a pace that leads to major changes in the energy mix in the second half of the century." (REN21 2006a: 11)

The danger of climate change might require policies to accelerate the switch to sustainable energy systems.

2.2.2 Social, Environmental, and Economic Sustainability

This section will outline three senses of sustainability which network governance must take into account. Each sense corresponds with two sorts of energy market failures and one sort of government failure to successfully regulate the respective market failure to produce sustainable outcomes. These failures circumscribe the tasks of network governance functions which they have to address effectively.
While the Millenium Development Goals did not define a particular goal for energy, it turned out that energy is necessary and relevant for all **Millennium Development Goals** (MDGs). (DFID 2002) Sustainable development, therefore, depends on sustainable energy.

[19] In fact, energy has characteristics of a Giffen good which is defined by a consumption pattern that increases the demand of and, thereby, the share of household income spent on that good if the price of that good rises.

Sustainable energy has various dimensions to it: Global development will only be socially sustainable if it allows the poor to participate in development and provides them with reliable, affordable, economically viable, and environmentally sound *energy access*. Global development and the related emissions of carbon dioxide into the atmosphere have already reached a level, which threatens the conditions of man's natural livelyhood. Environmentally sustainable development must consider *climate change* through mitigation and adaptation. Otherwise the impact of current economic practices on the global climate will have severe economic backlashes in future, as the Stern report calculated. (Stern 2006) And sustainable energy has an economic dimension to it, for economically sustainable energy prices represent some form of *energy security*, or the perception thereof, and the independence of energy commodity imports from politically unstable world regions. Sustainable energy-related global policy networks must deal with all those dimensions. Sustainable energy does not refer merely to environmentalists' concerns. (compare Friedman 2006a) Although there are several **definitions of sustainability**, respectively sustainable development, the most recognized definition, stemming from the Brundtland-Report, refers not only to environmental issues but has a very general approach, defining sustainable development as:

> "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland-Report 1987)[20]

The strength of this definition is at the same time its weakness, depending on the argument. For, not to compromise the opportunities of future generations does not necessarily mean to use only the amount of resources which one generation can grow or recycle. The next generation may need completely different resources or have other technologies. Today, we just do not know. Hence, the definition implies a flexible use of resources, not determining exact caps or technological boundaries. This flexibility may compromise future generations' opportunities to live the way they want. The definition is a rule of thumb which lays down whose interests to consider.

The definition qualifies development only ex post as unsustainable, but at no point of time any policy as finally sustainable. We just do not know whether a given policy is sustainable in the long-term. The definition makes sustainable development to a never ending process. Only the next generations will know if our policies and economic practices had been sustainable. However, as soon as we recognize the danger that our societal systems and practices might not be sustainable, we ought to change them. For sustainability must be a principle of rule for the long-term development of every society.

In order to engage in immediate action for sustainable development and sustainable energy in particular, a more pragmatic definition is needed and provided by the World Bank:

> "'Sustainable energy' refers to the combination of renewable energy and energy efficiency, although they are not the only energy options through which sustainable development can be achieved." (World Bank 2004: 3)

Thus, the actors committed to sustainable energy mainly promote the market development of renewable energy and efficiency technologies as these markets are facing a very uneven playing field and various barriers and failures to produce sustainable outcomes.

As John Christensen, lead author of the REN21 report on the role of renewable energy with regards to climate change, said:

> "Although there are many good political, economic and social reasons for stimulating a more rapid development of renewable energy – not the least of which is climate change – the sector is hampered by a number of market distortions and institutional, financial, and economic barriers." (REN21 and UNEP 2006)

[20] In economic terms sustainable development defines a model of accounting, and reads as the following condition: "the stock of overall capital assets remains constant or rises over time." (Pearce, Warford 1993: 2. Cited after: Todaro 2000: 411)

These market barriers are high upfront capital costs of renewable energies as well as legal and regulatory barriers discriminating conventional fuels against renewable energies. Externalities, which prices do not fully reflect, distort markets. (REN21 2006a: 10 and 14)
Additionally, sunk costs of investments in grids and subsidies for research and development and the building of the current energy infrastructure, benefit the providers of conventional energy, dominating the present energy systems. Thereby, grid owners enjoy the competitive advantage of natural monopolists. Wholesale prices for energy place renewable energy at a disadvantage, for economies of scale are not yet fully developed by independent power producers as they are newcomers in the energy markets. (REN21 2006a: 18)
The provision of access to modern energy for the poor especially in off-grid markets is perceived as a high risk and long-term investment. Therefore underinvestment is the consequence. (REN21 2005c: 17)
Keohane identified market failures to develop in a sustainable way as the reason to establish international regimes. (Keohane 1984: 65-110) Todaro (2000: 644/645) enumerates six forms of **market failures** in the development context: monopolies, misallocation of resources, lack of information, prohibitive transaction costs, external effects, and long-term effects. (compare additionally Messner 1995: 214/215)

> "Commodity and factor markets are often badly organized, and the existence of distorted prices often means that producers and consumers are responding to economic signals and incentives that are a poor reflection of the real cost to society of these goods, services and resources. (…) the failure of the market to price factors of production correctly is further assumed to lead to gross disparities between social and private valuations of alternative investment projects." (Todaro 2000: 624) That leads "(…) to a misallocation of present and future resources or, at least, to an allocation that may not be in the best long-run social interests." (Todaro 2000: 624)

This is particularly true for developing countries, where free markets are not developed.
Market failures signify a situation where self-organizing dynamics do not produce the outcomes, which are desirable from a societal viewpoint. Basically, the *structures* of the market are not setting the right incentives. Governmental regulation is supposed to overcome market failures and set up agencies to regulate the market, set right incentives, and design frameworks for an effective and efficient sustainable development. These governmental interventions, however, fail sometimes, too, to produce better results. Government failures, as mirror image of market failures, are differentiated by Jänicke (1991: 1053) into political government failure, the lack of capacity to intervene, functional government failure, the ineffectiveness of interventions respectively the decision not to intervene, and economic government failure, the inefficient ratio of price and quality of the produced public good. In the situation of market and government failure, the new model of governance through global policy networks on energy for sustainable development must address the according to Nicholas Stern "greatest and widest-ranging market failure ever seen", (Stern 2000: 1) the climate change.
In the following subsections will be explained how sustainability is infringed by the different forms of market and government failures. Sustainability must be understood in a threefold sense of the term. Every sense again corresponds with two sorts of possible *market failures*.

2.2.2.1 Social Sustainability

Social sustainability means that all societal groups today and in future have the opportunity to meet their own needs and participate in societal development. Practices of allocation must allow all social groups enjoying at least security to meet their basic and equitable needs, and no group must aim to exclude certain actors and interests, or even to dissolve the own or other societal groups. In economies of scale as, for instance, in grid-industries *monopolists* gain market power to raise prices above an economically efficient level, thereby excluding certain actors from access to certain goods and services, while investment costs for potential competitors are prohibitive.

Moreover in developing countries monopolists are often priviliged by legislation for political ends, thus prohibiting competitors to enter the market. (World Bank 2001: 7) The overall welfare of the economy and the consumers' benefit is impaired by highly monopolized energy markets, which often go together with corruption and patronage. (Worldbank – Energy Mining Sector Board 2002: 12) Another form of social exclusion results from *misallocated resources*, which allow certain groups pushing through their vested interests while other actors are hardly able to meet their basic needs. Questions of social equity, redistribution, and safety nets touch on social sustainability, and in the context of energy markets, the provision of the poor with energy services for vitally necessary appliances to purify water, for cooking, heating, cooling vaccines and for lighting to prolong hours of labour and education after sunset.
Jänicke describes the government failure to intervene and regulate in such socially unsustainable markets as political weakness or inability to organize the development of issues which are considered problematic and unacceptable. (Jänicke 1991: 1053)
Distributed and decentralized energy systems of small independent power producers, diversified in their dependence on certain energy commodities and their suppliers, avoid natural monopolies of grid owners and allow competition with big companies enjoying an advantage of economies of scale. Thereby, energy security can increase. The energy system can become more efficient because electricity is generated closer to the place of consumption, which reduces costs and losses of distribution. (REN21 2006a: 18) That is particularly true in developing countries where there are no – or compared to industrialized countries less – sunk costs of already established energy infrastructure like that of electricity grids. And decentralized and distributed energy systems can be more competitive despite their high upfront investment costs.

2.2.2.2 Environmental Sustainability
Environmental sustainability refers to practices that enable eco-systems to persist their natural processes or at least to maintain the assets of existing eco-systems. Energy systems must not exploit certain natural resources, if they strip thereby future generations of opportunities to meet their needs. Neither must energy systems emit substances that prevent stable processes in the natural environment of human societies to continue in the way they did before human interference. For, such changes in complex systems like the natural environment might cause unpredictable and detrimental effects and thereby incur high risks. If the exploitation of energy commodities and industrial interferences with the natural environment destroy living spaces, the interference of man's energy systems with his natural environment is not sustainable. Such anthropogenic changes in nature can be caused through large hydro power facilities or the conversion of energy emitting carbon dioxide that causes the climate to change.
The challenge of environmental sustainability is that all detrimental effects on the environment have only indirectly detrimental effects on the satisfaction of human needs: economic practices might deteriorate the environment, which compromises certain actors' ability to meet their needs, however, their interests are not touched immediately by the respective economic practices but only through environment at a far away place and/ or far away time. Therefore knowledge and a proper understanding of causal links between economic practices and natural environment are necessary to recognize those external effects, which are often uncertain or become effective only in the far future. Hence, scientific knowledge is salient for environmental governance. (Jasanoff, Long Martello 2004)
Additionally, sustainable energy technologies, which could solve the problems of unsustainable industrial interferences with the natural environment, are highly diverse and depend on local conditions. Hardly any actor can have perfect information on technology options, potential partners or investment opportunities, "(…) size of local markets, the presence of other producers, and the availability of inputs, both domestic and imported. Consumers may be unsure about the quality and availability of products and their substitutes." (Todaro 2000: 644) Hence, the lack of

environmental sustainability may be due to the simple fact that causal connections are not understood properly and to a *lack of information*.
In developing countries the actors necessary for certain development policies are simply missing. Their endowments are not adequate. They are not sufficiently educated in sustainable energy technologies and their application. They have neither the knowledge nor the contacts to knowledgeable and capable actors to bridge that gap. In the long-term capacities lack, in the short-term partners for immediate action are missing.[21] The switch to a sustainable energy system lacks knowledge and local human and technological capacities to adequately address global environmental issues. Due to this lack of local capacities *transaction costs are prohibitive*.
Imperfect information and prohibitive transaction costs lead to unsustainable markets, products, practices, and technologies and thereby to solutions which are inefficient from a societal viewpoint. If governmental interventions are not successful in curing these inefficiencies to provide the needed knowledge and capacities for sustainable development, Jänicke speaks of economic government failure, inefficiently framing pricing mechanisms for merit goods like a well-trained and educated work force. (Jänicke 1991: 1053)
The development of markets for sustainable, i.e. efficient and renewable energy technologies as well as carbon capture storage technologies will minimize industrial interferences with natural eco-systems and thus minimize risks of unsustainable economic practices and the destruction of livelihoods – even without absolute consensus on global environmental cause-effect-chains. Additionally, the development of local capacities, necessary for the development of local markets, will spur economic and social development and contribute to the solution of global environmental problems.

2.2.2.3 Economic Sustainability

Economic sustainability means that practices and the related costs are financed by the actors, who benefit from these practices, and allow proceeding with these practices even in the long-term. Energy systems are economically sustainable, if their prices cover all costs, can be financed by current energy consumers, and secure the energy provision even in thirty years or more. Energy systems which rely on energy sources that produce costs through climate change or through radioactive wastes that must be looked after to avoid leakages and that must be protected from terrorist attacks or abuses even by future generations are not sustainable by definition. Those costs are negative *external effects*, while positive external effects like a stable climate can be enjoyed by free riders not contributing to the financing of necessary economic changes and changes in energy systems.
Besides of external effects, *long-term effects* are not included in market prices, too, and, therefore, cause overinvestment in what is detrimental to the society, or underinvestment in technologies, products, or industrial practices, desirable from a societal point of view. For, certain investments are only profitable in the long-term and thus beyond the time horizon of private actors. This applies to investments in long-term changes as, for example, the switch of a country's energy system to sustainable energies. The investments imply high economic costs and are perceived as relatively high risks which deter private investors. On the other hand, energy systems can cause negative long-term effects. Energy systems are not sustainable if they rely on limited energy commodities which will be fully exploited at some point in time and strip future generations from the use of those resources. If energy commodities are imports from foreign world regions where political upheaval denies a secure provision, this insecurity raises the price of energy and determines costs for the heirs of such import-dependent energy systems.

[21] The lack of human capital is a special case of long-term effects (see section 2.2.2.3 on Economic Sustainability). For actually the investment in human capital is a long-term investment in infrastructure. However, since human resources are mobile infrastructure opposed to usual infrastructure which is locally bound, partnerships can help to overcome the lack of human capital in the short-term and through capacity-building in the long-term, while locally bound infrastructure cannot be transferred in partnerships.

External and long-term effects and the corresponding under- and over-investments could be subject of international regimes and national regulation. However, so far governments failed to effectively intervene or decided intentionally not to govern this issue which represents a case of functional government failure in the terms of Jänicke. (Jänicke 1991: 1053)
Energy security, i.e. the affordable and reliable provision of energy in the future, is a central element of economic sustainability because of the crucial role of energy for every economy, which is why energy commodities are often subject to power politics. Long-term effects of today's investments in energy infrastructure can impair economic sustainability. Therefore energy systems should be diversified in their dependence on certain single energy commodities and their suppliers. Renewable energies have experienced considerable cost reductions and performance improvements, and have, thereby, become competitive for a wide range of commercial applications. (GVEP 2005a: 1) By their decentralized nature, renewable energies can compete structurally, though not yet virtually with monopolies in the energy sector. In grid-industries monopolies are often a huge problem due to corruption but also due to market distortions in cities as well as other grid-connected areas. Obviously, renewable energies contribute to sustainability as well as to energy security through diversification and independence on energy commodity imports and their rising prices, and to local development of service economies. (Worldbank – Energy Mining Sector Board 2002)

Of course, the inefficient prices resulting from external and long-term effects give an example of economic government failure as well. The failure of governments to set market incentives thus to produce environmental sustainability are obviously a problem of missing political capacities to do so. And the government failure to regulate monopolies or entry barriers to markets is often a decision not to do so and thus an example of functional government failure. Hence, the three kinds of long-term sustainability and the corresponding market and government failures are interrelated and simultaneously affect socially, economically and environmentally sustainable development. The enumeration and categorization of market and government failures serves in this thesis merely the purpose to systematically identify situations which network governance has to address. In section 2.9 these situations build sort of a matrix of required action for which theses on how to address them will be deduced from theoretical approaches to international relations issues in order to be tested in part three of this thesis in the five scrutinized global policy networks.

2.2.3 Interrelatedness

After having outlined which functions of global policy networks have to solve which problems in sustainable development of energy markets, it has to be pointed out that network governance functions as well as issues to be addressed are interrelated in reality. The interrelatedness of issues and policies to address these issues is mirrored by what Messner calls network failure, i.e. the failure of networks to execute certain functions to overcome different market and government failures. Network failures signify a form of failures of societal processes, apart from market and government failures. Messner (1995: 214/215) distinguishes five forms of network failures, or core problems ("Kernprobleme"). Those five network failures are (1) veto positions which block any decision to solve a problem, (2) agreements only on the smallest common denominator, (3) tension between disintegration through weak ties and low innovativeness through strong ties,[22] (4) blocking of bargaining results when it comes to distributive questions, (5) externalization of costs to the network environment and not intended external effects. (Messner 1995: 244)
Messner identified seven "problem dimensions", resulting in the above mentioned network failures: (1) the problem of great numbers, which implies problems of imperfect information and to coordinate external effects; (2) the timely dimension of decisions concerns the balancing of short-term interests and long-term effects of network activities, the integration of new members,

[22] For a definition of weak ties and strong ties, see section 2.6.3.1.

and the stability and trust of the network members' relations; (3) the institutionalization of collective identities and thereby boundaries, which leads to two challenges: on the one hand networks must mediate interests among network partners as well as with the network environment, on the other hand networks must balance openness for new network members, installing weak ties to enhance innovativeness and to overcome imperfect information, with trust and coordination of strong ties helping to internalize external effects; (4) the problem of coordination, which considers external effects and conflicting interests as those of future generations in sustainability; (5) the negotiation dilemma, which takes into account the problem of trust necessary and distorting for effective coordination and mediation of interests; (6) the problem of power in network relations, which results in problems of interdependence, potentials of complementary resource endowments, and the necessity of maintaining the capacity for organizational learning and integrating partners to enhance innovativeness in a situation with powerful actors, whose power bases on knowledge and who can control information, define what is conceived as the truth, and thereby limit the ability to learn; (7) the tension between conflict and cooperation, which refers to the innovative potential for development through cooperation of conflicting actors but also to the dangers of societal conflicts, in which interests must be mediated to avoid unsustainable developments and fissions in society. (Messner 1995: 216-244)

Although the complex interrelatedness of those problem dimensions and the resulting network failures does not easily allow any plain approach to address all these challenges to effective network governance, a network governance strategy must deliver exactly this: a plain and clear scheme of action for what network partners have to consider when taking strategic action and contributing to the execution of functions for governance through networks, enabling to deal with market and government failures effectively as well as implicitly addressing network failures.

Network failures menace to make network governance ineffective, but network governance is necessary. For, where markets and governments fail, networks, or, as Jänicke phrases it, more flexible, voluntary, cooperative, negotiated, decentralized, participative, and innovative arrangements come in. (Jänicke 1991: 1057-1061)[23] Nevertheless, effective macroeconomic regimes have stronger leverages and are thus necessary for global environmental governance and sustainable development, to which microeconomic strategies-based networks can only be a complement.

2.2.4 Macroeconomic Solutions to Climate Change and Sustainable Development

This section presents several proposals for international regimes to develop market-based solutions for the climate change issue. In the end, the top runner approach, based on sectoral agreements, is introduced as the form of international regime which fits most demands for economically efficient regulation and supports best flexible and voluntary commitments to sustainable development.

At the basis of any macroeconomic solution for global environmental problems lies the debate on the technical options how to solve that problem. In order to address climate change, several technologies and practices of sustainable economics are discussed: (compare Edenhofer 2003: 18-20)

- the Carbon Capture and Storage (CCS) technology represents an end-of-pipe solution for the reduction of greenhouse gas emissions by capturing the emissions, sequestering the carbon, and store it in old gas and oil fields;
- forestation and a halt to deforestation will filter greenhouse gas emissions from the atmosphere and store them in living plants, additionally, the conservation of rain forests will preserve biodiversity, a global public good for future generations;

[23] It must be added although that Jänicke understands policy networks rather as pressure groups with vested interests denying sustainable development.

- other solutions are subsumed under the term geo-engineering which refers to
    - mitigating global warming by installing mirrors in space deflecting and distributing radiation from the sun, or
    - emitting aerosols into the stratosphere filtering the sunlight, or
    - changing the orbit of the planet around the sun, or
    - fertilizing oceans in order to grow algae increasing the capacity of oceans to store greenhouse gas emissions.

All proposals how to deal with climate change must consider additional measures of adaptation like adjusting infrastructure to more frequent droughts, floods, and other disasters. Economies would have to develop new industries or adapt old ones to new challenges and demands. Some even argue that costs of climate change would not exceed costs of adaptation and thus climate change mitigation would be more costly, although the recent Stern-Report (2006) finally came to a different conclusion and prominently proved this argument wrong.
Particularly, the proposals of geo-engineering would require global agreements and the establishment of regimes which is unlikely to be introduced successfully due to the redistributive effects, entailed by such solutions, and risks of unforeseeable consequences of such policies.
Nuclear or fission energy is sometimes propagated as bridging technology into a renewable energy future.[24] Fusion power plants are another alternative for future energy systems, though it is still uncertain if this technology will ever be available. Today there are only R&D efforts to develop this technology.
After all, mitigation of climate change seems to be possible at acceptable costs and without terminating positive outlooks for economic growth by raising energy efficiency, promoting renewable energies, and boosting innovations in all industries. The question, however, is how to do that and how to prepare transition and support economies all over the world to switch to more sustainable energy systems. There are several macroeconomic answers to that question: (compare Ott, Oberthür 1999: 7)

- green taxation,
- large-scale R&D effort for renewables and the efficient use of energy,
- levelling playing field for sustainable energy by removing subsidies, (while one-time subsidies for the access to energy might be economically efficient, subsidizing energy consumption distorts energy markets in the long-term (Jaccard, Mao 2002: 58))
- energy efficiency, respectively carbon dioxide intensity standards,
- public procurement of sustainable energy.

All those policies demand public interventions and regulations of energy markets. However, it is always questionable if public policies are efficient, or if the same or even more sustainable outcomes could be reached with market-based incentives, leaving alone that it is "politically unfeasible" (Ott, Oberthür 1999: 22) to agree on these public policies at a global level.
Whereas market-based systems like certificate trade might be more flexible and set incentives to comply with international regimes because they foster opportunities to make profits. (compare Edenhofer 2003: 23-26)
The Kyoto climate regime already introduced the trade with greenhouse gas emissions certificates and, thereby, priced the use of the atmosphere, respectively the climate as public good. At the same time the purchase of certificates in developing countries represents a growing financial

[24] The argument that nuclear energy will be necessary for mitigating climate change and substituting fossil energy sources is irrational. For the costs of climate change are potential future costs just as well as the costs of storing and safeguarding nuclear waste as well as covering costs of possible nuclear fallouts and radioactive radiation in accidents. Thus, both costs of climate change and costs of nuclear energy will materialize in future and are uncertain. It is impossible to tell which form of energy will entail more costs and thereby be more expensive than the other one, whereas sustainable forms of energy do not entail those costs and burdens for future generations. Therefore, economically speaking, it is completely uncertain if nuclear energy can be an economically viable substitute for fossil energy, or vice versa.

transfer from industrialized countries to developing countries for the development of more sustainable energy systems. (Mrusek 2007) However, the trade with emission certificates depends on the caps for the allowed use of the atmosphere. To define these caps is a political decision which industrialized countries had globally to agree on. So far these caps are far from enforcing a sufficient reduction in emissions to mitigate climate change and apply only to the emissions of industrialized countries because developing countries argued that climate change mitigation is a 'common but differentiated responsibility' of all countries. For, the economic development of industrialized countries over the last 150 years took advantage of the free use of the atmosphere to dispose carbon dioxide emissions. In the meantime emerging economies like China and India have become large emitters of greenhouse gases in absolute terms although their per-capita emissions are still far below the level of industrialized countries. As these emerging economies are not Annex I countries of the Kyoto Protocol with binding emission reduction targets, the Kyoto regime is of very limited effectiveness, the Post-Kyoto regime must agree on much more effective caps.

One flaw, criticized in the Kyoto regime, is that absolute caps do not reflect necessities and opportunities to reduce emissions in relation to economic growth. Therefore, one proposal is to set caps in terms of efficiency as a ratio of emissions per GDP unit. Another recently publicly debated suggestion is to define long-term per-capita emission caps.

Instead of avoiding the emission of carbon dioxide emissions, carbon can be sequestered and stored. This alternative is economically viable as long as the price of disposing emissions in geological formations or oceans is lower than the price of using the atmosphere. If prices reflect the actual costs, the market could develop the most efficient solution to mitigate climate change. In order to internalize the true environmental and long-term costs of the CCS technology, the storage of emissions must be insured. Carbon sequestration bonds must cover the costs of sequestering the carbon, maintaining the emissions disposal sites, and insuring the long-term risk of leakages in the disposal sites. Such bonds can be tradable certificates with a fixed term after which the bond will only be repaid with interest to the holder if no leakages in the emissions disposal site occurred during the term. Thereby, the long-term risks are insured even after the lifetime of the emission sequestering and storing company. (Edenhofer 2003: 25/26)

Apart of pricing the use of the atmosphere and thus assigning a price to emissions, "green energy certificates" can govern the future development of energy systems infrastructure and even out existing energy market distortions without politically deciding on prices and choice of technologies. Power providers are obliged to feed in a certain politically determined quota of renewable energy based electricity, at the same time "green energy certificates" are issued to renewable energy providers in relation to the amount of converted renewable energy. These certificates are tradable and allow power providers to buy certificates and/ or to install renewable energy technologies themselves in order to achieve their quota of green energy in their energy mix. Such quotas represent a quantity-based subsidy as long as prices of green energy are not competitive compared to fossil and nuclear energy. The subsidization, however, is necessary because the initial costs of learning in the development of a new technology and a new industry and the investments in grids and power plants of fossil and nuclear energy providers have long been depreciated and represent now sunk costs. Even if new energy technologies might provide energy in the long-term at lower prices, they are not able to compete with the established energy sources and technologies in the short-term. Hence, pioneers need some additional incentive to develop the new technologies, a first-mover advantage will not be sufficient. "Green energy certificates" can thereby work as temporary subsidy without determining the long-term energy mix. (Edenhofer 2003: 23-25) Although the argument of different development stages of different energy technologies to justify temporary subsidies applies as well to the different development stages of different renewable energy technologies. Thereby different quotas for different green energies might be justified, which would, in fact, reflect political decisions about the choice of technology in the energy mix.

Functionally a quantity-based subsidy like the "green energy certificate" system is equivalent to a price-based subsidy like feed-in laws. Experiences in different countries showed, however, that feed-in laws proved more successful in the promotion of renewable energy. This might be due to the fact that most electricity markets are dominated by monopolists or oligopolists who can, if they negotiate prices of "green energy certificates" with independent power providers, use their power and beat down prices.
International goals for renewable energy could never be agreed on, which was one reason for the German government at the WSSD in Johannesburg 2002 to host the renewables2004 conference in Bonn.
All the described macroeconomic solutions for the problem of climate change might produce efficient sustainable outcomes. However, due to resistance at national as well as international level so far no effective international regime or national legislation could be established. And even if such a regime could be successfully introduced, every actor would have a strong incentive to defect and free-ride. That's why alternatively voluntary and flexible approaches have been developed. The voluntary European agreement with car manufacturers to limit emissions of new cars came into being but proved to be ineffective because the car manufacturers amongst themselves do not have any power to sanction defectors and free-riders. Hence, leadership of some actors should spur a process towards enhanced sustainability. (compare Ott, Oberthür 1999) The JREC is an example of such leadership but remained ineffective and mostly inactive so far.
Nevertheless, in absence of an effective regime or legislation, voluntary and flexible cooperation in networks might be the most that can be achieved for sustainable development. (compare Oberthür, Pfahl, Tänzler 2004) Such networks can be a complement or an enabling condition for the process of establishing an effective international regime on climate and energy.
Only if partnership action might enable economic actors to produce sustainable outcomes and, thereby, yield industry leaders in sustainable practices and technologies, these leaders might enable governments to negotiate international targets of greenhousegas emission reductions. A recent study of the Pew Center, which is funded by private companies,[25] suggested sectoral agreements in an overarching post-2012 climate framework which could introduce sequentially or simultaneously industry-wide national and international technology-based or best-practice strandards. (Bodansky 2007: 3) Indeed, among the few mechanisms mentioned explicitly in the Bali Road Map are "cooperative sectoral approaches and sector-specific actions". (Bali Action Plan 2007: 2)
The *"top runner" program* reflects sectoral approaches. (Bodansky 2007: 16) The most sustainable practice or technology of an industry leader and the related degree of CO2-efficiency of production of the industry leader defines successively the standard for the whole industry[26]. For, the industry leader proves that sustainable practices can be economically viable and competitive and thus the legislator might define the standard of the leader for the whole industry while allowing competitors a certain time frame to reorganize their businesses. Longer time frames might later on enforce top runner standards in foreign countries and finally expand standards to an economy-wide scope.
Public-private partnership action can make sure that leaders will push the standards continuously upwards. (compare Bodansky 2007: 3) Bodansky even recommends that companies should participate in the intergovernmental negotiations of sectoral agreements. (Bodansky 2007: 15) Developed countries can then ambitiously engage for climate change mitigation and reduce greenhouse gas emissions while at the same time avoid setting too ambitious standards or

[25] On the history of the Pew Center, compare David Levy: Business and the Evolution of the Climate Regime: The Dynamics of Corporate Strategies. In: David Levy, Peter Newell (eds.): The Business of Global Environmental Governance. Cambridge, MASS, London: MIT Press, 2005, p. 73-104.
[26] In practice this benchmarking mechanism is always subject of pressure groups' influence aiming to define groups of products and services or boundaries of industries for which an own sectoral benchmark, respectively top runner defined standard applies.

overtaxing their economies. Sectoral agreements would address concerns about competitiveness of different companies from one industry. For internationally exposed global competitors from one sector would all have to undertake mitigation efforts. (Bodansky 2007: 6 and 10) Even if not all countries would comply with sectoral agreements on standards, the weight of the markets of parties to the agreement could set an incentive for suppliers worldwide to adapt their standards to be able to compete in the leading sustainable markets.[27] (Bodansky 2007: 11)

The incentive for leaders to invest in sustainable technologies and practices is the competitive advantage they will enjoy and which a top runner program protects against social or environmental dumping prices. Thereby, a top runner program might incentivize a *race to the top*. Now, developing countries might argue that such an international top runner regime is a new form of protectionism of the developing countries and will push developing countries' companies and industries out of the market if they are not able to reorganize their infant industries. However, the top runner approach holds incentives to comply for developing countries as well. Foreign direct investments of global industry leaders in developing countries will become more likely as the companies can benefit from their lead in sustainable technology and practice and will not have to compete with companies undercutting prices with cheaper but dirty and hazardous technologies and practices. And in order to enjoy their first mover advantage from their lead in sustainable technologies and practices, the industry leaders must supply their top runner products and services in developing countries to force competitors to invest to catch up. Additionally, the compliance with an international climate regime creates out of the scarcity in emission rights investment opportunities for clean technologies. Hence, there might be incentives for industry leaders to invest in developing countries for reasons of secure investment conditions as well as for strategic reasons of harnessing first mover advantages in the development of future markets.

> "With the current and predicted cost competitiveness of many renewable energy technologies, however, it is not necessary to wait for strengthened global agreements before taking action at national level." (REN21 and UNEP 2006)

In fact, global agreements can only be achieved and implemented if actors know how to and are able to implement the agreed upon goals. International targets on greenhouse gas emissions reductions will only meet with general approval and become binding if there are strategies how whole economies and companies can achieve these targets. Politics must follow capacities of economics, otherwise political regulation and legislation might become inefficient and costly. Politics might only force laggards to follow leaders. That's why the instrument of top runner programs might allow to efficiently rule sustainable economic development and to effectively accelerate sustainable economic development through supportive multi-stakeholder partnerships.

[27] This effect is called the California Effect after the leading Californian legislation on clean air, which forced suppliers from all over the USA to adjust their standards due to the sheer size of the Californian market.

2.3 Debate on Governance and Network Governance Theory/-ies

This section connects the argument on networks to the debate on governance. Definitions of governance and of networks as well as partnerships are discussed to demonstrate that both concepts go together well. In this context, networks present combinations of different organizational forms and accordingly different patterns of action of different actors who involve in governance. In the following section the debate on networks in global governance will be considered and adapted to the argument of this thesis. Certain management functions as identified by another research project on networks in global governance relate to network governance functions to solve the problems in international politics as outlined in section 2.2.2. Apart from this research in network governance, the structuration theory and transaction cost economics are the dominating constructivist and rationalist theories on network governance. Both have something to contribute but, as will be argued in this thesis, cannot account for all aspects of governance in and through global policy networks. Neither of the two can meet the claim and serve as sufficient and comprehensive theory on network governance. Network governance requires a more differentiated picture of theories addressing different aspects of network governance, though indeed based on constructivist and rationalist approaches.

2.3.1 Defining Governance

As this thesis explores global policy networks as instruments and manifestation of global governance, the term of governance requires some clarification. Niklas Luhmann and Fritz Scharpf had a debate on the basic question if the political subsystem of societies could control and govern other subsystems. This debate moved on from the traditional understanding of top-down decision-making and implementation to a more sophisticated consideration of complexity of situational context, the instruments and resources for management, and the actors in institutional settings. (Dose 2003) This debate and its development are reflected by the concept and debate on the term ‘governance’.

The rather vague term of governance points to actual changes and new developments like globalization. (Benz 2004: 12/13) Under the conditions of globalization nation-states and non-state actors need to cooperate in transnational regimes to meet demands for effectiveness and efficiency. These regimes are more functionally policy and problem-oriented. (Grande 2003) Highly complex and self-referential systems are hardly suited to be externally governed and controlled; they can only be self-governed. (Töller 2003: 171)

In opposition to Luhmann and the system theory sceptics, doubting the governability of systems, Scharpf and Mayntz consider governance as possible in principle. However, Mayntz conceptualizes governance not in the sense of control *of* but *in* societies. Policies are developed increasingly in cooperative processes in policy networks, though in the “shadow of hierarchy” of a state with regulatory power. Such collaborative policies promise to be more effective in problem-solving due to their flexibility where state regulations are nearly impossible like in climate mitigation. (Töller 2003: 173-177)

Mayntz identifies four problems which governance must address: problems of implementation due to inability of states to effectively regulate an issue, problems of motivation due to addressees of policies refusing to comply, problems of knowledge due to the legislator having insufficient understanding of an issue, and problems of controllability due to the complexity of societal contexts and issues. (Mayntz 1997: 194) To address these problems, governance systems must integrate and complement different concepts of control through different managing and intervening actors (Mayntz 1997: 192), of unilateral and external control (Mayntz, Scharpf 1995: 16), and of self-organizing governance. (Mayntz, Scharpf 1995: 23) Mayntz understands self-governing processes and self-organizing processes as voluntary, horizontal coordination of action among autonomous actors. (Mayntz 1997: 192) This process-related approach corresponds also with Young’s demands on dynamic and complex governance systems adjusting to socioecological changes. (Young 2008)

Rhodes highlights the role of self-organizing dynamics, too, and defines governance as a process, more specifically: "*(G)overnance refers to self-organizing, interorganizational networks*". (Rhodes 1997a: xi. Italics in original) And: "Governance is about managing networks." (Rhodes 1997a: 52) Governance emerges in process, for, in interdependent, complex dynamic settings no single actor has all the necessary knowledge or other resources to solve problems and apply policies effectively. Each actor can contribute relevant resources. (Rhodes 1997a: 50)

Walter Kickert extends on the features of systems to be governed by referring to chaos theory which is concerned with non-linear dynamic systems. Social systems can be like that: complex, self-referential, i.e. autopoietic, autonomous, and – at the same time – self-organizing which means self-governing. Thus, policy networks can establish or rather let emerge self-organizing governance. (Kickert 1993)

Jann's definition of governance corresponds with Rhodes' one, and takes up the self-organizing feature, too: Governance is a "form on its own of 'self-organizing' coordination and cooperation in interorganizational networks, which can comprise public policy and administrative institutions, associations, companies, and non-profit organizations – including governmental actors or not."[28] (Jann 2002)

At the global level the definition of the Commission on Global Governance has gained some authority:

> "Governance is the sum of the many ways individuals and institutions, public and private, manage their common affairs. It is a continuing process through which conflicting or diverse interests may be accommodated and co-operative action may be taken. It includes formal institutions and regimes empowered to enforce compliance, as well as informal arrangements that people and institutions either have agreed to or perceive to be in their interest." (Commission on Global Governance 1995: 2)

Particularly in the context of international relations the importance of interdependencies must be considered in governance systems. Young defines governance as a social function.

> "(I)t centers on the management of complex interdependencies among actors (…) who are engaged in interactive decisionmaking and, therefore, taking actions that affect each other's welfare." (Young 1996: 2)

Keohane and Nye extend on the significance of interdependencies and connect those to the network concept. They understand globalization as the quantitative increase in interdependent relationships and "networks of interdependence", (Keohane, Nye 2000: 11) which means – according to "scientific theories of 'chaos'" – that events can have catalytic effects elsewhere in the system, from which, however, "a new kind of structuring may emerge – out of chaos", as Dunsire explains referring to Ilya Prigogine and James Gleick. (Dunsire 1993: 23) Governance aims to reach a self-organizing order through mechanisms which must be as complex, dynamic and diverse as the units to be governed, and must, referring to Mayntz, consider interdependencies, governability and controllability. (Dunsire 1993: 23) In this context governance is the attempt to "manage these increasingly complex interconnected systems" (Keohane, Nye 2000: 12), defined as the "formal and informal institutions and processes, guiding and restraining collective activities". (Keohane, Nye 2000: 12) Nye and Keohane predict that governance at the global level will require networked cooperation – adapted to the conditions of globalism – and have no hierarchies, but maintain the autonomy of actors. (Keohane, Nye 2000: 14 and 19)

However, global policy networks are no substitute to international regimes but a supplement.

> "The negotiated outcome (of the WSSD, S.W.) can be considered as core and lowest common denominator, while everything else is considered as complement to bring more concrete results that would not be achievable in the plenary assembly." (Suding, Lempp

[28] Original quote in German: "eigenständige 'self-organizing' Form der Koordination und Kooperation in interorganisatorischen Netzwerken, die sich aus Politik- und Verwaltungsorganisationen, Verbänden, Unternehmen und Nonprofit-Organisationen – mit oder ohne staatliche Beteiligung – zusammensetzen können."

> 2007: 7) "(…) Type II partnerships are intended to complement, not replace, traditional agreements." (Hale, Mauzerall 2004: 237)

In conclusion, Benz points out that governance reflects the dynamics of structures and processes, of institutions and actors contributing both to the process of governance to produce collective goods and eventually forming network structures. Governance, hence, takes the shape of networks as well as harnesses networks as instruments. (Benz 2004: 20/21 and 23) Benz evaluated several definitions of governance which all have in common, that they highlight the interplay of institutions with interaction of multi-sector actors in self-organizing processes. (Benz 2004: 16-25) He suggests therefore combining different theoretical perspectives, namely cybernetic or autopoietic system theory, game theory, actor-centred institutionalism, action theories, decision theories, and network theories. (Benz 2004: 27)

For the question how to organize governance effectively, these theoretical approaches might draft hypotheses on how to organize governance effectively and theses in detail how to organize the process of governance, how to support and harness cooperative relations of actors and use resources, how to foster self-organizing dynamics, and, in conclusion, how networks might be the instrument as well as the subject of governance.

2.3.2 Defining Networks

Networks and partnerships are not always clearly distinguished by definition, and in reality type II partnerships combine characteristics from according to definition differentiated organizational forms. (Suding, Lempp 2007: 5/6) Kenis and Schneider provided an initial definition of policy networks as "*decentralized concept of social organization and governance*", (Kenis, Schneider 1991: 26. Italics in original) "characterized by the predominance of informal, decentralized and horizontal relations." (Marin, Mayntz 1991: 15)

Networks are often understood as partnerships because networks themselves often only manifest as partnerships and through partnership action. Projects represent concrete strategic action implemented in partnerships which emerge from networks. The networks as such can hardly act.

Networks and partnerships differ in their governance. Networks are themselves too complex and harness resources, like knowledge and good contacts, too complex to be managed in a top-down manner. Therefore, networks rather instigate certain action by fostering self-organizing processes, whereas partnerships base on clear-cut contracts and well-defined management systems. Nevertheless, even those partnership projects benefit from self-organizing dynamics in networks and cannot, in fact, function without.

Annan gave a definition of partnerships and their relation to networks in his report on partnerships for sustainable development:

> "Partnerships for sustainable development are collaborative initiatives focused on finding innovative solutions to sustainable development challenges. By pooling their knowledge, skills and resources, these partnerships are working to develop knowledge networks to contribute to an environment of informed decision-making. Most partnerships reported progress in implementation within the broad categories of partnership building/coordination, capacity-building activities, information sharing and pilot projects." (Annan 2006: 1)

This definition points out that partnerships are not like new organizations, but that partners keep their resources and autonomy, pooling their knowledge about how to access which resources and skills in networks and sharing them in concrete partnership action. Therefore actors from all sectors can join networks without running the risk of impairing future opportunities for action, investments etc. Indeed, many definitions of networks extend on the exchange and sharing of *resources*. (compare Nölke 2000: 336; or Klijn 1997: 30)

This organizational characteristic puts networks between markets and organizations. In its most general form, the debate on governance opposes markets to hierarchies, respectively hierarchical

organizations or public regimes, as organizational concepts which might establish effective and efficient mechanisms to govern certain issues.

Markets follow the logic of the appropriation of individual monetary benefits. Behavior of actors depends on the amount of expected benefits compared to the loss of consumption through investment of resources. The basic pattern of interaction in markets is one of *exchange*.

Hierarchies (shall) intervene when market outcomes such as prices do not include societal benefits which cannot be individually appropriated. The interventions shall then force actors to take those public benefits into their consideration or change the market outcome at large. The basic pattern of interaction in hierarchies is that of *command*.

Networks (shall) connect both forms of interaction patterns and all concerned actors. Networks allow the inclusion of all relevant actors without creating a situation of unanimity, and they allow excluding irrelevant actors for specific action. Thus, networks can maintain efficiency and avoid growing too large to organize action efficiently and effectively, but at the same time maximize effectiveness through being open and participatory and integrating relevant actors pro-actively. They are like a pool from which actors can be selected situationally and according to opportunities. Networks are as large as possible for building capacities and as small as necessary for taking strategic action. The basic logic of interaction of partners in networks is the *sharing* of resources like knowledge or good contacts, i.e. social capital.

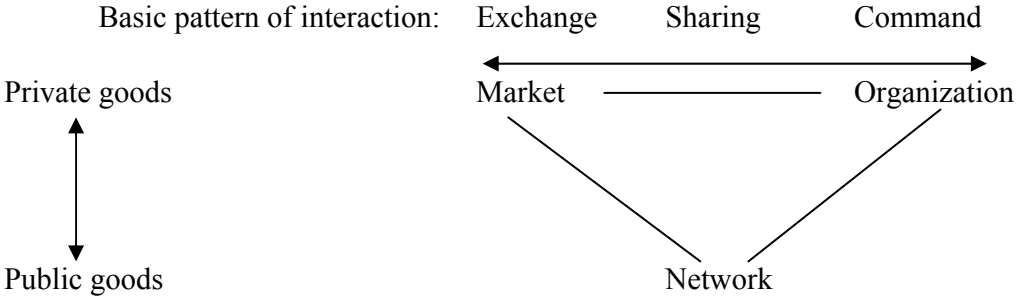
Those three patterns of interaction can be applied to different purposes and the governance of different sorts of resources: Markets *allocate private goods* most efficiently, which is crucial for the successful long-term development of any society. Hierarchies such as states perform certain functions, as for instance to organize social security of individuals, by *redistributing private goods* which works only if a hierarchical superordinate level commands this to be done. Thereby hierarchies and particularly states can also provide public goods being often considered at the national level to be a state assignment. Although, if states can fulfil this assignment best, or if states only have to set incentives right and let markets take care of the provision of pulic goods, is still debatable. Networks provide *public goods*, which are non-rivalrous in consumption and non-excludable for potential consumers, by *sharing* them.

States are actors who can harness all three patterns of interaction to achieve different goals of societal development, not merely the provision of public goods. And they are not restricted to merely command the redistribution of private goods. In a way networks might contribute to the smooth organization of markets and hierarchies by providing certain public goods and thereby complementing the other organizational forms and interaction patterns, but neither markets nor hierarchies nor networks could all merely on their own perform all needed societal functions for sustainable development.

While financial assets and power have characteristics of private goods, in the sense of resources for action, which cannot be shared without diminishing in value, knowledge and social capital are public goods. Their value is not depleted through use.[29] That's why they are suitable for sharing which is the basic pattern of interaction in networks. They are the managerial resources in networks for strategic collective action. As all four kinds of resources are necessary for sustainable development and must complement one another, the basic logic of interaction of networks must be applied as complementary but not alternative to those of markets and organizations: exchange and command. Whilst knowledge and social capital can be provided and enhanced by networks, individual actors must bring in power and financing. Only networks allow for the mobilization of public as well as private goods as resources for action, for only networks maintain the autonomy of actors in free markets, integrate hierarchically organized collective actors, and identify and organize opportunities for collective action of those actors by taking different logics of interaction into consideration.

[29] On the characteristics of knowledge and social capital as resources for action see sections 2.6.3 and 2.6.4.

Diagram 1: Patterns of Interaction in Markets, Organizations, Networks



Common goods, which are rivalrous in consumption but from whose consumption no consumer can be excluded, like the climate, or from whose consumption consumers can be excluded but which are non-rivalrous in consumption like the classical club-goods, lie on the scale in between private and public goods. They can be allocated efficiently by distributing property rights and trading them on markets like in the case of emissions certificate trading, or their consumption can be regulated and taxed by legislation. Thereby, common goods can be transferred into and treated like private goods. If this solution is not viable, because actors in international politics defect, for instance, collective action must organize the avoidance of overexploitation of or underinvestment in the common good. Such collective action can emerge even in the absence of international institutions with sanctioning power over defecting actors among autonomous actors in global policy networks, launching partnerships which develop sustainable practices at a micro-level for the use of the common good at the macro-level. Partnerships, facilitated in global policy networks, are therefore a bridge across the gap to a sustainable future.
If it is technically possible to share public goods and use them commonly, networks can realize efficient solutions through complementary combinations of self-organizing market allocation and managed interventionist policies. Therefore, network governance must focus on sharable resources (compare Fountain 1998: 105) like the public goods of knowledge and social capital, and, thereby, organize collective action for a sustainable development of common goods like the climate, for instance.
The anthropologist Polanyi (1992) identified three main patterns of economic processes: exchange, redistribution, and reciprocity. While exchange clearly belongs to markets, redistribution requires a center toward which and out of which “appropriational movements” (Polanyi 1992: 35) of resources take place. This center might be the state within a society. The third pattern, reciprocity, characterizes horizontal relations among “symmetrical groupings”, (Polanyi 1992: 35) like in networks. Indeed, reciprocity is often supposed to explain the logic of action in networks. However, the institution of reciprocity is a somewhat idealized way of describing the relations among network partners. Polanyi asserts that mutuality between individuals leads to reciprocative relations, redistribution will be present if sharing is common, and bartering results in market exchange. Networks seem to combine all those three patterns of resource movements but cannot be reduced to only one of them: Mutuality eases cooperation but is not necessary as a *sine qua non* condition, thus, reciprocity helps; sharing occurs in networks but networks almost by definition do not have a center to redirect resource flows; and network partners do barter but cooperate even beyond this form of exchange as in markets.

2.3.3 Networks in Global Governance

This section will take up results of research on networks in global governance and relate those to the argument of this thesis. Network governance is supposed to address problems, governments as well as markets failed to solve in a sustainable way. (compare Schmitter 2002: 54) Hence, global policy networks must execute certain functions to contribute to effective governance.
Reinicke and Deng (2000: 27-63) provide a categorization of functions of global policy networks and differentiate “six most important functions of global public policy networks”. (Reinicke,

Deng 2000: 27) These functions address the failures of markets to produce sustainable outcomes, as described in section 2.2.2, and define network management activities to execute those functions by managing relationships (Reinicke, Deng 2000: 29) and knowledge. (Reinicke, Deng 2000: 30) Reinicke and Deng identified in their research for the UN Vision Project six "crucial management issues" (Reinicke, Deng 2000: 65) to support network dynamics. However, the network functions matched with tasks of network governance are actually no one-to-one categorization. This form of presentation serves merely a reduction of complexity. The market failures, the network functions, and the strategic activities of network partners to execute these functions are all interrelated as was already described above in section 2.2.3.[30] Management activities for network functions sort of mirror the six failures in non-sustainable markets:

- *Monopolies* and other barriers prohibit the entry of competitors in energy markets. Reinicke and Deng identify a network function, phrasing it as "placing issues on the global agenda", (Reinicke, Deng 2000: 31-35) which represents the pro-active *integration* of certain relevant actors, issues, and excluded interest groups and the building of relations based on a common agenda and strategy. This does not say network functions of agenda setting and integration are identical but agenda setting is always some form of integration, although agenda setting is much more specific and serves a particular purpose for action. Global policy networks fulfil a role as convenor by integrating certain actors and raising awareness for cooperation. To place an issue on an agenda means for a network management in a multi-sectoral network according to Reinicke and Deng to "find allies outside one's sector" (Reinicke, Deng 2000: 75-77) for opportunities to cooperate and win their commitment to that issue. That is the precondition for voluntary activities to enhance competition with monopolists, for instance, by providing energy from decentral renewable sources.
- *Misallocation* of resources and *distortions* of energy markets impair social sustainability since certain actors will always renegotiate the outcome. "Negotiating and setting of global standards", as Reinicke and Deng call it, (2000: 36-47) reflect a network function to address such distortions and lack of social as well as environmental sustainability. To this end, the *mediation of adverse interests* is necessary and must address, for instance, questions of social equity and safety nets, as in the context of energy tariffs below a 'lifeline' level. However, due to the difficulties to calculate the social and environmental costs of certain energy sources and thus to recognize misallocations and distortions, which impair the different interests of actors, the involvement of many stakeholders and the consideration of their interests may be justified but can easily paralyze the network. Therefore what Reinicke and Deng define as "balancing of adequate consultation and goal delivery" (2000: 70-72) is a task of the network management to avoid paralysis of the network. On a global scale standardization of methods for analysis of energy systems (IISD 2004b: 7) and standard setting may support the process to include interests, which are not represented in the market. This function serves as a platform for marginalized groups and to level the playing field. Participation gives legitimacy, but management must make sure that debate maintains the focus on results, so norms can be established.
- *Lack of information* on energy technology options, potential partners or investment opportunities causes ineffective governance and inefficient outcomes. The network function of "gathering and disseminating knowledge" (Reinicke, Deng 2000: 47-52) addresses this failure. *Knowledge sharing* through knowledge mapping benefiting from economies of scale in sufficiently great networks in knowledge-intensive issues and fields of policies allows supporting voluntary activities for sustainable development and provides incentives to cooperate. Reinicke and Deng see "maintaining the 'structure' in structured informality" (2000: 74) as crucial determinant for the connection of and

[30] On the interrelatedness of network functions see Annex IV.

exchange among knowledge holders with various backgrounds. This structured informality allows knowledge sharing and facilitates relations among actors which are beneficial for all network functions. It creates thereby a comparative advantage for network members. To this end, management must maintain flexibility, the strength of networks, and keep them open and receptive to outside opinions.

- *Lack of human capital* educated and trained in sustainable energy technologies and their application, or *prohibitive transaction costs* for cooperation with adequate partners blocks activities for sustainable development. Therefore, one function, which networks must perform, is "closing the participatory gap". (Reinicke, Deng 2000: 61-64) To bridge that gap, global policy networks can help to connect partners with complementary capacities as well as local to global level; networks must function as a mechanism for effective *partner selection* to take place. Hence, network managers have to "get the right people on board and create a common, shared vision" (Reinicke, Deng 2000: xvi) for "getting the network off the ground". (Reinicke, Deng 2000: 65-69) That means to build trust (Reinicke, Deng 2000: 62) as the starting point for lowering transaction costs and taking collective action.
- Underinvestment in *public goods* or *external effects* on the environment from which the poor suffer most represent a market failure or even the complete absence of markets. Global policy networks must, therefore, support the "making and deepening markets". (Reinicke, Deng 2000: 52-57) To this end, networks can help internalizing external effects by *coordination* through communication among network partners on what and how action affects other actors. By such enhanced understanding for causal connections and mutual interests communication might deepen markets, identify opportunities for cooperation, and effectively coordinate activities. In order to achieve a certain authority of the network and sufficient investment to effectively influence strategic activities of actors to provide public goods, "securing sustainable funding" (Reinicke, Deng 2000: 72-74) and advertizing outcomes, which the network produces, (compare Reinicke, Deng 2000: 55) is the task of the network management.
- Prohibitive costs of investments due to *long term effects or risks* linked to the switch to sustainable energy systems impede needed activities for sustainable development. Since markets do not provide incentives to organize these activities, one function of global policy networks is to support the "implementing ideas and decisions" (Reinicke, Deng 2000: 57-61) without being economically profitable in the short-term. The *implementation* of such action can build in networks on established relations and on sharing costs among partners from developed and developing countries whose orientations, resources and capacities match. Network partners must manage the relationships within the network aiming at "tackling the dual challenge of inclusion" (Reinicke, Deng 2000: 77-89) in order to allow local implementation of global policies while considering rationales and capacities of actors from developed and developing countries'.

Table 1: Connections of Market Failures, Network Functions and Strategic Action – Overview

Market failure	Network function	Network function as defined by UN Vision Project	Tasks of the network manager as defined by UN Vision Project
Monopolies/ closed markets	Integration	Global agenda setting	Finding allies
Misallocation and distortions/ lack of sustainability	Interest Mediation	Negotiating global standards	Balancing consultation and goal delivery
Lack of information	Knowledge sharing	Disseminating knowledge	Maintaining structured informality
Lack of human capital/ prohbitive transaction costs	Partner selection	Closing participatory gap	Getting the network off the ground
External effects	Coordination	Making and deepening markets	Securing sustainable funding
Prohibitive costs of investment/ long term effects and risks	Implementation	Implementing ideas and decisions	Tackling dual challenge of inclusion

Now, the question remains *how* strategic network management might contribute to and foster network dynamics toward the execution of those network functions. To this end, theoretical approaches will be examined and strategic action in existing global policy networks will be explored. Giddens' Structuration theory as well as institutionalist approaches amongst which particularly the transaction cost economics have gained prominence to account for network governance are often applied to networks and discussed as network theories. In the following sections potentials as well as limits of theories on network governance will be outlined.

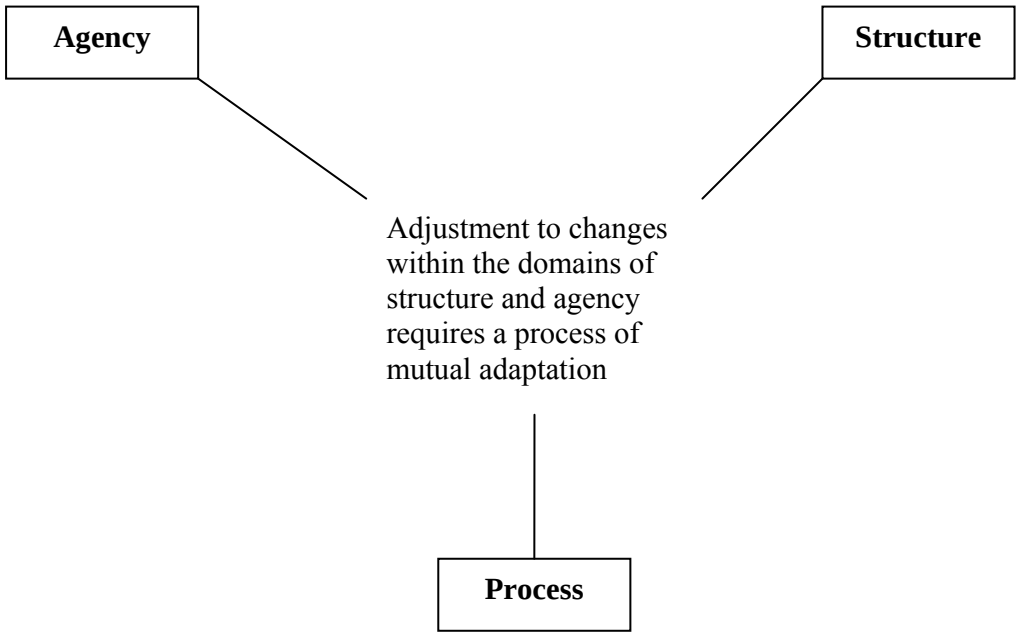
2.3.4 Giddens' Structuration Theory

In the academic debate on network theories, Giddens' structuration process is by some proposed to account for the process of governance in networks. Giddens' dimensions of structure and of agency focus on the questions what should be developed pursuing what end and who will be the agent of the respective changes. If people (actors) do not have the possibilities – needed options and incentives (structure) – to meet their own expectations, or if the capacities of people are not sufficient to use the given options, these options and capacities must be the ends for a sustainable development, i.e. changes within the domains of agency and structure. The process dimension of these changes has to be addressed on its own.

Giddens' classic categories for explaining variables of social phenomena – structure and agency – represent the attempt to understand the "active flow of social life" as a "series of ongoing activities and practices that people carry on". (Giddens, Pierson 1998: 75/76) The process of *structuration* refers to the duality of institution and individual, drawing a picture of structure defining the space in which action is possible, while voluntarist action forms and materializes structures. Structuration is the process of mutually constituting structure and agency. That means that actors can and do influence and change the process of structuration strategically. However, the process of structuration itself is not strategic, neither it explains how to change the processes of structuration strategically, which is though the purpose of global policy networks and strategic

partnerships. Networks enable actors to become more effective in their strategic action, so that they can provoke structural changes and thereby changes in the action of other actors.
Although these change processes might be understood as processes of structuration themselves, it is not sufficient to analyze the categories of structure and agency in order to describe, explain, and recommend strategies for networks, as structure and agency are dependent variables of the process of structuration, which is – with regard to Giddens' theory – the independent variable. Therefore the level of process itself must be subject of analysis.
The process dimension has explanatory power in its own right. The factors of success or failure of action cannot be reduced to structures and actors. Additionally to these possibilities (structure), and potentials and endowments (actors) there is a need for explanations of *how* (process) someone (actor) acts successfully or fails and under what circumstances (structure). Only the process dimension describes in fact what happens. Given structures determine a space of possible outcomes, and potentially, the given potentials of actors to utilize or change structures.
Indeed, structural policies will only be agreed to if appropriate **activities by actors to adjust to new structures complement the policies**. That might be the reason why too many reforms cannot be implemented at one time: the structural adjustments exceed the capacities of societal actors to adjust their behavior. In global climate policies, the lack of effective strategies how to achieve emission reduction targets may be one reason for the reluctance of many countries to agree to a binding regime. It is not sufficient to control structural change or capacity building but the change process itself must be managed as well and *tuned in* with actors' capacities and structural changes. The changes within the domains of structure and agency demand capacities of actors to adjust to changed structures. Therefore the process of adjustment must avoid excessive demands on capacities of actors to change. Policy networks have to consider what makes that process of mutual adaptation successful. Success of network governance depends largely on a process management by the network which complements the self-organizing dynamics of that process.

Diagram 2: Agency – Structure – Process



The analysis of the process level comprises those of the structure and agency levels. The structure level explores *what* is an effective policy to control action, while the agency level accounts for

who obeys which incentives. These questions, however, are of subordinate relevance to strategic action of actors in networks, for they must deal with failures of self-organizing processes to deliver sustainable outcomes in markets. In these markets actors interact with one another and with structures, and in these markets processes of structuration must take place. Only if the networks achieve to overcome these market failures, the processes of structuration can become effective and change actors' behavior effectively and sustainably.
These dimensions of scientific analysis are a scientific categorization, they are not ontological categories. In real-world politics these categories must be differentiated in policy levels – as will be proposed in section 2.9.2 – to cover all levels of political programs which policy makers have to consider in sustainable development. The structuration process of structure and agency cannot explain strategic action of network partners and how they execute functions of network governance, but the process dimension is, indeed, very important in network governance.

2.3.5 Governance and New Economic Institutionalism/ Transaction Cost Economics

Although the theoretical approaches to understand the individual network functions refer to constructivist approaches as well as to critiques and developments of game theory approaches the argument at large, and the way the argument unfolds, considers many contributions from the debates of New Institutionalism and Political Economy.
Institutionalist theories aim to explain actors' behavior by social or economic institutions, which set incentives, regulate, or preselect possible options of action. The New Economic Institutionalism paradigm starts from the concept of individuals as economic men and accounts for institutional incentives for action.
Although many theoretical approaches to governance in general and network governance in particular follow **institutionalist** arguments[31], network governance emerges particularly where institutions are missing or might only develop in the future or at least need a supplement, as in the case of global climate and energy regimes.

> That is so in "(…) emergent systems in which the absence of culturally embedded statuses, roles, and norms makes actors particularly dependent upon informal networks, and the structure of such networks particularly consequential for the development of the field." (DiMaggio 1992: 122)

Informal networks do not have a developed culture or other institutions, which steer their actors' behavior, and are, therefore, institution-free interorganizational settings. Institutions have to develop first. They are not like laws of nature existing since ever. Thus, even if theoretical approaches to network governance are of an institutionalist nature, strategies of actors and network managers and processes or games of interaction are forced to consider the logic of action of individual actors taken from institutionalist theories, but model the actions without institutions and rather purely follow strategic thinking. Not even the network itself might be an institution according to the definition of the term, for many networks face the problem that the partners do not share a common perception of the network and its purpose. The strategies might be the only institutions framing the action of individual actors.
The object of exploration of this thesis, global policy networks as complementary means to implement global policies, does not lend itself to an *institutionalist perspective* on networks as institutions. Because global policy networks emerge in situations when international institutions fail to arise, or networks might commence and form the process, that creates an international institution. In his political-economic approach Coleman observes that norms as an institution arise in order to limit and sanction negative external effects, but that they can only emerge in closed

[31] There are many definitions for what an institution is. The understanding of institution in the context of this thesis will be that whatever is man-made and is intersubjectively of relevance for the action of individual and collective actors should be called an institution. The decisive function for the field of global public policies on energy and climate is that an institution frames and governs action. Thereby an institution can give incentives for rational actors to act in a way that is beneficial to sustainable development.

social networks. (Coleman 1988: 105-108) Global policy networks, however, are open on purpose. Therefore, it is a contradiction in terms if networks are governed through establishing institutions like norms. Hence, networks are supposed to be complementary to international institutions, existing as well as emerging ones. Buchanan's political-economic theory of public choice is not appropriate to analyze networks, for it is "an economic theory of constitutions" and a "theory of political institutions", (Buchanan 1972: 15) not of micro-economic individual action – which Buchanan's theory, however, is based on.

Institutions in the widest sense of the term as human-made, intersubjective constructs can enforce or set incentives for collective action, however, often international institutions will lack resources for either. Even more obstacles appear when relevant actors abstain intentionally from an institution and if there is simply no common interest or intersubjective perception. In these situations networks might make valuable, complementary contributions to the sustainable development process. These activities are excluded by the institutionalist perspective by definition, although there are good chances that there still are opportunities for collective action and cooperation between actors.

Interestingly enough, Haas, Keohane, and Levy (1993a and 1993b) nevertheless arrive with their institutionalist analysis, which they admit is "state-centric", at the same functions respectively needs of the international sustainable development process and at the same managerial resources for Global Environmental Governance as the analysis of global policy network functions in this thesis. Haas, Keohane, and Levy even propagate that international institutions should be analyzed as a dynamic process, like global policy networks. Thus, institutionalists may come to the same findings on networks as researchers, who start from a different analytical perspective and do not assume any intersubjectively shared construct as precondition for collective action.

Williamson developed **Transaction Cost Economics** as a strand of institutional economics in organization theory to a comprehensive network theory in order to explain where to choose intentional governance and how to design institutions as spontaneous governance at the microeconomic level. (Williamson 1996b) Transaction Cost Economics consider situations of bounded rationality due to a limited capacity of individuals to process information and foresee future developments. Transaction Cost Economics account for "make-or-buy" decisions depending on asset specificity – the degree of resources to be used for only one purpose by only one actor. (Williamson 1996a) High asset specificity leads to high transaction costs. Knowledge and contacts are such assets whose specificity decides if actors exchange them and sell their services in markets as in the case of high specificity, redistribute them in hierarchically integrated organizations if they have a low specificity, or share them in networks in cases of mixed specificity.

Indeed, to avoid and minimize transaction costs is one important function of networks though not the only one. A clever partner selection in networks addresses that function. This specific function can, therefore, be accounted for by a transaction cost economic approach. However, networks execute other functions as well, and Transaction Cost Economics can hardly present a general theory of partners' action in networks due to the following reason.

Williamson claimed that cultural embeddedness had to be considered to calculate transaction costs. (Williamson 1996c) In principle, this combination of rationalist and contructivist approaches reflects real world conditions, however, explanations can, thereby, become tautological. For instance, Jones, Hesterly, and Borgatti (1997) aim to design a theory of network governance based on transaction cost economics integrated with social network theory. They want to explain the conditions under which "(…) network governance (…) has comparative advantage and is therefore likely to emerge and thrive" (Jones, Hesterly, Borgatti 1997: 911) by social, often informal institutions and mechanisms changing transaction costs. (Jones, Hesterly, Borgatti 1997: 923) If, however, transaction costs are supposed to explain network governance, which is, as Jones, Hesterly, and Borgatti (1997: 916) define, "a complicated dance of mutual adjustment and communication" establishing through frequent interactions the "conditions of relational and

structural embeddedness", (Jones, Hesterly, Borgatti 1997: 917) transaction costs themselves can hardly be explained and determined by these conditions of embeddedness. This tautology of transaction costs causing networks' emergence causing again social embeddedness determining in turn transaction costs may even draw a realistic picture of network dynamics, but a tautology cannot distinguish conditions and actors starting to organize themselves as a network or not. No tautological explanation can work as a point of distinction.
In fact, transaction cost economics explanations easily tend to account for network governance with the help of effective, often informal, but observable social institutions, while vice versa the absence of networks suggests that social institutions are such that transaction costs of markets or hierarchical organizations are lower. Basically, this explanation resembles self-fulfilling prophecies. This argument does not run counter to constructivist explanations in general. Social institutions can be effective and should be considered in governance processes, but strategic action like that of individual partners in networks can intentionally aim to change the institutionalist conditions of and overcome institutionalist limits on action. Thus, institutions themselves change in and depend on the process to be explained. Therefore, transaction cost economics approaches do not account for strategic action in networks apart from the selection of partners in networks instead of markets or hierarchies, for every strategic action beyond that take off of the network changes institutions which determine transaction costs and suggest therefore different strategies for action. Strategies for network governance must, therefore, rely on theories which consider feedback loops of self-organizing dynamics and complement them with strategies.
Nevertheless, the paradigm of transaction cost economics that costly interactions and the exchange of valuable advantages incentivize actors must be taken into account in network theory. For, the sharing of network resources as interaction pattern in networks – see section 2.3.2 – might be a point of access to govern network activities.

To conclude section 2.3, neither structuration processes nor transaction cost economics can sufficiently account for governance of strategic network activities. Nevertheless, constructivist as well as rationalist theories represent necessary foundations for network theory.

2. B Phase I: What Has to be Considered When Global Policy Networks Emerge?

Networks cannot be built like an institution which works after implementation in an ex ante defined way and follows a plan of an institutionalist architect. When global policy networks are launched the architects can only install a process-related approach which will always allow every committed partner to become herself an architect and somehow develop the network continuously. Only a process-related approach might enable the network to react and adapt adequately to ongoing changes within the network and in its complex environment. Thereby, a process-related approach allows a network to reach the next stage of organizational development and increase its capability to solve problems.

2.4 The Framework: Rationalist Games and Construed Systems

This section argues to integrate theories of opposed paradigms so that they can mutually supplement. A process-related approach can integrate opposing theories by integrating them in succession and applying them to different situations without coming into conflict with one another. In fact, the debate of the opposing theories is ongoing and far from being resolved and this section does not claim to achieve that. This section merely tests the waters how to combine conclusions from even opposing theories in the specific context of global policy networks, specific phases of development of these networks and specific problems which these networks address.

Political-economic approaches cannot be reduced to *social constructivist* approaches or vice versa, but they can both be integrated, as Jones, Hesterly, and Borgatti legitimately attempt in the outline of their theory of network governance. (Jones, Hesterly, Borgatti 1997) Both rationalist and constructivist theoretical strands are justified intheir own right and necessary for the development of a thorough understanding for management interventions in network governance. Economic transactions and social relations both lend themselves to understand certain aspects of interaction and motivations of actors. The analysis, though, will not explore the reasons why actors behave as they do, but focus on how and which effect their actions have. Neither the rationalist paradigm nor the social constructivist paradigm will be discussed in their foundations, which would detract too much attention of the rather policy-oriented question how to organize global policy networks anyway, but approaches of both paradigms will be considered.

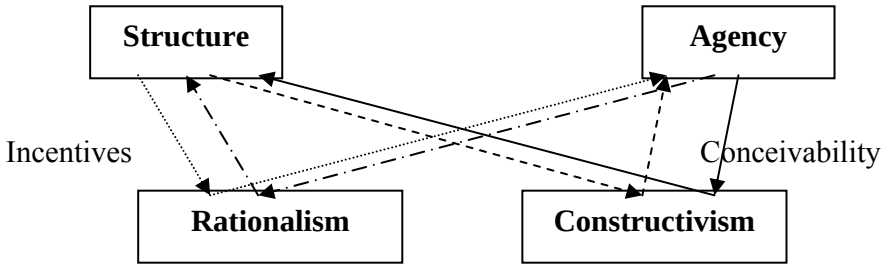
Theories of International Relations are usually divided in rationalist versus constructivist ones. (compare for instance Hasenclever, Mayer, Rittberger 1997) Neorealist approaches which suppose power as independent variable, and neoliberalist approaches which refer to interests as independent variable and consider individual utility as ultimate reason for action classify as rationalist theories. Whereas cognitivist approaches, which understand knowledge or ideas and social relations resulting in identities as independent variables, are constructivist theories.

To model behavior in game situations accomodates the modelling of rationalist actors whose interests and identities are assumed as given, like in games with an objective defined by the given rules of the game, whereas constructivist system theory understands social systems as constructed in socially specific ways and analyzes the functional structures of differentiated and construed social realities. While rationalist explanations apply action instrumentally to an external environment assuming self-interest pursuing actors, constructivist approaches model actors as governed by their individual reference system and what this system perceives as possible action. While rationalist approaches conceive of interests and identities as exogenously given, cognitivist approaches analyze how interests and identities evolve from ideas and social relations. (Wendt 1992a: 391) Wendt integrated both paradigms in a causal chain with ideas and social relations accounting for the formation of interests and identities, which determine the use of power.

It shall be argued that those apparently fundamentally opposed paradigms of rationalism and constructivism can be transformed into each other or are even identical. Incentives govern rationalist actors, who will obey these incentives to maximize their utility. The constructivist actor

simply has no choice, she has to act the way she does due to what her socially constructed, normative reference system defines as conceivable action. Thus, conceivability takes the place of incentives.
In fact, however, both paradigms describe the same reality, only with reversed causal relations: In rationalism self-interest is determined by who might gain in which situation by what action; regarding Marx' "social being determines consciousness" quote, actors do not have the freedom to choose their preferences but these preferences are determined by the reality in which they act. In constructivism thoughts – or better perception – determine reality, which rather corresponds with the Weberian position. Structure and agency are dependent and independent variable, and vice versa:

Diagram 3: Rationalist and Constructivist Patterns of Causal Relations



: Starting from the actor and which socially construed options for action are conceivable for her, *constructivism* explains why and how actors produce and reproduce which structures.

: Starting from given (or created) incentive structures, *rationalism* explains how actors accomodate with those structures and act to maximize individual utility.

Now, both paradigms can reverse the causal linkage of structure and agency without giving up their respective basic assumption of what moves the actors:

: Starting from the structures and how those form the actor, *constructivism* explains indirectly how structures form agency, i.e. the actor's action.

: Starting from the self-interested actor, *rationalism* explains why and how the actor supports and benefits from the incentive structure.

Rationalism and constructivism can explain the same relations between structure and agency along the same cause-effect relations without giving up their basic assumptions of the self-interested, incentives obeying actor or the normatively or socially formed actor. Game theoretic modelling comprises the constructivist perception of situations and options for action by implicit inclusion in the pay-off matrix. System theoretic modelling designs actors entangled in relations – or communications – considering rationalities according to different sub-systems. The opposition of rationalism and constructivism seems, therefore, to be a merely rhetorical one. Nevertheless, the two paradigms differ in their basic assumptions regarding man: homo oeconomicus faces homo sociologicus.
The rationalist concept of man, just like the constructivist one, reduces the holistic human being to a model, which is supposed to be manageable for scientific analysis. That's why Granovetter called these two concepts "undersocialized" and "oversocialized". (Granovetter 1992) The rationalist economic man draws a picture of an atomized, Hobbesian actor, exclusively oriented to her self-interest and the maximization of her individual interest. In order to align the interests of the common good with those of this actor, incentives must be set right.
Granovetter suspected this economic man to be undersocialized and rather having apart of his self-interest further motives which originate in his social environment. The constructivist concept of man models the individual and her perception and motivations as formed by her social environment. This

individual perceives what she has learnt is conceivable and acts only in categories which she imitates of other actors from her environment. Other options for action are not conceivable to her, even if these options were in her best interest, she could not choose them. This concept of man, however, Granovetter thinks, is oversocialized and overestimates the power of the social environment to form individual action. Both concepts are, therefore, too reductionist.

In fact, social systems are highly complex and dynamic. Unidirectional causal links and explanations cannot be as viable as those which rely on iterated and feedback loops. Game theory, based on rationalist assumptions, and systems theory, constructing social systems as links of functions, could be integrated both in a process-oriented approach complementarily. Wendt, too, propagates the necessity of such an integrative process-related approach to resolve Giddens' structure-agency dichotomy on the one hand, and to account for the formation of interests and identities in the causal chain that leads up to the use of power. (Wendt 1992a: 413) Giddens himself already attempts to combine the limits of action through structure and the change of structures through strategic actors in his term of structuration, (compare Meckling 2003: 22) which has been discussed in section 2.3.4 already in detail.

Neither incentive structures nor certain actors, acting as network managers, can possibly govern the network, for no actor or central institution has the necessary power or resources at hand. It is rather true that the mutual influence of incentives and actors as described through Giddens' structuration becomes effective. This structuration is, as discussed in section 2.3.4, processual in its very nature. The process level must be added as the third independent variable accounting for network governance, as sort of a Hegelian synthesis of the thesis and antithesis of structure and agency. The rationalist as well as the constructivist prescriptive inferences must be applied to the same processes to understand network governance and govern the mutual adaptation of structure and agency in networks in order to enhance effectiveness of network interaction.

Based on this argument, Thomas Risse's critique to rationalist action unfolds as follows. Rational choice approaches conceive interests as defined exogenously and fixed in the process of games. In reality, however, he argues, games are processes in which interests can change. (Risse-Kappen 1995: 176/177) Keeping the basic assumption of rational behavior, certain new information leads to certain changes of interests and action. Communicative action serves to disseminate such relevant information and is effective through persuasion. (Risse 2000: 8 and 11) Communication constructs a different world and, thereby, changes what is rationally perceived as self-interest and self-interest serving action. Rationalist and constructivist action are not identical but mutually feed into one another if considering the process dimension of action.

Prerequisite for such information-guided rational behavior is the readiness to be persuaded and the openness to new information and change. Arguing is then not about attaining one's fixed preferences or confirming one's perceptions and interests, but about what Risse calls "truth seeking". (Risse 2000: 7 and 12) However, "truth seeking" is a mode of behavior mainly relevant in the academic sector, while actors from other sectors rather obey arguments of power, financial resources, or societal conventions of equity. Indeed, Risse lists situations in which arguing is ineffective, namely if there is no "common life-world", no international institutions providing "common knowledge" or a "collective culture" to start from, and if there are power asymmetries. (Risse 2000: 14-17) Nevertheless, Risse claims, communicative action can be effective in these situations on different stages of international negotiations: first in the agenda setting, second in the distributive bargaining and the getting to a reasoned consensus, and third in the trustful communication of the actual problem-solving part. (Risse 2000: 20/21) Risse relates the effectiveness of rational communicative action to different settings of international negotiations. Communicative processes are not taking place only behind closed doors of secret diplomatic circles but are carried out in modern democracies in public spheres. According to Risse, the public sphere is more open to a variety of actors (Risse 2000: 22) and, thereby, more relations among actors have to be considered. This might be a reason why more issues of social identities, constituted by the relations among actors, are touched. (Risse 2000: 22)

Social identities in turn call for constructivist explanations for action. Communicative action must, therefore, manage knowledge and social relations to constitute and strategically form an actor's identity, defining *how* this actor executes certain functions of her role, as will be described in section 2.6.2. Following Risse's argument, this constructivist explanation for behaviour is identical with a rationalist explanation if the strategic forming of an actor's so-called identity bases on the reception of new information and a rational change of identity and interest according to the new information.

In this context, Kickert and Koppenjan distinguish "game management" from "network structuring". (Kickert, Koppenjan 1997: 46/47) While "game management" refers to the activation of certain actors or relations and to the immediate influence on interaction in the network, "network structuring" means the intentional targeted change of the network. (Kickert, Koppenjan 1997: 47-53) In both cases, the managerial resources to effect the desired changes are knowledge and social capital. Following constructivist theory, the resources can be used to change actors and their constructions of their social systems, which define what action is perceived as possible. Speaking with rationalist arguments, the resources serve to change and form the games, i.e. strategic interaction, in the network.

Hereby, knowledge and social relations must complement the structural factor of power and the actor-oriented factor of interests to be able to understand and govern the whole process of policy-making. (compare Krasner 1995: 368) Knowledge and relations can be treated in a rationalist as well as constructivist sense as resources in policy processes.

Game theory approaches identify the instruments which rational actors can use to govern strategically their environment in a self-interest maximizing way. That's why resource dependency theory accounts for which relations in networks and, thereby, which accessed resources serve which purpose of action. System theory approaches define instruments to govern the interactions and communications among individual and collective actors, which construct the complex environments, like networks, of these actors. Governance of these interactions and communications work with the targeted and fine tuned use of knowledge and social capital as managerial resources. That's why Willke, for instance, developed an action theory on "decentralized contextual governance" of self-governed systems. (compare Koob 1999) And why system theory based management theory aims at the constitutional characteristics of self-organizing systems, which must be considered by managers.

Moreover rationalist game theory attempts to find equilibria which must characterize as win-win situations to be a sustainable outcome. Whereas constructivist system theory is interested in systems fostering self-organizing processes which, if those processes result in the specialization of system functions to become more efficient and effective, represent sustainable development.

Conclusion of Phase I

There cannot be the *one* theory for network governance, rationalist as well as constructivist approaches have both their justification to explain certain aspects of network governance and should be considered both, hence. Therefore, network governance must be understood as a process. Autonomous actors, obeying different rationales and incentives or concepts and identities, contribute in different phases of network development to different network activities for sustainable development with their independent individual activities. Thus, these actors follow different prescriptive conclusions how to act. In order to organize collective action nevertheless consistently and coherently, the prescriptive conclusions of different, sometimes contradictory theories must be combined in one process-related approach. Only if this process-related governance allows complex positive feedback loops among the activities of the various network partners and allows them to follow their individual rationales or consider their concepts without generating activities, which counteract one another, produce mutually eliminating effects, or exclude one another, the process of governance is consistent and allows to consider conclusions of different theories on network governance.

Hypothesis 1 on Governance in Networks:
In order to combine great autonomy and cohesion, fluidity and stability in networks, network governance must allow for a great variety of actors, rationales and identities, and individual, independent activities. Therefore, combining very different conclusions how to act for sustainable development, *network governance strategy must harness a* ***process-related approach***.

2. C Phase II: What Has to be Considered When Global Policy Networks Start Activities?

In the second phase of network development a shortage in financing often forces partners to undertake reforms. The shortage of resources requires a very efficient management of network resources. In fact the semi-public resources of knowledge and social capital are the managerial resources for network governance. Those cannot substitute for the hard factors of regulatory power or financial assets but can enhance accessibility of needed resources and the effectiveness and efficiency of their use.

2.5 Game Theory: Models of Market Failures

This section presents the game theory perspective in international politics which focuses on the actors and their rationales, and models certain situations, respectively problems in international politics, concluding if and how these problems can be solved. The games discussed will model the problems of market failures which global policy networks are supposed to address, and therefore allow conclusions which approaches and related mechanisms might help overcoming these problems.

> In international relations "(…) explanations must take account of interactions among purposive actors, (therefore) the most useful analytic models will be of a game-theoretic nature, which (…) implies that they will combine the specification of a particular actor constellation and a particular mode of interaction with the specification of a particular institutional setting." (Scharpf 1997: 31)

Indeed, *game-theoretic approaches* are often chosen in international relations research. Game theory explores situations where actors have to make a decision which depends on decisions of other rational actors. Thus it is a theory of social interactions and not a game against nature. Therefore strategies are crucial for the process of the game, the interaction or the conflict. (Rieck 1993: 16/17)

Game-theoretic strategies base mostly on the modelling of specific situations, which can be classified into certain games. Each class of a game again allows identifying a strategy – out of a set of strategies like cooperation and defection – how to maximize a player's utility, as Oye, for instance, demonstrates. (Oye 1986) Game theory is rather supposed to explain, less to predict actors' behavior. (Snidal 1986: 55)

Oye, however, bases on the game-theoretic modelling of specific situations an analysis how to change that situation strategically. He proposes three possible ways to increase the probability for cooperation in international politics: (i) Altering the payoff structure by building regimes or changing the players' understanding of the game situation and mutual interests through changing the conditions of the game and increasing transparency. (ii) Lengthening the shadow of the future through issue-linkage, which resembles Young's integrative bargaining. (compare Young 1989: 361) (iii) Reducing the number of players which, however, inhibits externalities on third parties and might increase efficiency but decrease problem-solving effectiveness. (Oye 1986: 23) Axelrod and Keohane list these three "dimensions of situations" as the pivotal game-theoretic factors to account for cooperation. (Axelrod, Keohane 1986: 253)

These strategies address certain failures of games to generate sustainable outcomes. First, changing players' understanding and increasing transparency helps to overcome situations of imperfect information, which is nearly always the case in environmental market failures. Second, issue-linkage and integrating new issues can help to solve distributive conflicts by transforming zero-sum games into positive-sum games. Distributive conflicts are particularly a problem of social sustainability and distorted or misallocated resources. Third, reducing the number of involved players eases sanctioning of free-riding. It helps to overcome problems of external effects, but at the same time excluding players can produce new externalities, which result in

economic market failures. Thus, this third strategy might only be an appropriate solution for individual partnership action, not for global policy networks at large.[32]
These strategies for "game management", as Kickert and Koppenjan (Kickert, Koppenjan 1997: 46) call it with regards to network governance, adress failures of sustainable development and aim to overcome these failures. Game theory models certain situations of failure to produce sustainable outcomes and, thereby, implies which strategies could overcome the situation of failure. The game theoretic ambition is to develop an "upward-looking theory of strategy" and combine it with "downward-looking theory of regimes". (Axelrod, Keohane 1986: 252)
The process level, i.e. all those actions to overcome the failures modelled as games, however, are not comprised by game theory in general or game theoretic matrices in particular. It has to be stated that strategies like issue-linkage or changing players' understanding of games represent extensions of game theory or at least a change of the modelled games. Therefore, these strategies cannot be deduced from game theory but must by definition overcome the limits of game-theoretic conclusions and refer to other theoretical approaches.
Game theory describes certain situations of actors, their orientations, strategies and endowments (Scharpf 1997: 44) and which failures of self-organizing processes and stalemates of rational actors have to be surmounted to reach the socially optimal outcome. However, game-theoretic analysis has little capacity to offer for complex situations and actors, their capacities and action. It is fascinated with equilibria not in the process to reach these equilibria, (Sebenius 1992) whereas network governance needs to be more process-focused. Indeed in development policies the awareness is increasing that it is impossible to predetermine optimal outcomes but that the focus must be on the development process. (compare, for instance, FAZ 2004) Game theoretic matrices are idealtypes of actor situations. When regarding real-world situations reality is either too complex to be represented by a matrix or matrices soon turn out to be too complex still to be handled. Scharpf criticizes game theory because of its inapplicability to real-world problems, because although game theory can model multilateral situations, these models turn out to be far too complex to produce any results for understanding or designs of solutions. (Messner 1995: 216) A game theory matrix is highly abstract and hardly usable for real-world solutions, as Rieck (1993: 18) admits, but game theory can provide a *more systematic* approach to real-world problems, and particularly to rationalist management approaches for network governance.

> Game theory defines strategic action as "(…) on the basis of accurate perceptions and adequate information-processing capacity, he or she is able to respond to the risks and opportunities inherent in a given actor constellation by selecting the strategies that will maximize his or her expected total utility." (Scharpf 1997: 58)

The inspiration of game theory is that only considering the interests of other actors allows developing a strategy, which takes strategic action of other actors into account from the outset, in order to reach a sustainable outcome. A network governance strategy is supposed to support the necessary analysis for perceptions and information-processing, considering the overall utility and thus contributing to sustainable development.

The different *game matrices*, as categorized by game theory, represent different situations where the self-organizing processes fail to produce the optimal outcome and strategic action must be taken by the actors to overcome the failure. Game theory has developed several categories of games, modelling certain situations of failure of cooperation, in which the actors fail to reach a sustainable, (Kaldor-) optimal[33] outcome. Through strategic action extending the space of possible

[32] Another game-theoretic strategy discussed is reciprocity. (Axelrod, Keohane 1986) However, especially in the field of global climate politics, reciprocity between big developing countries and industrialized countries led to a stalemate. Neither the USA nor China, India, or Brazil are ready to start to reduce carbon emissions before the other started it.
[33] While the Pareto-optimum signifies a situation where no actor can be better off without leaving another actor worse off, the Kaldor-optimum allows to trade gains, so that the gains of one actor only need to be equal to or larger than the losses of the other actor in order to compensate the loser. (Scharpf 1997: 91)

action, i.e. cooperation or defection in given options for action, the actors may be able to overcome these failures.

2.5.1 Battle of the Sexes

The *Battle of the Sexes* accounts for conflicts over distribution. (Scharpf 1997: 74) Since the total utility of both Nash-outcomes[34] is the same, but only the distribution differs, this game can actually be understood as what Scharpf calls the second policy problem: the redistribution problem[35]. (Scharpf 1997: 70)

There are two Nash-equilibria, which are both Kaldor-optimal, but each of them benefits one actor more than the other. In this game the first movers will always have an advantage and be able to force the other actor to comply, since if she not cooperated, the outcome would be even worse. However, although the outcome would be a Nash-equilibrium, one actor would always aim to renegotiate the distribution. Despite of an efficient allocation the distribution is hardly sustainable. Therefore actors have to mediate their interests to agree on cooperative action – and eventually redistribute gains. Otherwise they will not necessarily end up in one of the optimal outcomes.

Game situations, which assign advantages to first movers, reflect situations where outsiders face barriers to enter fora of societal participation like the market in the case of monopolies based on sunk costs, and situations of – with regard to social sustainability – misallocated resources, allowing special interest groups to push through their demands towards unsustainable outcomes.

	Cooperation	Defection
Cooperation	1 1	4 Nash 3
Defection	3 Nash 4	2 2

Battle of the Sexes

With regards to first movers, enjoying an advantage in "Battle of the Sexes"-like game situations, it might be one option to set an incentive to consider other actors' interests, to lengthen the shadow of the future through issue-linkage, as Oye explained. (Oye 1986: 23.) Young's theory of institutional bargaining being a critique on and development of game theory provides an approach how to overcome such distributive struggles of zero-sum situations through integrative bargaining.

Moreover issue-linkage can create opportunities for new markets and thereby set incentives for first movers to give up or lower barriers and integrate outsiders, as well as network partners have a rationale to integrate these first movers if opportunities for cooperation exist. The theory of strong cognitivism suggests that identity, depending on the embeddedness of the actor, determines which opportunities she recognizes. The opportunities as well as this identity-formed perception itself depend on the actors and the relations among them in networks.

2.5.2 Assurance Game

The *Assurance Game* models a situation of lack of trust which increases transaction costs for negotiations to more than the prohibitive price of cooperation, so that actors fail to agree to total utility maximizing cooperative action. In a situation of mutual defection both actors do not switch to cooperation because if the other one did not the same, they would lose part of their realized

[34] The Nash-equilibrium is the outcome where no actor can change his behavior to be better off by unilateral action.

[35] Although prohibitive high costs of implementation can be shared by distribution among implementing partners, these partners will not – or not so much – conflict over distribution problems. For the distribution of costs allows to implement certain planned action while the benefits of public goods – as for instance the sustainability of the environment – are not competitive in consumption and can be enjoyed by all in common.

utility. That signifies the first policy problem, as defined by Scharpf: prohibitive transaction costs. (Scharpf 1997: 70)
Another explanation for suboptimal defective action in Assurance Games is a failure to provide actors with the necessary knowledge to understand the game properly, which represents a situation of imperfect information.

	Cooperation	Defection
Cooperation	4 Nash 4	3 1
Defection	1 3	2 Nash 2

Assurance

One strategy to overcome that stalemate of defection is obviously to share knowledge about the situation and point out the common interest so that even one player could unilaterally start cooperation because the other player would rationally follow. Another strategy might be to select another partner with complementary capacities to bridge the gap of knowledge or other relevant capacities. The cognitivist approach of epistemological communities highlights the relevance and influence of science and knowledge in international politics.
Partners can be selected for games intentionally. Actors can identify an appropriate partner for cooperation through an analysis of actors' capacities and expertise, or in terms of game theory their orientations and their interaction orientation. If actors follow a common strategy to analyze the other one's orientations, they might be capable to recognize the optimal outcome and adequate strategies to reach these outcomes. In the end it is a question of communication among the actors to agree to collaborate. This is particularly true in the case of global policy networks, for partnerships among network actors are voluntary in nature. The actors with whom to collaborate are not predetermined but can be selected from the pool of actors of the network. Hence not the actors are given and the game has to be played, but vice versa the actors are selected for a certain game, which is a model of a failure to produce sustainable outcomes and which can be overcome in partnership action. Actor-centred institutionalism, which has clear links to game theory, provides a theory of interaction modi to select appropriate partners to reach certain game outcomes and "solve problems". (Scharpf 1997: 125-135)

2.5.3 Prisoner's Dilemma

Basically the same problem of lack of trust as in the Assurance game exists in the *Prisoner's Dilemma*. However, here the Kaldor-optimal outcome is not the Nash equilibrium. If one actor does not trust the other one to trade gains she will switch to defection and thus leave the Kaldor-optimal outcome (3;3).
Keck (1995: 18) points out, that even if actors trust each other it would be rational for them to defect from the Kaldor-optimal outcome in order to maximize their individual utility. Thus, communication would be irrelevant. However, to reach a sustainable outcome the defecting actor (A) would have to compensate the cooperating actor (B) and offer her at least what he would gain if he defected as well, (A had to trade 1 of 4, leaving her with 3, to leave B with 2, which B could gain if she defected, too: {4-1; 1+1}) which would leave the defecting actor (A) then as good as when she cooperated. If not compensated, the cooperating actor would insist to renegotiate the outcome and defect as well to maximize her own utility. Under these circumstances of repeated games Keck rates communication as unnecessary, when the game is repeated with sufficiently

high probability (and infinitely, S.W.[36]). For, then every actor would cooperate to build up a reputation in order to make the other actor cooperate as well.

	Cooperation	Defection
Cooperation	3 3	4 1
Defection	1 4	2 Nash 2

Prisoner's Dilemma

Nevertheless, when it comes to the question of sustainability of a development process, communication does have relevance in international politics in order to select an appropriate partner for an aspired outcome or cooperative action. The Prisoner's Dilemma models a situation of international politics, in which free-riding – and the hope on the part of the defecting actor to defend their gains by defection through use of power – is a tempting option, like, for instance, in the case of climate politics. Climate politics suffer from a stalemate in which actors cannot agree on mandatory emissions reduction targets. Every actor has an incentive to free-ride, let the others save the global climate, and enjoy alone the competitive economic advantages of cheap, dirty energy. If all defect, the climate will collapse and will leave humankind in the worst case situation. Every individual player fears the economic disadvantages of taking action and protecting the climate unilaterally, thus having an incentive to defect.

Free-riding and use of power, however, do not represent strategies of sustainable global governance in the long run. In a globalizing and increasingly interconnected world the effects of non-cooperative action will affect all actors and thus harm the defecting actor as well, those harming effects are likely to grow, and "compromise the ability of future generations to meet their own needs". (compare Brundtland-Report 1987)

Basically, the Prisoner's Dilemma models the market failure of external effects or temporally external, long-term effects. The problem of one actor's action having a negative external effect represents the third policy problem in Scharpf's terms. (Scharpf 1997: 70) A reduction in numbers of involved actors – as the G8 negotiations – might enable actors to monitor and sanction free-riding, but will in the case of climate politics exclude stakeholders like other countries, economically dependent on G8 countries, or companies, vulnerable to climate change, produce new external effects, and reach only suboptimal outcomes in terms of effectiveness. Therefore, coordination through communicative action and policy and project implementation in global partnerships are promising strategies. Again the actor-centred institutionalism can help to match partners by theorizing on how strategies and endowments of partners must be compatible in order to allow sharing costs and risks of partnership action.

In section 2.9 theses on how network governance can address each of the problems modelled in this section as game situations will be developed on the basis of the theoretical approaches and mechanisms which have been identified in this section's game theory analysis how the modelled problems could be solved.

[36] If the game is not repeated infinitely, the actors have at least an incentive to defect in the last game. But if they defect in the last game they do not need to build up a reputation to cooperate in the second last game as well, and so on. So they defect right from the beginning.

2.6 Resource Dependency: Resources For Action

Following the section on game theory which highlighted the significance of actors and their rationales, this section will specify the rationales of some actor groups and classify the resources which they can bring in. For resources for action as the resource dependency approach explains depend on as well as form the relations among partners constituting a network. That's why the argument goes on to elaborate on the particularities of the network resources knowledge and social capital and outlines what has to be considered to manage these resources effectively in order to harness them for the execution of network functions.

2.6.1 Resource Dependency

A rationalist approach of interorganizational theory explains microeconomic, strategic action and resource management of rational actors in networks with the actors' resource interdependencies. Basically, Resource Dependency theory says there are resources and relations, and actors must manage their relations strategically so that they can access specific resources which they lack for specific action. (compare Aldrich 1979)

The **Resource Dependency** approach asserts that networks serve actors to receive scarce resources, which they depend on. Such dependencies represent a potential for the resource owners to rule the dependent actors. In order to decrease their dependence, actors attempt to manage strategically their relations and build up new relations to compensate dependencies. Such strategic network and relations building occurs mainly in areas of different actors' activities which intersect. (Benson 1982: 150-154; and Sydow 1992: 196; Nölke 1995: 77)

The Resource Dependency approach understands networks as the attempt to respond to the threat of resource deprivation. Interorganizational relations reflect, therefore, power-dependence relations. (Benson 1982: 143) Resource dependence accounts for power asymmetries, based on asset specificity. Though, asset specificity is a "source of productive benefits", so it might be chosen fully rationally to mutual benefit and is not necessarily the reason for exploitative power use. (Williamson 1996c)

Benson distinguishes between networks, which are composed of resource-interdependent actors, and action sets, which have formed for a particular purpose of action, (Benson 1982: 152) sort of partnerships. Resource Dependency theory aims to determine the action of networks between "semiautonomous organizations lacking hierarchical integration" (Benson 1982: 153) by accounting for how actors pursue their interests and access certain resources through complex relationships. (Benson 1982: 152) Interorganizational relations are always in process (Benson 1982: 164), and need, therefore, continuous interventions and management. Resource Dependency theory gives reason why actors enter into certain relationships and start certain activities to access the needed resources. (Benson 1982: 154) Resource Dependency, however, does not explain how actors use the accessed resources for certain purposes. Resource Dependency theory only highlights the role of resources in network governance and the necessity to manage these resources in networks in order to enable actors to pursue their interests more effectively than markets or hierarchies would allow them to. In case of complementary activities or capacities, "one agency can (..) meet its objectives effectively only if it has access to resources provided by the other agency. The dependence of the agencies grows out of the intersection of their domains (…)". (Benson 1982: 151)

Indeed, networks shape and govern resource flows, and any theory of network governance must account for these resource flows. If markets as well as organizations fail to provide these resources, policy networks must deliver them. (Kickert, Koppenjan 1997: 27) Networks help actors to identify which resources they are short of and which partner could help to access these resources. A theory of network governance must, therefore, provide **instruments to analyze and bridge resource gaps**.

2.6.2 Actors' Rationales and Resources

There are certain interdependent domains in society which serve different functions, obey different rationales, and provide different resources. They may help to categorize actors in global sustainable development into four sectors plus one. Actors from these sectors differ in their rationales for action and in the resources which they contribute. In general, however, networks help to share resources and offer, therefore, incentives for all actors to commit to networks, as several interviewees described their motivation.

The **public sector** deals with all present and future common affairs. Its task is how to set up rules and regulation for those situations which produce non-sustainable outcomes. Therefore actors from the public sector have to consider what is within and what is out of the reach of their regulatory power. They aim to increase that reach of power. The network approach in international politics accompanies the hope on the side of governmental partners that partners from other sectors contribute to financing of activities and thereby ease rigorous public budget constraints. The opportunity for donor coordination adds itself to this rationale and promises more efficient uses of available resources.

The **private sector** produces and provides the material basis of a society. Private actors follow predominantly monetary incentives. An economically sustainable development requires companies making profits; while losses forces companies to abstain from related activities or finally to leave a market. Although private actors' strategic thinking might let them consider questions of social and environmental sustainability as well. Companies committed to global policy networks on sustainable development combine the profit motivation with strategic action for social and environmental sustainability. This does not imply a contradiction in terms.

The **civil society** comprises all people down from the grassroots level up to the heads of organizations whose actions obey interests in social equity and care for long-term social sustainability. The civil society is supposed to represent the interests of the poor and the powerless, the people with the least access to any kind of power resources. Hence distributive issues are on their agenda and their societal sub-system obeys the logic of dealing with all kinds of poverty, which one interviewee from one of the network secretariats confirmed. The rationale of NGOs to partner with other sectors comes from the combination of cooperative and conflictive strategies, as one interviewee from the civil society explained. Mainly the cooperative strategies of NGOs work through informing partners.

The **academic community** in modern societies has the role to provide the society with knowledge in order to research and develop new opportunities for societal development.[37] In the long-term, academic professionals will only be able to execute that function and receive the necessary means if they achieve to approach the truth, keeping their independence from any lobbying. Thus, academics have to follow in the first place methods to approach truth to build up their own reputation, neither power nor wealth, although the affinity to those resources is instrumental for them. As one academic interviewee phrased it, self-interest is always a human factor but academics are on a "quest for knowledge".

Finally, the influences from the international domain on all four domains and vice versa from actors of all four sectors on the international domain are of considerable significance, particularly in environmental issues which are by nature cross-border issues. Thus, **Intergovernmental Organizations** represent a fifth category of actors. They attempt to establish frameworks internationally which oblige actors from the other sectors to comply. However, since there is no such authority to enforce that compliance transnationally intergovernmental organizations aim to increase their reach of power permanently with regards to global issues. Although quite costly, global policy networks offer opportunities to meet face-to-face with other high-ranking representatives from other organizations, as one interviewee from an IGO remarked. Although

[37] Besides, the academic community may contribute to some intrinsic values of human beings, which, however, will be of no relevance in the context of sustainable energy for development.

these personal relations are more important in the initial stages of a network, while later on standardized mechanisms become functional for transparency and credibility, as another interviewee from one of the network secretariats explained. IGOs use networks to develop new ideas, contribute to debate, push implementation, benchmark with others, connect to other agencies, and promote own ideas.

In fact, the categorization of actors into five sectors is quite acknowledged in social and political science, at least the public, private, and civil sectors are differentiated most of the times. In the context of global environmental governance the international and academic sector are added due to the fact that the issue of international environmental problems depends strongly on international actors as well as scientific knowledge respectively academic actors. Kanie and Haas (2004), for instance, differentiate NGOs, Business, Multilevel Governance, Multilateral Institutions, and Science Policy.

These different actors with the respective incentives or system logics are all necessary to be considered in order to resolve certain issues. There are no policy issues that can be optimally dealt with by only one sector.

For, the different sectors contribute **different kinds of resources**, which can – due to interdependencies among actors – complement each other. (Klijn 1997: 31) The public sector brings in regulatory power, the private sector has the financial muscle, the academic community contributes truth as in the sense of thorough and good reasoning, increasing sustainability, and the civil society provides legitimacy, having relations to or even representing the local people, the poor, the excluded, or the somehow disadvantaged.

> "Implementation (of global environmental policy targets, S.W.) has to be achieved by and in cooperation with actors from all sectors (…)." (Müller-Kränner 2003: 55)

Actually, global policy networks do not need to legitimatize their activities because they do not exert power over anybody. All partners cooperate voluntarily. Their activities need only to be legal and thereby respecting the freedom of every stakeholder. However, if global policy network activities are supposed to be socially sustainable – what they are meant to be – this entails legitimacy. Therefore **NGOs** can contribute valuable knowledge and relations to support the underrepresented groups. And legitimacy, the resource which NGOs contribute, as one interviewee from the civil society phrased it, is functional also in another way at the operational level. Transparency and subsidiarity help to increase participation, which all feed into legitimacy and effectiveness by opening the network for actors of global governance at the same time. (Witte, Reinicke, Benner 2002: 20)

When addressing the **public sector** most actors aim at the regulatory power of public actors. Even if other actors might be powerful in some sense of the term, no actor apart from public ones can legislate and thereby force other actors to consider and contribute to sustainable development. Nevertheless, public actors, respectively governments, contribute most funding to partnership activities, in fact, (Hale, Mauzerall 2004: 235/236) even if these activities vice versa often aim to change legislation. That may be due to the dilemma of public actors when it comes to issues of international collective action: there is no legislative authority on the international level. In order to reach an international agreement and establish an institutionalized regime, even the most powerful actors have to act strategically and consider the action and interests of other actors. No one can rule the others, thus, every actor attempts to organize collective action, for instance by committing to global policy networks and partnership action. Although governmental representatives act in **intergovernmental organizations**, they themselves have neither regulatory power nor immediate access to regulatory power. Intergovernmental organizations comprise characteristics of and collaborate with all sectors, thus they can bring in all kinds of resources in parts but do not have any resource particularly assigned to them.

Private actors follow financial incentive structures. Thus, financial resources would be what they could contribute, it seems. In fact, however, only less than 1% of funding of Type-II partnership activities comes from the private sector. (Hale, Mauzerall 2004: 235/236) Private actors rather

prefer to contribute in-kind resources like personnel, time, skills, technology, i.e. machines from their core business or respective production line. These in-kind contributions could be bought on world market and would have to be financed if private actors not brought in these resources. Therefore, the contributions of the private sector can be calculated like financial resources. Whilst **academic institutions** or **NGOs**, whose services can be paid for, too, follow different rationales of action and contribute different resources like 'truth', or issue-specific knowledgeable opinions, and 'legitimacy', or relations and representation of marginalized groups. These latter resources can actually not be bought.

Following a system theory argument and terminology, the different sectors are subsystems of international society. As these subsystems utilize different resources in their action, they differ from one another in their respective **logic of action**, which dichotomize in system theory in opposing categories:

The civil society is concerned with categories of rich/poor, or dominant/marginalized and how to reconcile that opposition by promoting social safety and social sustainability.

The academic sector applies true/false as measures for successful action. In the long-term the reputation of each academic professional depends on if her theories pass or fail tests, thus approaching the 'truth' or not. For, only if theories successfully apply to real world problems and thereby generate utility, someone will be willing to pay for future research of this academic. Thus, to raise one's reputation is in the very interest of academics.[38]

Private actors' success and survival depends on if their activities are economically viable or not. Profitable/not profitable decides if a private actor can carry out a strategic action or has to abstain from this activity.

The basic question for actors from the public sector is if the aim of an activity is inside or outside the actor's reach of power, if the actor holds the power to do something or not. Public actors have to act and negotiate strategically to gain the necessary power to implement their plans.

Intergovernmental organizations consider like public actors their reach of power: if they are capable to carry out a work program or not, and what they have to do to develop this capability. However, due to their nature, intergovernmental organizations aim at transnational issues.

Networks build collaborative relations among those actors and their subsystems, so that different logics of action are confronted with one another. However, there is no new logic of action emerging, but the different logics of action are connected in a collaborative manner. Network governance has to deal with the question: "How can the different strategies of the various actors be linked together?" (Klijn, Teisman 1997: 110) There might develop a common strategy among the network partners. "Networks can handle this diversity of actors precisely because of the productive tensions on which they rest." (Reinicke, Deng 2000: xxi) No new subsystem emerges but a hybrid organizational form, which can enhance effectiveness and efficiency compared to the individual subsystems.

Benson conceives resources, governing actors' relations, as "chiefly money and authority" (Benson 1982: 148), but, in fact, autonomous actors do not easily give up and transfer their resources if these resources have the character of private goods. Networks rather serve to *share* resources like **knowledge and social capital**, which have the nature of semi-public goods and are not rivalrous in consumption, so that no agency has to give up what it contributes.

[38] Paradoxically, in the academic realm an academic's reputation helps at the same time to define true and false at least in the short-term, thus reputation of an academic and of scientific theories tend to be a self-fulfilling prophecy, but will only stand in the long-term if it matches 'truth'. That's why reputation as well as knowledge itself is always dynamic and in process, always preliminary.

2.6.3 Social Capital As a Resource

2.6.3.1 Definitions

There are different kinds or necessary resources for action. Actors only rarely happen to hold all needed resources for action themselves. Hence, they must collaborate with other actors holding the missing resources.

> "Social capital is at once the structure of contacts in a network and resources they each hold. The first term describes how you reach. The second describes who you reach." (Burt 1992: 61)

Social capital describes a resource for action which allows accessing needed specific resources.

> "Like other forms of capital, social capital is productive, making possible the achievement of certain ends that would not be attainable in its absence (...)" (Putnam 1993: 167, cf. Coleman 1990: 302)

However, in contrast with conventional forms of capital social capital is increasing through use, and depleting if not used. Thus social capital and its effects work self-fulfilling. (Putnam 1993: 169/170)

> "The more extensively persons call on one another for aid, the greater will be the quantity of social capital generated (...) social relationships die out if not maintained; expectations and obligations wither over time; and norms depend on regular communication." (Putnam 1993: 242, cf. Coleman 1990: 321)

Social capital is a public good; it tends to be undervalued, and thus undersupplied and underinvested in. It must be produced as a by-product. (Putnam 1993: 170)

Trust is a form of social capital, as, for instance, in small close-knit communities it has the form of familiarity, in larger more complex networks social capital is more impersonal, indirect. (Putnam 1993: 171) That more impersonal, indirect form is what Granovetter meant with his notion of weak ties bridging relational gaps, so-called ‘structural holes’. (Burt 1992) Strong ties are social relations which can be bypassed through other relations in relatively dense relational networks, while weak ties are the only existing contacts between two individuals or groups. Hence, “*no strong tie is a bridge*”, and “all bridges are weak ties”. (Granovetter 1973: 1364. Italics in original) Strong ties connect similar actors, holding similar information, or more generally similar resource endowments, and represent contacts which require rather large investments in terms of time, emotional intensity, and reciprocity of services. (Granovetter 1973: 1361/1362) Therefore, weak ties are particularly valuable to access needed resources. Thus, the "trust in the trust of others" allows acquiring external information, (Putnam 1993: 168) which enhances effectiveness of networks.

Networks are providing a form of social capital, which enforces compliance by risking otherwise all other and all future transactions in the network, and establish norms of reciprocity. (Putnam 1993: 173) Social capital works thus as a collateral, while reciprocal mechanisms often have the purpose to build social capital. (Putnam 1993: 169) Networks facilitate communication and flow of information. They allow transmitting relation-dependent capital as reputation and diminish uncertainties. "Other things being equal, the greater the communication (...) among participants, the greater their mutual trust and the easier they will find it to cooperate." (Putnam 1993: 174) Networks "embody past success at collaboration", (Putnam 1993: 174) build trust, and are vice versa built on that trust, thus enabling actors to cooperate.

> “Social capital refers to those resources inherent in social relations, which facilitate collective action. Social capital resources include trust, norms and networks or association representing any group, which gathers consistently for a common purpose.” (DFID 2002: 9)

Although I prefer to look at social capital as a resource provided and managed by networks instead of perceiving networks themselves as forms of social capital, this definition describes what social capital can be used for. Networks might be understood as social capital themselves, though they are as well an instrument to manage social capital.

> "Energy contributes towards social capital, by powering transport and communications so that poor people can maintain contact with their extended family and friendship groups. Energy is also used to prepare meals used to celebrate special events, which is important for maintaining social capital. Poor households draw on their social capital in order to cope better at times of shock or stress." (DFID 2002: 9)

Agranoff and McGuire, (1999: 5) referring to Fountain, (1998) apply the concept of social capital to *interorganizational relations*.

> "Fountain (1998: 104) refers to social capital as the 'stock' that is created when a group of organizations develops the ability to work together for mutual productive gain." (Agranoff, McGuire 1999: 5) Fountain's (1998: 105) definition of social capital reads: "Like physical or human capital – tools that enhance individual productivity – 'social capital' refers to features of social organization, such as networks, norms, and trust, that facilitate coordination and cooperation for mutual benefit. The notion of social capital extends our understanding of 'cooperation' or 'collaboration' in two significant ways. First, linking cooperation to the economic concept 'capital' signals the investment or growth potential of a group's ability to work jointly. Second, the concept identifies the structure created from collaborative effort as capital."

2.6.3.2 Social Capital to Lower Transaction Costs

In order to lower transaction costs for the creation of cooperations, actors can operate in networks based on a common strategy. The essential factor for **lowering transaction costs** is **trust** contained in social relations of networks and an eminent part of social capital. (compare, for instance, Loose, Sydow 1994) Trust can help people to cooperate without any sort of insurance, which they would demand in a situation without trust before cooperating with a compatible but alien partner. In fact Francis Fukuyama has been argueing that the lack of trust is the main reason for the failure of transactions in developing countries. (Fukuyama 1995) However, trust is to a high degree the *outcome* of successful cooperation and transactions, thus the argument turns tautological and trust is just an epiphenomenon. Nevertheless, trust can have distorting effects if trusted partners from a different societal context which is irrelevant for the actual transaction are selected as it is the case in corruption or nepotism: if, for instance, family members are chosen as suppliers instead of the supplier cheapest and best in quality.

The social capital contained in networks, however, can arrange cooperations without distorting effects if the social capital is managed functionally within the specific network context. For instance, if a cooperation of two SMEs from a developing and an industrialized country can be arranged. The network can thus help actors, who lack international relations, (compare EREC 2004) to establish relations and make use of the social capital of the different actors in the network. Now trust can work as a catalyst.

From a point of view of the **economics of transaction costs**[39] knowledge and social capital merely decrease transaction costs. However, from a constructivist or 'social embeddedness' point of view, the allocation and pro-active management of knowledge and social capital contributes to the overcoming of far more market failures. (Sydow 1992: 141, 154, in case of monopolies 158) Thus, partners do not only cooperate in networks to decrease their transaction costs but also in order to gain various benefits from the semi-public cognitive and social resources, which the market – or more generally self-organizing dynamics – fail to generate.

[39] The economics of transaction costs assume that cooperation imposes additional costs depending on the partner of the respective transaction. (Sydow 1992: 130/131) These costs depend on knowledge about and trust among the partners.

2.6.4 Knowledge As a Resource

2.6.4.1 Definitions

According to Annan's definition of partnerships, they are developing knowledge networks. (Annan 2006: 1) Denning adds to that: "(M)oney is merely a commodity. The real driver is knowledge." (Denning 2006) Indeed, knowledge is sort of the currency of global policy networks and enables actors to take strategic action for sustainable development.

> "The provision of global public goods – such as climate stability and communicable disease control – involves establishing balanced access to relevant knowledge. (…) effective and efficient knowledge management is crucial input to the provision of global public goods." (Kaul, Conceicao, Le Goulven, Mendoza 2003: 45)

The World Bank as a leader in the field of development policies was among the first to establish a new paradigm in the development community and focus on knowledge as a "major driver of development". (Wolfensohn 1996) The World Bank started in July 1996 with the 'Strategic Compact' announced by James Wolfensohn to improve effectiveness and efficiency by extensive knowledge management. The goal was to become the 'Knowledge Bank', the first and most important knowledge broker in the development community. The Bank's knowledge management uses the instruments of knowledge bases, help desks, communities of practice, called "Thematic Groups", has established a matrix organization with thematic networks, and a central knowledge management unit. (Fuhr, Gabriel 2004) Knowledge management of the World Bank has since its inception a central unit. Originally this was the information technology group, but with the rise of importance of the thematic groups knowledge management turned to focus on connecting people. For, as most knowledge is tacit, it cannot be stored, made accessible and shared through a technological system. Technology tools must always be combined with human practices. Now the central knowledge management unit is with the vice-presidency Operation Core Services, while the whole organization of knowledge management at the World Bank develops the pattern of a knowledge organization: a governance body formulates the overall knowledge management policies, the central unit coordinates and facilitates knowledge management, operational managers implement the knowledge management policies in the networks, thematic groups and help desks are responsible for the operative knowledge sharing, and the World Bank provides a budget for the expenses for technology and the different knowledge management units. (Pommier 2004)

This knowledge management was supposed to service internal knowledge demands originally and developed increasingly an external orientation. (King, McGrath 2003: 17) For "without the benefit of a shared practice, people will constantly reinvent the wheel, deliver sub-optimal solutions to their clients, and miss potential efficiency gains." (Pommier 2004)

As "(k)nowledge is the most public of all goods." (Kaul, Conceicao, Le Goulven, Mendoza 2003: 45) and thereby a public resource for action on sustainable development, it can be shared externally without facing the loss of valuable resources. Since knowledge, however, can be sort of monopolized by knowledge holders like good contacts can be, I prefer to call it – like social capital – a semi-public resource. Although the marginal costs of an additional user of existing knowledge may be close to zero, the "distribution" of knowledge can entail high costs; learning of new knowledge takes time. Transparent networks can be efficient instruments to distribute knowledge, but many actors protect their knowledge anxiously to keep competitive advantages. (Maier 2004: 69) The monopolizing strategy for knowledge (compare Denning's (2007) thoughts on democratization of knowledge) as well as for good contacts, however, is not sustainable in the long-term due to the following characteristics of knowledge and social capital. Knowledge resources, just like social capital, are not devalued by using it as normal – private – resources are. To share these resources and use them in common allows other users to bring in their knowledge and contacts and might foster synergies. That's why knowledge and social capital even increase in value through using it, while it might devalue if not used because knowledge loses topicality and contacts might vanish. These resources can neither be stored unless knowledge can be made explicit and contacts can be institutionalized.

Consequently, Probst, Raub, and Romhardt deny that actors could buy the organizational knowledge base for action, but it takes time to develop, and offers a competitive advantage for early movers. (Probst, Raub, Romhardt 1999: 44/45) Thus, they recommend installing "hybrid systems" to connect knowledge distributing instruments to the human knowledge holders (Probst, Raub, Romhardt 1999: 256) and put the increasing-in-value-through-use characteristic in the following equation: (Probst, Raub, Romhardt 1999: 245)

$$Knowledge = (People + Information)^{sharing}$$

In a game theory context, there is even another reason for rationalist actors to share knowledge.

> "People are willing to share knowledge because they may be in the position to be a recipient of knowledge at a later point in time. In addition to access knowledge, by participating, people gain access to contacts. This helps build a network of trusted individuals." (Carayannis, Laporte 2002: 23)

The definition and distinction of knowledge comprises a vast debate. (see, for instance, Schreyögg, Geiger 2002) The focus of this thesis, however, requires highlighting the functional aspect of knowledge as skills and expertise to solve problems, which corresponds with Francis Bacon's definition of knowledge as "capacity to act". (compare Franken 2002: 4; or Sveiby 1997: 37) These skills and expertise are people-bound, but base on external information and data, which must be distinguished from knowledge. (Probst, Raub, Romhardt 1999: 46)

> "Information is defined as data arranged in meaningful patterns, while knowledge is an idea or fact that is believed and is reliable." (Denning 1998, cited after: Carayannis, Laporte 2002: 15)

This definition says that **data** are unorganized bits of information while **information** organizes these data in meaningful patterns. Knowledge, however, is more: **Knowledge** is what humans make out of information. Therefore it is a resource to be managed as well as an instrument to manage. It is dynamic and never certain but it is a more or less reliable basis for action. (Willke 1998: 4) Knowledge depends not so much on information, organized as lighthouses, but on the networking or the mapping of this information.

In a system theory context, which is the underlying basis for many knowledge management approaches, (Maier 2004: 27) Willke understands data as observations organized by cognitive maps. (Willke 1998: 7) System theory conceives information not as intersubjectively given, but only as system specifically defined and always as data interpreted in a system specifically relevant context with relevance always depending on the system, respectively. (Willke 1998: 8/9) Consequently, Willke defines knowledge as information embedded in experiences which are relevant for action. Knowledge then turns into a resource for action. (Willke 1998: 4/5 and 11) Therefore, systemic **knowledge management** implies to consider the contextual interconnections of knowledge as resource and other factors in action like societal, organizational, technological, and individual ones. (Willke 1998: 6) Knowledge management in global policy networks must consider those contextually relevant interconnections, too, for the mere provision of knowledge on an issue as carried out by academic institutions and publications will not address the necessities of various actors in these networks. Although knowledge can be stored in organizational structures, knowledge management always depends on people. (Willke 1995: 298)

New knowledge[40] and information can, according to Gregory Bateson, only be generated through comparison and the observation of differences. (Willke 1995: 239) That process is a mental one, thus, only innovating individuals can generate new knowledge. (Willke 1995: 298) That's why knowledge about potential partners and stakeholders is increasingly important. (Willke 1995: 322) Only with the help of these partners, innovations to overcome certain problems can be made effective for sustainable development. Therefore network management implies the connection of management of knowledge with the management of social capital contained in relations.
Learning means in terms of the system theory the reinterpretation of communicated information according to the relevance of the respective system. At a systemic level, therefore, learning in the strict sense of the term is not possible, however, individuals can learn thanks to their empathic abilities to recognize the relevance of information in another system sending the communicated information. Organizational learning refers to the change of practices in organizations. These practices base on knowledge, defined as information embedded in experiences. That process enables organizations to institutionalize certain knowledge and to apply it, even without anyone being aware or having access to that explicit knowledge[41]. Therefore, organizational learning represents a self-organizing, not planned, not externally controlled dynamic. (Willke 1998: 16/17) However, even though global policy networks may institutionalize certain practices at least informally, the strength of their effectiveness is their flexibility. Thus, the partners in networks may learn, organizational learning, which is a form of routinization, can hinder them to increase their effectiveness.
Nevertheless, networks seem to be appropriate settings for the generation of new knowledge either through learning or through invention. Nonaka and Takeuchi have developed a widely acknowledged approach to describe and explain the generation of new knowledge: the spiral process theory. (Nonaka, Takeuchi 1995) They assume that organization cannot create knowledge but only through the exchange and combination of tacit knowledge new knowledge emerges. The socialization of knowledge needs a space for interaction where knowledge holders exchange their tacit knowledge. The externalization of knowledge occurs through dialogue transforming tacit to explicit knowledge. The combination of explicit knowledge refers to the usual scientific networking process of various knowledge fields for inventions. And finally, the internalization of explicit knowledge lets individuals transform explicit to tacit knowledge through learning by doing, which then feeds back into the socialization of knowledge. (Rehäuser, Krcmar 1996: 35) The described spiral process does not always and necessarily works like this. It is rather an idealtype form of a transition of implicit to explicit knowledge and vice versa, although Schreyögg criticizes the spiral process at all as impossible by definition because of the differentiation of implicit and explicit knowledge by definition. (Schreyögg, Geiger 2002: 15) This process can hardly be controlled in a top-down manner but must be fostered by opportunities to interact, hold dialogues, network with partners, and to act in common and learn. Networks do provide these opportunities through decentralized activities all feeding in the creation of opportunities to exchange, distribute, access, and apply knowledge.

[40] Monitoring and evaluation is a widely discussed topic when it comes to questions of network effectiveness, action for sustainable development, and compliance with international environmental policies. In general, monitoring and evaluation contribute to the generation and analysis of new knowledge. Knowledge generation and knowledge distribution can describe the same processes, if, for instance, people exchange knowledge and, thereby, learn, they generate new knowledge for themselves and distribute it amongst them at the same time. Global policy networks foster both processes, and, thereby, support action on sustainable development. This thesis, however, will focus on the distribution of knowledge, not the generation. Therefore, the whole monitoring debate will be disregarded.

[41] Michael Polanyi differentiates explicit and tacit knowledge, referring to knowledge which is accessible to anyone capable and to knowledge which is embedded in one certain social context and only accessible from within that context. The more complex a context is the more tacit knowledge to allow a holistic understanding is necessary to understand. (Polanyi 1985)

2.6.4.2 Knowledge Management

The dilemma of managing the resources of knowledge and social capital, being due to their very nature dependent on people, is to establish an organizational management whose failure or success does not depend on the mistakes or cleverness of individuals' action. Therefore something like the framework of markets is needed, which sets incentives for individual action to consider the impact of one's action on the common good, thereby governing individual action in a decentralized manner. A common strategy which considers the action of partners and maximizes the utility of an individual could represent such a decentralized organizational management. Thereby the crucial managerial resources of knowledge and social capital will be managed individually but the individuals will know how to manage these resources effectively for sustainable development and the whole network would not be at the mercy of the mistakes or cleverness of individuals.

The World Bank gives a definition of "(…) knowledge management as the process for knowledge sharing." (Carayannis, Laporte 2002: 15) Basically, various definitions share the understanding of knowledge management as strategic use of knowledge to enhance an organization's performance based on people, organizational design, and technology. (Maier 2004: 49-55) Knowledge management serves the transfer of knowledge by connecting experts to hand on tacit knowledge, by pro-actively building networks to increase efficiency, and by sharing knowledge. (Maier 2004: 67/68) Knowledge management refers to the individual use of knowledge for action, the process dimension, while organizational learning means the institutionalization of new knowledge, the structure dimension. While knowledge management addresses the broader conditions and strategies how to harness knowledge as a resource for various network functions, the network function of knowledge sharing distributes knowledge for specific action to overcome situations of incomplete information.

Stephen Denning, Program Director for Knowledge Management in the World Bank and co-author of the World Bank's 1999 "World Development Report: Knowledge for Development", (World Bank 1999) understands *connecting* knowledge holders and *collecting* knowledge as the two central aspects of knowledge management.

> For, "knowledge is sticky", it sticks to the knowledge holders, "(…) knowledge is embodied in people, and in the relationships (…)" (Denning 2006)

Therefore, knowledge networks must manage not only the collection of relevant knowledge for action but also the connection of knowledge holders to knowledge users in order to enable the users to identify relevant knowledge, and access and harness it.

> "Communities and networks are essential to enable knowledge to pass from one person to another." (Denning 2006)

Global policy networks can provide "the network of trusted individuals" to access knowledge (Carayannis, Laporte 2002: 23) and the understanding of complex situations to distribute "usable knowledge", i.e. relevant scientific knowledge. (Haas 2004: 116) That's why the two semi-public resources of social capital, i.e. good contacts, and knowledge must be considered as crucial for the effectiveness of action of and be managed in and by networks.

Knowledge, defined as capacity to act, does not necessarily refer exclusively to scientific knowledge which is knowledge selected with the help of scientific methods. These scientific processes often are not practicable methods but are slow and sluggish and special interests easily achieve to hinder the process of consensus building. Hence, Schreyögg's argument (Schreyögg, Geiger 2002: 21/22) that knowledge management must be selective and that the selection process should, in fact, be oriented to the scientific method of examination procedures of asserted reasons does not apply to the knowledge needs for partnership action. In order to organize effective knowledge management, not so much expertise, but "'tactical and strategic' know-how, knowledge about the actors involved and their idiosyncrasies, and the shared perceptions and the game rules which affect the behaviour of actors within the network" is necessary. "The ability to correctly assess who should be involved in interaction processes and which information should be

given to them" is crucial for network management. (Kickert, Koppenjan 1997: 58) Organizational knowledge must lay out the future way for development, only then expert knowledge becomes valuable, what Stiglitz phrased as following:

> "Much of the knowledge that is required for successful development is not patentable." (Stiglitz 2003: 318)

2.6.4.3 How to Avoid Information Overload: Knowledge Management Strategy

Knowledge management entails the paradoxon that "the more we know the more we know what we do not know" and that, therefore, "the more an organization knows the more knowledge it demands". (Maier 2004: 70) This paradoxon feeds into the danger of an "information overload" and an inefficient 'oversupply' of knowledge. (Maier 2004: 70) Thus, knowledge management must have a strategy what knowledge and how to share knowledge efficiently.

The example of the World Bank showed that the making of systematic knowledge management strategies was taking some time. Larry Prusak, Director of the IBM Institute for Knowledge Management, recommended the World Bank to restate its knowledge management strategy, for instance. (Prusak 1999) Today the Bank's knowledge management strategy has been mainstreamed with the overall World Bank strategy. (World Bank 2007) Most of the Type II partnerships, which will be explored in part III of this thesis, have developed their strategies as part of their overal business strategies, too.

A knowledge management strategy is supposed to close gaps to execute strategic action. (Maier 2004: 98/99)

> The „(…) goal of a knowledge management strategy is to support the development and application of organizational competencies. A knowledge management strategy can be seen as the general, abstract, high-level approach to align an organization's knowledge resources and knowledge-related capabilities to the knowledge requirements of its business strategy." (Maier 2004: 102)

The knowledge management strategy feeds in and is part of the common, eventually emerging network governance strategy.

Knowledge itself is self-organizing and, therefore, certain conditions of the system foster knowledge management: the autonomy of knowledge holders; variety of knowledge to allow fast and free access; redundancy makes tacit knowledge of knowledge holders accessible if more knowledge than immediately needed is accessible, though this condition might entail the problem of information overload; instability to create critical faculty and thereby dynamics and new knowledge; and the intentionality of actors to look for specific knowledge. (Rehäuser, Krcmar 1996: 25) All these conditions describe the structure of and activities in networks, thus, networks promise to be an adequate knowledge management environment. An efficient knowledge management strategy, therefore, combines self-organizing dynamics in knowledge networks with effective strategic knowledge management.

In many organizations so-called Communities of Practice have emerged to connect knowledge holders and implement effective knowledge management. (Wenger, McDermott, Snyder 2002: 9) Communities of Practice can be distributed geographically and share knowledge without meeting personally, they can be informal, built spontaneously, heterogenous, and unstable, (Wenger, McDermott, Snyder 2002: 25-27) but they do need some sort of instruments or central coordinating unit to connect relevant knowledge holders to solve problems. (Wenger, McDermott, Snyder 2002: 127) These instruments and unit should be developed on the grounds of a knowledge management strategy.

Strategic knowledge management activities comprise to create networks and communities of practice, establish virtual workspaces to connect people and exchange tacit knowledge, map sources of expertise and knowledge holders, adapt channels of communication, distribute knowledge pro-actively, promote self-organizing knowledge management, raise awareness, and assign accountability for knowledge management tasks. (Maier 2004: 120/121) Basically, all

these activities are more or less network management activities and foster self-organizing dynamics, though particularly in the first phase of a network leadership and management interventions are necessary.

In fact, most success factors of knowledge management strategies, which Maier lists, foster self-organizing dynamics: the strategy must be holistic, consider interdependence, cultivate communication and openness, incentives must accompany knowledge management activities, knowledge management structures must be flexible and dynamic, redunddant channels for knowledge transfers must support learning, participation of stakeholders fosters the emergence of knowledge management strategies. Though, he distinguishes and suggests combining a centralized approach with a competence center and a central knowledge base with a decentralized approach with emerging knowledge networks. (Maier 2004: 126/127 and 131)

Concluding, a knowledge management strategy should be process-related to reflect the dynamic of ongoingly changing and developing knowledge, foster self-organizing dynamics, combine the collection of knowledge with the connection of people, and benefits from the sharing instead of monopolizing of knowledge. Indeed, those were the very principles of knowledge management identified in an interview discussion of six high-level managers from six oil companies. (Oilfield Review 2001) And the knowledge management strategy must fit in the overall network governance strategy.

Conclusion of Phase II

When global policy networks become operational and start immediate action, rational actors always need to consider the costs and benefits of their commitment. Beneficial effects of sustainable development might sometimes come in the short-term, usually in the long-term, but costs of needed resources for action are charged nearly always immediately. However, actors in international politics are usually reluctant to commit to costly action for sustainable development, for most goods or benefits produced are not appropriable but are public goods. That's why an international regime harnessing power and distributing financial resources in order to establish global governance on collective action for sustainable development is although necessary unlikely to be agreed to by the actors in international politics.

Actors join global policy networks and cooperate with network partners only if they can realize advantages. Such advantages can be created by networks not only through the use of private resources like investments in collective action, for, the distribution of private resources results in a zero-sum game: what one actor gains, loses another one. Only investment opportunities creating new gains to distribute might form an incentive to commit to global policy networks on sustainable development and engage in collective action. The question is how networks can foster such opportunities, or what they have to offer in support of such opportunities to invest in sustainable development and which actors in international politics would not have without global policy networks. An important incentive to develop relations to partners in networks is the access to complementary resources. (Sydow 1992: 299) The access to private resources, respectively to the holders of private resources, can be organized by networks efficiently through knowledge about opportunities and through social relations, both contained in networks. Such semi-public resources for action are what networks can offer as incentives for network partners to commit to activities for sustainable development.

Hypothesis 2 on Governance in Networks:

Rational actors in international politics consider usually political power and financial assets, respectively costly assets like time and man-power, as resources for action. These badly needed resources for sustainable development, however, are unlikely to be redistributed by an international regime and only scarcely committed to collective action. Not a substitute for, but a complement and an access to the hard resources of power and financing could be the soft resources of knowledge and social capital. *A network governance strategy should help to organize the semi-public resources of* ***knowledge*** *and* ***social capital*** *in networks efficiently and effectively for collective action.*

2. D Phase III: What Has to be Considered When Global Policy Networks Produce Long-term Outputs?

In the third phase of network development, global policy networks produce long-term outputs. These outputs are determined by governance in networks and governance through networks. Governance in networks requires a process-related approach to governance, the management of certain resources for action to be able to govern partnership activities in the network, and it requires in the long-term efficiency of governance. Efficiency of governance of complex systems depends on self-organizing dynamics, as was assumed. The system theory provides a holistic approach which accounts for governance from within in systems which cannot be controlled externally. Systemic organizational theory adds to that and identifies principles how systems can self-organize. These principles will serve the analysis to compare if networks which obey these principles indeed reach higher efficiency and thus compare how global policy networks can increase their network governance efficiency.

The deduced hypotheses on governance in networks claim to describe how network governance should be executed most effectively and efficiently, while theses on governance through networks tell how to address certain issues in international politics and how networks become effective in terms of problem solving. At the end of part two of this thesis, such theses are finally deduced from appropriate theories on international relations which each addresses an issue at stake in global policy networks.

2.7 System Theory: Governance From Within

After having considered conclusions on network governance from rationalist game theory and game theory based approaches in the last two sections, conctructivist system theory and system theory based approaches will add to that in the two sections to come. System theory has designed a holistic approach to governance and argues that actors are not capable to govern a system. Thus, governance must come from the system level and be self-organizing. Actors can only influence governance contextually with the help of their expertise which system theory considers the decisive managerial resource.

While game theory models problems of collective action or governance in a way that concludes how regimes might solve the problem or how collective strategies could help actors to manage the problem, Luhmann's **system theory's** conclusion on the question of governance is that no sub-system could manage other sub-systems at all. That means that neither networks can govern organizations nor can organizations govern their networks immediately. (Sydow, Windeler 2000: 7) Actors are neither effective nor relevant in system theory. Systems can only govern themselves by self-organizing dynamics.

One reason for the inability to govern foreign systems is their complexity. Such systems which are non-linear and dynamic in scientific terms with regards to their lines of action and cause-effect-relationships can be modelled as turbulent fields.

> "Within this context the traditional techniques of rational planning and control may be of little use, since turbulent fields cannot be controlled through modes of unilateral action." (Morgan 1982: 528)

It is not only the lack of information or the limited capacity to process vast amounts of information but the very nature of complex systems. In the 19th century, Simon Pierre de Laplace contributed to the debate in physics about the determinism of systems the concept of the so called 'Laplacean Demon'. This Demon had infiinite capacity to calculate and perfect information about the momentum of all particles in the whole universe at any point of time. Laplace assumed that the demon would be able to predict the development of any system with deliberate precision. Only modern research on complex systems, which contributes to the academic debate on network governance, (Sydow, Windeler 2000: 8) recognized that highly complex systems do not develop by coincidence but neither completely determined. The behavior of complex systems cannot be reduced to the behavior of their parts but new patterns of behavior emerge, which – by their very

nature – cannot be predicted with deliberate precision. Therefore, these complex systems cannot be governed by foreign systems, but develop in self-organizing ways. That's why Helmut Willke introduced the concept of 'contextual governance'[42] (Willke 1995) to account for management of complex systems through external actors. These actors can neither predict nor govern complex systems but they have some knowledge to understand how the systems develop and can influence them. Organizational forms must be able "(…) to engage in effective self-regulation and control, through contextual strategies of action (…)." (Morgan 1982: 534)

Unfortunately, there is some confusion with regards to the term of self-organizing dynamics, for there are different understandings among political scientists and organizational theorists. Mayntz **defines** self-organizing control or governance of political systems as voluntary coordination of action of equal actors through mutual (horizontal) cooperation.[43] Mayntz' definition does not describe spontaneous and non-intentional emergence of order, but rather a voluntary association of actors, transferring their autonomy partly to a management level. Self-organizing dynamics, however, are characterized by the lack of hierarchy. Accordingly, Messner's definition of self-coordination (Selbstkoordination) is '*coordination without hierarchy*' ('Koordinierung ohne Hierarchie'). (Messner 1995: 246) A voluntary, self-referential management is part of the conventional democratic governance, which is not self-organizing. Only the process of building a democratic system may be self-organizing, the application of power in a democracy is not, but carried out by certain actors through the legitimized hierarchy.

The aspiration of this thesis is to feed insights in self-organizing dynamics from system, organization, and management theory into theories of international politics. For, certain approaches consider managing interventions, just like international politics do, but attempt to understand how social systems govern themselves without interventions in order to create prescriptive knowledge on least distorting but effective management. (compare Probst 1987; or Malik 1993)

One downside of system theory, for what it is often criticized, is its highly abstract character and that it is hardly applicable to real world problems. Nevertheless, a strand of management and organization theory is inspired by system theory. These approaches highlight a process-focus on governance from within the system and a holistic approach of management which considers knowledge as managerial resource and aims to explain self-organizing capacities of systems by their management of knowledge. (compare the St.Gallen model of management by Hans Ulrich and the related evolutionary management approach by Malik, Probst 1984; or more knowledge management related: Willke 1998)

> "Both power and money as instruments of governance come in the wake of a new logic of governance – the governance by and through expertise."[44] (Willke 1998: 28)

Weak cognitivism is the theoretical approach which considers ideas as pivotal variable in international relations. The concept of 'epistemic communities' describes the influence of experts in international politics. This theoretical strand will be used account for certain strategic activities in global policy networks. For, knowledge management represents targeted action to connect people and organizations to mutually complement their resources and to provide each other with their individual knowledge resources. (Willke 1998: 30) Therefore managed and self-organizing activities must both feed into each other to pool, generate and distribute relevant resources what global policy networks are supposed to facilitate.

System theory understands complex systems like global policy networks or the international system at large to be characterized by the relations – or as Malik calls it, the interactions (Malik 1993: 236) – among the parts and between the parts and the whole system. The theoretical

[42] Willke framed the German term „Kontextsteuerung".

[43] Original quote in German, reading: „freiwillige Handlungskoordination gleichberechtigter Akteure durch gegenseitige (horizontale) Abstimmung" (Mayntz 1997: 192)

[44] Original quote in German, reading: "Sowohl Macht wie Geld als Steuerungsmedien geraten in den Sog einer anderen Steuerungslogik – der Steuerung mit und durch Expertise."

approaches of strong cognitivism and of communicative action take on the significance of relations and communications in global policy networks and conclude how to harness those for mechanisms to execute network governance functions. Strong cognitivism defines the identity of an international actor through her relations. Communicative action deliberates how international actors can coordinate through communications.

System theory, however, explains that the governance of complex systems requires functional differentiation otherwise the complexity of the system makes any governance impossible. That differentiation produces subsystems increasing the effectiveness and efficiency of the whole system. Thereby emergent qualities can be explained by the principle: The whole is more than the sum of its parts, which justifies the system theory's holistic approach of analysis. (Willke 1996a: 134-139) Complex systems are characterized by non-linear and dynamic behavior, changes of certain parameters do not destabilize the system, but the system is sensitive to changes of certain parameters. That means complex systems are self-referential, they are sensitive to their environment but at the same time function in an operationally closed manner. (Willke 1994: 72/73) Self-organizing complex systems are open to their environment without being dependent on it. So-called 'boundary spanners' are important actors to connect systems like networks to external actors and systems.

Growing complexity in systems leads to higher levels of emergence, enabling complex system to maintain governance through self-organizing dynamics. (Willke 1996a: 163) Emergence of new qualities and capacities is defined as only explicable at a holistic level, not through the aggregation of parts and their characteristics. (Willke 1996a: 144)

The concept of self-organizing dynamics and the consideration of holistic approaches in complex systems stem originally from the chaos theory, which explores dynamic, non-linear systems developing in causal loops like meteorology does. Chaotic systems are strictly deterministic systems and at the same time highly sensitive to minutest changes in the environment. Those systems are not predictable and, thus, can not be planned or controlled. Management focus, therefore, shifts to strategies how to deal with complexity and processes, which cannot be controlled from top-down. In chaos theory so-called strange attractors describe development paths of complex systems, which Willke calls in system theory a rule, meaning the "condensation of expected outcomes". (Willke 1994: 185/186) Prigogine was the first to discover and describe the phenomenon of emergence in physical-chemical systems. Actually, the development of spontaneous order runs counter the law of entropy. Prigogine called that "dissipative structures". (Willke 1996a: 145)

Malik appeals to scientific knowledge on physical systems the Bremermann limit, a quantum physical limit of maximal capacity of physical systems of matter to process information bits per time unit. Even though the amount of theoretically processable information is amazingly huge – 2*10^47 bits/g per sec –, systems with only a little number of actors contain too much information to be managed and coordinated in a centralized, top-down manner. (Malik 1993: 236) Management must switch to a contextual, holistic approach is the conclusion of system theory oriented management models, relying on self-organizing dynamics attempting to complement these dynamics with management interventions.[45]

[45] Giddens calls this way to control a system "reflexive monitoring". Actors must have knowledge of system mechanisms and make use of their knowledge to influence these mechanisms with their action, although the consequences of action might due to the causal loops of complex systems influence the outcomes of action in unintended ways and feed back in the action. (Giddens 1992)

2.8 Systemic Organizational Theory: Fostering Self-Organizing Dynamics

Systemic organizational theory is supposed to provide insights how systems like networks can self-organize and how that can be fostered. These system theory based findings shall be the basis for the analysis of global policy networks if they achieve to foster enabling conditions for self-organizing dynamics.

2.8.1 Defining Self-organizing Dynamics

The paradigm of system theory supposes that complex systems cannot be governed from a hierarchical, external position. Hence, systemic organizational theory aims to explain the emergence of a spontaneous order of a system from within through the dynamics amongst the units. (compare Schreyögg 1996: 16) These explanations base on research on complex systems, which define self-organizing dynamics as follows:

> "A microscopic form of interaction of individual elements produces a macroscopic state of order that then stabilizes its origins through feedback loops." (Küppers 1993: 131) "Self-organizing systems are rule forming: Organized structures in the macroworld emerge from unorganized microdynamics." (Küppers 1993: 136)

The term 'self-organizing dynamics' refers to processes of governance from within the system, as opposed to control of a (sub-)system from outside of the (sub-)system. (compare Haken 1990: 207) Institutions of social organization, economics, politics, and science or religion control human behavior mutually, with each institution from one subsystem controlling behavior in other subsystems. The problem – paticularly in the international system – is to install such institutions. If an institution based on the specific logic of action from one subsystem governs the behavior of units in this subsystem, i.e. if mechanisms create spontaneous order through interaction among independent units obeying the same logic of action, this order must be called self-organizing.[46]

E.g. prices govern economic behavior. Price mechanisms emerge from the individual pursuit of profits, and price mechanisms create order in profit oriented markets.

Political authority sustaining mechanisms govern political action. Actors in politics obey these mechanisms in order to maintain their individual power, thereby establishing and confirming a hierarchical order of authority.

Prestige is basically a self-enforcing mechanism governing societal organization. Actors aim to maintain and increase their individual prestige in social relations, and establish thereby a social order, based on inter-human acknowledgement, different from economic or political order.

In fact, the academic sub-system is strongly governed in a self-organizing manner, although financial resources and political contacts, i.e. assets from other sub-systems, can play a decisive role for academics. Actors who have access to knowledge are more able to generate new knowledge. They sort of define truth within the academic community by defining "thinking styles" of "what is held to be a reasonable question and a correct answer" (Küppers 1993: 131) – basically of what is thinkable. The institutions scientists are embedded in form "external boundary conditions", which define possible research outcomes. (Küppers 1993: 135) These research outcomes relate back recursively to the existing body of knowledge and generate thus coherence, thereby establishing a self-enforcing order.

[46] A democratic order organizes a process through interacting individuals, thereby establishing governance from within that system. Hence, democratic systems are sometimes called self-organizing, (compare Mayntz 1997: 201) although a democratic order establishes hierarchical positions, for instance a government, to govern the system *not through self-organizing processes* among independent units. Democratic governance may entail self-organizing processes of establishing hierarchical, quasi-external institutions of control, but the units, i.e. citizens of a democratic society, do not themselves establish a spontaneous order in the whole system through self-organizing processes amongst them.

2.8.2 How Can Systems Self-Organize?

The attempt of system theory and systemic organizational theory is to explain governance in systems, which are deterministic but cannot be controlled, and to establish a management, which does not plan and control the system but still intervenes and influences the development of the system – just like decentralized, horizontal networks do. That attempt requires what Talcott Parsons introduced as contingency: the possibility of a system to characterize through two different, mutually excluding qualities, like being not determined but not accidental either. (Willke 1996a: 26) Complex systems may have such contingent characteristics and may thereby allow the system to develop emergent capacities.

Due to the attempt of managing self-organizing systems, new system theory dragged the focus of research. While self-organizing systems can still function in an operationally closed manner, sensitive to changes in the environment but stable towards these changes, regarding the development of systems they are considered rather as open ones. New theoretical approaches provide some inspiration: organizational theory takes the environment into account; interorganizational theory adds relations among organizations, ranging from competitive to synergetic-collaborative relations; network theories, finally, explore how interorganizational relations determine individual action. (Willke 1994: 169-175) All these theories have their stake in and contribute ideas to the explanation of how networks work, and how they can be managed. System theory oriented management approaches apply the theoretical findings on systems to real world organizations, distill an understanding of self-organizing dynamics, and recommend how to complement the self-organizing dynamics in these organizations, respectively systems, with intervening management action to execute certain functions.

The phenomenon of systems being capable to develop emergent qualities and spontaneous self-organizing orders is referred to as autopoiesis in system theory. Autopoiesis means that systems are self-referential and operationally closed, i.e. operational processes in systems are organized in feed back loops, which are observable in systems with complex, autonomous, and redundant processes. (Willke 1998: 31/32) System theory identifies several systemic characteristics of systems capable of self-organizing dynamics: (Probst 1987: 76-84)

- complex (Komplexität): necessary *condition* of a system to allow for self-organizing dynamics; complex systems are neither deterministic, nor accidental i.e. not predictable, but can emerge from deterministic elements.
- self-referential (Selbstreferenz): allowing the system to organize it*self*, its identity, and its boundaries while still being open to the environment. The system *constructs* its reality depending on its epistemology, how to understand external information from the point of a certain system-owned world view. A system, respectively a global policy network, has the potential to act in a targeted way only if it is self-referential. This characteristic reveals when a spontaneous order or strategy, i.e. enhanced effectiveness, emerges in networks and their strategic action.
- autonomous (Autonomie): allowing the system to govern and define itself *independent* of foreign forces, nonetheless the system is open to its encompassing environment, which can influence the system. Thus, an autonomous system is neither deterministic nor completely free by choice. No unilateral control or governance is possible, but only an evolution through feed back mechanisms. Network partners are governing the processes from within the network, but none of them is in full control of these processes.
- redundant (Redundanz): potential to organize the system[47] is spread over the system (decentralized) and allows the system to be *organized* without a hierarchical center. Units with greatest knowledge/ amount of information are effectively managing the system ('Principle of Redundancy of Potential Command'), however, at the same time all parts/

[47] To organize the system means that autonomous units, respectively actors, act in a cooperative manner, i.e. their strategies must match one another. If they do not match the units will hardly contribute to the execution of the functions of the whole system and hence no self-organizing dynamics will emerge.

> units contribute to the execution of all functions of the whole system (so-called holism). Flexibility and innovations emerge from that redundancy, i.e. the system starts to evolve in self-organizing dynamics.

A *complex structure*, *self-referential processes* and an *autonomous network* as well as *autonomous actors*, according to Messner a prerequisite for any involvement with networks, (Messner 1995: 205) represent the necessary conditions for social systems in general and global policy networks to generate self-organizing, spontaneous order in particular. Provided these three necessary conditions are met, *redundancy in strategy and action of network partners* is the sufficient condition for the emergence of self-organizing dynamics. The analysis of efficiency of network governance in section 3.11 will check the explored networks for these features.

2.8.2.1 Redundancy in Political Systems and International Cooperation

Redundancy is necessary to allow for self-organizing dynamics. Yet redundancy in systems calls for coordination to avoid inefficient duplication. That's why communication is needed to coordinate activities and inform partners about potential external effects and what they have to consider regarding their partnership's environment. Thereby, synergies may emerge, gaps in needed action are avoided, and through integrative solutions additional spill-over effects may self-organize. Without redundancy neither the need for coordination nor opportunities for self-organizing dynamics could occur.

Most academic arguments on networks as well as dominant thinking among actors in the field of sustainable development equate redundancy with inefficiency. Granovetter's argument on the strength of weak ties (see section 2.6.3.1) and on strong ties as redundant contacts seems to imply that redundant relations in networks and thereby accessed information are inefficient, as, for instance, Burt argues. (Burt 1992: 65) Although that is not justified always as Landau argues. (Landau 1969) His argument runs as follows: Zero redundancy increases the probability of failure. For, top-down, hierarchically and intentionally planned and organized systems are prone to make mistakes at least in certain parts of the organized system or interventions as they can only process a limited amount of information. Large complex systems tend to amplify small errors.

> "The failure, then, of a single part can mean the failure of the entire system (…) In complex and tightly ordered systems the cost of error can run very high." (Landau 1969: 350)

Networks and face-to-face meetings promote establishing strong ties and complete possible relations within a network, thereby generating trust. Burt's argument is that these relations are costly and inefficient as long as an actor has at least one single weak tie into the network. In fact, however, only direct relations can be activated for action. As networks are pools of potential partners, indirect relations can only help to identify adequate partners for collaboration and to establish direct relations for action. The more direct relations an actor has, or the more action in partnerships an actor has already carried out the stronger will be the ties of this actor. Such strong ties may be costly but have no substitute when it comes to strategic collaborative action. Efficiency of a network will thus ultimately depend on efficiency and effectiveness of action and on the choice of optimal partners, not only on the costs of maintenance of relations.[48] These costs might even come down per relation if ties grow stronger and synergies emerge through redundancy of relations. (compare Diller 2002: 223 and 233) As, for instance, a meeting with the whole network might incur the same costs for an individual actor as a meeting with only one member from the network. Nevertheless, weak ties are indeed important to receive relevant information. An action-oriented network, however, must grow its ties stronger continuously. Burt is right when he claims more weak ties increase capacities of networks but the argument does not work the other way. Networks do not necessarily decrease efficiency when weak ties grow to strong ties.

[48] The attempt that network structure as independent variable accounts for effectiveness and efficiency of networks disregards the ongoing strategic management of network structure through network partners. Thus, network structure is itself dependent variable.

> "Concerns about redundancy and efficiency are red herrings for (organizational, S.W.) design principles. Redundancy amplifies the political influence of policy networks involved in governance, and also assures that the governance system persists even if one of the nodes suffers political setbacks. Redundancy in funding of sources may also compensate for episodic shortfalls in financing from principal funding sources. Similarly, efficiency is a principle that obscures the symbiotic influences between the elements of the network." (Kanie, Haas, Murphy 2004: 276)

Redundancy can be "redundancy of parts" or a "redundancy of functions", (Morgan 1982: 528) though redundancy of parts, or in the case of policy networks of actors, feeds into redundancy of functions, because redundancy of actors means that actors' capacities overlap and execute same functions.

> "By making the various elements of a system able to perform a wider range of functions, some of which will not be needed at any given time, the range and flexibility of possible responses widens." (Morgan 1982: 529)

Redundancy decreases error-proneness and increases innovativity. (Diller 2002: 232) If global policy networks really avoided redundancy of activities of partners, the effectiveness of the whole network would depend on the success and effectiveness of every single individual partner involved. As soon as one failed, the whole partnership would be jeopardized by failure. System theory concludes that complex systems cannot be governed except in a spontaneous, self-organizing way, which, indeed, reflects the challenge of organizations and their interorganizational relations in a world of growing interdependence and complexity. (Messner 1995: 127/128 and 176)

Redundancy allows other parts or interventions to correct individual failures. With reference to John von Neumann, Landau argues that the whole can be more than the sum of its parts by "adding sufficient redundancy".

> "The probability of failure in a system decreases exponentially as redundancy factors are increased." (Landau 1969: 350)

Landau explains this fact, referring to Warren McCulloch's "principle of redundancy of potential command", by "(…) some 'overlap' at all times which enbales residual parts or subsidiary centers to 'take over'." (Landau 1969: 351) This principle corresponds with the concept of governance, as explained by Rhodes referring to Rosenau, to be more participatory. For, all individuals might engage in collective action, depending on their knowledge, when it is best. (Rhodes 1997b: 58)

Basically, Landau argues against the image of centrally planned systems and the functions of central control points in any kind of organizations to make systems more efficient. Such a benevolent dictator, even if she were, indeed, benevolent, cannot possibly control and process the necessary information and action. (Landau 1969: 353-355) The only way out of the dilemma of the apparent necessity as well as impossibility of governance of complex systems are self-organizing systems, as Landau suggests for "large-scale organizations", where "redundancy serves many vital functions". (Landau 1969: 356) Redundancy allows flexible forms of governance because governance functions are distributed across the whole system, and redundancy fosters innovations in an evolutionary, not planned way. (Probst 1987: 81)

However, redundancy, of course, is costly, indeed.

> It "(…) remains to learn to distinguish between inefficient redundancies and those that are constructive and reinforcing (…)." (Landau 1969: 356)

Thus, there might be an optimal point of balancing costly redundancy with costly risk of system failure.

This point can be determined in a demand-driven manner: As long as people demand activities to satisfy their needs and start to collaborate with partners from a global network, more actors take strategic action to contribute to sustainable development. Given these activities are not centrally planned or somehow coordinated, the redundancy of activities for sustainable development is likely to increase. Nevertheless, effectiveness and efficiency increase as well. For, only if people

develop their societal systems of need satisfaction *pro-actively* in ownership action, these activities will be sustainable. And if these actors *cooperate* in global policy networks, partners are able to exchange information on their strategic action and consider thereby mutual negative external effects which decrease efficiency due to redundancy. The communication of strategic action allows different actors in networks to avoid too much duplication and vary their strategic action so that probability rises to find at least one successful strategy to cope with certain problems. For, the variation of overlapping strategic action allows an almost evolutionary trial-and-error method to search for the most efficient action to adress certain situations.
The assertion is that global policy networks, if they achieve to communicate external effects properly, will optimize redundancy in a self-orgainzing manner to that point where relations and activities overlap and allow self-organizing governance without diminishing efficiency through too much of an overlap of relations and activities.[49] Social costs will be calculated and considered in networks by collective actors such as governmental agencies, concerned companies, NGOs, academic community, and Intergovernmental organizations when they take strategic action in the network. Individual utility curves of network partners will not change but a *common strategy* will help to consider other actors' utility curves for one's own benefit. Even in competitive situations the network might mediate interests and develop an integrative solution to the distributive conflict.

2.8.3 Self-Organizing Dynamics in Political Systems

Probst's four characteristics of self-organizing systems comprehend variables of the *structure* dimension of scentific analysis, of the *agency* dimension as well as of the *process* dimension. The structure of a system must be complex, its units, the actors, autonomous, and the processes must be self-referential, which forms and constructs the structure, and redundant in order to be self-organizing. Self-referential and redundant processes cannot be reduced to structure or agency. Non-linear and dynamic systems need to be analyzed as processes. The self-organizing dynamics emerge only in processes and cannot be predicted just by the structure of the system or by its actors. Nevertheless structures and actors must be considered as well to understand action in self-organizing systems. Only processes could hardly explain action and develop strategies for future action, nor could do so only structure or only agency.
Self-organizing systems are characterized by the **complex interplay** of different units, the effectiveness and efficiency of the overall system to produce order and execute certain functions depend not on single variables or their sum but rather on the interplay of the variables as it is the case in complex, dynamic, non-linear systems like the system of international relations. Young and Demko hold that it is unlikely that it will be successful to identify necessary or sufficient conditions for achieving effectiveness; rather the substitution effects and interaction effects among the determinants of effectiveness can explain how to organize international governance successfully. (Young, Demko 1996) Thus, effectiveness and efficiency of networks in executing certain functions to overcome market failures depend not on the execution of the hypothesized activities but on *how* the individual actors and their activities *work together*, which represents redundancy of strategic action of various actors. In order to foster self-organizing processes in networks, the strategies of individual actors must match one another and all contribute individually in a somewhat redundant way to the execution of the same network functions, covering a whole development project cycle. To that end the network of links among the units of a system, i.e. the actors of the network, must be sufficiently complex and redundant in the execution of the network functions.
'The Principle of Redundancy of Potential Command' (Probst 1987: 81) says that the unit with most information in a system will be in control of and manage the system. Basically, the unit with most matching relations to other units will hold that position in a network. The more complete all

[49] Compare the detailed discussion of the cost-effectiveness ratio in redundant systems in Annex III.

actors in the network are connected, the more decentral and redundant will the governance be in that network. Therefore, the success or failure of networks depends on the resources of knowledge and social capital created and managed by the network.

Redundancy cannot be explained solely by rational self-interested motivations but needs a rather holistic approach to governance in a system. An explanation requires an analysis of the system as a whole and its dynamics.

Mayntz understands action theory as a more holistic "(…) understanding of the emergence of social phenomenons. (…) Basically, it is pointed out that macro-phenomena derive not from mere aggregation of elements. The main problem is seen in connecting the micro level of social action with the macro-level of structural development of society." The interference of "processes of collective behaviour" and "strategic interactions of cooperative actors" must be analyzed to explain processes of complex socio-political systems. (Obser 1999: 54, referring to Mayntz 1990: 60-65)

Keohane and Nye call the quality of relations among units of a system "interconnectedness" or in case of reciprocal costly effects of transactions "interdependence". (Keohane, Nye 2001: 8) The term "interconnectedness" refers only to actors, while in the context of network governance a whole set of relations among units of a system and among the network functions is in the focus of analysis. One action to execute a network governance function serves several other functions at the same time. The term 'interrelatedness' shall refer to this set of relations including the quality of complexity of relations. This quality is a sort of multiplexity, which signifies a relation serving several functions, as when one actor has several relations to and thus roles in relation to another actor. (compare Boissevain in Schweizer 1989: 16) Interrelatedness is by definition a characteristic of complex systems because the fact that units of complex systems are interrelated and interact builds the complexity of the system. (Malik 1993: 236) Thus an action, aiming at one unit or function, affects other units and functions always in a complex system, while the specific effect depends on the individual relations among units. Complexity of a system is condition for redundancy in a system.

The holistic view then allows an optimistic outlook: If the execution of functions is spread over the whole network, and the strategies of actors, how to execute network functions, match one another, self-organizing dynamics and thereby enhanced effectiveness and efficiency will emerge.

Conclusion of Phase III

Networks represent systems too complex to be controlled and governed other than through self-organizing processes. Governance of complex systems by a superordinate institution would be ineffective and inefficient because errors could never be controlled and avoided efficiently and effectively by any institutionalized mechanism. Redundancy of relations, functions and activities enables networks to avoid or overcome these failures and to self-organize. Nevertheless, every partner is supposed to manage the available network resources. Sydow calls the attempts to manage networks under circumstances of "uncontrollability" "management of evolution" or "planned evolution". (Sydow 1992: 307) Messner describes how different groups of actors work together in networks and harness the social capital in networks between market and the state, making knowledge-based societies more adaptive nd hence more competitive. (Messner 1995: XII)

Self-organizing systems are in an elastic, dynamic equilibrium, a steady state. Due to the continuously changing environment the systems themselves have to adapt continuously, too, which is a highly complex process that must necessarily be self-organizing and can only evolve in a polycentric system. This innovative process can be characterized as organizational learning. (Probst 1987: 83/84)[50]

Kappelhoff points out that self-organizing dynamics emerge in complex adaptive systems not simply if certain system characteristics combine but these characteristics must hold a fine-tuned balance of stability and plurality. (Kappelhoff 2000b: 355) The common network strategy must maintain the *autonomy* of all actors but at the same time ensure the needed *cohesion* to organize collective action. The independent actors shall be able to pursue their individual interests and at the same time understand what they have to consider in order to contribute to partnership activities and to sustainable development at large – even without becoming dependent on contributions to partnership action on sustainable development by other actors. In order to be able to make contributions to partnerships on sustainable development, *complementarity* of actors will be effective, but *similarity* supports trust and collaboration. *Fluidity* of the network relations helps to adress new problems and challenges in the short-term, while *stability* allows long-term relations and cooperation. Therefore, to increase effectiveness, a network governance strategy must always combine and balance the opposing strategic principles of autonomy–cohesion, complementarity–similarity, and fluidity–stability. (Ibarra 1992: 178-183) That means that self-organizing dynamics for rather short-term developments and managerial action with a long-term planning horizon must complement one another, as Ibarra shows. Paradoxically, in the long-term the effectiveness of self-organizing processes is probably optimized, while managerial action is needed to instigate strategic early action for sustainable development in the short-term. That cross-over connection of self-organizing dynamics and managerial interventions with short-term and long-term processes explains why both self-organizing dynamics and managerial interventions must combine forces and complement one another.

Thereby, macroeconomic failures can be addressed by microeconomic strategic management of network resources at a subordinate system level at which complexity, autonomy, self-reference, and redundancy can be created which in turn enables the whole system to develop emergent capacities to self-organize at the holistic level of the system.

Hypothesis 3 on Governance in Networks:

Effective and efficient network governance will only emerge if self-organizing dynamics will be fostered and complemented by strategic management of knowledge and social capital contained in the network. *An efficient network governance strategy must foster and harness* ***self-organizing***

[50] Probst adheres to a social constructivist paradigm, considering categories like free will, sense making, the power of symbolic action, and the construction of reality in the perception of actors. Even though the analysis of network functions will consider Probst's thoughts on self-organizing processes, these social constructivist categories will not be taken into account.

dynamics *by executing network functions in a way that creates enabling conditions for collective action of independent network partners to self-organize in their individual activities for sustainable development.*

2.9 Network Governance Strategy

This section will circumscribe what a strategy for network governance must look like: It must provide a scheme of action which network partners have to consider when taking individual action in order to address issues of sustainable development effectively with the help of networks. To this end different theoretical approaches will be used to conclude on how to execute network governance functions. These theoretical approaches base partly on very different, some even on conflicting assumtions. Their conclusions, however, address different phases, aspects, and issues of network governance. As this is already discussed in section 2.4, the opposing paradigms are not supposed to be integrated in one theory but merely their deduced conclusions shall be harnessed in the specific context of global policy networks on sustainable energy for development.

The debate on the provision of global public goods like a stable climate for sustainable development focuses mainly on macroeconomic regimes which require agreements of all relevant actors in international politics. Such an international climate and energy regime is highly improbable as long as such regimes are perceived as zero-sum-games. Therefore a complementary microeconomic strategy is needed which identifies mechanisms how autonomous self-interested actors can decentrally but effectively contribute to the provision of the global public good of a stable climate.

Although Haas, Keohane, and Levy explore the impact of international institutions of global environmental governance and regulatory and intervening governmental public policies, but not of partnerships, they identify failures of steps of a policy cycle, or – with regards to partnership activities – of project cycles, which correspond with the six functions of global policy networks, addressing these failures. Haas, Keohane, and Levy (1993) call the stages of the policy cycle in their study of international institutions (i) agenda setting, (ii) international policies, and (iii) national policy responses. International institutions, they suggest, must contribute to agenda setting and consensus building by integrating relevant actors and sharing scientific knowledge to inform decision-makers as well as domestic pressure groups. In the process of negotiating international policies, institutions must identify appropriate partners for policies and projects and mediate interests or in case conflicts. Finally, these international policies must translate into national policies controlling sources of environmental degradation, which implies to implement action on the ground and internalize external costs of non-sustainable behavior.

However, as long as the question of how such international institutions can evolve in the absence of commitment of strong and powerful governments remains open, networks and partnership activities will have to play a complementary role to such international institutions – or more specific regimes – and the institutionalist perspective will not be sufficient for the analysis of these networks. Therefore the aim *cannot* be to develop a strategy as an international institution, being an intersubjectively shared mechanism of governance, but only to identify a decentralized strategy, which can be applied by individual autonomous actors to cooperate effectively with other individual autonomous actors for sustainable development, even if these other actors do not apply or consent to that strategy.

The quest is for a **long-term strategy** how to manage knowledge and social capital as the resources available in global policy networks for the promotion of sustainable energy for development, and to match strategic network management with self-organizing processes in the network as well as in society. For, that very combination of managing interventions and self-organizing dynamics is promise as well as purpose of networks. So far a strategy or a "system-wide strategic framework" (Reinicke, Deng 2000: 111) for multisectoral cooperative action and the management of knowledge (Reinicke, Deng 2000: 108) and relations, (Reinicke, Deng 2000: 109) as, for instance, needed by the United Nations, is missing.

According to Messner, the effectiveness of networks depends on the ability of network partners to act strategically, i.e. to consider long-term interests and balance those with short-term interests, to adapt flexibly goals and strategy for action to changing circumstances, and to anticipate and consider the action of other actors. (Messner 1995: 300/301)

Common interests and goals simplify to reach collective action in international politics, however, unfortunately, often the commonalities of interests of autonomous actors in international politics are too small to initiate collective action for sustainable development. Nevertheless, interests are probably the strongest drive for individual action as common interests are for collective action. Thus, the art of network governance is to develop a common strategy, which allows all individual actors to pursue their individual interest-led and identity-based strategies and, at the same time, to acknowledge and contribute to the interests of all stakeholders in sustainable development.

2.9.1 Defining Strategy

According to Sydow, networks, combining or being between interaction patterns of market governance and hierarchical governance, only qualify as such if they have a strategy. He defines such networks of independent, autonomous actors – he focuses on networks of companies – explicitly as "strategic networks". (Sydow 1992: 72/73)

Most sustainable development strategies of global actors are structure-focused though they are supposed to give *schemes for action*. For, a strategy is in game theory defined as "a complete plan of action, which defines for every possible situation in a game what to do."[51] (Rieck 1993: 35) This situation-specific application makes the difference between a strategy and an action plan, which is independent of situational considerations and thus of dynamics and changes in the environment of a certain project. In reality such an "exact plan of proceeding trying to take into account the variables which impact one's own action"[52] (Rieck 1993: 111) can hardly define real-world solutions. (Rieck 1993: 18) The clearness and definiteness of strategic rules for action depend on the complexity of a situation, i.e. the number of options of possible action. Nevertheless a clear cut scheme what to consider when planning action, making decisions and implementing policies is necessary if network functions are supposed to complement self-organizing processes. In general, rules can never be absolutely clear and definite about what to do in reality, the less the more complex a situation is. Game theoretic strategies, respectively modelling, must reduce complexity by aggregating corporate and collective actors in multiactor constellations or decoupling interdependencies. (Scharpf 1997: 80)

A theory of action must evolve as something, what Scharpf calls a *framework*:

> "Compared to a fully specified theory, a framework has less information content in the sense that fewer questions will be answered directly and more will have to be answered empirically." (Scharpf 1997: 30)

A scientific framework has to be applied to empirical facts just like a strategy has to be applied in practice. This immanent need of application leaves space for the inclusion of self-organizing processes in the explanation of complex systems as the international relations or more specifically global policy networks. A common strategy of global policy networks *can* only be applied and implemented decentrally and must, therefore, aim to foster self-organizing dynamics to create spontaneous order in strategic action of network partners. No centralized network management could possibly substitute for these dynamics.

Nevertheless, **management interventions** are necessary when self-organizing processes fail to take off. Interventions, however, cannot guarantee to increase efficiency even if processes do not work by themselves. Therefore, there is no *a priori* legitimation to endow single actors as an intergovernmental organization or a technical secretariat in the network with the power and means to intervene, leaving alone that there is hardly the political will to do so in the international arena. A network governance strategy has to be applied decentrally. All actors need to consider and follow a common long-term strategy, while single actors must support the translation of the

[51] Original quote was in German, reading: „Eine spieltheoretische Strategie ist ein vollständiger Verhaltensplan, der für jede mögliche Situation innerhalb eines Spieles vorschreibt, was zu tun ist."

[52] Original quote was in German, reading: "genauer Plan des eigenen Vorgehens, (…) in dem man diejenigen Faktoren, die in die eigene Aktion hineinspielen könnten, von vornherein einzukalkulieren versucht." (Definition zitiert nach dem Duden)

strategy into action as leaders and partners. This common strategy – Sydow uses the term "collective strategy" – can emerge in a self-organizing way without being intended by any actor or can be intentionally planned and agreed to by all actors. And an "emergent strategy" can become a "deliberate strategy"[53]. A common strategy is always result of collective action, but can never – even in very asymmetrical power relations – be imposed by any actor. (Sydow 1992: 268-270 and 273)

A strategy in a strategic network must reflect the autonomy of actors, the decentralized nature of the network, and the capacity to self-organize. (Sydow 1992: 280) A common decentralized strategy reflects the characteristics of international politics of many autonomous actors, hardly ready to transfer power or financial resources or to obey an international authority of an energy and climate regime. Hence, self-organizing processes are more adequate than centrally managed processes or political interventions due to real world systems, like markets, or real world processes being highly complex. In fact, such systems as well as networks require a "decentralized governance"[54]. (Sydow 1992: 308) They are too complex to be predetermined or somehow planned, as Sydow explains with regard to strategic networks (Sydow 1992: 306) and Jaeger argues when he propagates negotiated solutions for collective action situations in the field of energy and climate and praises the self-organizing capacities of markets compared to inefficient "queueing" in centrally planned economies. (Jaeger 2004) Therefore a long-term network governance strategy must minimize interventions and must not crowd out individual initiatives to start self-organizing processes. Strategic management interventions by independent actors must "organize the self-organizing dynamics"[55]. (Sydow 1992: 247) A such spread, decentralized strategy must establish schemes what has to be considered in individual actions in order to make them compatible with long-term sustainable development and where they can find partners and information for their immediate action and short-term goals, thus helping to overcome stagnation and the failure of self-organizing processes. Networks promise to combine self-organizing and interventionist managing dynamics in an effective and efficient manner because networks lie between markets and hierarchies and have thus organizational features from both.

Hence, network governance strategies must strictly consider these essential conditions of networks and stick to decentralized processes, guide actors how to contribute to collective action for sustainable development individually and to the mutual benefit.

> "The concept of strategy means that actors attempt to influence the collective action. (…) For the accomplishments of collective ends, the cooperation problem must be overcome. Goals and actions of actors should be mutually adjusted. This requires the efforts of entrepreneurs and the forming of coalitions. (…) The stakes, rules, goals and strategies of other actors form the 'logic of the situation'. Based on this 'rationality' the actors adjust both their strategies and their goals. Too large a gap between individual and collective 'rationality' endangers the 'game'. Stagnation, the threat of lose-lose situations and destructive games may be the result. Network management is aimed at facilitating the process of interaction, including conflict reduction and conflict resolution." (Kickert, Klijn, Koppenjan 1997b: 184)

Aldrich observes that actors in networks might form action sets to overcome the collective rationality problem and follow a collective rational strategy, which, however, occurred only rarely because partnership action is voluntary and individual rational actors attempted to free-ride. (Aldrich 1979: 317) To develop 'action sets' and a common strategy will only be successful after a learning process, which requires time for the experience of failed collective action and the availability of knowledge to understand the necessities for collective action. Only if such knowledge is available, a rational choice of a common strategy is possible. Thus, actors always

[53] Sydow refers in this distinction between intended "deliberate strategy" and not intended "emergent strategy" to Henry Mintzberg who defined strategy as a "pattern in a stream of actions". (Mintzberg, Waters 1985)

[54] Original quote in German, using the term "dezentrale Führung".

[55] Original quote in German, describing external management in networks as "Organisation der Selbstorganisation".

act under conditions of **bounded rationality**, for the availability of and capacity to process knowledge and information is always limited. Therefore actors – under bounded rationality – might do simply what other actors do, with no respect for which strategy might seem to be individually rational given the available information. This might increase the chances to establish a common strategy.

2.9.2 How To Apply a Network Governance Strategy

The decentralized network governance strategy aims to establish schemes for actors in the network what has to be considered when taking long-term strategic action. That strategy is the virtual basis of the network, for only strategic action allows the network to promote self-organizing processes for sustainable development when they fail to take off through individual actions alone. The network governance strategy works in the way that all individual actors take on leadership roles in the sense that they act strategically and contribute through their action to the formation of a sort of network-based regime. The different individual actors, performing roles of different leaders, can contribute different resources to the network governance. The different leadership roles can complement one another and, thereby, allow acting without a hierarchical leading center in a network. A decentralized network governance strategy can integrate the individual actions and thus foster self-organizing processes towards the long-term goal of sustainable development.

However, a network governance strategy is not supposed to tell anything about the *final forms* of the different policy levels' outcomes, but only about how actors can contribute with their knowledge resources and social capital in the *process* of policy design, decision making and implementation on the respective policy level to sustainable development.

For, the strategic action can be self-organizing to a fairly high degree and thus needs no exact planning in every detail. Networks are supposed to organize action without crowding out self-organizing activities but complementing them. That realm of self-organizing action, however, is hardly ever recognized in any strategy. A strategy must then comprise the analysis of failures of the self-organizing processes, and a hypothesis about strategic action indicating how what failure can be overcome. Thus, strategy must keep a process focus – instead of predetermining the structure of the final outcome – and thereby concluding how to change real world systems. Indeed, most strategies of actors committed to sustainable development comprise an extensive analysis, objectives, and core principles for action, some comprise additionally a part on actors or potential partners, but none of those instruct individual actors how to act.

In order to be fully aware of local domestic circumstances, global governance needs bottom-up mechanisms for the local implementation and for the critical feed back into policy design and decision making, thus guaranteeing for continued participation and ownership of concerned people. That is the reason why global policy networks must be *multilevel networks* (compare Witte, Reinicke, Benner 2000) in order to include local actors who apply the strategy and who can initiate activities, and connect them to global, national, and regional actors.

In general, strategies must be applied locally. As one of the recommendations of the REN21 report on the role of renewable energy to mitigate climate change was, "specific policy tools need to fit local circumstances". (REN21 2006a: 3) Otherwise the two principal demands to development policies cannot be satisfied: coherence and ownership, for they exclude each other if there is not a common strategy which is applied individually by the autonomous local actors. Thus, national development strategies must mainstream the sustainable energy issue and operationalize it in national action plans.

The network governance strategy is supposed to help organize individual and partnership activities more effectively by making contributions to network functions. Therefore these functions fill out the blank left in the process dimension at the different geographic levels of policies and action for sustainable development.

In the planning of their strategic action partners should apply a common decentralized network governance strategy, how to execute the network functions, to the different policy levels of framework, incentives (structure); organization, i.e. the building of an actor accountable for a specific task (agency); information, i.e. monitoring and evaluation, and action, i.e. the cooperation of actors (process). Thereby, the individual partners complete the following network functions×policy level-matrix[56] with regard to the individual situation of actors in the sustainable development process:

Table 2: Network Functions – Policy Level Matrix

Policy level / Network functions	Structure		Agency	Process	
	Framework	Incentives	Organizations	Information	Action
Integration					
Mediation of Interests					
Partner Selection					
Knowledge Sharing					
Coordination					
Implementation					

2.9.3 Strategic Action to Foster and Execute Self-organizing Network Functions

Finally, this section serves to deduce theses on how network governance functions can address which issue. These theses suggest strategic action to solve certain problems of sustainable development, and will be tested in part three on the examples of five sustainable energy related type II partnerships.

The effectiveness of network governance reflects the effectiveness of the execution of network functions, i.e. Governance through Networks. The governance through networks though is object of network governance strategies, laying out *how* to execute network functions, i.e. Governance in Networks. Governance in Networks is so far sketched in three hypotheses: (i) Network governance requires a *process-related approach*. (ii) On a subordinate, more operational level of network governance, the network governance strategy bases on the use of *managerial resources*

[56] There could be other matrices taking into account another systematization of categories. However, the dimensions of scientific analysis – structure, agency and process – must necessarily be considered whenever a policy is designed and inplemented, while other categories, which have an important stake in the development process, may be interrelated, but do not affect one another like these dimensions do always. Thus, groups of categories like geographic levels (local, national, regional, global) or cultural compartments of societies (social organization, economy, science and religion, politics) are significant for development policies and underline what has to be considered in a matrix when development of one such category is being supported, but they do not have to be taken into account in all functions of the network strategy.

contained in and accessible through networks – knowledge and social capital. These semi-public resources are harnessed in the execution of network functions. (iii) Network governance and specifically the execution of network governance functions can only be effective if self-organizing dynamics within the network are not crowded out by management interventions. *Management* in networks must *complement self-organizing dynamics*.

Hence, this section is supposed to conclude part one and deduce from different theoretical approaches to problems in the realm of international relations six theses on by what strategic action global policy networks could execute functions to overcome corresponding failures in energy markets effectively and efficiently and produce sustainable outcomes. The theoretical approaches from which those theses are deduced are selected according to their ability to address a market failure in question, and each sense of sustainability is addressed by one rationalist as well as one constructivist approach in order to make sure that both paradigmatic strands are considered. The three hypotheses on Governance in Networks, as developed so far in the conclusions of the three phases, should be considered when network partners take strategic action as recommended in the six theses on Governance through Networks to organize effective network governance.

Basically the different network functions deal with market failures by taking immediate action against the very causes of these market failures: Networks integrate and install competitors of monopolists; they represent interests of certain actors not represented in the market, which prevents market outcomes from being sustainable; they provide information to overcome imperfect information; they provide human capital and build capacities where transaction costs are prohibitive due to a lack of human capital; they internalize external effects by communicating those effects and thus coordinating activities of interdependent autonomous actors; and finally if investment costs of socially and environmentally desirable action are prohibitive high, networks help to share costs and implement action plans.

All these strategic activities in networks are interrelated and one action can serve several functions, although all market failures are nearly impossible to overcome without the respective strategic action. If one of the related network functions is not executed effectively, the other functions may contribute to solutions for the respective market failure, but they will hardly succeed to organize effective collaboration to overcome that specific failure.[57]

2.9.3.1 Integration

Monopolies in and barriers to enter energy markets exclude groups of consumers, predominantly the poor, as well as competitors and decrease thereby the overall efficiency and sustainability of outcomes of market processes. In general, networks can increase markets and enhance business opportunities for all partners. In order to give monopolists as well as other actors with market power an incentive to allow new actors into the market and to provide marginalized consumers with energy services, networks have a variety of advantages to offer without forcing any actor to sacrifice any power. Marginalized groups only join a network if they benefit from opportunities in the network to make productive use of their capacities. Networks can perform the role of a convenor and generate such synergies among various actors through increasing flexibility, fostering specialization, sharing risks, accessing local knowledge, offering a common ground for learning and communication through common perceptions, and entering trusted relations which lower transaction costs. (compare Sydow 1992) These competitive advantages might be an incentive for rationalist actors to join a network, "offering advantages for one or more actors in the network", (Klijn 1997: 27) but these actors must recognize the strategic opportunities to gain advantages, which is a question of perception. Partners must recognize opportunities as such to make use of them. Mutual symbolic acknowledgement, a common base for communications, and common definitions of problems (Müller 1994: 30, 33-36) constitute for a constructivist actor

[57] See Annex IV

what Klijn calls learning of partners in networks, which represents a costly investment to enter a network:

> "These costs are related to the investments that have to be made in learning the language and rules, establishing patterns of relationships and offering advantages for one or more actors in the network." (Klijn 1997: 27)

Hence, networking is not cheap.

To integrate these actors in the network, their interests and identities must be considered. The international relations theory of **strong cognitivism** analyzes interests and identities forming an actor's perception. The basic assumption of strong cognitivism is that international cooperation is a dependent variable of the socialization of actors. The embeddedness in institutions of the international society shapes the behavior of actors, (Hasenclever, Mayer Rittberger 1997: 155, 157, and 170) which in turn reproduces and transforms the society and its institutions. (Wendt 1987: 337) According to constructivist paradigm, identity and interests depend on social relations and knowledge. Social relations form identities by shaping the perception of one's own and an alter's identity[58], as Wendt explains, knowledge enables actors to identify their interests and act accordingly. (Hasenclever, Mayer Rittberger 1997: 186-188) Thus, social relations and knowledge shape the perception of actors and can become managerial resources to change an actor's perception and thereby his or her strategy or what he or she recognizes as strategic opportunities.

Thesis 1 on Governance through Networks:

In order to integrate certain actors like power utilities, which are often monopolists, into global policy networks for sustainable energy, the network must create comparative advantages for the creation of new markets. Therefore, *networks need to* ***build relations in a targeted manner*** *to trusted multipliers, boundary-spanners, and local partners, who have access to needed resources, or hold knowledge on local conditions, or increase organizational advantages like flexibility and specialization of the network.*

A Few Elucidatory Comments on Thesis 1:

Initially the creation of comparative advantages is critical and must come with some *leadership* among the partners. Once these advantages exist there is an incentive for all actors to comply with the common strategy, for non-compliance leads to exclusion through partners stopping cooperation. Thus, the advantage of integration must always be greater than the advantage of acting independently.

Networks are supposed to mobilize needed resources which are spread over a large number of actors. These actors are interdependent. (Messner 1995: 233) The resource dependency approach to network governance explains power relations among network actors through this dependence on certain strategic managerial resources. In this context, however, Messner points out that due to the distribution of resources across the network even the small and relatively powerless actors enjoy a certain power in networks because the powerful actors depend on the widely distributed resources of these actors. (Messner 1995: 235) Thereby, power asymmetries decrease while

[58] Social constructivists refer in their causal explanations to the identity of actors. While identity of individual actors clearly depends on inter-human relations and forms interests and action, collective actors have identities which can hardly be reduced to inter-human relations. The social relations of collective actors, forming the collective identities, are rather interorganizational relations. These interorganizational social relations define *how* collective actors, like organizations, states, or corporations, function. Without these social relations and the resulting identity, collective actors could not execute any of their assignments. They would lack needed information and knowledge, trust for cooperation, and the access to different resources and capacities of actors from other societal subsystems. These social relations and identity of collective actors are not deliberately changeable – at least not on a short-term basis. Therefore the social capital contained in the social relations of a collective actor in a network should be considered in the context of network governance.

incentives for powerful and powerless actors exist to join the network in order to access needed resources.

The access to and use of *knowledge* through networks diminishes the power of monopolies. Keohane and Nye see this new kind of power as recently emerging:

> "(…) the information revolution has a decentralizing and levelling effect. As it reduces costs, economies of scale, and barriers of entry to markets, it should reduce the power of large states and enhance the power of small states and nonstate actors." (Keohane, Nye 2001: 221)

As a consequence "knowledge is power" – "soft power" as Keohane and Nye call it in opposition to "hard power". They define "soft power" as the ability to get desired outcomes with the help of others who are attracted to do so not by coercion, while "hard power" is the ability to make others do what they would not without being inferior in a power relation. (Keohane, Nye 2001: 220) Soft power increases the possibilities to act for powerless actors, for knowledge is a semi-public good which gives power not so much to the holder nor to the user but to the one who knows to manage it. However, in fact, the rich and powerful achieve to gain more benefits from knowledge, and power and wealth often go together with a smart management of knowledge and social capital. Hence, hard power and soft power never really separate but neither of them ever really rules alone.

Networks, or clusters, enhance the *innovativeness* of competitors, thereby providing an incentive to join networks explains Messner as principal reason why networks increase the competitiveness of network partners. (Messner 1995) Stability of as well as the innovativeness in networks mutually depends on each other. However, particularly strategic innovations and best practices improving the organization and cooperation of activities for sustainable development can be copied by anyone, there is no such protection as intellectual property for strategic tacit knowledge. Therefore networks must offer an additional service like the pro-active dissemination of knowledge and innovation and support for actors in applying these innovations and tacit knowledge through *connecting partners* respectively making use of the partners' social capital and related resources, and create a comparative advantage for network members. (Witte, Streck, Benner 2003: 67)

The capacity of "structured informality" (Reinicke, Deng 2000: 85) in networks to connect large numbers of actors in a flexible manner and select situationally the relevant ones to provide one another with their knowledge and contacts for enhanced innovativity (compare Granovetter 1973: 1369; as well: Haas 1990: 208/209) can create an incentive to join the network. That feature allows actors in networks to take advantage of *economies of scale* as they occur in knowledge-intensive industries (Reinicke, Deng 2000: 13) and at the same time to avoid coordination costs for the effective management of a large number of involved actors.

Since the partnership approach was born out of the dilemma that not all actors could agree on common sustainable development and particularly climate and energy regime and policies, the efficiency of partnership action, so is often argued, depended on involving only a small number of actors. On the other hand, the more actors are involved the stronger the impact and the higher the effectiveness of action might be. Therefore, the summary of the International Forum on Partnerships for Sustainable Development recommends a balance between more and fewer actors. For, the experience reported was that the smaller a partnership the faster results were obtained. (Bennouna 2005: 6/7) In fact, bigger networks mean bigger pools from which resources and partners can be mobilized for partnership activities in which all partners should be able to handle the number of involved actors. To deal with different actors can be made easier by referring to categories of actors like the sectors and their specific rationales for action, as described in section 2.6.2. In order to enhance the pool of accessible capacities, knowledge, and good contacts, *as many partners as possible* should be integrated in the network. Rationalist analyses of games, however, often conclude that a limited number of players keep games manageable. Hence, in one specific project actors should partner with *as few as possible* – and as many as necessary – to keep the network governance strategy manageable. (compare Messner 1995: 218)

Only on the basis of a *common strategy* these comparative advantages can arise. Otherwise actors would hardly be connected effectively and could hardly compete with powerful actors like monopolists in the energy market to gain access to that market. It is the interrelatedness of the different functions that ensures compliance with the common strategy and hence commitment to sustainable development, for as soon as an actor would violate against strategy with regards to one network function other actors might stop cooperation and he would lose benefits gained from other network functions as well.

2.9.3.2 Mediation of interests

The problem of social sustainability and the question of misallocation of resources in social safety nets – the "social welfare case for government intervention" (Todaro 2000: 645) –, as for instance connected to a subsidised tariff for energy consumption below a 'lifeline' level, (DFID 2002: 17) represents an example for adverse interests due to the fact that they are zero-sum games at the Pareto-frontier: what is taken from one actor is redistributed to another one. This kind of "distributive bargaining" (Scharpf 1997: 126- 130) can be translated into "integrative bargaining" (Young 1989: 361) by integrating different intersecting issues and thus leaving the Pareto-frontier due to uncertainties and creating opportunities for cooperation in win-win situations and thereby a positive-sum game. (compare Kickert, Koppenjan 1997: 40) The access to capacities of partners in partnerships works as an incentive to sacrifice certain own advantages as trade-off for greater advantages in collaborative activities.

To connect local networks globally may allow 'integrative bargaining', for collective action may create a positive value for networks somewhere else by avoiding fundamentalist movements, terrorism, migrations, extensive exploitation of global public goods as the climate or rainforests, or a race to the bottom through the destructive competition of lowest environmental and labour standards. (compare Messner 1999: 6) Actors may be willing to support such global policy networks to benefit from their positive effects and allocate resources through them. Basically this is the price actors from industrialized countries will have to pay to enjoy the benefits of globalization while at the same time avoiding its welfare losses. Global policy networks allow for such a "(…) legitimate and accountable global governance (which) amounts to neither a zero-sum game nor a power shift." (Reinicke, Deng 2000: 111)

Young explains the possibility for cooperation with 'integrative bargaining', negotiating outcomes of expanded benefits, and with referring to James Buchanan the 'veil of uncertainty', leaving uncertain the exact future results of an international agreement, make it possible that actors agree. (Young 1989)

Levy, Young and Zürn distilled six mechanisms how to enhance regime effectiveness. (Levy, Young, Zürn 1994: 31-33) Each mechanism can be understood to contribute to different functions as executed by global policy networks, yet mechanisms and functions are not identical. The six mechanisms organize collective action

- by changing costs and benefits, thereby modifying utility of self-interested utility maximizers through linking issues;
- by enhancing cooperation by increasing transparency and trust, by reducing transaction costs, and by lengthening the shadow of the future through increasing probability of benefits of future cooperation;
- by supporting authority of individual leaders and thus governing activities of autonomous actors;
- by facilitating individual and social learning through providing knowledge for new perspectives on a problem, and new ideas how to solve problems effectively and implement action. The generation of new knowledge reduces uncertainty, contributes to understand a problem more properly, or to reassess values and to redefine interests;
- by shaping identities and role-adequate action;

- by strengthening non-state actors to pressure national governments to change international activities.

There are a number of strategic activities to overcome distributive conflicts but, in general, global policy networks are supposed to be capable to organize collective action where other regimes fail to be effective by enabling actors to collaborate voluntarily and situation- or opportunity-specific on a partnership base.

Thesis 2 on Governance through Networks:
Adverse interests in distributive conflicts can be mediated through establishing leadership, disseminating knowledge, and building trusted relations in order to reach ***integrative solutions*** *and to recognize and harness opportunities for collaboration by linking intersecting issues, connecting partners, and defining roles.* Thereby zero-sum games might turn into positive-sum games.

2.9.3.3 Knowledge Sharing

Problems of environmental sustainability always require the understanding of complex cause-effect chains. However, due to a lack of information and knowledge, problems are often not properly understood as well as opportunities to solve the problems are often not realized. Imperfect information is a usual market failure, which policies have to address. Therefore global policy networks must develop some instruments and mechanisms to share knowledge. As knowledge sticks to its holders, apart from instruments and mechanisms an actor-centred approach must explore how knowledge can be strategically disseminated in global governance. The incentive for actors to provide their knowledge is basically that they might market their capacities and find partners to offer their services to for common activities.

Weak cognitivism analyzes how actors provide their knowledge to and influence policy makers. Cognitivist approaches to international relations base on the assumption that "ideas define the universe of possibilities for action". (Goldstein, Keohane 1993: 8) In a rationalist, game theory paradigm, ideas can explain strategic action in situations of incomplete information. (Goldstein, Keohane 1993: 17) In such situations of uncertainty, "networks of knowledge-based experts – epistemic communities" can help policy makers to identify interests, frame the issues in debate, propose policies, and govern international negotiations. (Haas 1992: 2) When policy makers depend on experts who filter as gatekeepers, bringing in their embeddedness in their tacit knowledge, (Haas 1992: 27) and prepare information on certain complex, technical, or global issues for decision-making, (Haas 1992: 1) these experts are likely to form informal networks, so-called epistemic communities, to organize their influence on policy makers. (Haas 1992: 20) Epistemic communities of scientific specialists share a common paradigm, which is defined through shared normative, principled, and causal beliefs. (Haas 1992: 3) Basically, these beliefs are world views including normative values, principled conviction of rules, how to deal with certain challenges, and intersubjectively, cause-effect or means-ends relationships held true within the community. (Goldstein, Keohane 1993: 8-10) Epistemic communities connect scientists who collaborate amongst themselves to exert their authority on a certain policy enterprise by establishing relations to and informing policy makers.

> "Effective knowledge sharing programs provide processes to help individuals obtain the correct information when they need it." (Carayannis, Laporte 2002: 18)

The method of mind-mapping can be applied to issue-specific knowledge in order to systematize available knowledge resources, which can be accessed, by region, issue or technology, and problems of governance. The World Bank has tried to apply an approach of "*Mapping of Knowledge* Resources" (Prusak 1999: 7) for systematization of knowledge resources. To gain a broader view on specific development questions and support innovations, it is vitally important to be aware of links among different issues in order to increase effectiveness and efficiency of individual development activities through accessing greater cross-knowledge.

A map of available resources and their links is relevant for all actor-dependent resources. Hence, to be able to access these resources properly and understand their contexts thoroughly a knowledge map should contain information of an *actors' catalogue*, i.e. internal and external knowledge holders, the fields of their – implicit – knowledge and the links to other knowledge areas, (Schreiber, Höhnel 2002: 205; as well as Probst, Raub, Romhardt 1999: 110-113) and of potential partners as well.
"An organizational 'directory of expertise' (that is, a 'who's who' indicating who knows what) can enable staff to connect to the right people and know-how more efficiently." (Denning 2006)
This was the result of the World Bank's action review, too, recommending to "(…) connect the directory with the 'map' of social networks (…)". (Prusak 1999: 20) Thus, it makes only sense that network membership is bound to being listed in an actors' catalogue linked to the knowledge map. To allow a self-organizing process of updating the knowledge map, links among knowledge areas and between knowledge areas and expert knowledge holders should become stronger and prioritized through being followed frequently by map users.

Thesis 3 on Governance through Networks:
Where markets fail due to a lack of information, knowledge sharing of network partners should ***pro-actively distribute needed knowledge*** *by targeting and connecting network partners to support effective network governance*, instead of merely making knowledge accessible. The self-organizing process of building relations to better inform and support partnership activities may be backed by knowledge maps to manage knowledge. These maps should be connected to an actors' catalogue of the respective knowledge holders to foster the building of relations between knowledge holders and knowledge users.

A Few Elucidatory Comments on Thesis 3:
Maps shall reflect the holistic complexity of a knowledge area but allow at the same time to reduce complexity for analysis. Maps are supposed to govern action, adapt and optimize individual action, and instigate new cooperation. (Lehner 1996: 93 and 120) *Knowledge maps* are "meta information systems" because they deliver the way to knowledge, not the knowledge itself. Thereby they can identify knowledge gaps and missing links among knowledge areas, make relevant and accessible knowledge transparent, support to find relevant knowledge, and assign tasks. (Schreiber, Höhnel 2002: 206)
Such a Knowledge Map[59] is a dynamic system, (Prusak 1999: 21) always in process and must be continuously updated. (Schnauffer, Voigt, Staiger 2004: 220)

> "(…) (N)o body of knowledge is ever final and complete. (…) to manage interdependence also implies the incessant reexamination of older bargains." (Haas 1990: 130)

Therefore any governance of interdependent units based on knowledge resources needs a process orientation, which allows self-organizing interaction among the autonomous units. (compare Haas 1990: 206/207)

> "Efforts to build knowledge collections in the hope that 'users will come' almost always encounter a disappointing response, since the builders find it difficult anticipate what knowledge users will want, and even if they succeed in theory, the users will regard the collection as something external and foreign unless they had a hand in designing and constructing it." (Denning 2006)

The maps and their continuous updates must be organized decentralized, bottom-up, and generate individual utility in the long-term. (Probst, Raub, Romhardt 1999: 114) A decentralized and

[59] Knowledge Maps are in contrast to Cognitive Maps a social construction of reality, while Cognitive Maps refer to how individuals and groups (Shared Maps) construct their reality. A Cognitive Map is more actor-dependent and indicates why actors behave in a certain way, saying nothing about the nature of the problem at stake, only about the dealings with the problem. Lehner criticizes that cognitive maps block innovations because they are meant to be a picture of reality but imply no changes. (Lehner 1996: 119)

bottom-up organization of a knowledge sharing system ensures that plural knowledge is considered and that even knowledge holders, who do not enjoy to have established trusted channels to policy makers, can participate. (compare Haas 1990) Thereby a self-organizing process might emerge through relatively informal communities of practice, which, however, can be exclusionary and thereby decrease the effectiveness of knowledge sharing. (Denning 2006) Therefore communities must balance openness with excellence, particularly in the case of scientific communities. Networks might ensure this balance by integrating different communities and thereby combine excellence of certain communities with the openness of maximized participation. Thus, self-organizing dynamics of knowledge sharing must be complemented by management interventions by leaders, the establishment of a central unit with an assigned budget to support the knowledge sharing processes, the setting of informal incentives, and the adaptation of technology to human capacities and practices, i.e. the mutual adaptation of structure and agency. These activities can foster the self-organizing processes. (Denning 2006)

The link between social relations and knowledge supports self-organizing processes among the network partners, and the link allows accessing knowledge more easily. On the other hand, accessing knowledge through a contact enables to exclude actors and price knowledge. The *price or charge for shared knowledge works as a signal in self-organizing processes* through increasing transparency and making information on opportunities for and value of collaboration more complete. However, pricing is not sufficient for the effectiveness and efficiency of self-organizing processes, neither it is desirable, for there is no rivalry in the use of strategic knowledge. The nearly free and open accessibility of good contacts and knowledge resources within the network must become a comparative advantage for network members. Only the services of the knowledge holder connected to the provided knowledge should be priced to cover additional costs of demanded services, to reflect the rivalry for the valuable service, and to set incentives for capable actors to offer their knowledge and services.

The possibility of gaining benefits from the exclusive use of an actor's contacts and knowledge is the reason why actors try to *monopolize* their social capital and knowledge resources, although in the long-term the accessibility of these resources for all actors would increase total utility and could create synergies. The greater the accessible knowledge and social capital contained in the network, the better in quality are the services of the network.

> "(C)ontrol over knowledge and information is an important dimension of power and (..) the diffusion of new ideas and information can lead to new patterns of behaviour and prove to be an important determinant of international policy coordination." (Haas 1992: 2)

The success of exerted influence depends on the quality of the epistemic community's relations to policy makers and if the epistemic community can create a consensus on the relevant knowledge. (Haas 1992: 30) However, as consensual knowledge is only rarely achievable due to a path-dependent and epistemologically biased use of knowledge, as Ernst Haas argues, (Haas 1990) knowledge holders organize and cooperate in informal networks to maximize the effect of their knowledge. Therefore, knowledge holders must deliver their expertise through legitimate channels to leaders. Legitimacy depends in large parts on the reputation of the scientists and that the generation of knowledge is "beyond suspicion of political bias of sponsors". These channels depend on trust of "personal networks". (Haas 2004: 129) In order to provide usable policy knowledge the networks of epistemic communities should pro-actively select and integrate certain actors, ensure interdisciplinary, complementary participation, avoid dependence on single actors, be open for debate and plural knowledge in order to be able to establish consensus, avoid government designation of scientists and prefer international and plural combination of experts to ensure independence, arrange interactions between scientists and policy makers to span boundaries, and keep actors involved through opportunities to implement cooperative projects. (Haas 2004: 131)

> "According to current organizational thinking, decentralized information-rich systems are the best design for addressing highly complex and tightly coupled problems. Thus international

> governance for sustainable development may be best served through a decentralized architecture coordinated by an electronically sophisticated hub that is capable of quickly accessing usable information and transmitting it to the appropriate institutional nodes in the network. (…) Such decentralized systems do not cede full autonomy to states or markets: rather they seek to engage states and markets with actors and policy networks which are sensitive to possible abuses of unfettered free markets." (Kanie, Haas, Murphy 2004: 276/277)

2.9.3.4 Partner Selection

If transaction costs are prohibitive, markets fail to produce activities and outcomes which are needed for sustainable development, which is often due to a lack of adequate capacities and human capital. Prohibitive transaction costs can be overcome through capacity development in the long-term and by lowering transaction costs in the short-term through finding an adequate partner within the global policy network. Trusted contacts in the network help to select the appropriate partner, and thereby the network serves as a marketplace where partners can offer their capacities for viable activities.

Hence, the question is how different actors can complement their resource endowments and capacities mutually and thereby create synergies. The **actor-centred institutionalism** by Scharpf and Mayntz explores such situations and interactions among international actors to form collective action. Scharpf (1997) distinguishes four modes of interaction – unilateral action, negotiated agreement, majority vote, and hierarchical direction (Scharpf 1997) – of which negotiated agreement best describes the interaction in global policy networks. Further on Scharpf distinguishes four forms of negotiated agreements – spot contracts or negative coordination, distributive bargaining, problem solving, and positive coordination (Scharpf 1997: 125-135) – and two dimensions – production and distribution dimension (Scharpf 1997: 120/121) – in which these agreements generate results. If partners are trusted and known in terms of their strategies, endowments, and orientations, which Scharpf differentiates in actors-related orientation, determining the rationale of an actor, (Scharpf 1997: 62-66) and relational interaction orientation, specifying the relations with other actors, (Scharpf 1997: 84/85) spot contracts in markets are possible. If, however, transaction costs are prohibitive due to a lack of knowledge about other actors and thereby the inability to anticipate one another's moves, the more managed problem-solving mode of interaction must produce outcomes. This mode and, hence, the partner selection function of networks belong predominantly to the "production dimension", for partners can be selected according to what outcome the partnership activity is supposed to produce and what strategies, resource and capacity endowments, and orientations are appropriate to this end.

Network partners must be *complementary* to make global cooperation prosper, which can be supported by identifying requirements and action which helps immediately to connect partners with complementary expectations, goals and visions or plans to act. (World Bank Knowledge Sharing Team 2004)

Thesis 4 on Governance through Networks:

To avoid prohibitive transaction costs when local capacities lack, *networks* ***provide transparency and a forum****, where potential partners can find one another, and at the same time networking can* ***pro-actively identify and connect partners with complementary capacities*** *for action for sustainable development in the short-term and develop capacities in the long-term.*

A Few Elucidatory Comments on Thesis 4:

In order to lower transaction costs for the creation of cooperation, actors can operate in networks based on a common strategy. The essential factor for *lowering transaction costs is trust* contained in social relations of networks. Trust or "empathy" (Müller 1994: 32) can help people to cooperate without any sort of insurance, which they would demand in a situation without trust before

cooperating with a compatible but alien partner. In fact, there have scientists been argueing that the lack of trust is the main reason for the failure of market development and transactions in developing countries. (Fukuyama 1995) However, trust is to a high degree the outcome of earlier successful cooperation and transactions. Thus the argument turns tautological and trust is merely an *epiphenomenon*. This analysis corresponds with the observation that cooperation in networks is prone to be repeated and to stabilize the collaborative relationship. (Sydow 1992: 302; and Messner 1995: 220) Nevertheless, trust can have distorting effects if trusted partners are selected from a different societal context which is irrelevant for the actual transaction, for instance, if family members are chosen as suppliers instead of the supplier cheapest and best in quality. The social capital contained in networks, however, can arrange cooperation without distorting effects if the used contacts originate within the specific network context and the trust contained in these relations is merely epiphenomenal, coming from successful collaboration of network partners.

2.9.3.5 Coordination

If activities, technologies, or products cause negative external effects, market mechanisms do not internalize these effects in prices. Beneficiaries of these activities and users of these technologies and products, thereby, do not pay all costs incurred. Other actors must carry at least part of the burden. Users of non-sustainable energy pollute the global environment. The costs of climate change are worst for the poor who contribute least to the causes of climate change but can hardly afford adaptation. Those actors, who rely on others to save the climate and to invest in sustainable energy, act as free-riders, enjoying positive external effects in form of a stable climate.

In order to force free-riders to internalize the external costs, which their action causes, an international regime had to set international market prices for energy right, including unpriced costs. The emissions certificate trade of the Kyoto climate regime does that by limiting the maximal amount of greenhouse gas emissions for industrialized countries, assigning sort of property rights in the atmosphere to store greenhouse gas, and initiating trade of these allowances to emit. Thereby, a price for non-sustainable activities can emerge. However, experiences of climate negotiations have shown that not all relevant actors accepted limits on greenhouse gas emissions and some did not ratify the Kyoto protocol. That's why negotiations for an international climate regime need a parallel flexible approach like global policy networks to promote the transition to more sustainable energy systems even in the absence of a regime setting market prices right to internalize external costs.

Without instruments at hand to exchange "costly signals" enforcing sustainable action, coordination through open communication and trustful cooperation is without alternative. (Messner 1995: 232) Communicative action, so-called "cheap talk", (Risse 2000: 8) means to consider external effects even if that might infringe own interests, and to understand and internalize other actors' interests when taking strategic, rational and self-interested action. (Risse-Kappen 1995: 181) Communicative action must manage knowledge to make actors understand the external effects of their action. The long work of the IPCC basically formed this global understanding of the causal links between global energy economics and climate change. By understanding and considering external effects, actors can internalize these effects if partnership action offers opportunities for mutually beneficial action.

The communicative action approach of international relations theory is not so much a theory in the strict sense of the term, but reflects more generally an instrument of constructivist approaches to explain actors' behaviour in international politics. Although Risse explains how communicative action can apply to rationalist assumptions, as described above in section 2.4. (Risse 2000; Risse-Kappen 1995) Through mutual understanding and persuasion communicative action becomes effective. Müller argues that communicative action is necessary for strategic action to coordinate strategic activities of autonomous actors. (Müller 1994: 27) Messner agrees and recommends continuous coordination processes to avoid blockades. (Messner 1995: 217)

Globalization causes growing interdependencies and complexity and requires communication among an ever increasing number of actors. Regimes must become more flexible and allow communication processes, which make individual paths of development understandable as well as enable actors to influence and change their interests and identities mutually. (Hasenclever, Mayer, Rittberger 1997)
Considering a *common network governance strategy* will help to coordinate actions and internalize external effects even in a decentralized self-organizing network. In individual situations may targeted **communicative action** be necessary nevertheless. The exchange of information will help to identify interdependencies and consequences of individual actions. In this context the communicative action approach defines strategic action as "selection of appropriate means to control in an efficient way the social environment of actors". (Hasenclever, Mayer, Rittberger 1997: 176) Social relations are the means of that control. The use of social capital allows distributing certain knowledge. Communicative action enhances mutual understanding and coordinates by persuasive arguments. (Hasenclever, Mayer, Rittberger 1997: 176)

Thesis 5 on Governance through Networks:
*Network governance may be enhanced by **as free as possible communications** and feed back loops to enhance effectiveness in communicative action for coordination among actors, who intentionally match messages with target audiences, i.e. actor-/ recipient-specific rationales, and communication channels.*

A Few Elucidatory Comments on Thesis 5:
The World Bank (1999: 100) suggests in its "World Development Report: Knowledge for Development" to deal with external environmental effects by disseminating knowledge about environmental impacts, technologies, and performance. For actors must know the consequences of their action to consider sustainability, since no price system contains that information, neither do markets ensure an efficient allocation of environmental goods. However, that knowledge must not so much be persuasive, but enhance understanding of medium- to long-term external effects and possible backlashes by nature or society, clients, and consumers, or respective necessities for regulations by governments or international regimes.
Precondition for communicative action is that actors acknowledge one another and that actors are capable of empathy to understand the message contained in communications. In order to communicate persuasive arguments, trusted relations and scientific knowledge represent the managerial resources for actors to take communicative strategic action. (Müller 1994: 27, 31 and 35) That's why messages must match recipients and channels of communication. (Obser 1999: 63)

2.9.3.6 Implementation
The time horizon of an investment and its time of having depreciated its costs of financing for the investor can become a question of redistribution between generations: who benefits, who pays the costs? Or the benefits of the investment are distributed in space among different groups to varying shares:

> "The poorest people often live in the most ecologically sensitive and vulnerable physical locations. These areas may be the most affected by the predicted effects of climate change such as increased frequency of exreme events." (DFID 2002: 9)

Thus an investment may be too costly for an individual actor or generation.
Networks *distribute high costs of investments among many actors* and make investments possible where single actors could not afford the investment, as for example innovation networks share the high upfront costs of research and development. Implementation of partnership activities in collective action increases the accessible capacities and shares the costs, thereby public goods, which are not appropriable by private actors, can be financed in common while their consumption

is not rivalrous and benefits all actors like a stable climate. Hence, long-term effects can be considered by actors in markets and long-term investments *can* be realized. Though incentives for free-riding must not be too big which might deter many actors from commitment to global policy networks.

Scharpf calls the distribution of costs and benefits in order to reach collective action the "distributive dimension" (Scharpf 1997: 120/121) of the policy cycle. The **actor-centred institutionalism** (see section 2.9.3.4) analyzes the actor-related orientations and the relational interaction orientations of actors to explain why certain actors cooperate in certain institutional settings. Scharpf distinguishes five orientations of actors, signifying their individual rationales why and how to act: Cognitive orientations refer to knowledge and perceptions, and deal with uncertainties by learning processes in reasoning individual action; preferences give reason to the action of rational actors; basic self-interest orients individual action to the satisfaction of needs of physical well-being and social recognition; normative role orientations determine individual action in reference to social expectations; and identities represent relatively stable patterns of individual action, thereby reducing search costs for appropriate behavior and making individual action predictable. (Scharpf 1997: 62-66) The interaction modes determine how actors behave in relation to other actors: Individualism refers to actors, solely considering their own utility; solidarity considers ego's and alter's utility; altruism solely alter's utility; competition prefers action to increase ego's utility and alter's loss; and hostility is solely interested in the losses of alter. (Scharpf 1997: 84-86)

These orientations comprise both the paradigm of constructivist sociological man and of rationalist economic man. Indeed, network partners need to consider interests as well as identities, resource endowments as well as orientations of one another when they cooperate and start collective action to implement action for sustainable development. The orientations represent a general readiness of actors to cooperate or not. The solidarity interaction mode "defines the precondition of unrestricted cooperation". (Scharpf 1997: 85)

Thesis 6 on Governance through Networks:

Capacities and resource endowments of partners must be as complementary as the partners' orientations: ***Orientations of partners must match*** *to enable partners to collaborate and to implement long-term strategic action because they are more capable and ready to share risks and costs of activities producing sustainable outcomes.*

Table 3: Synopsis of Corresponding Market Failures, Network Functions, and Theoretical Approaches

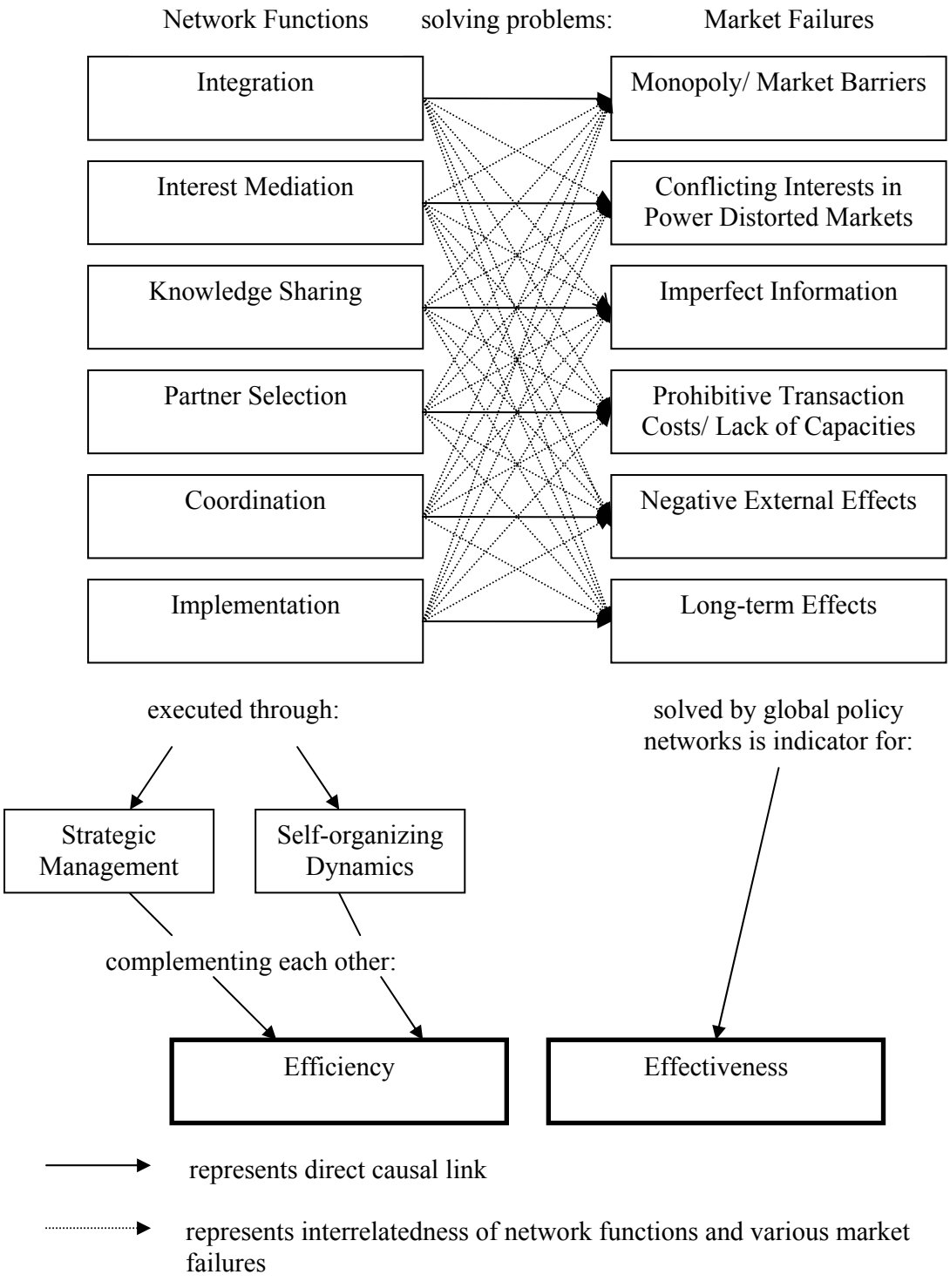
The following network governance functions are each responding to another energy market failure. Conclusions on how to execute the respective network governance functions are deduced from a corresponding theoretical approach:

Failure of self-organizing processes	Functions of network	Corresponding theoretical approaches *Belonging to strand of theory*	Strategic question to be considered
Barriers to enter the market and the network	Integration	Strong Cognitivism *Constructivism*	Who is excluded? └ who should be integrated
Misallocation of resources	Interest mediation	Institutional bargaining (Integrative bargaining) *Rationalism/ game theory*	Which sector has which interests? └ design project and integrate actors until every stakeholder has an interest in the success of the project
Imperfect information	Knowledge sharing	Weak Cognitivism (epistemological) *Constructivism*	Which knowledge must be considered? └ Knowledge Map: which stakeholders must participate
Prohibitive transaction costs	Partner selection	Actor-centred institutionalism *Rationalism/ game theory*	Which capacities lack? └ Actors' Catalogue: who provides needed capacities and where to find these partners
External Effects	Coordination	Communicative action *Constructivism*	Who is affected? └ adress stakeholders in free and individually adapted communication
Prohibitive costs of investment	Implementation	Actor-centred institutionalism *Rationalism/ game theory*	Who is affected in future? └ include stakeholders (if they are already there) and share costs and risks of implementation

Following the theoretical approaches, the last column lists the strategic questions that have to be considered in practice when addressing certain market failures. The theses on strategic action for governance through networks identify strategic action how to manage the corresponding network governance functions.

The theses on the effective execution of network governance functions will be tested in a qualitative research in order to explore the causal relations between the independent variable of a network governance strategy and the dependent variables of effectiveness and efficiency of network activities, as the following graphic is supposed to illustrate, and explain how that strategy can contribute to more effectiveness and efficiency of global governance.

Diagram 4: Graphic representation of qualitative causal relations of independent to dependent variables:



3. The Jazzier Dance of Partnerships

"This Summit will be remembered not for the treaties, the commitments, or the declarations it produced, but for the first stirrings of a new way of governing the global commons – the beginnings of a shift from the stiff formal waltz of traditional diplomacy to the jazzier dance of improvisational solution-oriented partnerships that may include non-government organizations, willing governments and other stakeholders."

(Jonathan Lash (President of the World Resources Institute), Washington D.C. and Johannesburg, September 4, 2002)

3. A Phase 0: The Run-up to Global Policy Networks

Before the phases of network development of the scrutinized networks will be explored, this section will describe the background situation from which the sustainable energy related global policy networks emerged.

3.1 The Series of World Conferences on Sustainable Development

The partnership approach gained prominence in the realm of international politics when it was acknowledged as official outcome at the WSSD in 2002. Until – and after – the process reached this summit, it took a long way to develop and become salient as a concept in global environmental governance.

The Rio de Janeiro Earth Summit 1992 (UNCED) gave a start to the series of world conferences on development and environment under the UN umbrella and significantly increased the participation of non-state actors. Among the conference participants have been numerous business leaders as well as NGO representatives. The UNCED launched sort of a participatory global legislative decision-making process: The Agenda 21, a major outcome of the conference and sort of a global action plan on economic, social and environment challenges, outlined how to change structures of various issues of national to local policies in order to achieve sustainable development. As there was no global authority, however, to monitor and control the agenda's implementation, the 'Thinking Globally, Acting Locally' slogan turned out to be the virtual strategy for implementation. Non-compliance with the Agenda 21 – as with the UNFCCC, another major conference outcome – could never be sanctioned, thus independent actors at the local level are supposed to consider global environmental issues and act locally and voluntarily. In order to support an effective follow-up, the Commission on Sustainable Development (CSD) was established which has hosted ever since annually issue-specific meetings at the UN headquarters in New York to carry on with the process and maintain the momentum. The CSD was later nominated to become the sort of focal point in the UN system for the type II partnerships. CSD-9 in 2000 is widely acknowledged for highlighting the significance of partnerships and of information for sustainable development. Since 2004 the CSD sessions revolve around the five main subjects of the WSSD water, energy, health, agriculture, and biodiversity each in two year cycles with a first review session and in the second year a policy session.

Particularly the UNFCCC needed some legally binding agreements on mechanisms and mandatory commitments by national governments to organize an effective mitigation of climate change. The parties to the UNFCCC meet annually in Conferences Of the Parties (COPs) and twice a year in the Subsidiary Bodies for Implementation (SBI) and for Scientific and Technological Advice (SBSTA). In 1997, at COP-3, the Kyoto-Protocol to the UNFCCC could successfully be negotiated finally where national governments of industrialized countries were obliged to reach individual targets to reduce greenhouse gas emissions. To this end, the emissions certificate trade together with the CDM, allowing industrialized countries to reach their emission reduction targets by investing in clean technologies in developing countries, and JI, allowing

industrialized countries to achieve their reductions in common projects, were established as flexible mechanisms to create a global market for how to reduce greenhouse gas emissions. However, due to the reluctance of the US Senate and later on of the George Bush jr. administration to ratify the protocol, it took another eight years until the Kyoto-Protocol became internationally binding law through Russia's ratification on February 16, 2005.

Therefore, in the meantime, the next summit on sustainable development after the Rio Earth Summit had to come up with something new how to promote policies on climate change mitigation and sustainable development. Hence, during the preparation for WSSD the idea to make voluntary partnerships with non-state actors an official conference outcome and an instrument for sustainable development was born. At an informal preparatory meeting to the WSSD on Bali, Indonesia, in June 2002, participants agreed to the "Bali Guiding Principles for Partnerships for Sustainable Development" (Kara, Quarless 2002) defining what type II partnerships are supposed to achieve for sustainable development.

These so-called type II partnerships turned out to be the truly new outcome of the summit though partnerships have been considered important already since the Rio Earth Summit. (Ivanova 2003: 10) For the Johannesburg Plan of Implementation (JPoI) as intergovernmentally-agreed outcome of the WSSD mainly reaffirmed the outcomes of the Earth Summit. The "Framework for Action on Energy", another outcome of the conference, claims in its energy chapter to outline a "road-map for action" (WEHAB Working Group 2002: 15) for sustainable energy. In fact, it merely lists targets for action, but does not provide a strategy how to reach these targets nor does it provide a framework how to instigate and foster the action for sustainable development.

Ambitions to agree on binding clear and ambitious time bound targets for the expansion of renewable energies were blocked at the WSSD, which was why the EU and Small Island Developing States formed the Johannesburg Renewable Energy Coalition (JREC) and the German government invited the international community to the renewables2004 – International Conference for Renewable Energies, Bonn, where the launch of a global policy network for renewable energy was announced in the official Political Declaration of the conference. This conference coincided with a significant climb of the oil price which all of a sudden made energy security an issue of public awareness.

The process of climate policies gained new momentum when Tony Blair, president of the G-8 in 2005, announced to push climate change to the top of the agenda of the G-8 Summit in Gleneagles, Scotland, in July 2005. Like two years later in Heiligendamm, Germany, there were no binding targets reached but the prominent event raised global awareness for climate change and G-8 leaders launched a "Gleneagles Dialogue on Climate Change, Clean Energy and Sustainable Development" at ministerial level.

For the time being, CSD-14 and 15 have been the climax in the partnerships-for-sustainable-energy process, followed by the G-8 Summit in Heiligendamm, a high-level UN meeting convened by Secretary-General Ban Ki-Moon, and the Major Economies Meeting hosted by the United States of which none produced clear and binding outcomes but merely prepared the negotiations of a post-Kyoto regime in Bali in December 2007. The CSD sessions 14 and 15 comprised the two year cycle on energy in the CSD process. While the review session served the purpose to present the achievements so far and the various activities of partnerships, and to share information and experiences, the policy session was supposed to produce some policy outcomes and intergovernmentally-agreed targets. The review session reflected the progress made among actors in the process of sustainable development, but the policy session failed to agree to ambitious targets reflecting the progress made. That's why the EU representatives refused to sign the final declaration and CSD-15 basically ended without an official negotiated outcome. In consequence, the CSD as such or at least its current form was questioned.

The Bali summit in December 2007 was considered to be the last chance to negotiate a post-2012 regime, or rather a timetable for a negotiation process on mechanisms of such a regime. The success of that process to erect an international effective climate and energy regime partially

depends on if non-state actors and complementary mechanisms will have the capacities to implement mitigation actions and reach emission reduction targets of such a regime.
The series of conferences produced numerous proposals and repeatedly reaffirmed old ones what structural adjustments needed to be made for sustainable development, however, without achieving to agree to binding targets. The networks which emerged as merely a by-product of the conferences are supposed to develop action plans and organize collaborative action in order to implement the needed structural adjustments.

3.1.1 The WSSD and the CSD Process: The Partnership Approach

Originally, networks emerged from the NGO world and based on "wishful thinking", as one interviewee from the inner circle of one of the explored networks stated, however, now, there is little idealism in the field of sustainable energy for development.

> "Looking at the antecedents of initiatives, it is obvious that there is a relationship to negotiated outcomes of the UN- and other multilateral conferences. (…) the partnerships, conferences and voluntary commitments have been created partly to compensate the lack of concreteness and impulse from WSSD. (…) Since Johannesburg, the dichotomy of a comprehensive but general committing outcome (JPoI) and partial issue-specific initiatives (Type II Partnerships) began to exist." (Suding, Lempp 2007: 7)

Hence, the partnership approach made a virtue out of necessity, nevertheless "(p)artnerships have been recognized as one of the most innovative outcomes of the World Summit (…)." (Annan 2006: 20) In 2005, Mats Karlsson, chair of UN-Energy,[60] and Thomas Johansson, director of the IIIEE, highlighted that instead of mega institutions global networks are important to tackle long-term sustainable development objectives. (IISD 2005e)
In preparation of the WSSD, the 'Bali Guiding Principles For Partnerships For Sustainable Development' were developed at two informal meetings of the Preparatory Committee to the WSSD. These principles make clear that partnerships with non-state actors do not "substitute strong commitments by governments (…), rather they should reinforce the implementation of (intergovernmentally agreed) commitments through concrete action." (Kara, Quarless 2002) At the preparatory meetings as well as later on at the summit, particularly representatives from NGOs and developing countries were worried that the type II-outcome could be misused by developed countries' governments to avoid strong commitments and financial aid. (Witte, Streck, Benner 2003: 60) Therefore, the 'Guiding Principles' emphasize that the partnerships shall mobilize additional resources.
With regards to the management of partnerships, the 'Guiding Principles' recommend "ownership of the partnership process", openness and transparency, that partnerships should involve the local level, should "integrate the economic, social and environmental dimensions of sustainable development", should combine partners in a multi-stakeholder approach, and that the Commission on Sustainable Development should serve all type II partnerships as a focal point. (Kara, Quarless 2002)

> "It was generally understood that partnerships for sustainable development are of a voluntary, self-organizing nature. The framework for their elaboration should therefore be flexible enough to allow for creativity and innovative ideas." (Kara, Quarless 2002)

This flexibility allows "(…) to improve the quality of implementation by involving those stakeholders whose activities have a direct impact on sustainable development", (Ivanova 2003: 15) but on the other hand this flexibility leaves unanswered "(…) how the recommendations on partnership management would be turned into action (…)" (Ivanova 2003: 19) The 'Guiding Principles' are not a strategy for partnership management, or – in a wider context – network governance, which, however, is needed to increase effectiveness of international cooperation, as,

[60] UN-Energy is the principal inter-agency mechanism in the UN system in the field of energy. [UN-Energy: Energy in the United Nations: An Overview of UN-Energy Activities. 2006, p. 2]

for instance, Stephen Karekezi, director of AFREPREN, stated at the GFSE-5 highlighting the benefits of a *common strategy*. (IISD 2005e)
The CSD has started in 2006 to establish a matrix of case studies of partnerships to fill this lack of strategy. However, this database of case studies works as collection of examples for more or less successful partnerships and the management thereof. It does not tell how to manage networks in order to execute certain governance functions, which partnerships are supposed to execute more effectively than states and intergovernmental organizations in the context of globalization. (Andonova, Levy 2003/2004: 19) And Andonova and Levy believe that there might emerge something like a strategy how to manage partnerships, but doubt that there will be ever "overarching co-ordination" to diffuse that strategy. They predict rather that this strategy might form what Young called a "spontaneous regime". (Young 1982)
The CSD, originally founded as institutional follow-up of the Earth Summit in Rio, 1992, was chosen to become the institutional follow-up of the WSSD outcomes. The CSD organizes once a year a two weeks conference at the UN Headquarters in New York. These conferences focus in two year cycles on the WEHAB issues – Water, Energy, Habitat, Agriculture, Biodiversity – of the WSSD. The first year of each cycle is a 'Review Year' to assess progress and prepare in-depth analysis for the second year. The second year is the 'Policy Year' which is supposed to examine and recommend policies to overcome constraints. (Annan 2003: 11) The energy issue's two year cycle was 2006 to 2007, the CSD 2007 finished with a clash of the EU and the other nations, for the EU refused to sign the final declaration which was a step backwards in terms of aspirations to a global energy and climate regime. This stir left the question unanswered what purpose the CSD might be able to have in future.
The report of the Secretary General to the CSD-11 focused on the future role of the CSD for partnerships as a follow-up to the WSSD. It listed six *functions* to increase the effectiveness of partnerships: advocacy, clearing house for information, policy coherence, encouraging and facilitating collaborative arrangements, strengthening the knowledge base, and promoting stronger linkages between global, regional and national activities. (Annan 2003: 18) This list of aspired achievements left open, however, how to achieve them. The CSD is also supposed to be a forum for partnerships to present themselves in order to identify opportunities for cooperation among actors and to exchange experiences, and to create online communities of practice. Thereby, partnerships shall be supported to build alliances with other partnerships working in complementary areas (Annan 2006: 19/20) and thus forming a *division of labor*, which was confirmed to be aspired and to happen in several interviews. (compare also Suding, Lempp 2007: 4) At a meeting of representatives from EUEI, GVEP, REEEP, GNESD, and JREC, "(t)here was general consensus about the need for knowing who is doing what in which country, to share resources and avoid paralleling other Initiative's efforts." (EUEI 2003b: 1) In order to achieve that aspired coordination, the task ahead was to "(m)ap ongoing work of each Initiative in every country". (EUEI 2003b: 3)
For instance, the cooperation of GVEP and REEEP creates synergies because they coordinate their activities and harness GVEP's technical in-country expertise and wider outreach to the local level, while REEEP supports the legislative and regulatory framework of the marketplace for sustainable energy at the national level. (REEEP 2005d) GVEP and GNESD were planning to cooperate and to link GVEP's knowledge management service line to the knowledge network of GNESD. Fatima Denton, who worked with the UNEP Risoe Center, which hosted GNESD's secretariat, was supposed to take the lead of GVEP's knowledge management. GNESD and REEEP cooperate to the end that REEEP implements advice from GNESD's analysis and loops "the practical work back to the policy analysis", (REEEP 2006b) thereby allowing to generate cross-knowledge and apply knowledge from other countries and regions. In order to ensure the complementarity of activities of the different type II partnerships, members of GVEP's initial Technical Secretariat have been involved in GNESD as well as EUEI. (GVEP 2002) In general,

"(c)ollaboration includes sharing knowledge on related developments in the energy practice." (GVEP 2007a)

Energy for sustainable development and climate are among those issues addressed by most partnerships. (Annan 2006: 7; Hale, Mauzerall 2004: 233) The report of the Secretary General to the CSD-14 on partnerships named the mechanisms to implement partnerships through dialogue and knowledge:

> "Partnerships active in the thematic cluster (energy for sustainable development, industrial development, air pollution/ atmosphere and climate change, S.W.) are working to create global policy networks that promote dialogue and knowledge sharing." (Annan 2006: 18)

Partnerships, thereby, feed into global governance through global policy networks harnessing knowledge and relations, which is dialogue as the most general form of relations among actors, as *managerial resources*.

The CSD-website describes the governance of partnerships as "through a variety of mutually agreed mechanisms", (UNDESA 2007) however, the partnership approach is characterized by rather informal and collaborative forms of governance. Generally, network partners cooperate informally, but as soon as they collaborate in concrete partnership action they usually define explicit rules and contract partners formally. Due to the voluntary nature of partnerships partners can hardly be held accountable unless they signed a contract for some specific partnership action, and monitoring, though financiers demand that, is difficult and often not at all to carry out, especially if quantifiable results are demanded. (Bennouna 2005: 6 and 9) However, as networks are no substitutes for treaties they do not obey the same formal requirements of accountability and monitoring.

The voluntary and informal nature of networks is one reason why mostly semi-public resources like knowledge and good contacts are managerial resources in networks, while the harder factors of financing and power are hardly redistributed. This, however, causes probably one of the biggest obstacles to networks. Networks are perceived as having high opportunity costs, the soft resources of networks and what they promise to achieve seem to be less effective than other activities. Therefore, time-consuming networking is often compared to alternative activities and many actors conclude that the alternative activities would be more effective, as an internal World Bank study, which explored and compared among other networks GVEP, REEEP, GNESD and EUEI, found out.

Although uneven power and resource relations are seen mostly as an unresolved issue for partnerships, (Bennouna 2005: 6) such asymmetries can be, as we have seen in section 2.6.1, the "source of productive benefits". (Williamson 1996c)

3. B Phase I: The Emergence of Global Policy Networks

In the first phase of network development, global policy networks take form as start-ups defining their governance structure. This section will briefly present the history of each of the scrutinized type II partnerships, describe how the networks are designed to be governed, and sketch who commits to the network and which roles different actors play.

3.2 History

GVEP – Global Village Energy Partnership

During the 1990s World Bank's ESMAP, USAID, the US Department of Energy, NREL, Winrock International, and several private companies organized a series of Village Power Conferences. These conferences basically had the same functions like policy networks have, or, vice versa, networks are sort of permanently continued conferences. After the Village Power 2000 Conference, several organizations set up a 10 year program on energy access. This program was the origin of GVEP. At the beginning ESMAP hosted the Technical Secretariat. On August 31, 2002, GVEP was launched as a type II partnership at the WSSD. (GVEP 2007a) A Consultative Executive Board, comprising 35 members from partner organizations from all sectors, determined the rules and procedures of GVEP governance. (GVEP 2004b)

While the process of relocating the Technical Secretariat began already at the first Partnership Board meeting, the Technical Secretariat moved out of the World Bank only in 2004 and Practical Action (PA), formerly the Intermediate Technology Development Group (ITDG), in Rugby took over as host organization. (GVEP 2007a) With that move GVEP installed a GVEP Manager, a former director of the Ghana-based Kumasi Institute of Technology & Environment (KITE), as head of the Technical Secretariat being responsible for strategic planning, guidance support for the secretariat and successful implementation of GVEP's work program. (GVEP 2004f: 1)

In July 2006, GVEP International, an international NGO as core organization for GVEP's network, emerged and moved again from PA to an own office located in London. GVEP International was founded to enable GVEP to channel funding directly instead of through an organization with an own legal body. (GVEP 2007a)

REEEP – Renewable Energy and Energy Efficiency Partnership

> "(…) (P)artnerships will be crucial to the future of sustainable development (…) We need a new kind of partnership that draws on the expertise of everyone with a stake in sustainable development." (REEEP 2007b)

This quote of Tony Blair is posted on the homepage of REEEP and expresses the impetus which led to the creation of REEEP. The British government announced REEEP at the WSSD, while the actual launch was on October 23, 2003 in London at a particular launch conference with representatives participating from Germany, France, USA, Brazil, India, as well as from the private sector, from NGOs, and from IGOs. Afterwards the secretariat was headed by Graham Clough from the Foreign and Commonwealth Office in Vienna, who also represented REEEP in the first time before REEEP was actually becoming operational a half year later with Marianne Osterkorn taking office as full time International Director of the International Secretariat in 2004. In these first few months of existence of the network, a Steering Committee and an initial Governing Board was put together, partners, predominantly governments, donating at least 50,000 British Pound were approached, and an initial work programme and the regional structure have already started to be worked out.

After Marianne Osterkorn taking over management, REEEP began to grow steadily in numbers of partners and of available financing, as well as in numbers of secretariat staff from two in 2003 to 17 in 2007, of which approximately ten are located continuously at the secretariat in Vienna, where the international secretariat is hosted by the UNIDO.

GNESD – Global Network on Energy for Sustainable Development

GNESD was launched by UNEP at the WSSD on September 1, 2002. It is a research network of 20 centres of excellence committed to energy issues from all over the world, from developing as well as industrialized countries.

> "The idea of a Network was developed by UNEP in cooperation with the UNDP, UNIDO, UN DESA and The World Bank drawing on proposals and inputs from the energy centres themselves. Initial funding partners are the governments of Germany, France, United Kingdom, Denmark, and the UN Foundation." (UNEP 2002)

While the idea became salient in the 1990s, the first proposal was put forward at the CSD-9 in 2001, as John Christensen remembered. (Interview August 16, 2005)

The initial meeting after the official launch had to define who would become a member of the network. However, at that first meeting no appointments were made, no leadership assigned. And nothing happened afterwards. No – self-organizing – activities emerged. A management approach had to be put in place first.

By agreeing on clear objectives like two research themes and assigning clear-cut roles and responsibilities, GNESD could start to become operational. In November 2002 Energy Access was launched as first research theme. (CSD Partnership Database 2006b) Particularly because the individuals whose collaboration should be fostered and supported had already personal relations to large parts and knew one another by heart, the task of the GNESD secretariat had a good base to start from.

EUEI – European Union Energy Initiative for Poverty Eradication and Sustainable Development

EUEI was launched at the WSSD. In the context of the WSSD, the European governments launched this initiative for mapping activities to collect figures on energy-related development activities to be able to compare the European governments' energy-related expenses and effectiveness of development cooperation. As no new implementing activities were supposed to be started from that launch but only former activities should be mapped and coordinated, EUEI took quite some time to analyze the situation in the field of sustainable energy for development and identify needs of developing countries as well as gaps in EU activities. During this phase conference appearances were made and workshops organized, partnerships were created but became operational in a second phase later on. EUEI was laid out that way from the beginning.

The planning of two of three programs of EUEI started already in 2003, but started operations only in 2005. Another program was proposed in 2004 and began in 2006 to prepare first implementing activities. From that time on, EUEI reached a new stage in their development and thanks to the massive financial power of the EUEI's programs in their effectiveness.

REN21 – Renewable Energy Network for the 21st century

REN21 was embraced in the Political Declaration of the renewables2004 – International Conference on Renewable Energies, Bonn, meant as alternative action to the founding of IRENA, an international Renewables Energy Agency as proposed originally by the North-South Commission headed by Willy Brandt and as counterpart to the IAEA. REN21 was finally launched one year after. The problem in the debate on the structure of the international system and intergovernmental organizations is that an unnecessary growth in number of IGOs shall be avoided. Consequently, no new IGO was launched but a network of already existing actors of international politics.

However, the German government, having been the host of the conference, did not want to assume leadership again in the development of the global policy network. Without leadership no initiative emerged until a consultation process among 70 interested stakeholders with received feedback from 42 was undertaken in September/ October 2004 (REN21 2004c: 1) and the German GTZ, which organized the conference already, hosted a preparatory workshop in Berlin on October 18 and 19, 2004 with some 40 distinguished individuals, some of them being active in the

other type II partnerships. It was debated if a new network were needed at all, and if so, which functions it should perform. This discussion went on even until after the official launch of the network. From the Berlin workshop, an Interim Steering Committee with an Interim Work Plan emerged under the lead of the German government and started a series of meetings. The establishment of an Interim Steering Committee, originating from the International Steering Committee of the renewables2004, was necessary in order to balance self-organizing dynamics with intentional network management. (REN21 2004a: 4) GTZ and WWI carried out interim secretariat functions, (REN21 2005e) led an extensive consultation process including more than 100 governments and non-governmental stakeholders. (REN21 2005a: 1)

It was proposed that REN21 could perform an umbrella function for other networks (REN21 2004a: 4) and contribute mainly to knowledge management and "provide a common influencing strategy – a virtual renewables2004." (REN21 2004c: 1)

> "REGPN could help bring different initiatives together, coordinate the respective working fields, clarifying their focus in order to reduce overlaps and make their work more effective." (REN21 2004c: 5)

This proposed role, however, resembled too much a hierarchical, superordinate organization and was therefore criticized. Finally, at the first meeting of the Interim Steering Committee on February 14 and 15, 2005 in Casablanca, "(c)onsensus developed that it should connect networks and initiatives on the political level with those on the ground." (REN21 2005e)

After a long-winded process of designing a governance structure and defining a role to play for REN21, in June 2005, REN21 was officially launched in Copenhagen with BMU and BMZ, convenors of renewables2004, as initiators of REN21. (REN21 2005a: 1) At this meeting the Interim Steering Committee agreed on the establishment of several other Committees with specific tasks, as well as a Bureau and how to provide a secretariat, thereby defining the governance structure of REN21 in large parts. The first Interim Steering Committee meeting in February 2005 decided on a draft workplan for REN21, (REN21 2005b) but only in November 2005 in Beijing the definition of central tasks of REN21 was finalized. And in February 2006, the permanent secretariat started to work in Paris, hosted by UNEP in cooperation with GTZ, after having declined another offer of EREC.

Since that start of operations, the Steering Committee held its fourth and fifth meeting in May 2006 in New York, parallel to the CSD 14, and in January/ February 2007 in the Renewable Energy House in Brussels, following the European Renewable Energy Policy Conference. REN21 has now reached a phase in which they carry out ongoing activities like the follow-up on the International Action Programme, a list of approximately 200 voluntary specific actions announced at the renewables2004, and the publication and update of certain reports like the Renewables Global Status Report.

3.3 Governance Structures

GVEP

As the minutes of the Fourth Partnership Board Meeting said:

> "The Board needs to consider that GVEP is a new approach to energy delivery and represents a decentralized way of thinking, not the traditional top-down approach. (…) The Secretariat is working effectively from the top down through the existing work plan, but also needs to work from the bottom up. This bottom up approach is difficult but is what differentiates the Partnership and is an appropriate role for GVEP. The Board wants to see a broadening of constituencies to include the private sector, entrepreneurs, NGOs etc." (GVEP 2003c: 4 and 10)

Nevertheless, several Partnership Board members criticized that although GVEP activities are carried out in a participatory manner, they are, in fact, still organized in a top-down manner. (GVEP 2004a: 3)

GVEP partners gather for a biennial assembly as a platform to consult with each other on planned activities and principle decisions on the future direction of GVEP. This platform serves as well for the Technical Secretariat to report to the partners about progress and activities. (GVEP 2005a: 12) The first Partner Assembly brought together some 200 partners from over 40 countries in October 2005 in Brasilia, Brazil. (CSD Partnership Database 2006a) However, as one interviewee reported from GVEP partners in developing countries, it is simply not affordable for them to travel to that assembly from all over the world. Thus, they follow the reports on side-events and other thematic activities, which are interesting for them individually, on-line. For, this information, which they could gain, is not worthwhile for them compared to the travel expenses. Another interviewee, who worked at the time of the first GVEP Partners Assembly with Practical Action, the host of GVEP's Technical Secretariat at the time, stated that the financial burden for the Technical Secretariat was actually too much. Nevertheless, the partners in a network are, of course, the real agents and implementers of any action at all.

> "Partners provide both the demand for, and supply of the GVEP services." (GVEP 2005a: 12)

Without partners' action there would not be any activity. Hence, it makes only sense to focus on the partners in the governance structure.

The GVEP Partnership Board comprises 14 members and serves as an advisory body for the management team in the Technical Secretariat as well as to partners, donors and the broader international community. The members of the board serve only in a personal capacity not as representatives of their individual organizations. Nevertheless, there are seats on the board reserved for specific organizations or sectors to ensure that the board members represent all sectors. (GVEP 2004b) They provide leadership and outreach being a selected collection of high-ranking individuals of high reputation and excellent expertise with far-reaching personal contacts in the energy and development community. They do not engage in day-to-day operations of GVEP Technical Secretariat or GVEP International and have no fiduciary authority or responsibility. (GVEP 2007a)

The GVEP Technical Secretariat reports to the board. Basically, all GVEP activities to support the networking and partnership activities among GVEP partners are carried out by the secretariat. They prepare work plans, conduct fund raising, integrate partners pro-actively and build the partnership base, serve as focal point for information, deliver the GVEP services, and provide support to GVEP partners.

> "The GVEP Secretariat serves in a facilitation role to the partners, helping to ensure that partners deliver their knowledge, technical capabilities, and financial resources to implement GVEP country actions and related activities." (GVEP 2005a: 13)

The Technical Secretariat is organized internally along the service lines, GVEP provides. For each service line one secretariat member is accountable. Additionally, there is the status of so-called Resource Persons from key funding partner organizations, who belong neither to the Partnership Board nor to the Technical Secretariat. (GVEP 2004f: 2) The Technical Secretariat comprises

approximately seven persons. At least at first the Technical Secretariat was organized decentrally with secretariat members not being located at the location of the secretariat itself, but working from their home organization. This organizational pattern was seriously considered by the Partnership Board as model for the secretariat. (GVEP 2003c: 6) However, as one interviewee stated the secretariat members preferred to work together at one place allowing face-to-face interactions, which was realized when the secretariat moved to PA. The Partnership Board discussed to house the secretariat in a developing country, but, as one interviewee reported, a location in a developing country would have simply proved not practical. For, other regions could have difficulties with that location. Instead, regional nodes should be established. (GVEP 2004a: 5)

As GVEP's organization chart shows is the Technical Secretariat the central network hub, initiating network action of partners. (GVEP 2005a: 12) In this respect, there is hardly a decentralized management strategy, although the network partners carry out their activities in complete autonomy, just as the Technical Secretariat members come from different home organizations and thus keep their individual ties outside of the Technical Secretariat. GVEP resembles in fact rather a lean organization with a tiny budget than a network, but follows an intervening management approach as far as their material resource endowment allows them to. (Adams 2006) The Technical Secretariat ought to be sort of a panel which manages the support of self-organizing dynamics among the network partners in the allocation and use of the semi-public network resources of knowledge for innovations, project identification, and action planning, and social capital, building on relations to GVEP partners as donors, developing countries governments, NGOs, or local implementers. Knowledge and contacts to access and mobilize resources among partners are, in fact, considered as managerial resources, as Sarah Adams, Programme Coordinator with GVEP and now CEO of GVEP International, presented GVEP's activities and strategy at a side-event of CSD-14. (Adams 2006)

One challenge GVEP as a network must face is that good contacts among network partners can lead to market distortions and unsustainable projects. That's why GVEP supports only market-driven activities. (GVEP 2005a: 11)

REEEP

Ralph Alexander, chief executive of BP Gas, Power & Renewables, stated at the launch conference to the transition to sustainable energy future:

> "Partnerships are the only way forward here; no single faction can create the answer." (Alexander 2003)

The highest decision making body is the General Assembly where all partners meet every other year. As Marianne Osterkorn highlighted in the interview, other networks like GVEP and GNESD are included in the General Assembly to promote and organize cooperation with them. (Interview October 11, 2005)

The Governing Board, which is the central body in the governance structure, is accountable to the General Assembly. The Governing Board represents the different sectors and geographical regions, from which REEEP partners come. This body is responsible for the conduct of REEEP's business and that it obeys REEEP's mission. To that end, it consults with the Programme Board and the Finance Committee, and advises, on the basis of recommendations from Programme Board and Finance Committee, the International Secretariat. (REEEP 2005a: 3) In meetings of the Governing Board, conflicts are supposed to be solved. The work of the Governing Board is mainly operational and implementation-oriented.

In the Finance Committee all donors with an annual donation of at least € 70,000 hold a seat. It is supposed to link REEEP with the donor community, the financial sector, and private companies. The Finance Committee is assigned to oversee the finances of all bodies of REEEP and to recommend on financial aspects of REEEP's work and on fundraising. (REEEP 2005a: 3) The Governing Board has to decide on the recommendations of the Finance Committee and to advise

the International Secretariat for implementation. However, the strong financial muscle of the representatives from the Finance Committee allows them to decide on the program.
The Programme Board consists of experts from the regions, where REEEP is active, and from donors. They set biannual Work Programme priorities, support the International Secretariat with their expertise, and recommend on the steering committees' selection of projects to be funded by REEEP. (REEEP 2005a: 4) Basically, the Programme Board works on REEEP's global program, while the steering committees of regional partners develop regional action plans, invite partners' entries and select regional projects for funding.
The International Secretariat is hosted by UNIDO at the international city of the UN in Vienna.

> "The International Secretariat is the central service hub of the partnership responsible for dissemination of information, servicing the bodies of the governance structure, and providing guidance and support for the regional secretariats." (REEEP 2005a: 4)

The major part of the operational work is carried out by the International Secretariat. Its members develop and implement most strategic activities aimed at supporting the action of partners and the implementation of concrete partnership projects. Even strategic activities to foster self-organizing processes among the network partners are started and initiated by the secretariat members. Thereby, the International Secretariat has a natural leadership role to play in the network.
However, the International Secretariat is not able to coordinate and implement action at the local level. Therefore, REEEP has established nine regional secretariats. On the occasion of the opening of the seventh regional secretariat in Moscow in October 2005, the tasks of that regional secretariat were described as to facilitate knowledge exchange and cooperation between public, private, regional, national and intergovernmental organizations. The regional secretariat are responsible for the local outreach of REEEP, are supposed to work demand-driven, and receive on the basis of formal contracts certain financial support to ensure the achievement of REEEP objectives in the regions. (REEEP 2005a: 4)
The regional secretariats cover the regions of Central & Eastern Europe, East Asia, Latin America & the Caribbean, North America, Southern Africa, Russia, South Asia, and South East Asia & the Pacific. The host organizations are always institutions of fairly high reputation in the sustainable energy field, which offers opportunities to leverage influence. In Szentendre, Hungary, the regional secretariat is hosted by the Regional Environmental Center (REC), in China by the Chinese Renewable Energy Industries Association (CREIA), the Latin American & Caribbean host is the Organization of American States (OAS) in whose offices in Washington, D.C. the regional secretariat is located. The North American regional secretariat is in Washington, D.C., too, hosted by the American Council On Renewable Energy (ACORE) and the Alliance to Save Energy (ASE). AGAMA Energy in Capetown, South Africa, hosts the regional secretariat for Africa. So far this region comprises not all countries from Sub-Saharan Africa, while North Africa is merely represented by a Focal Point. The regional secretariat in Moscow, Russia, hosted by the Regional Environmental Center, covers the region of the former Soviet Union. In New Delhi, India, the Asian Energy Institute (AEI) is the host, and in Melbourne, Australia, the Australian Business Council on Sustainable Energy (BSCE).
The regional secretariats are supposed to harness industrial knowledge for bottom-up cooperation and to foster exchanges on legislative and regulatory frameworks with REEEP regional networks from other parts of the world. (REEEP 2006c) Additionally, there is a regional focal point for Northern Africa, held by a voluntary representative of REEEP.
REEEP works very informal and has hardly established rules. The overall institutionalization of the network is kept small in order to avoid dependence on certain sponsors and governments. REEEP rather harnesses self-organizing processes among the partners to execute certain functions, as one interviewee from the International Secretariat confirmed. Only contracts with host organizations of Regional Secretariats have to be clear-cut. They are obliged to gain a certain number of new partners, and must make annual communication plans which operationalize

REEEP's global communication strategy. Apart from that, Regional Secretariats work relatively autonomous.
Marianne Osterkorn, International Director of REEEP, prefers to see the network of REEEP as a lean organization and follows clearly a management approach of targeted interventions and explicit contracts with the regional secretariats, for instance. (Interview October 11, 2005) In this sense, REEEP implements its global strategy in a top-down manner, though with regards to the autonomy of the regional secretariats and how regional partners collect project proposals for funding, REEEP combines top-down and bottom-up management approaches. One interviewee criticized REEEP's governance and particularly its provision of knowledge to local actors as top-down and not familiar with local conditions. Another interviewee observed an evolution from central guidance to decentralized decision-making in REEEP without a specific point in time when to switch from one form of governance to the other. This evolution is confirmed by research on networks. (Creech, Willard 2001: 73)

GNESD
The Network Assembly meets once a year and comprises delegates from the partner research centres. The Network Assembly has to approve the documents put forward to them by the Steering Committee like the work program and the budget and decides about new centres as members. GVEP, REEEP and EUEI contributed in the Network Assembly and pointed out possibilities for collaboration. (GNESD 2004a: 1 and 4)
The Steering Committee consists of representatives from the research institutes, with the majority coming from the developing countries' institutes, and from donors. Additionally, two Co-chairs, one from a developing country, one from an industrialized country institute, preside the Steering Committee, and one seat is taken by a UNEP representative. The Steering Committee prepares together with the GNESD Secretariat the strategic plan, the work program, progress reports, and other documents to be submitted to the Network Assembly. (GNESD 2007)
The GNESD Secretariat is situated in Roskilde, Denmark, with the UNEP Risoe Centre and is supposed to facilitate and coordinate research cooperation. The secretariat's role is to coordinate and facilitate the research carried out by the researchers in the partner institutes independently. The value added of GNESD lies mainly in the generation and exchange of comparable data through the work on same research questions. Thereby, knowledge on the impact of and experiences with certain energy policies from one country and region can be applied to the development of energy policies in other countries and regions. To this and, the secretariat contracts research institutes from among the GNESD members to work on specific research themes and develops communication instruments to disseminate the generated knowledge on energy policies among policy makers.
The actual research on the specific themes, energy access and renewable energy for poverty reduction, is organized in Ad Hoc Working Groups, in which researchers carrying out their individual research independently and decentralized cooperate. The constitution and facilitation of these Ad Hoc Working Groups is part of the work of the secretariat.
GNESD is a UNEP facilitated knowledge network forming sort of an epistemic community aiming to cooperate with external actors. For GNESD produces and manages knowledge with the objective to build developing countries' institutional capacities for designing policies and "solutions to energy, environment and development problems" (GNESD secretariat 2003) and to inform policy makers and actors who plan, decide and implement "activities that link energy and sustainable development". (GNESD secretariat 2003) Thus, GNESD is rather a composite actor within a network. Nevertheless their strategy aims at supporting and strengthening network functions within that wider community as well.

EUEI

The EUEI secretariat is situated in Brussels with the DG Development of the Commission. This secretariat is staffed with only four persons from both the Commission and Member States, while the different strands of activities are managed by other secretariats hosted by other institutions. The EUEI secretariat facilitates collaboration of donors and partner countries by executing a communicative role and being a point of first contact. Moreover it reports on activities, represents EUEI in international fora and cooperates with other networks. EUEI is engaged in an ongoing dialogue and cooperation with several other networks, among which are GVEP, REEEP, and GNESD. (EUEI 2007a)

When needed Working Groups are established to develop thematic papers, concepts, and solutions and to exchange views and experiences. (EUEI 2007a)

The Advisory Group is the forum for dialogue and coordination. It is constituted by representatives from European member states and the Commission, and experts. (Commission of the European Communities 2004: 4)

> "The group serves as a vehicle for seeking complementarity between this and other initiatives and programmes and to develop networking." (EUEI 2004)

The actual work of EUEI is carried out in partnerships to which, apart from the Commission and Member States, partner country governments, regional organizations, end-users and local communities, and stakeholders from the private sector and civil society contribute. Those partnerships are participatory, and focus on the support of policies, strategies and institutional, legislative and regulatory frameworks, thereby building capacities. (EUEI 2003a: 6)

The EUEI was originally established to administrate all energy-related development activities of the EU. It developed into an administrative mechanism of certain instruments of the EU to support energy-related activities for sustainable development. The biggest fund to be administered of these instruments is the 2006 launched Energy Facility. EUEI and its Advisory Group are supposed to develop into an "advisory body of the Energy Facility, to which member States will send their representatives." (Commission of the European Communities 2004: 9)

REN21

> "Stakeholders share an understanding that structure, governance and participation in the network will evolve over time, based on needs and practical experiences." (REN21 2004b: 2)

This sort of evolutionary principle allows a process-based governance of the network. REN21's governance structure is supposed to take advantage of the dynamics among the various stakeholders. To this end it has to balance formalization with the effective execution of network functions.

> "REN21 is also a market place of ideas and advice (…)." (CSD Partnership Database 2006c)

The processes in this market place cannot be fully governed by structures but must evolve as freely as possible. The exchange of ideas within the network takes mainly place at the Steering Committee meetings, as described above. The Steering Committee constitutes of some 30 "distinguished and committed individuals". (REN21 2006d) These individuals represent in a supposedly balanced way the world regions and the different sectors of society, categorized into "Governments, International Governmental Organisations, Non-Governmental Organisations, Industry, Finance, Regional Governments, Local Governments, and At-large Members." (REN21 2006d) A Nominating Committee, consisting of five members of the Steering Committee, prepares who to invite into the Steering Committee. Personal relations of individual Steering Committee members may be used for the actual invitation. Hence, the Steering Committee basically works like a network of dense personal relations, systematically completing the sets of relations of the high-ranking individuals from the energy, development and environment communities. After two years the Steering Committee members are supposed to be replaced, with every year replacing half of the members.

The Steering Committee's composition is balanced by a rough distribution among different stakeholder groups. There are supposed to be approximately the following numbers of representatives from each sector in the Steering Committee: five from developing countries, five from OECD countries, four from intergovernmental organizations, four from NGOs, two from industry, two from finance, one regional representative, one representative for local governments, and one for the European Commission. (REN21 2005e)
The Steering Committee is headed by one Chair and five Vice-Chairs, representing the different sectors of the Committee members. (REN21 2005g: 2) The first Chair Rajendra Pachauri, Chairman of the UN's IPCC, passed his mandate on to Mohamed El-Ashry, former Chairman of the GEF and now Senior Fellow with the UN Foundation. (REN21 2006b: 2) Between the Steering Committee meetings a Bureau composed of the Chair, the Vice-Chairs and the head of the secretariat is the executive body of REN21 to make decisions. (REN21 2005g: 2)
The annual Steering Committee meetings gather leaders from the renewable energy community on the occasions of international conferences. Thereby, it can be ensured that high level political actors are able to participate in the Steering Committee meetings and maintain the momentum of the renewables2004. (REN21 2004a: 2)
At the Copenhagen Steering Committee meeting, when REN21 was officially launched, a Participation Committee was established to define who should be allowed to participate in REN21 activities, bearing in mind that REN21 shall be as open as possible. The Participation Committee comprises six members of the Steering Committee. In general, everyone seriously interested and committed and active in the renewable energy field should have a slot for participation. (REN21 2005g: 2)
One particular issue of the Participation Committee is the inclusion of financial partners to access the necessary financial resources, needed for REN21's operational business. Therefore, a special Fundraising Committee was established as well, consisting of three Steering Committee members of whom two come from the initial sponsors of REN21 the BMU and BMZ. (REN21 2005g: 2; and REN21 2007: 6)
In order to carry out activities and deliver outcomes, the Steering Committee agreed in Copenhagen to establish Issue Groups. Every Issue Group manages a project of the REN21 activities, thereby implementing the operational work of REN21. (REN21 2005g: 2) These Issue Groups are supposed to reach out and to animate communication and spark and spur activities. Each Issue Group has a facilitator to work as a link to the Steering Committee. (REN21 2006c: 4)
The technical secretariat of REN21 is hosted by UNEP's Division for Technology, Industry, and Economics, Paris, with provision of staff through the GTZ and supported by the IEA. Additionally one organization representing developing countries shall be included in the collaboration. (REN21 2005g: 2) The secretariat is headed by Paul Suding from the GTZ. The secretariat is supposed to administrate all activities of REN21 and prepare the Steering Committee meetings as well as support the Steering Committee. It does not carry out the operational work of REN21. This work is outsourced to experts from outside of the network and looked after by the Issue Groups. The secretariat, though, supports the outreach of REN21 and develops and maintains the website. (REN21 2006c: 7)

3.4 Actors: Leaders and Partners

The roles which actors play in networks are closely related to their individual rationales. That's why in the first part of this section, research findings on the rationales of self-interested private actors to commit to activities for sustainable development are presented.

Commitment to sustainable development is not merely philantropic but strategic with regards to future opportunities. For in the long-term, one can only make profit if one speculates towards the market equilibrium. The long-term market equilibrium, however, will characterize through sustainable solutions by definition of sustainability. Consequently, sustainable development will create market opportunities.

However, in order to convince top-level managers, who make the strategic decisions for their organizations, a strategy how to tap into these opportunities which sustainable development can provide is needed. Therefore, a common strategy, how various actors can successfully and effectively cooperate, is needed. NGOs, public actors, Intergovernmental Organizations, and members of the academic community are not part of this strategy for reasons of charity but because they all can bring something to the table that is needed for collective action on sustainable development.

3.4.1 Excursus: Private actors' rationale to cooperate for sustainable development

A private actor's foremost motivation to commit to sustainable development may aim at a good reputation, (Ruggie 2002: 35) which can translate into monetary advantages in different ways. A company's sustainable development label might help it to enjoy a competitive advantage in a *second round of licensing*, as, for instance, in the case of oil companies which compete for licenses from governments to drill an oil well. These governments might rationally rank applicants for drilling licenses according to their reputation for considering social and environmental concerns, as an interviewee from a multinational oil company reported. (Interview with Alex Nevill, Shell, July 10, 2006) A sustainable development label may also be helpful for companies in the competition for access to financing, technology, and opportunities to grow. (Interview with Alex Nevill, Shell, July 10, 2006)

Apart from credibility, a good *reputation* and different sorts of green-, blue-, or red-washing, companies have several more reasons to invest in sustainable development. To a certain degree, such action might be due to *bounded rationality*, companies simply follow market leaders and first movers in order to avoid to be left behind, when the market moves on. This follower's logic of action works, too, if companies want to avoid repeating the failures of competitors to address demands for sustainable development, as Ruggie gives example from the case of BP's commitment in Angola following Shell struggling in Nigeria. (Ruggie 2002: 35) However, there are other good reasons why fully rational actors might take care of sustainable development.

Public pressure by NGOs might force companies to invest in sustainable development to safeguard their profits, for in markets, where consumers perceive products as homogenous and are not able to differentiate the products' qualities a positive brand reputation may be the crucial difference to tip the *consumer's buying decision* in favour of one supplier or the other. Thus, CSR could be the distinctive feature.

The *motivation of employees* may be enhanced by a sustainable image of the company and opportunities to participate in activities for sustainable development. Ruggie describes as the reasons for companies to partner with the UN that companies "(…) cannot sufficiently motivate the very best people with monetary rewards alone." (Ruggie 2002: 35)

Investments in activities for sustainable development may feed into *strategies of company development*. To innovate and develop creative solutions for societal and environmental challenges might be opportunities to access new markets and develop the whole company strategically and sustainably. (Ruggie 2002: 35; compare Hoffman 2006) The telecommunication company Ericsson, for instance, started to collaborate with UNDP's Growing Sustainable Business initiative (UNDP-GSB), when Ericsson realized that they could only grow in new

markets. For, the demand in developed country markets was completely met with mobile phones. Hence, they approached UNDP-GSB to create new markets for ICT in developing countries and, thereby, propel pro-poor growth. (Gandhi 2005)

The WBCSD's Tomorrow's Leaders group, a group of distinguished executives from leading international companies, elaborated in 2007 "A manifesto for tomorrow's global business", stating:

> "We believe that the leading global companies of 2020 will be those that provide global goods and services and reach new customers in ways that address the world's major challenges – including poverty, climate change, resource depletion, globalization, and demographic shifts." (WBCSD The Tomorrow's Leaders group 2007: 4)

They define a general strategy based on understanding of global issues turning this understanding into business opportunities, integrating these opportunities into core business strategies, and defining business success in long-term measures. (WBCSD The Tomorrow's Leaders group 2007: 4)

Challenges of sustainable development, which "(…) alter existing markets or create new ones (…)", (Hoffman 2006) can always be understood as investment opportunities. Commitment to sustainable development can thus create business opportunities. Hence, the private focus on early action to mitigate climate change shifts from risk management to the core business strategy in order to position themselves for emerging opportunities and to gain competitive advantage. (Hoffman 2006)

> "If action to address (global) issues is to be substantial and sustainable, it must also be profitable. Our (the Tomorrow's Leaders group's, S.W.) major contribution to society will therefore come through our core business, rather than through our philanthropic programs." (WBCSD The Tomorrow's Leaders group 2007: 4)

Although, in fact, many companies are interested in action for sustainable development predominantly in order to manage risks. They regard *risk management* only as avoiding running into economic, social, or environmental costs, but not as overcoming market failures at the roots of respective risks. The integration of certain actors and the mediation of conflicting interests are supposed to manage the risk of potential future social upheaval or to avoid that certain partnership relations might turn hostile. Knowledge sharing and partner selection make businesses more sustainable by informing about and managing future environmentally costly risks and by developing capacities for own activities. The coordination of activities with other actors and the implementation of certain private policies decrease the risk of costly and perhaps less efficient public regulation or simply the disadvantage of implementing sustainable practices and technologies later than competitors, and coordination and implementation manage demands of other actors. Collaboration with local partners is thereby used as possibility to sort of outsource these risks or share them. Nevertheless, in global policy networks partners must consider interests of other actors and address the overcoming of market failures directly to make a sustainable impact.

The fear in the top level management in companies of *future liabilities* for climate change might be another reason to commit to and invest in voluntary and cooperative sustainable development activities, as Brian Storms, CEO Marsh (insurance broker for private companies), observed. (FAZ 2007) To take the risk of such future liabilities into account is a rational strategic decision.

Actors from the private sector are willing to cooperate, even if this collaboration impairs their profits, or free-riding might be a cheap opportunity. For their understanding is that certain public interests *will* be served by policy makers through *regulations* which may cause distortions that would be worse than the lost profits through cooperation and commitment to sustainable development. (Ruggie 2002: 35) For instance, many US companies commit voluntarily to emission reductions in order "(1) (t)o maintain competitiveness in light of regulations undertaken outside the US, and (2) to position themselves to receive credit for 'early adopter' activities and prepare for what they view as inevitable domestic regulations." (REN21 2006a: 26)

With regards to public regulation, companies might commit to sustainable development simply to influence public policies. (compare Hoffman 2006) Actually this is the situation of classical prisoners' dilemma, though through communication in networks among governments and private companies, for instance, they can agree on collaboration to the mutual benefit. Or as Shell phrased it: Cooperation with NGOs "(…) is the best way of avoiding future unproductive confrontations." (Shell International 2001: 24) There is the common anticipation among US companies that "(…) it's only a matter of time before we'll face (U.S. federal) regulatory mandates to reduce our emissions." (Inter Press Service 2004) An increasing number of US states have already introduced cap-and-trade schemes, and many companies see an advantage in taking early action to reduce greenhouse gases even without regulations. Thus, the question for US companies will be to free ride and enjoy short-term advantages or invest and avoid lagging behind in the long-term. (Wirth, Lubber 2004) Therefore, caps on emissions can be supportive for businesses due to the fact that they create definite policies and *reduce uncertainties* about what governments might do or what is expected they might be doing. (Dalton 2004)

To safeguard the reputation of the company is particularly important if these companies are organised in relatively autonomous businesses. For, the loss of good reputation affects not only the own business but also other businesses of the group as these businesses share a *common reputation* in public perception. If a company's reputation depends on other actors, the company will always use its power to coerce those other actors, like suppliers, to meet certain social and environmental standards.

Commitment in renewable energy and energy efficiency markets can be profitable as well due to the fact that companies can gain leadership positions, so-called *first mover or early-mover advantages*, in future growth markets (WBCSD The Tomorrow's Leaders group 2007: 9) through stimulation of innovation, saving costs through 'eco-efficiency' while at the same time "(…) lessening the drain on natural resources", (Shell Internationall 2001: 13) and staying in touch with the consumers in order to assess potential risks through changing attitudes.

Further, short-term effects and long-term effects are interrelated through society. Companies act in societies and are dependent on their *confidence*. (Shell International 1997) In fact, these *time frames* of action differ: NGOs may have more urgent timetables, governments may orient to electoral cycles, while businesses set their top priority on profitability. Such different time horizons are considered as an issue difficult to be solved for partnerships. (Bennouna 2005: 6) These different time frames of demands and action cause most of the controversies, as Shell explains, although, in general, all actors agree on the goals of sustainable development. (Shell Internationall 2001: 19-24) However, all rational actors must consider impacts of climate change when projections included in decisions exceed a time horizon of more than 25 years. (Scott 2005) All the different time horizons must be taken into account by partnerships, while sustainability always has the longest.

Commitment to sustainable development is significant for the whole environment of investments. To consider sustainable development goals may be necessary to increase the confidence of *shareholders and investors*. For they want to know if the company is prepared to avoid upheaval against the company and for the risk of possible future regulations. Due to this very reason reporting on greenhouse gas footprint and commitments to a sustainable development of the company and its business were demanded by the shareholders from US oil and gas companies. (CERES 2004)

> Additionally, "the financial risks from global warming are growing each day. So serious is the issue that the world's second largest re insurer, Swiss Re, is telling its corporate clients to come up with strategies for handling global warming or risk losing their liability coverage." (Wirth, Lubber 2004)

Over the last century investors had to consider the amount of oil a well would produce, the costs of drilling at given technology, the price of oil, which has to stay within a certain corridor whose width depends on the costs of drilling, and finally under certain circumstances the political

stability of the region where the investment should be placed, when it came to the commercial viability of an investment, as Bob Ebel explained at a workshop in Berlin in 2005. (Ebel 2005) Today the sustainability of an investment depends at least on two more factors: the environmental sustainability, and in times of a growing knowledge economy the knowledge and skills of the employees. Thus, if investments shall be sustainable, companies have to invest in sustainable development and human capital.

> "ChevronTexaco in the wake of a resolution requesting further investment in renewables last year, has become a quiet industry leader on climate change." (CERES 2004)

Emerging from the action of international leaders self-organizing pressures from competitors for shareholders, who have an interest in securing their shares, force laggards (or followers) to adopt goals and standards for sustainable development of their business even if that impairs profits in the short term.

However, all those good reasons why private companies might not only consider their profits and obey monetary incentives but also engage in networks and partnerships do not reflect the pattern of action of the mainstream of private companies. In conclusion, it has to be stated that private actors, committed to sustainable development, focus mainly on the sustainable management of their **core businesses.** They do not develop strategies to act in collaborative partnerships which support their own competitive position and will be appropriate for the international character of environmental issues. In reality, it is still a minority – though growing according to recent surveys and – experiences, of companies which engage in networks and partnerships. Shell, for instance, announces in its management guideline to cooperate in partnerships with actors from other sectors and with business partners as well in sustainable development projects. (Shell International 2001: 22 and 26)

More or less companies' commitment to sustainable development amounts to reporting on their own behaviour, which is in some cases on demand of the shareholders. They conduct audits regarding the sustainability of their business activities; they demand only very carefully slight policy adjustments; and some of them engage in networks and collaborative partnerships like BP or Shell.

Companies, however, as individual actors do not have the capacities to become active in any number of projects and investments apart from their core business. Even transnational companies, global players, commit themselves to only relatively few projects. However, these global players are the only ones who commit anything at all to activities outside of their core businesses and engage in multi-sector development networks. This is particularly true for global energy companies. They have the necessary capacities, while SMEs require, for instance, export agencies' support, even if their core business is concerned with sustainable development.

Some private companies pursue no strategic changes in management of their core businesses but focus on sustainability in other possibly value-producing activities such as research, like ExxonMobil does, or human capacity building. One interviewee from an IGO collaborating with private companies reported from the difficulties in cooperation with private companies due to the fact that all strategic decisions are top-level management decisions. Top-level managers are, however, difficult to contact. Therefore strategic partnerships always address the core businesses of partner companies and aim to develop new sustainable business models by supporting and informing the operational activities of the middle management and the internal communication of companies.

Concluding, a company's strategy for commitment to sustainable development is mainly focused on its own management and business and not on international partnerships, although these partnerships promise to ease the dilemma between competitiveness and sustainability.

3.4.2 Leadership Among Equals

The actors in networks are all autonomous and contributing voluntarily. They are partners in the strict sense of the term. No hierarchical order would be accepted. In fact, network partners are reluctant to take on leadership roles or build any vertical relations. Nevertheless, particularly in the initial phase of network some of the partners will have to unfold a certain **leadership** to get things running. Without such leadership, experience showed, nothing would happen.

Simply, differences in capacities to act of different network partners result in actual leadership of these actually equal partners. However, this leadership can be qualified and reflects no general super- or subordination. Young distinguishes structural leadership, basing on material power, entrepreneurial leadership, employing negotiating skills such as integrative bargaining and brokerage of interests, and intellectual leadership relying on the power of ideas. Such leaders can be individuals as well as collective entities. The different kinds of leadership can complement one another, thus, leadership depends on relationships among the leadership individuals, and in part on timing. (Young 1991) Young asserts that leadership is a necessary condition for successful bargaining of contracts, which corresponds with the experiences from networks that leadership is necessary to start partnership activities.

Young's categories comprise the conventional three explaining variables of international relations: power, interests, and knowledge. Ott and Oberthür differentiate instead of intellectual leadership as third form directional leadership basing on independent action which other actors will follow. (Ott, Oberthür 1999: 17/18) All these forms of leadership among autonomous network partners might play a role in global policy networks to start processes of network development, and can, indeed, be found in the five explored type II partnerships.

GVEP

GVEP Partners are representatives of corporate actors in the field of energy policy from all over the world from IGOs, NGOs, private sector, national development agencies. In 2007, there have more than 1500 organizations registered with GVEP as partners, (GVEP 2007b) although partners are individual members representing the organization they are working for. Thereby GVEP has most outreach to the local level and can effectively link the global to the local level. This partner base is GVEP's "biggest asset". (GVEP 2005a: 10) The partners are GVEP's value-added. They enable GVEP to provide support all the way along the supply chain. (GVEP 2006a)

GVEP established right from the beginning a growing partners' database listing activities of GVEP partners and their contact information. (GVEP 2002) While IGOs and governmental agencies belong to the major sponsors, the backbone of activities as well as the majority of partners come from private companies, approximately 40% of all partners, and NGOs, making up for approximately 30-40%. The number of partners grew continuously and steadily from 300 in 2003, to over 500 in 2004, to over 600 in 2005, to approximately 1,000 in 2006 and over 1,500 partners in 2007. It appears that GVEP overstepped a critical mass in numbers of partners and grew afterwards even more than incrementally. However, 90% of partners are hardly active at all. To engage the passive majority is a problem which the Board addresses repeatedly. (GVEP 2005d: 6)

REEEP

Partners can only be organizations like companies, NGOs and governments, not individuals. REEEP has grown to over 200 collective partners, who become REEEP partners by being approved signatories to REEEP's Mission Statement. The statement characterizes REEEP as a multisectoral global policy network to promote new and flexible ways of cooperation by sharing knowledge and communicating best practices across boundaries with the aim to overcome barriers of a sustainable energy future. By signing the Mission Statement partners commit to provide financing and relevant knowledge on legislative schemes and other information for action, to contribute to the publication and dissemination of knowledge and experiences, to support and

participate in REEEP events and activities through advice and expertise, and to advertise the network to media, politicians, academic and industry associations. (REEEP 2005a: 16) The announcement of commitment through signing the Mission Statement alone is hardly obliging actors to any action. It rather defines that the network mainly works through the sharing of semi-public resources of knowledge and contacts, and maintains complete autonomy of all actors, thereby, keeping flexibility of cooperation maximal. Nevertheless, the signing of the statement proved to be not meaningless. The International Secretariat indeed approves the potential partners individually and, thereby, builds trustful relations for collaboration.
While in 2005 with over 120 partners, two-thirds of partners came from the public sector and only one third from the private sector, (REEEP 2005a: 2) the International Secretariat engaged pro-actively in joining forces with private companies. In 2007 the ratio has turned upside down, and the majority of partners come from the private sector and civil society.
Over 3700 individuals from over 1000 organizations are connected via REEEP's communicative tools in 2007. (CSD Partnership Database 2007)
Among the REEEP's partners leadership is as far as possible avoided, as interviewees from the network said. In fact, Great Britain has a leadership role due to its role as biggest sponsor. Apart from that, the International Director and the International Secretariat certainly have a leading role due to the individual capacities of Marianne Osterkorn as International Director and due to the central position of the International Secretariat in the governance structure and for operational activities and the funding thereof. One interviewee from the secretariat even preferred to see REEEP as a lean management organization with an efficient overhead administration.

GNESD
As the partners in GNESD are all research institutes of excellence, the network is not an open network, but new partners can only join the network if selected and invited. The first meeting took place only after the official launch of GNESD. In this meeting donors as well as leading scientists, like Rajendra Pachauri (TERI), Stephen Karekezi (AFREPREN), and Youba Sokona (ENDA-TM) from leading energy research institutes, like the South African Energy Research Centre (ERC) and the Argentinian Bariloche Foundation, were involved and chose the members of the network, which were, in fact, the ones everyone was working with anyway. (Interview with John Christensen, August 16, 2005)
From this initial meeting the selection of eight original centres in GNESD emerged: The African Energy Policy Research Network (AFREPREN) is situated in Kenya and brings together over 100 researchers and policy makers from Africa, working on the link between energy research and policy formulation and implementation. The Asian Institute of Technology (AIT), Thailand, carries out research and training on renewable energy technologies, energy conservation, cleaner production, energy economics and planning, energy and environmental policies, power sector restructuring, environmental engineering and management, and climate change studies. The two Brazilian centres CentroClima, Rio de Janeiro, and CENBIO National Reference Center on Biomass, Sao Paolo, have joined forces in GNESD. The Energy Research Centre (ERC) in South Africa has a focus on African energy needs, problems and challenges and analyzes conditions for improved social equity, economic efficiency and environmental sustainability. They educate and train human resources in the energy sector. Environnement et Développement du Tiers Monde (ENDA-TM), Senegal, assists energy professionals and strengthens cooperation between countries. The Institute for Energy Economics of the Bariloche Foundation, Argentina, has its strengths in applied research and training in energy economics and sustainable energy policies. The Energy and Resources Institute (TERI), India, is the largest developing country institution working on every aspect of energy and environment towards sustainable development. The Chinese Energy Research Institute (ERI) carries out research on energy strategy development, energy demand and supply balance, energy safety policy, energy pricing, energy conservation, environmental protection, rural energy development, and renewable energy. (GNESD 2007)

On October 27 and November 22, 2003 the Steering Committee decided to expand the number of the original eight institutes, which were all from developing countries, with two other institutes from developing regions, not represented so far, and ten other institutes from industrialized countries. At the same time the chosen research institutes should represent excellence in research on sustainable energy, and from all world regions should at least one institute be integrated for reasons of outreach.
These twelve additional institutes were from the developing countries the Energy Research Group (ERG) from the American University of Beirut and the University of the South Pacific, Fiji, and from the OECD-countries the sustainable energy consultancy Future Energy Solutions, the Energy research Center of the Netherlands (ECN), the Institute of Energy Economics (IEEJ), Japan, the German Forschungszentrum Jülich, the Department of Energy and Environmental Policies of the Production and International Integration Economics Laboratory of the French Université Pierre Mendès-France (LEPII-EPE), the Stockholm Environment Institute, the International Institute for Industrial Environmental Economics (IIIEE) in Lund, Sweden, the Fraunhofer Institute for Solar Energy Systems (ISE), Freiburg, Germany, the US energy department's institution for renewable energy research the National Renewable Energy Laboratory (NREL), and the UNEP Risoe Centre in Roskilde, Denmark, hosting the GNESD secretariat. (GNESD 2007)
Later on the representation of each world region was given up in parts in favour of excellence, because certain institutes from developing countries simply did not have the capacity to participate. As the Energy Group of the University of the South Pacific could hardly contribute to GNESD's activities aimed at capacity development in developing country institutes, but rather needed capacity building itself and therefore could not do anything, this institute was replaced by the Mediterranean Renewable Energy Centre Regional Centre (MEDREC) for training, information dissemination, networking and development of pilot projects in the field of renewable energies in the Mediterranean region.
Additionally, there are 34 Network Partners from all sectors who benefit from the knowledge provided by GNESD and cooperate with GNESD. (CSD Partnership Database 2006b) The Kumasi Institute of Technology and Environment (KITE) providing research, training and consultancy is one of those partners, for instance. (Interview with John Christensen, August 16, 2005) The Network Partners are the addressees of the secretariats strategic activities to disseminate the generated knowledge. Among those Partners are GVEP, REEEP and EUEI, with which GNESD cooperates to create synergies. (GNESD 2007)

> "The objective of this collaboration is to find ways to maximize the dissemination and impact of the four partnerships. GNESD activities and outputs are well suited for promotion across the three other partnerships." (GNESD 2004a: 4)

EUEI
As one interviewee reported EUEI was strongly influenced in its governance design as well as in the current operational activities by the informal leadership of six to seven high-level governmental administrative officials. These officials from the Commission and member states worked together anyway and had sort of an informal network of personal relations before the EUEI was launched. Thereby, an informal process of networking ran parallel to the process following the political decision to launch a type II partnership. Hence, in a way, the development of a network is – usually – the systematization and completion of informal processes and relations in order to leverage the effectiveness of these informal processes.
The partners of EUEI are mainly European and ACP governments due to EUEI's focus on government-to-government liaisons, though, local partners as well as private companies and experts from the academic sector participate in the implementing activities, too. However, EUEI is perceived by actors from the field of sustainable energy not to be very open. One interviewee even stated that EUEI has failed and that the actors from the field of sustainable energy lost interest in EUEI and turned to other, more promising networks. This perception may come from a

fairly long time of preparing to become operational and, thereby, at times disappointed expectations in EUEI.

REN21

Due to their role as initiators and providers of initial funding, BMU and BMZ had a corporate leadership role, though not wanted. In the process of building the network, defining its governance structure and identifying potentials for activities, however, differing individual informal leadership emerged among the members of the Steering Committee according to individual involvement in and commitment to the processes within the network. Overall, the members of the Steering Committee are all fairly high ranking individuals so that actually no real leadership could develop, but rather horizontal relations evolved.

Right from the beginning REN21 was planned to be an open, transparent and informal forum for frank debates.

> "The principles for association with the network will be as inclusive as possible and allow as much diversity as possible, i.e. invite participation from all types of organisations and institutions from developed and developing countries, bringing together the environment and development communities." (REN21 2004a: 4)

All participation is voluntary. Actors are the capable and the committed. (REN21 2005a: 4)

> "REN21 connects governments, international institutions and organisations, partnerships and initiatives and other stakeholders on the political level with those 'on the ground'." (REN21 2005f)

The answer to the question of who can become a partner and, consequently, what activities the network will commit to has not been finalized for a long time. In the beginning there was some discussion on membership of private companies not particularly associated with renewable energy, like Shell or BP due to the risk of losing credibility. There was the proposal to class members as core members and associated members, according to their involvement and commitment, which reflects the reality of networks usually. (REN21 2004c: 3) In fact, the Steering Committee members form sort of an inner circle of the network with the highest density of relations among them and, thereby, most opportunities for cooperation. Steering Committee meetings, indeed, work as forum for the members to debate, brainstorm and exchange ideas (REN21 2004c: 4) and to present own activities and receive valuable feedback and identify opportunities for synergies with other actors' activities.

> “With the ambition of building an open and yet effective network, REN21 is an interconnection of stakeholders. Key persons of the different stakeholder groups come together in the Steering Committee (SC). The SC is surrounded by many more participants to the Network (…). The interconnection among the participants is established via the SC or via their respective stakeholder category or by participating in thematic Issue Groups.” (REN21 2006c: 2)

To date, there is no exclusive formal membership in REN21. Every individual can subscribe online as a participant and contribute to the activities of REN21. Accordingly, overall participation in REN21's activities is rapidly increasing. An actor subscribes with the “relevant activities that this actor is engaged in and wishes to bring into the network”, (REN21 2006c: 3) thereby a self-organizing Actors’ Catalogue emerges. This participants’ base of REN21 might overlap with REEGLE’s Actors’ Catalogue, but it harnesses the dense network of relations REN21 is able to support.

Conclusion of Phase I

At the WSSD type II partnerships emerged according to the principle "Let a thousand blossoms bloom". Many of those stayed behind over the first years and simply disappeared or did not achieve to be more than an internet portal. One interviewee from one of the five explored networks predicted that from the original approximately 40 energy-related networks probably only five to six might survive. The five big sustainable energy related type II partnerships had considerable backing by partners who invested at critical points of development and, thereby, kept these networks going.

In this phase it is essential to develop internal network governance, integrate a critical mass and quality of partners, plan some activities which can produce a value-added, and secure initial funding to be able to install a secretariat and staff responsible to start activities.

With regard to hypothesis 1 that network governance strategy must harness a process-related approach, the examples of the design of governance structures of the five explored networks show that all networks have built into their governance structure elements to allow for participatory development processes of the network in a somewhat evolutionary way. These participatory processes like GVEP's Partners Assembly are mechanisms to open the network to various committed actors and activities and to search continuously for opportunities to create synergies for sustainable development as REN21 explicitly aims to do that. All networks tend to establish a strong management although a more decentralized governance structure would seem more appropriate, but they, indeed, all combine top-down mechanisms with bottom-up ones like REEEP through the regional secretariats.

Processes have a beginning and an end, they are not just there. Processes need leaders to initiate and actors to realize them. GNESD or REN21, for instance, made the experience that without leadership there is nothing ever going to happen. Sometimes this needed initiating leadership is structural like in the case of the British government in REEEP. Sometimes it is rather intellectual as within EUEI or by the individual high reputation researchers in GNESD. In the case of REN21 the German government assumed an entrepreneurial and structural leadership and hosted an initial meeting as well as financed three reports, which produced some high quality output making the network attractive for partners. However, leadership in networks is always only temporary and will shift from one partner to the other or even from the network hub to more decentralized partners.

Leadership is necessary during this first phase of each network, although in the long-term hierarchical positions will hardly be accepted by the autonomous partners. Hence, **hypothesis 1** needs modification: *Network governance strategy must harness a **process-related approach** and needs **leadership** to initiate processes.*

3. C Phase II: Activities of Global Policy Networks

In the second phase, resource endowments in networks and the management thereof become a pressing issue for network governance. Hence, this section explains which resources are to be managed, where these resources come from, what activities they are used for, and if the actual strategic activities can confirm the theses on governance through networks from section 2.9.3.

3.5 Financing

The financing of networks covers mainly network activities, only little support to the rather small budgets of network secretariats is granted. Hence, financing and the management of scarce resources for action become increasingly important in phase two of network development when networks become operational and start activities.

GVEP

While it was originally initiated by UNDP and the World Bank, GVEP aimed to become more independent and be perceived more as such. That's why they moved the Technical Secretariat away from the Bank and aim to diversify their donors, among which the World Bank has since played always a major role, but UK's DFID has become another one beside of USAID, the Dutch government's organization for cooperation (DGIS), SIDA, and the Russian government, and UNDP through in-country support. Additionally, GVEP cooperates with a wide range of private sector partners. (GVEP 2007a) Sarah Adams, the acting CEO of GVEP International, for instance, has taken a sabbatical of her former company EdF to join GVEP. Nevertheless, GVEP is still perceived by many partners as a World Bank initiative. (GVEP 2005e: 1) In order to change this perception the World Bank has already made intentionally no appearance and told its staff *not* to participate in GVEP meetings.

The country actions took the largest part from the overall budget. In the 2005/2006 budget cycle, the GAPfund had a planned funding of $3 million, of which $1.2 million were committed from the Dutch government and DFID and placed at ESMAP for contracting because GVEP had not the legal status to receive and channel public funds at that time. The GAPfund, for instance, had to be managed by the US NGO Winrock International. (GVEP 2005g) In May 2005 there was still $1 million of the planned action unfunded, so that the Technical Secretariat had to raise funds for already planned actions. (GVEP 2005a: 17; and GVEP 2005c: 1/2) The lack of funding is one of the risks challenging the future existence of GVEP. Therefore, the Technical Secretariat planned to respond to that risk by keeping the secretariat small and lean, ensuring that activities are demand-driven, and possibly levying fees for service activities. Generally, the focus on managing the semi-public resources of knowledge and social relations avoids big expenses. (GVEP 2005a: 11)

Nevertheless, the 2005 Business Plan expected that GVEP would leverage and obtain with these rather small financing commitments for funding for five major investment projects or programs targeting close to 700,000 people in over eighty communities, requiring some $100 million for implementation. (GVEP 2005a: Summary)

From GVEP's launch at the WSSD in 2002 to 2007, DFID has provided 900,000 British Pound over these five years plus the full time services of a senior energy advisor for three years who worked for DFID and was seconded to GVEP's Technical Secretariat. In 2006 DFID wanted to move on with GVEP and to develop GVEP's activities beyond advocacy and knowledge management, what has been GVEP's main activities so far. Therefore DFID decided to fund GVEP activities with 1 million British Pound per year over the next four years. (Davies 2007) At the G8 Finance Ministers meeting in 2006 in St. Petersburg, Russia pledged to contribute $30 million to scale up GVEP's Sub-Saharan work. (GVEP 2006c) These pledges moved GVEP into a new dimension of its capacities to take effective action. So far, the two years business plans of GVEP Technical Secretariat comprised comparatively small sums for the funding of GVEP's

service lines, yet even those were in parts unfunded, so that additional fund raising was still necessary. (GVEP 2005a: 17)

REEEP

> "While REEEP funds projects, it is not a project implementation agency. REEEP's role is to build capacity within the policy and finance sectors and to leverage donor contributions. REEEP projects are expected to produce deliverables which can be replicated and scaled-up worldwide via the regional secretariats and strategic relationships." (REEEP 2005a: 14)

Due to the replicability of projects 20-30% of start-up costs can be saved so that €1 million can fund 15 to 20 projects while an additional €1 million provides funding for 20 to 25 projects. (REEEP 2005a: 14)
Approximately € 1 million of REEEP's budget is dedicated to REEEP's delivery structure including costs for the International Secretariat, the Regional Secretariat, services for Boards and Committees, and service & support for project activities. (REEEP 2005a: 14)
Funding comes from several European governments, namely the UK, Spain, Netherlands, Austria, EU. The UK, which initiated REEEP originally, is still the main donor, but the International Secretariat aims to attract increasing funding from and collaborate more with the private sector. (Osterkorn 2005a) Other governments fund only specific activities or contributed specifically to certain rounds of funding as for instance Ireland supported the expansion of sources of finance, the improvement of communication among financiers, and the establishment of risk mitigation tools in round five. (REEEP 2006a) The German BMU, the Dutch VROM, and the British DEFRA, for instance, financed the REEGLE project. In round six Norway became a project donor government like UK, Ireland, Italy, and New Zealand, and pledged to contribute €3.7 million over three years. (REEEP 2007a)
Private companies prefer to make in-kind contributions, like BP, on whose behalf Ralph Alexander, chief executive of BP Gas, Power & Renewables, pledged to provide over the next two years solar panels and services for REEEP projects. (Alexander 2003)

GNESD

The initial funding of approximately $2 million to start activities was secured in 2002 for the period from March 2003 to August 2005. Funding partners were the governments of Germany, France, United Kingdom, Denmark, and the UN Foundation. Further contributions are office space at the Risoe National Laboratory provided by the government of Denmark. In 2005 the funding was extended for the period from 2005 to 2007 with additional funds of $1 million. (CSD Partnership Database 2006b) These funds are used for contract research on the energy access and renewable energy and poverty reduction themes, as well as regional workshops to disseminate the research results. As funding goes exclusively to developing country institutes, the contributions from industrialized country institutes are rather small. After 2007, GNESD will move into a consolidation phase and its long-term future will become clearer. (Interview with John Christensen, August 16, 2005)

EUEI

As EUEI was supposed to administrate and map all energy-related development activities of the EU in the beginning, the main funder of activities addressed by EUEI were the EU and its Development Fund and the European governments. (IISD 2004a: 5)
Since June 2006, EUEI manages the EU Energy Facility of 220 Million € for energy-related projects in ACP-countries. The first call for proposals for projects has concluded. With regards to this big and strong financial muscle, EUEI has now to flex, it has developed towards a public financing mechanism. EUEI's focus has dragged away from the originally intended network approach. Nevertheless, it still represents a network of more or less personalized relations among relatively high-ranking government officials.

REN21

The initial funding came to large parts from the German government. They funded the three reports and so far the secretariat staff. In-kind contributions came from UNEP which provides the office facilities and IEA which provides another staff member. The budget of REN21 covers the next Global Status Report update, the activities to follow-up on the IAP, and the secretariat, including external consulting and technical services, equipment, publications, travel expenses, administration, and taxes. (REN21 2006c: 6; and REN21 2007: 6) Additional activities need additional funding. Therefore Steering Committee members suggested that "concrete and distinct activities with specified budgets" might facilitate financing. Other Steering Committee members announced that they would provide in-kind support by carrying out joint activities to leverage REN21 action. (REN21 2007: 7)

As REN21 is supposed to mainly conceptually and intellectually engage in operational activities and as they run an accordingly lean secretariat, their need for financial resources is fairly small. This network is aiming at another approach to contribute to global environmental and energy governance for sustainable development.

3.6 Activities

This section introduces the various activities of the scrutinized networks. It shows the importance of the network resources of knowledge and social capital for network activities.

GVEP

> "As a WSSD Type II Partnership, GVEP offers a unique mechanism for building upon the global commons of knowledge and experience for mitigating some of the traditional barriers to energy service delivery and socio-economic development." (GVEP 2005a: ii)

GVEP is managing and facilitating the sharing of contacts and knowledge of partners and facilitates cooperation to enhance access to modern energy[61] by creating an enabling environment and providing support to energy SMEs in developing countries through organising financing, contributing to capacity development, policy design and knowledge management. As one interviewee from the GVEP Technical Secretariat said, they consider themselves as sort of relations managers. GVEP bridges gaps between investors, entrepreneurs and customers, and GVEP serves as "one-stop-shop for information, best practices, and lessons learned on the effective development and implementation of energy for poverty reduction projects and programmes." (GVEP 2005a: 3) GVEP's focus lies on poverty reduction, social development, and reliable energy access for basic needs and productive use.

The Technical Secretariat's activities to support partnership action are categorized as knowledge management, capacity building, finance facilitation, monitoring & evaluation, and the GAPfund activities. All activities obey the principles of technology neutrality, market based solutions and cross sector involvement, particularly aimed at the private sector and local energy SMEs, and aim at the MDGs in general and poverty reduction in particular. Local energy supply chains are supposed to foster economic development from the bottom, though GVEP links these activities to the policy level. (GVEP International 2007) Thereby, GVEP is active at local, national, regional and global level.

Abeeku Brew-Hammond, GVEP Manager from 2004 to 2006, stated that GVEP would face two main challenges:

> "The first is to get the various players – including donor agencies, the private sector, government representatives and NGOs – to work together. At the moment they tend to be focused exclusively on their own projects, which at times are duplicating or even undermining what others are doing. For example, you may have one donor trying to promote the development of commercial, enterprise-based renewable energy projects, while another is giving heavy subsidies. We need to make sure that all the activities are coordinated and add value to each other." (Brew-Hammond 2005)

The second challenge is to link the provision of energy services to productive uses. That means partnership projects must be demand-driven and oriented to local needs, and local entrepreneurs should be supported. (Brew-Hammond 2005)

Although GVEP's online project database does not at all include all activities of all partners but rather serves actors to showcase what they do in order to identify potential partners for future collaboration, those displayed project activities can give a slight idea of how GVEP partners prefer to organize their strategic action for sustainable development. GVEP partners' activities focus predominantly on poverty reduction and energy access even if all projects do consider sustainability. Due to the small-scale size of most projects energy market failures of resource misallocation in social terms or macroeconomic external costs can be neglected and are hardly addressed of network functions. The impact of all projects as described by the project reports proved the effectiveness of action, although the selection of projects contained in the database is hardly representative. Most projects were categorized under Knowledge Exchange. Indeed,

[61] The Statement of Principles of GVEP understands modern energy as appropriate combination of renewable energy, energy efficiency, and advanced energy technologies, including cleaner fossil fuel technologies. (GVEP 2004c)

knowledge and to a minor degree social capital are considered as significant network resources in sustainable development cooperation. Most partners apparently prefer strong management approaches, although many projects aim to instigate more self-organizing, bottom-up processes, encourage ownership and participation.

The Third Partnership Board meeting decided that the Technical Secretariat would develop an action plan blue print, sort of a strategy for sustainable development of energy systems, which should be applied by every country individually. (GVEP 2003b) GVEP's activities support development and implementation of national action plans, linked to national poverty reduction strategy papers, through GVEP's Action Programme Fund (GAPfund). The GAPfund assists actions to implement national action plans on energy for sustainable development and supports those actions through GVEP's four service lines knowledge management, finance facilitation, capacity development, and results monitoring and evaluation. GAPfund activities focus on certain countries to create regional hubs. (Adams 2006) Regionally, these activities have slightly different foci, though they always include developing business models and up-scaling of pilot projects for poverty reduction. (GVEP 2007a)

GVEP's knowledge management disseminates knowledge on needs, services, products, project profiles and best practices via the website, but develops as well non-internet dissemination tools like radio, adapted to the capacities of developing countries' rural villages. (GVEP 2002) Knowledge management is supposed to map activities as well as equipment and suppliers. (GVEP 2007a) Basically, this service line offers access to selected documents online. Gaps in the knowledge base are bridged by networking among partners and communities of practice. (GVEP 2005a: 5)

GVEP started in 2002 with an inventory of existing financing resources in order to set up later an own fund to finance or assist pilot projects. (GVEP 2002) Finance facilitation bridges gaps between village energy projects, local entrepreneurs and consumers. Failures of energy markets to provide modern energy services and technologies to power them are often perceived by financiers as risks and thus managed as such instead of aiming to overcome these failures. High upfront costs often inhibit needed investments in modern energy services. Therefore GVEP helps to link entrepreneurs to financiers as well as consumers to access affordable credit for reliable energy services. The finance facilitation service line comprises support for business planning and operations, training programs for bankers and micro finance institutions, links for partners to financing sources worldwide like multilateral and bilateral donors, investors, foundations and private firms, and risk mitigation instruments. (GVEP 2007a)

GVEP started the capacity development activities with the inventorying of already existing capacity building tools, assessing needs, identifying gaps, and finally designed a pilot practitioner training program to be held in three regions in 2003. (GVEP 2002) GVEP's capacity development builds bridges to institutions and links up experts and centers of excellence, thereby offering a wealth of knowledge. Capacity development accelerates the energy market transformation process by "enhancing policy frameworks, facilitating entrepreneurial development, understanding the linkages between microfinance, entrepreneurs and energy consumers, expanding the number and capabilities of enterprises operating in rural markets". (GVEP 2007a)

The monitoring & evaluation service line has been under construction for a long time, when GVEP in cooperation with EdF, putting in considerably in-kind support, EUEI, REEEP, GNESD and a number of other actors from the networks developed a guide how to monitor and develop energy projects. This guide is based on project-specific operationalization of a long list of quantitative indicators to measure the effectiveness of the projects aiming at increases in quality of life. These indicators must always be applied and adapted to specific local conditions and needs of stakeholders. (GVEP 2007a)

GVEP aims to collaborate closely with the "other main energy initiatives", REEEP, GNESD and EUEI. (Brew-Hammond 2005) Thus, the networks of the different networks overlap or are identical in parts.

REEEP

REEEP is an "excellent networking venue", as the fund manager of the Private Energy Market Fund, a REEEP backed project, stated.

> "In the clean energy sector you need to collaborate and partner. Successful projects need good developers, added value risk capital and co-operation between the market operators. Track record is fundamental. You only collaborate with those who know what they're doing and have done it before. At present we focus on Asia, but we are keen on networking through REEEP for any project, wherever it may be, that needs the type of financial expertise we can offer." (Lehdonvirta 2005)
>
> "The key to REEEP's effectiveness is the exchange of information throughout the partnership to identify, share and replicate best practice." (REEEP 2005b)

REEEP's strategic principle as well as yardstick how to organize effective action is always to produce a value-added through bottom-up evolving projects promoting local and regional value chains, as one interviewee from REEEP explained. The instruments to produce value-added are to "share contacts and lessons learnt", provide information and training tools, to build capacity in order to scale-up projects and transfer lessons learnt into other markets, and to create synergies and avoid "overlapping activities", causing external effects and duplication. (Osterkorn 2006) REEEP uses for the sharing and exchange of information and contacts and the transfer of knowledge an online tool called trampoline, but basically all activities harness knowledge and relations resources. (CSD Partnership Database 2007)

REEEP looks for matches of donors and projects, and contributes, thereby, to implementation at the local level, helps to integrate energy issues in programs, and supports policies for levelling playing fields. "REEEP focuses on financing, policy and regulation" (IISD 2004c) with the objective to accelerate market development for sustainable energy technologies and applications.

REEEP provides strategic guidance and assumes a communicative role. REEEP's assignment is to transfer knowledge and capacities to provide access to affordable, available and sustainable energy. That means to use indigenous energy resources instead of importing energy commodities, which will be less costly in the long-term. (Osterkorn 2005a) To that end REEEP supports the financing of high upfront investment costs by giving access to best practice knowledge and advice on financing mechanisms tailored to local market conditions, and by reducing commercial risks, respectively the perception of risks of investments in renewable energy and energy efficiency. (REEEP 2004b)

Marianne Osterkorn, International Director of REEEP, sees the lack of finance due to small-scale renewable energy and energy efficiency projects, which are not bankable and rated by investors as high-risk and long-term, as the biggest obstacle. (Osterkorn 2005a) However, investments in sustainable energy are not necessarily high-risk ones if possible failures are addressed strategically from the beginning. Therefore REEEP bundles small projects into bankable size or scale-up investments. (Osterkorn 2005a) REEEP provides funding while local partners run the projects. (IISD 2004c) Thereby, REEEP contributes to local capacity development and helps developing countries to get a share in the growing global markets of renewable energy and energy efficiency. Developing countries reduce their dependence on energy imports of fossil fuels, the new markets provide local jobs, deliver clean power and are often a cheap alternative to expensive grid extensions, as Rajendra Pachauri, Chairman of the IPCC and REEEP Facilitator for South Asia, explained.

> "International finance is necessary to jump-start the process. The REEEP can play a role here in mobilizing and tapping international sources of finance and in identifying the best policy frameworks to attract it." (Pachauri 2005)

REEEP's provision of financing comes in funding rounds which start with a call for proposals. Local partners may apply for funding, thereby, guaranteeing a demand-driven, bottom-up process, which is centrally coordinated, however. The funding round 2007 is the sixth in its four year history. (REEEP 2007a) In earlier funding rounds, REEEP focused on renewable energies and

aimed at the overcoming of barriers to these new markets, like the lack of resources and capacities or the perception of risks in new energy markets. Funded projects should be pilots and scalable to leverage limited resources available. (REEEP 2004a) Later on Marianne Osterkorn dragged the focus of REEEP's project funding from renewable energy to energy efficiency as saved costs can work as an incentive in markets to invest. Nevertheless, sustainability is taken as more important than energy access compared to activities of other networks. Regionally, the projects were distributed with most projects in Asia followed by Africa. However, this distribution was supposed to be levelled out in the next funding rounds.
The sixth round was the largest so far.

> "The REEEP portfolio is moving beyond a collection of good projects to being more strategic, we have started the replication and scale-up of successful projects in the past (…)."
> (Morgan Bazilian (REEEP Programme Board Chair) in REEEP 2007a)

In this sixth round, REEEP for the first time not only selected projects for funding, but directly commissioned projects, of which one is the development of a global status report on energy efficiency, and one is on the "development and establishment of a risk mitigation mechanism for renewable energy and energy efficiency investments in India". (REEEP 2007a) Global sustainable development grew more important, poverty reduction compared to global sustainable development became less important, which might turn out as sort of a division of labour with GVEP.
REEEP's projects execute most of the functions of networks, although it has to be stated that a clear strategy with a systematic approach is not in place. Nearly all projects harnessed knowledge as a resource and an increasing number of projects connected partners from different regions and in some cases from different sectors. Often REEEP's rationale is to kick-off self-organizing processes by generating knowledge and fostering learning processes in partner organizations, as it was laid out in interviews. However, due to REEEP's success in raising additional funds, it turned to some degree in sort of a donor development agency. Knowledge and good contacts, hence, were not the only assets at hand. Nevertheless, their significance increased, particularly that of good contacts, which might be due to the fact that it takes time to develop those contacts and build trust. REEEP had and continues to have a strong management of their project activities. The majority of projects follow a clear management approach and only very few projects combine such interventionist management with some self-organizing dynamics.
Another obstacle apart from lack of financing is often the only slowly changing political and regulatory framework of sustainable energy markets. Stephen Karekezi, from AFREPREN and GVEP Board member, described REEEP's critical role as to help "overcoming 'first mover fear'", though energy efficiency measures often do not need huge investment and can pay back within short time periods, and to prove that sustainable energy delivers jobs and profits. (Karekezi 2004)
REEEP promotes with the help of its partners policies and innovative financing mechanisms to lower risks in renewable energy and energy efficiency marketplaces, (REEEP 2006c) thereby addressing issues of energy access and energy security. REEEP is not a project implementation organization but focuses on the creation of supportive market conditions for indigenous energy sources through stability of licensing systems and tariff structures. REEEP helps to identify most appropriate schemes for a local market by harnessing the network's global nature to access successful models like feed-in tariffs, green certificates, or carbon funds and tailors them to a local marketplace. (Osterkorn 2005b) To address the policy framework level, REEEP engages in awareness raising activities among policy-makers, regulators, local bodies or local government officials, bankers, and end-users, particularly rural communities. (Osterkorn 2006; and CSD Partnership Database 2007) REEEP also provides training and technical support. To that end, REEEP cooperates with other networks like GVEP and EUEI to increase its capacities and impact. (REEEP 2004b) Another project implementing partner is the Gold Standard. REEEP collaborated to increase transparency in the market for voluntary carbon off-setting, while the

Gold Standard collects funding for pollution, which has already been created, and invests in projects to reduce emissions at the source. (REEEP 2006d)
REEEP develops to a manager "(…) that actively engages its targeted knowledge users." (Matinga, Ballard-Tremeer 2006: 63)
One of REEEP's major projects, implemented in collaboration with REN21, was to develop an information clearinghouse, called REEGLE[62] Information Gateway for Renewable Energy and Energy Efficiency, (see REEGLE 2006) harnessing a knowledge map, similar to a mind map as the architects from REEEP explained at the launch at the CSD-14. REEGLE comprises an Intelligent Search tool, which guides the knowledge user along a knowledge map in the background to relevant and usable knowledge, a Basic Search tool, making knowledge accessible in the three categories of sector type of accessible knowledge, and region, and an Actors' Catalogue, categorizing actors after sector, region, and issue the actors are knowledgeable in. So far, the use of REEGLE is rising and, though most users come from Europe, spread fairly equally over the world.
The REEGLE Launch Invitation introduced the motto which the organization of REEGLE obeys:

> "Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it."

Hence, REEGLE harnesses consistently the semi-public resources of knowledge and good contacts, contained in networks.

GNESD
GNESD is supposed to disseminate and harness existing technological solutions to energy problems, poverty alleviation and sustainable development, and to influence sustainable energy policies, strategies, and programs by researching and developing policies aiming to address the climate change challenge and, thereby, reducing the dependence on fossil fuels. GNESD's research programs analyze pricing conditions in energy markets and "perverse policy incentives" for environmentally harmful energies and how sustainable energy technologies can become commercially viable options, able to compete with conventional energy options. (UNEP 2002)
The centres of excellence conduct research on energy policies, climate change mitigation options, energy sector reform, industrial energy efficiency, and the environmental impacts of transport choices. GNESD assists in the analysis of policies and business models, and promotes awareness-raising. They aim to create a global knowledge base on policy experience and adapt these experiences to national experiences and to build a network of knowledge holders and practitioners knowledgeable in issues as "power sector reform, policy and governance issues in energy, development, environment, interdisciplinary policies for energy for rural development, application for information technology for promotion of sustainable energy and climate change mitigation". (GNESD 2007) Overall, GNESD has a macro-economic focus in their research as well as in their knowledge management, but they aim to "assist energy authorities in outlining finance and investment strategies, including those involving partnerships with private sector investors, and assist project developers and entrepreneurs in developing sound business models," too. (GNESD 2007) Thereby, GNESD's Network Members, the 20 centres of excellence, can address the demands and the interests of the network partners from all sectors more specifically, and in turn GNESD can integrate these partners and benefit from their contributions. (GNESD 2007)
GNESD is supposed to build a network of energy, development, and environment institutions from developing, transition and industrialized countries to increase and harness the contacts and cooperation among them and to "acquire, assimilate, and apply existing knowledge and experiences". (CSD Partnership Database 2006b) The researchers provide one another with data for comparison and come up with recommendations for policy makers on power sector reform.

[62] REEGLE is an artificial word, made-op of the words Renewables and Google.

GNESD promotes information exchange, and, thereby, capacity building and advocacy and policy guidance. (Christensen 2006a)
GNESD's research is organized in two themes: renewable energy and energy access. AFREPREN has the coordinating leadership role on the energy access theme, which produced already a summary for policy makers (GNESD secretariat 2004) and concluded the following dissemination phase, when GNESD published the research results, in 2004. The main conclusion was that energy access policies must be intentionally modelled pro-poor and connected to income-generating activities to be sustainable. Afterwards the energy access policy implementation phase started to continue the research on impacts of energy access policies on poverty reduction and develop implementation guidance. (GNESD 2007)
The renewable energy for poverty reduction theme is coordinated by the Bariloche Foundation. The focus of this theme was to clarify which contribution renewable energy technologies can make for poverty alleviation and provide concrete policy guidance. (GNESD 2007) GNESD published in 2006 a summary of the – still ongoing – research, (GNESD 2006) and presented the results at the CSD-14. The outcome was that there was more scope for renewable energies than expected, although renewable energies are only effective for sustainable development if directed to the poor. Afterwards GNESD moved the theme to the next phase and disseminates the research results in regional workshops and provides guidance for implementation of policies. (Christensen 2006b)
Most important ambition is to support implementation of action, which is sort of an overarching function that other functions feed in. The communication strategy outlines that action aiming at the long term goals of GNESD can best be implemented by "identify(ing) the target groups and then match(ing) them with the network outputs". (GNESD secretariat 2003)
Knowledge sharing and information exchange are interconnected with the implementation function and represent actually the core business of GNESD. The communication strategy focuses on eleven communication channels of which nine are all sorts of publications of research results, one is to organize workshops and only the last one is "networking with other partnerships: dissemination through cooperation with for example GVEP may prove helpful in reaching target groups". (GNESD secretariat 2003) The knowledge sharing function neglects the human dimension of knowledge and the connection of actors to make tacit knowledge, which can hardly be stored and shared in published form, accessible by connecting knowledge holders and knowledge users.

EUEI

> "The Initiative will raise *political awareness* among high level decision makers, encourage the *coherence and synergy* of energy-related activities and attract *new resources* (capital, technology, human resources) from the private sector, financial institutions, civil society and end-users. The Initiative is a framework for policy dialogue with Developing Countries and other partners, and also for specific actions and partnerships, supported by the Commission and Member States, and developed in close collaboration with Developing Countries." (EUEI 2007a)

The emphasis on coherence and synergy gives evidence of the aspiration that the network of partners shall develop self-organizing processes und foster and support the partnerships of the EUEI. The various sectors from which resources shall be tapped points at the multi-sector nature of the network. And the network is supposed to become operational on two levels: on the policy framework level as well as on the specific action level.

> EUEI "aims to facilitate the achievement of the Millennium Development Goal of halving the number of people in extreme poverty and other MDGs by 2015, through the provision of adequate, affordable, sustainable energy services. (…) Through the Initiative the EU proposes to establish "Energy Access Partnerships" with developing countries, with the involvement of

> the private sector and civil society that will develop in response to the energy needs of developing countries and regions." (CSD Partnership Database 2003)

To that end, EUEI maps energy-related development activities to identify gaps in necessary assistance for energy needs. (CSD Partnership Database 2003) The creation of partnerships for mapping and identifying energy needs in the context of PRSPs is the first phase of EUEI's operational action. The second phase comprises the coordination and implementation of projects. (CSD Partnership Database 2003)

Mapping might allow coordinating all EU energy-related activities as well, however, as one interviewee, who participated in the design of EUEI, mentioned, the EUEI is *not supposed to* coordinate activities, but only to administrate the EU's energy-related activities. The partnerships with developing country partners and other stakeholders are supposed to increase energy access while adapting action to local circumstances and requirements. (CSD Partnership Database 2003)

EUEI's activities work as catalyst for action to increase access to modern and affordable energy services by maximizing energy efficiency including fossil fuels and the use of renewable energy. (EUEI 2007a) In order to develop energy markets, EUEI focuses on local partners and their capacities and supports the implementation of concrete energy projects in partnerships. (CSD Partnership Database 2003) EUEI's knowledge management works through policy dialogues with partners. However, as EcoLtd. found out during research for GVEP's Knowledge Management and Communication strategy, EUEI must target their knowledge at private and grassroots actors. So far, energy solutions often are not culturally adapted, tacit knowledge must be harnessed. (Matinga, Ballard-Tremeer 2006: 41-47) They address the project level through institutional and human capacity development by transferring knowledge and skills, building knowledge networks for technical cooperation, and providing training and education. By these means EUEI works with the managerial resources of all networks, knowledge and good contacts.

EUEI aims to support and organize collaboration of multi-sector stakeholders who implement energy access projects. They fund only up to a certain share of project costs in order to leverage financing from private sector. (CSD Partnership Database 2003) EUEI contributes to mainstream and integrate energy issues into development and poverty reduction strategy papers of all sectors and to coordinate on national, regional and international level. All activities are organized in ownership and collaboration with EU member states, and foster the ability to attract additional funds from private sector. (IISD 2004c) All EUEI-projects are public-private partnerships. The EUEI contributes strongly to the development of energy governance, management and frameworks. To this end EUEI harnesses the strategic mechanisms of dialogues, ownership and participation in implementation to build capacities of local authorities and communities, and regional cooperation. (Karottki 2006)

In the beginning EUEI had a focus "(…) to develop further dialogue on energy between the EU and African countries." (IISD 2004a: 5) Thus, EUEI initiated a conference in Nairobi in November 2003, and multi-disciplinary workshops in Ouagadougou, in October 2004, in Maputo in April 2005, and Kinshasa in June 2005.

In the meantime EUEI's activities became more and more implementation-oriented and EUEI has developed three main strands of activities, the partnership dialogue facility (PDF), which comes closest to what a network is supposed to represent judging by the semi-public resources they manage in their action, the COOPENER program, and the EU Energy Facility, which is by far the largest financial instrument compared to other sustainable energy-related partnerships.

The PDF facilitates and supports policy and strategy development in developing countries through the promotion of dialogue among European member states, the EU Commission, partner countries, and their regional organizations on energy access. The PDF is managed by the GTZ and started operations in 2005, although EUEI fostered policy dialogue already in workshops and conferences before. The PDF's budget sums up to €4 million, which is dedicated explicitly not to funding for implementation but to enhance the framework for dialogue. (Garcia-Fragio 2006) So

far the PDF completed three projects, while nine are still ongoing, and seven are still under preparation. (EUEI 2007b)

COOPENER is more project-oriented and supports capacity-development for renewable energies and energy efficiency. It aims at poverty reduction through strengthening of local capacities.

> "It addresses sustainable energy services as a cross-cutting issue, providing power to supply the most urgent development needs such as access to food, clean water, health services, and education through new and more appropriate approaches." (EUEI 2007b)

COOPENER belongs to the DG TREN. It was launched in 2003 and has supported 40 projects since 2005 in Sub-Saharan Africa, Latin America, and Asia. Funding has been distributed in three rounds, in which project proposals are submitted and selected in a demand-driven way. COOPENER leverages additional funding because it co-funds only 50% of project costs. The overall budget of COOPENER reaches approximately €17 million. (EUEI 2007b)

The EU considers the partnership approach to work together with the private sector, civil society and financial institutions as a "promising instrument for growth and economic development". (Commission of the European Communities 2004: 15)

> "However, with no resources of its own and no significant energy-sector allocations in the development cooperation budgets of the Community, the roll-out of the EUEI may prove too slow to maintain momentum and make a real contribution towards the MDGs. Unless greater efforts are undertaken at the political level to provide adequate, faster and more flexible resources and instruments, the impact of the EUEI will be limited to the possibilities for tapping into resources already allocated to other sectors." (Commission of the European Communities 2004: 15/16)
>
> "So far, provision of energy services to the poor has been able to attract only marginal private investment. Innovative and flexible funding mechanisms are urgently required to use the leverage effect of public resources and ODA and attract more resources from the private sector, development banks and financial institutions." (Commission of the European Communities 2004: 6)

In June 2005 the ACP-EU Ministers Council approved the proposal to launch a €220 million Energy Facility provided by the European Development Fund in order to "support better governance and management in the energy area". (EUEI 2007a) On June 2, 2006 the ACP-EU Energy Facility was approved by the Commission, allocating €198 million to co-funding of projects, and another €10 million to the EU-Africa Partnership on Infrastructure. The Energy Facility is managed and implemented by the DG AIDCO. The first round of funding started with a Call for Proposals on June 19, 2006. From the end of January to April 2007 a detailed evaluation of proposals considered 169 projects for funding. (EUEI 2007a)

Energy Facility co-funded projects must obey the principles of good governance, ownership, flexibility, and innovativeness. Good governance refers to institutional and regulatory frameworks for partnerships to enhance energy access for the poor, ownership means that projects must be demand-driven, flexibility of financing shall open partnerships to various sources of funding, and innovativeness is supposed to offer individually adapted responses to the needs of the poor for energy services. (EUEI 2006a) The Energy Facility will be managed by officials of the Commission and experts from outside the Commission. (Commission of the European Communities 2004: 9)

EUEI collaborates with African countries most. Additionally, EUEI is committed to some global or regional projects. All their projects have a priority on energy access as an instrument to alleviate poverty. Nevertheless, they consider questions not only of social but also of environmental sustainability.

Analyzing the project reports of PDF and COOPENER, EUEI's activities are mostly consulting services for developing country governments. Therefore knowledge management is always part of what EUEI is doing, although there is no common strategy in place. EUEI rather develops recommendations and exchanges best practices for specific problems.

Social capital contained in good contacts is hardly systematically harnessed in the partnership projects, though they often aim at strengths of multi-sector partnership idea. In some cases the benefits of good contacts might have turned out as an unintended side effect. Again there is no systematic strategy for the management of social capital in place.
There are only rarely in one project partners involved from different regions apart from the EU and the region of implementation. Hence, there is hardly any dissemination of knowledge or exchange of experiences between different developing regions, unless some actors from the EU work as boundary spanners and bring that knowledge in. Such inter-regional cooperation among developing regions occurs hardly at all in the PDF projects but at least in more than the half of the COOPENER projects. This lack of inter-regional relations building is just as true for the cross-sectoral relations building. In less than half of projects of PDF and COOPENER are partners from different sector. As most partners in projects come from the same sector, there will only rarely emerge synergies among the activities of actors from different sectors, unless these synergies are specifically intended and aimed at in individual projects.
According to the project reports, EUEI cooperation resembles conventional forms of development aid. The partnership approach makes only little impact.

REN21

> "REN21 is a global policy network aimed at providing a forum for international leadership on renewable energy. (…) Open to a very wide variety of relevant and dedicated stakeholders, REN21 helps to create an environment in which ideas and information are shared and cooperation and action are encouraged to promote renewable energy worldwide. (…) Taking into account their (the stakeholders', S.W.) work, REN21 is not an actor itself but a set of evolving relationships oriented around a commitment to renewable energy." (REN21 2005f)

REN21 is supposed to connect the already existing dynamics in the field of sustainable energy and to foster synergies by harnessing the semi-public resources of knowledge and good contacts of the various stakeholders committed to the network. REN21 uses deliberately relations among actors to identify and bridge knowledge gaps.

> Its goal is to "(p)romote knowledge generation and transfer by providing links among existing and future knowledge bases on renewable energy market and policy developments, and by working to ensure that gaps in the knowledge base are effectively filled by organizations and individuals who are best equipped to fill those gaps." (REN21 2005a: 5)

The knowledge mapping of REEGLE which is implemented by REN21 in cooperation with REEEP serves the identification of knowledge gaps and potential partners to bridge these gaps.
The strength of REN21 is certainly its legitimacy as an initiative of the international community, which allows them to become effective at a more strategic meta-level. However, debate already demonstrated that there are reluctance and worries about REN21 assuming a hierarchical role among the global policy networks on sustainable energy, or duplicating the work of other networks.

> "Several participants (of the REN21 preparatory workshop in October 2004, S.W.) voiced the need for the proposed network to provide support through project level assistance, but a solid majority believed that this level of activity should be left to existing initiatives." (REN21 2004a: 3)

For instance, GVEP defines its mission as to promote the mainstreaming of energy for poverty reduction in national strategies as well as on global level. (GVEP 2005a: ii) Due to REN21's legitimacy as an initiative of the international community, however, this linkage of energy and development in overall national strategies would rather be the task of REN21, while it is more adequate for GVEP to keep the focus on poverty reduction projects in particular.
The existing networks carry out the operational part of sustainable development. A global policy network, initiated by the majority of governments from all over the world, has a greater legitimacy than partnerships, initiated as one among many by only a few actors. Hence, a global

policy network being an official outcome of the final intergovernmentally coordinated declaration of an international conference can connect all development issues to the enhancement of sustainable use of energy, and translate national strategy papers like PRSPs, considering local needs within the overall context of the development process, into sustainable energy specific action plans:

> "It is vital to repair the current 'disconnect' between energy strategies and strategies elsewhere in the economy, and to understand more fully the requirement that all sectors have for energy services." (DFID 2002: 6)

REN21 can function as an overarching organisation with a greater scope of competence for mainstreaming sustainable energy in development policies and pulling together the necessary and relevant actors to implement action plans. Nevertheless, already existing initiatives will remain the acting forces in the sustainable development process.

The national action plans help to start activities, connect them and develop projects, which will be fostered by the local application of a network governance strategy how to organize individual activities of national action plans optimally. However, this global strategy is still missing and has been failed to be designed at the renewables2004 as the systematic background to an international action plan and the logical link between the political declaration, defining what has to be done, and the international action plan, listing approximately 200 actions what actors actually do.

At the initial preparatory workshop, it was proposed to "create a broad and unified strategy" and that the network should develop and support the implementation of a "political 'roadmap'", how to meet economic and security goals by providing energy for the poor, reducing the dependence on imported energy, and creating jobs. (REN21 2004a: 2) At the Copenhagen meeting of the Interim Steering Committee, attendants demanded of the preliminary work plan that it still needed "some more strategic thinking" and that a "multi-stakeholder participant-driven 'road map' for policy-oriented activities" should be developed. (REN21 2005g: 3) Apart from that conceptual, strategic work REN21 is supposed to function "as a knowledge community", "generating and disseminating knowledge", and to "provide networking and organizing services" in order to support and implement the common strategy. (REN21 2004c: 1)

The REN21 work plan is meant to be a living document including all activities initiated or approved by the Steering Committee and "supported by the network conceptually, intellectually, and – in some cases – financially." (REN21 2006c: 3) Activities undertaken by REN21 participants autonomously are differentiated by work plan activities as so called affiliated activities. Nonetheless these activities are encouraged by the network, too, and might benefit from the network as well in the process of implementation through various inputs by network partners.

The process dimension of policies is nearly left out in global politics. After *structural* adjustment policies for sustainable energy have been designed and should be mainstreamed in national poverty reduction strategies, REN21 is supposed to fill the gap and address the *process* dimension. It can deliver the missing network governance strategy in form of schemes for how to organize action of network partners, and it is an *agency* to support that process of operationalizing poverty reduction strategies into action plans. Other already existing agencies like EUEI, GVEP, or REEEP might be able to do the same, but REN21 could play an overarching role and integrate other international networks and organizations to establish a common strategy, while other networks would always have a specific focus on policy dialogue, poverty reduction, or market development.

The thematic foci of REN21's activities address the policy domains of structures, actors and processes and the according policy levels, as described in section 2.9.2. The level of policy frameworks and incentives in markets are supposed to be strengthened by REN21's activities in order to expand renewable energies in developed countries and emerging markets as well as increase access to reliable energy in developing countries. (REN21 2005a: 5) REN21 addresses key actors and provides opportunities for partners to cooperate. And REN21 follows a dynamic process-oriented approach to support action and focuses mainly on the information level of

policies by facilitating the collection, analysis, consolidation and dissemination of information. (REN21 2005a: 6)

REN21 has categorized its activities into Policy, Advocacy, and Exchange. The Policy area aims at regulatory environments and market structures accelerating the market launch and competitiveness of renewable energies. Advocacy refers to the production of issue papers – so far three reports – which represent analysis of macro-economic instruments how to harness renewable energy for sustainable development. Exchange facilitates the generation and dissemination of knowledge in cooperation with REEEP via REEGLE. (REN21 2006d) To generate new knowledge and make it accessible to users has been a key task for REN21 from the first plans (REN21 2004a: 3) to the actual implementation. Although the idea of an instrument like REEGLE to distribute usable knowledge became salient early in the process of building REN21, this idea met with similar ideas from REEEP who mainly did the operational work and realized it.

As one interviewee remarked, who was involved right from the beginning in the making of REN21, it was necessary to produce some high quality products like the three reports in order to create a reputation for REN21 and get the network started. The three reports were the Renewables Global Status Report, launched at the BIREC 2005. The Global Status Report received wide acknowledgement within the sustainable energy community and, therefore, is planned to be regularly updated. (REN21 2005d) The Renewable Energy Investment Report, so far part of the Global Status Report, will be a separate report and not anymore included in the updates. (REN21 2007: 3) The second and third reports were on the role of renewable energies for meeting the MDGs, launched at the summit of the UN in New York 2005, with Chris Flavin, president of the World Watch Institute being the lead author, (REN21 2005c) and on the role of renewable energies within the context of climate change, launched in February 2006 in Dubai. (REN21 2006a) An additional report is planned on mapping renewable energy resource potentials. (REN21 2007: 3)

These reports can be seen as duplication of work of GNESD, as one interviewee from another network mentioned. Indeed, the lead author of the climate change report was John Christensen, head of the GNESD secretariat, which illustrates the way REN21 usually works. They collaborate with other networks, namely REEEP, GNESD and GVEP among others, (REN21 2007: 4) for REN21 does not have the capacities to engage in operational activities themselves.

While the advocacy through issue papers and the exchange through REEGLE aim at what should necessarily be done, the International Action Programme of the renewables2004 listed what policies are implemented and what various partners actually do. In 2006 REN21 embarked upon the follow-up of the implementation of the International Action Programme and presented the outcome at the Steering Committee meeting in New York in May 2006. It showed indeed that the renewables2004 had instigated some additional actions and that those were implemented to a high degree, as far as the respondents to the survey reacted. This follow-up of the IAP is an additional activity of REN21 to the continuing cooperation and high-level policy dialogue of the representatives committed to REN21. (Fritsche, Kristensen 2005: 19)

Apart from these process-related activities of REN21, the network, emerged from an international conference, focuses on the continuous series of international conferences, particularly the CSD process. One major event, first initiated by US-based ACORE, was the WIREC 2008 which continued the series of international renewable energy conferences after Bonn 2004 and Beijing 2005. (REN21 2006c: 4) REN21 supported the WIREC 2008 by providing the basis for an international steering committee, by organizing the global outreach, and already by searching for the venue of the next conference in the series. (REN21 2007: 2)

These conferences maintain the momentum and give opportunity for the energy, development and environment communities to gather and meet face-to-face, building relations and exchanging ideas, thereby representing a marketplace of opportunities for collaboration. In general, global policy networks are supposed to work as open fora for exchange. Therefore actors should be very diverse, as one interviewee from an IGO propagated. Hence, networks must combine autonomy

and cohesion, complementarity and similarity, and fluidity and stability as demanded by Ibarra. (Ibarra 1992)

What, however, might be even more important, is the government of which country hosts the conference: after China, one of the biggest greenhouse gas emitters, the USA, currently still the biggest economy as well as biggest emitter and for a long time veto player in all negotiations on an international climate and energy regime. As one interviewee mentioned the locations of the conferences may make a strong statement in themselves on global sustainable development.

3.7 Functions

This section presents how the scrutinized networks address certain issues and tests the theses on how network governance functions can contribute to solutions for the different problems of sustainable development.

Type II partnerships execute a variety of functions. The report of the Secretary General on partnerships for sustainable development names following implementation mechanisms: capacity-building and technology transfer, information-sharing and knowledge exchange, clearinghouse mechanisms, a great variety of websites, newsletters, publications of case studies, directories, educational and training materials, policy papers, toolkits, databases, communication, providing global expertise, applying relevant information to their local needs, and bringing together key leaders and stakeholders. The report groups these mechanisms into the categories of partnership-building, information-sharing, capacity-building activities, partnership projects implementation, adding in the next paragraph internal governance and coordination mechanisms. (Annan 2006: 14/15) These enumerated mechanisms comprise and correspond with the six network functions postulated in the context of market failures to produce sustainable outcomes. Partnership-building comprises the integration function by integrating partners into the network in order to overcome market barriers, though the term partnership-building can refer to additional activities as well. Information-sharing corresponds with the knowledge-sharing function; capacity-building is essential element and consequence of a targeted partner selection function and probably a particular strength of partnership action. The implementation of partnership projects corresponds with the implementation function and produces only sustainable outcomes if long-term effects are considered. Internal governance mechanisms represent and implicitly include always rules to solve conflicts and mediate interests. Coordination mechanisms are supposed to avoid negative external effects which decrease effectiveness of action for sustainable development of the activity in question or another activity affected by the activity in question.

These different network functions are distributed over some hundreds of partnerships. The conducted interviews showed that at least all of the big networks had some approach to every network function, but, as the report says, most networks carry out activities serving not all of the postulated network functions directly and in a targeted and intentional manner. Every network focuses on certain functions. It requires a process of learning to understand more interrelations and to address them as well. Additionally, it is a question of resource endowments, determining the capacities of each network which functions it is able to execute. For instance, GVEP started to expand their activities from mainly knowledge management to increasing number of activities to support implementation of concrete projects, just like EUEI whose capacity to support implementation of projects grew enormously when they started to manage the Energy Facility. Hence, strategic activities of global policy networks do depend on resource endowments.

Nevertheless, the question with regards to a management strategy for network governance is how semi-public resources can be harnessed to execute certain network functions to promote sustainable development and overcome failures in energy markets. The following sections will draw a picture of strategic action of the five explored type II partnerships and how they execute their network functions. The description of how the individual networks execute certain functions will illustrate how certain activities might foster the execution of different network functions (see Annex IV).

If not indicated specifically, all information comes from interviews with representatives mainly from the inner circle of the respective network. Additionally, some remarks from interviewees from the wider and the outer circle are presented in general preliminary remarks, applying to all networks, on the execution of the respective function.

3.7.1 Integration

The integration function of networks aims to overcome barriers for sustainable energy to enter the market by integrating certain actors into the network. Energy markets erect manifold barriers for newcomers on the side of providers as well as on the side of the consumers. Monopolies or corruption are wide-spread in developing countries' energy markets. Grid extension to remote areas is often too costly to be economically viable. If global policy networks achieve to integrate specific actors, like utilities being monopolists or private investors and technology providers as well as local communities, cooperative action of these actors might abolish barriers, excluding certain social groups and thereby denying sustainable development. Global policy networks must at least serve to integrate actors from the global level with those from the local level.

In fact, the integration of certain actors might be the all decisive factor for the effectiveness of networks. One interviewee described the strategy of her organization to identify key people for sustainable development and – as she called them – "innovator companies", and to start cooperation with them. "Innovators" characterize through their leadership in one region, in a country, or in an industry. They may be whole companies or only individuals, but other companies might follow their example and, thereby, kick-off self-organizing dynamics among stakeholders. The mission for actors committed to sustainable development is to persuade the "innovators" to move forward, but to successfully instigate such dynamics is mainly a question of right timing. If there is no opportunity for collaboration and effective action for sustainable development, one can only work on framing conditions for cooperation and wait for the right time.

In general, partners must create win-win situations and develop strategic activities for mutual benefits of stakeholders in order to make activities and investments sustainable and safe reflecting the strategy of certain companies as described by several interviewees from the private sector. One way to integrate specific actors pro-actively is to make usable knowledge accessible and connect the provided knowledge to knowledge holders. Thereby, knowledge holders are integrated in networks, as one interviewee confirmed. Knowledge holders gain opportunities to apply their capacities and to do their business. Similarly, knowledge is offered to multipliers but in the end it is up to these multipliers to demand that knowledge and disseminate it. For, integrating societal multipliers intentionally always means to run a certain risk that some local socio-cultural norms might conflict with standards of global actors, as interviewees from transnational companies reported. Hence, local actors should participate in implementing action to overcome inter-cultural barriers and access knowledge on needs of communities, at the same time a strong management from the global level in partnerships is necessary.

GVEP

The Consultative Executive Board, which designed initially GVEP's governance structure, recommended on the selection process of Partnership Board members (GVEP 2002) and, thereby, pro-actively integrated representatives of specific collective actors.

> GVEP states that "(w)e have learned that the main engine for scaling up service provision (…) is the private sector. Thus it is critical to work towards removing barriers to entry, while developing incentives for the private sector to provide energy solutions (…)." (GVEP 2005a: 2)

In general, GVEP aspires to integrate more partners, but has no formalized strategy to do so pro-actively. It rather does with the help of other partners indirectly. A focus of integration shall be on corporate private partners. IISD proposed to establish different work groups in order to alleviate the integration of specific partners.

GVEP's partners are mainly SMEs from the renewable energy sector, which is too narrow with regards to the poverty reduction goal of GVEP. IISD recommended expansion to and integration of actors from local level, other sectors and other IGOs. Only a rough 15% of GVEP partners came from another than the energy sector in 2005. GVEP must become the connecting point to

other sectors and share labour with REEEP, which focuses on policies and regulations. Thus, the danger of big overlaps can be controlled. GVEP must be present in other than only energy forums.

REEEP

As REEEP projects address villages and are therefore rather small scale, monopolies and corruption of governmental agencies are effectively no problems. Nevertheless, there are barriers for renewable energies and energy efficiency due to the small size of projects making them hardly bankable, and through licensing and in administration. REEEP addresses these barriers through bundling of projects and risk management.

At the time of the interviews, two thirds of REEEP partners came from the public sector, and only one third from the private sector. However, the goal was to increase the share of the private partners by targeted invitations. To date everyone accepted the invitation to join REEEP, but partners must be a legal entity and sign REEEP's mission statement.

Certain actors are addressed in a targeted manner. Multipliers are interesting for awareness raising and the dissemination of knowledge. To that end partners from developing countries must be integrated.

EdF, UK utility and ESKOM, South Africa are already REEEP partners. These are all big utilities. Some of them have been monopolists in their national markets earlier. Negotiations with EON, ENEL and RWE were on the way. These former monopolists started to internationalize their operations after the liberalization of energy markets. These utilities are important investors.

On the other hand, one interviewee from the civil society stated that the utilities attempt to conquer overseas markets by their commitment to networks and partnerships for sustainable development and at the same time to fence off their home markets, not making these markets more sustainable.

In general, partnerships must not be a one way street, but there is no strategy for a balanced give and take to set incentives for partnering. REEEP, however, aims to develop such a strategy with the help of the Partnering Initiative from Cambridge University. There must be some sort of a win-win strategy. Only if an actor gains something, she will commit to partnership action. These gains provided by the network may be security of supply, or independence of oil imports, or renewable energy as competitive alternative to costly grid solutions. REEEP's "network advantage" lies in the independence of the network and the collaborating actors while governments are at the same time nevertheless supportive.

REEGLE can be another offer, attracting actors to the network. REEGLE is supposed to execute the function to integrate new actors into the network in order to as well as because of it can provide more contacts. Additionally, an attractive information service works as an incentive for other partnerships and policy makers to join the network.

GNESD

Who to integrate into the network was completely planned by a first core of network members. Institutes with a regional focus were actively integrated in order to represent each world region, although not all of these institutes had the capacities to contribute. Therefore changes in membership as described in section 3.4.2 were introduced.

The choice was originally made by the ones who worked with one another anyway and were definitely to be integrated in the network due to their high reputation. The incentive for the actors chosen to join the network is the "alternative wisdom", GNESD has to offer. The network puts together individual strengths and can thereby raise acceptance for what individual researchers have found. However, that comparative advantage of GNESD depends on the way to deliver scientific results as well as on the quality of what is delivered, though capacities are uneven among the institutes. Therefore, quality is ensured within GNESD by cross-regional comparisons, looking at the bigger picture and comparing knowledge and experiences from different regions. Success factors of policies can be analyzed, thereby.

The mutual benefit of sharing knowledge for own research and for building one's reputation is the added value compared to research done by only one institute individually. Although it is sometimes difficult for the network management to find the commonality of researchers, which network partners can build on their coordinated research. To present that added value is part of the communication strategy in order to support GNESD activities, underline their relevance, and influence action for sustainable energy.

EUEI

The EUEI secretariat has a linking pin role and is supposed to communicate with other networks and actors in order to connect to potential partners. (EUEI 2007a)

EUEI has no common strategy which actor should be integrated in the network, but EUEI does identify barriers and problems of centralization in energy markets and in the institutional design of policies, which must be overcome. Thus, EUEI's activities integrate those excluded, in fact. Market failures are addressed without a particular strategy, but through the involvement of delegations on-site which have due to their position in the field a reasonably good perception of barriers and how to help actors to overcome them.

As membership in networks promises money flows, clear-cut boundaries of the network are important. Hence, the integration function of networks means not only to integrate as many actors as possible but also to define who is in the network and who is not in order to guarantee a smooth functioning of the network.

REN21

Originally, the German government invited certain shortlisted individuals to a workshop in order to launch the global policy network, announced in the political declaration of the renewables2004, and to form the Interim Steering Committee of REN21. Many of these individuals came from the International Steering Committee which supervised the process towards the renewables2004 conference. In fact, personal relations and networks among the relevant individuals exist anyway, at least in the OECD countries.

Apart from those shortlisted individuals, the Steering Committee aims to establish relations with certain actors like foundations with own financial resources as well as certain academics for specific tasks, and to integrate multipliers, like representatives of certain countries, in the network. Hence, REN21 carries out a pro-active integration of certain new partners. The Steering Committee establishes seats to be taken by certain countries or organizations, and asks members with personal relations to approach certain individuals. However, some reserved seats in the Steering Committee are not taken by the respective actors due to internal conflicts as in the case of India, where different ministries are responsible for energy policies, or due to the little prestige renewable energies have in many developing and transitional countries. Other countries are simply not interested because energy policies are not perceived as an international but as a traditionally national issue in some countries. In the end, however, there is no big harm to the network if single actors refuse to cooperate.

On the other hand, REN21 is open to committed actors and representatives from countries and organizations which do not have reserved seats in the Steering Committee, as in the case of Denmark. Apart from targeted invitation to the Steering Committee, actors can access the network because all meetings are open and allow in individuals from organizations not represented in the Steering Committee. This informal character allows collaborating even in the absence of a common position; there is no surrender of autonomy. The quality of output and the high reputation are supposed to be the incentive, REN21 has to offer, to join the network. In general, REN21 is a network of the committed and the willing although it is an open question how much participation is desirable. To integrate a relevant actor in order to overcome barriers can mean to risk blockades within the network and amongst the network partners. Hence, the combination of

autonomy of actors and informality of cooperation in REN21 enables the network to integrate a great variety of stakeholders and opens participation in strategic activities as wide as possible.
However, certain actors do not fit in the network and apply to its goals. For instance, WEC, which is lobbying for interests of fossil companies, was member in the Interim Steering Committee, but agreed to resign. No individual companies are represented in the Steering Committee, only industry associations like EREC and ACORE.
All of the four other sustainable energy related networks – GVEP, REEEP, GNESD, and EUEI – are represented in the Steering Committee by individuals affiliated with one of the other networks. In Beijing 2005, there was an open reception, where all the other networks were invited. Rajendra Pachauri, then Chair of the REN21 Interim Steering Committee, emphasized that all networks have a different focus, but all can cooperate: REN21 is global but not regional, REEEP has regional secretariats, GVEP works at the sub-national and local level, and JREC's strength is its multi-stakeholder approach.

3.7.2 Interest Mediation

Misallocation of resources in markets can exclude certain interests and under-represent those social groups at disadvantage. Energy markets in developing countries particularly suffer from scarce resources and a lack of purchasing power of certain consumer groups; certain technological or policy options in energy markets imply distributive effects. Social conflicts may result from such situations. Only if these groups can make productive use of provided energy, they might be able to pay for energy services and lift themselves up from poverty. In order to bring the interests of those excluded social groups into the market, global policy networks need to mediate adverse interests, solve conflicts and create opportunities to cooperate among network partners to the mutual benefit.
Cooperation and competition are opposing interaction modes in networks among the various actors. Although partners in networks are meant to cooperate, all actors do compete at least for the attention of the wider public. In general, the common network governance strategy aims to avoid conflicts. Nevertheless, one interviewee involved in the design of several of the explored networks emphasized that consensus is not the goal of global policy networks, but conflicting views will always exist and must be possible.
Conflicts can be best avoided by maximizing transparency and communications. One interviewee from the private sector highlighted that independence of actors allows them to evade situations of conflicting interests. Open networks which do not exclude any actor from participating in network activities – one reason for conflicts – increase outreach to the local level and legitimacy of networks and help to avoid and solve conflicts. Additionally, openness can foster processes of learning about one another, thereby solving or avoiding conflicts. In fact, all explored networks aim to be as open as possible, to minimize power asymmetries and even avoid the emergence of leadership roles, as several interviewees reported from different situations and networks, and to support network partners to access missing capacities and resources. Hence, the actors in the explored networks handle the danger of deficits in legitimacy with great awareness.
However, after all, conflicts may be necessary in order to achieve more than least common denominator solutions and define sort of a corridor for action but leaving all details unspecified, as one interviewee from the civil society emphasized. Particularly NGOs must sometimes stick to controversial strategic action.
Often interviewees recommended dealing with dissenting opinions individually. Usually, single actors do not want to blockade the whole process, but leaders are needed to explore possible compromises without giving anyone the feeling to be left out. However, nearly all of the interviewees emphasized that common interests in sustainability and common goals of sustainable development are both given in networks and are most important for success and effectiveness of networks in general. Project-related collaboration allows even competitors and opponents to work

together which, however, stays the exception while the competitive or even hostile nature of interorganizational and intersectoral relations persists.
At least, the relevant stakeholders must achieve to overcome the distributive nature of conflicts as, for instance, that of the climate and development issue. If conflicting interests follow "catch as catch can" strategies, as one interviewee involved in the establishment of the German Emissions Trading Scheme phrased it, the strongest lobby of vested interests will gain most. Negotiations on the issue thus become indeed a zero-sum game which can end in lose-lose situations. For, the trade-off is not simply one of environment vs. profits. The apparent opposition of both interest spheres must be solved at the level of individual investment decisions. Both social and environmental interests must be considered at the same time. In this context an interviewee from the private sector pointed out that to abstain from an investment due to environmental reasons might leave behind unemployed poor people and cause thereby socially unsustainable effects. Often sustainable and economically viable solutions depend on the style how to facilitate negotiations and partnership action, and on sustainable technical solutions which private company managers build in if possible anyway because only shortly later on these technologies might become standard and mandatory or state of the art due to cost reductions. This attitude to overcome conflicts and organize collective action reflects the approach of integrative bargaining including economically, environmentally, and socially sustainable solutions and, indeed, reflects the experiences of private companies and the investment environment they aspire, as one interviewee from a private company reported.

GVEP
In general, conflicts within the network are avoided. To that end GVEP's governance includes a strict "no conflict of interest" policy on the Partnership Board which obliges all partners to "abstain from any decisions directly related to their organization". (GVEP 2004b)
Apart from that, interviewees were not aware of any conflicts. In the Monitoring & Evaluation service line competitors even collaborated. In GVEP there is no competition for funds among partners, and the competition of donors is rather coordinated. The GAPfund provides no funding for one-off projects anyway but only pilot financing. Projects are up-scaled without the GAPfund. Hence, with regards to social sustainability, GVEP has hardly the size to distort markets or misallocate resources.
There might be reluctance to share certain knowledge, as IISD observed. However, that may be due to some weariness just as well. It depends on the perception: the lack of knowledge sharing can be due to conflicting interests as well as to being unaware of relevance of knowledge or simply the assumption that the knowledge is inappropriate and is therefore not shared. Whatever the reason may be, a common perception is always helpful to avoid or mediate conflicting interests and is, therefore, worth to invest in.

REEEP
A lack of social sustainability in energy markets occurs where the poor are not able to pay their power bills. Therefore REEEP addresses policy makers to design frameworks of energy markets that guarantee the payment of electricity bills through subsidies and life-line tariffs.
So far there have been no ideological or distributive conflicts in REEEP. However, if the focus of activities will shift to energy efficiency, there might come up technological questions of whether extending the grid or investing in decentralized renewable energy sources will increase – or decrease – the overall efficiency. Thereby price levels for the access to energy can differ and result energy access for different social groupings. If such conflicts over strategic activities arise in REEEP, they are to be solved in the Governing Board.

GNESD

As GNESD is a network of research institutes, it does not have to deal with conflicting interests of stakeholders immediately but only indirectly if their research results and policy recommendations give preference to activities and policies benefiting certain interest groups. However, there have been no challenges from outside of the network so far because GNESD's results are not as authoritative as those of the IPCC, for instance, and, hence, do not have the same political and economic impact. Nevertheless, sometimes it has been asserted that GNESD's criticism would be unfair.

GNESD is the only of the explored networks which is not open to every committed and interested actor because GNESD is a network of research institutes aiming for excellence. The goal of excellence requires a selection of specialists, while, at the same time, the more open and critical the discussion of research results and the more critical voices participate the better the achieved quality of results will be. Hence, GNESD endeavours to use the contacts of the networked institutes and researchers flexibly and openly and to present its common research as widely as possible.

Internally, there is no competition and, therefore, no conflicting interests in GNESD.

EUEI

As investments in energy markets are often high risk investments due to changes in legislation on tariffs, for instance, EUEI identifies related problems in policies and develops recommendations how to avoid those problems. Hence, EUEI contributes to management of risks related to policies for social sustainability, rather than to mediation of conflicting interests of stakeholder groups in order to find integrative solutions and to overcome market failures to produce socially sustainable outcomes.

It is possible that actors with conflicting interests collaborate if their capacities and resource endowments complement one another.

REN21

So far, conflicts could be avoided in REN21. However, there are indeed actors on the Steering Committee who promote special interests of the organizations or countries which they represent. REN21 tried to deal with such constellations by choosing certain selected individuals, by avoiding the integration of representatives of companies, and by including only the relevant actors in the fields of energy, development and environment instead of all stakeholders.

Conflicts within the network tend to remain implicit. They depend on power relations among partners and on which powerful actor is involved and which one is not. Such power differences and actual exclusion can produce massive conflicts. For instance, certain organizations represented in REN21 have more critical stances towards renewable energies than others.

Poverty reduction strategies focus mainly on energy access but not on renewable energy and the sustainability of energy sources. This conflict of distribution and sustainability objectives is not necessarily one, but might have an integrative solution to it. As one interviewee from the private sector stated this conflict is often made-up artificially to block further developments, although the interviewee conceded that actors cannot overcome that opposition at a meta level of strategy but only at the level of the specific project. Strategically, the global growth of RETs shall exceed the global growth of energy demand, which will take care of both demands for equitable distribution and sustainable development. In a given project constellation partners must negotiate an integrative solution combining energy access with demands for environmental sustainability.

Whereas, in general, networks can avoid conflicts because of their decentralized character compared to organizations. In a network partners might collaborate if opportunities arise and they share common interests, while other network members might abstain from the collaborative action if they do not agree. Every network partner maintains his or her autonomy and is not forced to take part activities of other network partners. On the other hand the decentralized, horizontal

governance of networks and the absence of certain actors in certain activities can lead to time-consuming and repeated processes and debates. At the Copenhagen meeting in 2005, for instance, REN21 partners decided intentionally not to found an organization but a network. Some absent partners restarted the debate at the Beijing meeting later in 2005 because they were unsatisfied with the outcome of the first debate. Conflicts in networks cannot be solved simply by a majority vote or by a hierarchical super ordinate leader, but must consider all stakeholders, while in hierarchical organizations a clear decision-making governance structure avoids conflicts, but centralizes all decision-making processes, leaving potentially behind some actors unsatisfied.

3.7.3 Knowledge Sharing

As one academic interviewee remarked, "every policy is ultimately as good as the information it bases on." The decisive question would be not so much one of openness to or generation of new knowledge but rather of how to manage and exploit accessible knowledge. At the GFSE-5, information gaps were identified as one of the major obstacles for sustainable and particularly renewable energy in markets. The provision of knowledge in order to support the market launch of sustainable energy technologies is therefore a centrepiece for sustainable development. (IISD 2005e)

In order to mobilize resources, mapping of "what non-financial as well as financial resources each partner was bringing" (Bennouna 2005: 8) is one strategy to access and tap these resources. A knowledge map connected to an actor's catalogue executes the function of what the proposed mapping is supposed to do for resource mobilization. An interviewee, who is partner in two of the explored networks, expressed his doubts that an updated global information service could be possible. Another interviewee, involved in the knowledge management of two of the explored networks, proposed to develop a catalogue of fragmented policies, sort of a selection of worst cases to identify failures. However, these databases of best or worst cases sort of use story-telling methods how to execute certain functions or overcome certain barriers to sustainable development, they do not indicate the relevance for an individual knowledge user. Such institutionalized instruments of networks can as well work as an incentive for actors to join the network, for these instruments provide marketplaces to offer and promote one's expertise, services and products.

Internal as well as external communications help to execute the knowledge sharing function to identify needs, to improve management and implementation of partnership activities, and to strengthen ownership. (Bennouna 2005: 8) One interviewee from an IGO reported that targeted research and communication were used to identify possible future markets for sustainable businesses. Networks serve to develop and communicate new ideas and to feed them into the debate, but, as another interviewee from an IGO observed, it seems that the knowledge sharing function is hardly managed strategically, which was however emphasized by IISD's research on networks and particularly the knowledge management in networks:

> "(K)nowledge sharing works best when it is closest to the level of implementation." (IISD 2004d: 2)

Communications should base on both information and communication technology and interaction processes. A strategy for communications, advocacy, dissemination and the knowledge management infrastructure is necessary. Defined roles and responsibilities are crucial for finding the right personnel at different management levels. A process-related approach is needed to develop knowledge management dynamically.

To effectively organize knowledge sharing in networks always implies the problem to balance result with consensus. There might emerge – interest-based or not – conflicts about the quality of knowledge. To solve these conflicts can, however, take too long or simply paralyze the whole network. As such conflicts can hardly be avoided, one interviewee from an IGO recommended to allow these conflicts and deal with them through individual compromise positions.

Many interviewees emphasized that *transparency* fosters matching connections of knowledge holders and knowledge users. However, the networks must define the role of *gatekeepers* to avoid an information overload. This role demands neutrality and trust among partners. In fact, one interviewee from an NGO reported that this NGO aimed to work as a gatekeeper for information and provide certain actors with certain knowledge. This means that individual actors might use the network as instrument for lobbying activities which are not based on neutrality. As an open network, however, will never be ruled by a single actor, open networks will not work as merely lobbyist instruments. Transparency, hence, serves not only purposes to match partners but also to control intentional exertion of influence of vested interests.

GVEP

To set incentives for partners to engage in knowledge sharing and provide their technological knowledge on products and services as well as their socio-economic knowledge on how to organize activities most effectively, GVEP's knowledge management service line enables partners to advertise their individual services and products in order to find partners for business opportunities to collaborate, although to serve the specificity of information required particularly by businesses poses a problem to GVEP.

Staff in the Technical Secretariat and focal country persons work as sort of gatekeepers, filtering and distributing knowledge. They carried out that task without any particular tools or strategy until GVEP had the IISD to do research and develop a Communications and Knowledge Management strategy for GVEP (see section 3.8.1). Experiences from the Global Knowledge Partnership showed that knowledge networks of individual actors generally overlap with other networks of these actors, although the overlap might have different degrees depending on the respective region. In South East Asia, for instance, interlinkages and overlaps of networks are dense, while in Africa local actors merely interact with international actors and overlaps are comparatively small. These overlaps are fostering effective collaboration, which confirms the theory of redundancy fostering self-organizing processes. IISD's survey found that there were only very little overlaps in GVEP, apart from individual, sub-regional, specific networks. "(M)embers have almost no networks in common other than GVEP." (IISD 2005a: 11) Hence, IISD concluded that there is a lack of culture of global networks across all sectors. On the other hand, the lack of overlapping networks indicates that GVEP relations bridge so-called structural holes (Burt 1992) and represent weak ties, (Granovetter 1973) which are particularly valuable contacts to access certain scarce resources for action.

In principle, the problem for global policy networks to provide usable knowledge and contacts for action to local actors is that the knowledge and contacts are there but too costly and time-consuming for the local actors to access. And it is difficult to keep the provided information up to date. On the other side, the local actors find it hard to distinguish whether specific information reflects individual opinion or consensual knowledge, as one partner from two of the explored networks reported. Nevertheless, knowledge from the global level can be usable and valuable for implementation of local action. The question is how to make that knowledge easily accessible and distribute it pro-actively to the knowledge users in need of that knowledge.

Most GVEP partners are knowledge seekers, not knowledge sharers. Approximately 3000 to 4000 people, for instance, receive the GVEP Newsletter – far more than GVEP has partners, not to mention the number of actively participating partners. One of the key findings of the IISD was that partners preferred face-to-face interaction, but are always self-interested. They need to be prompted to share their knowledge. Therefore the IISD recommended that GVEP must create a culture and incentives for knowledge sharing by providing partners with opportunities to meet face-to-face, by establishing improved and effective web communications, and by making sure that proprietary knowledge is protected. The developed Knowledge Management strategy is not aimed at anticipation of what knowledge is needed. It is rather about connection of knowledge holders, less about collection of knowledge.

So far, there is no knowledge map apart from that in the heads of the secretariat staff, which represents an approach of governance that one interviewee criticized as top-down. However, there was already one member of staff in the Technical Secretariat doing research on case studies and developing guidelines on what worked and what did not in order to create an institutionalized instrument for the purpose of structured and pro-active contacts and knowledge management to support GVEP's different service lines. Basically, there is a lack of funding to thoroughly develop such a tool. Heather Creech from IISD, who headed the strategy development project, had doubts about a knowledge map and expressed her connotations with library science. (Interview, November 16, 2005) Indeed, knowledge maps are often supposed to file and index vast amount of information, which has proved to be impossible or useless. Such databases are hardly used by knowledge users. 98% of partners in IISD's survey of GVEP members start knowledge search with Google anyway, hence clearinghouse instruments may be unnecessary. It could prove rather to be worth to establish relationships with service companies and use already existing specific databases. Although GVEP as well as initiatives like REEGLE, which evaluates information from and connects to already existing databases, must not wait until partners contribute knowledge by themselves, as they want to control their content, and leadership is needed to instigate dynamic knowledge sharing processes.

REEEP

There are several situations of imperfect information distorting energy markets and blocking sustainable development. Renewable energy and energy efficiency suffer particularly from information barriers, as several interviewees stated. The lack of information on technologies, licenses, or prices for electricity hinders investors to launch modern energy technologies in developing countries. On the demand side, particularly RETs have a bad reputation in developing countries so that knowledge sharing must contribute to awareness raising.

REEEP itself is a networking approach to share knowledge through newsletters and by providing information on ongoing and completed projects to identify potential partners. The shared knowledge and best practices shall disseminate in a self-organizing way through partners, basically by reaching out to multipliers who distribute the knowledge, though there is no such institutionalized mechanism.

Nevertheless, there is, indeed, a sort of institutional basis for the management of knowledge and relations as managerial resources of network governance. To manage knowledge and relations as resources for action is integral part of REEEP's strategy. The REEEP International Secretariat took over the leadership and developed in collaboration with REN21 a knowledge map and a connected actor's catalogue: the REEGLE information gateway for renewable energy and energy efficiency. Marianne Osterkorn, International Director of REEEP, said about the then surfacing initiative:

> "Our 'backbone' is our Information Clearing House. (…) This system (…) will be a sort of renewable energy and energy efficiency Google-like system. It will provide contact information for experts and policymakers around the world, and offer a case study and best practice database." (Osterkorn 2005a)

The REEGLE Launch Invitation introduced the motto which the organization of REEGLE obeys: "Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it." Hence, REEGLE harnesses consistently the semi-public resources of knowledge and good contacts, contained in networks, in order to destroy information barriers of renewable energy and energy efficiency. The Launch Invitation promised a tool "using state of the art 'knowledge mapping' technology based on leading experts' usage patterns". (Cernohuby 2006) Thereby, it is supposed to bring together policy makers, project developers, the finance community and other stakeholders, (Cernohuby 2006) but apart from the support for knowledge and social capital management, REEGLE will not distribute financial resources or implement projects. REEGLE delivers high quality data on renewable energy and energy efficiency, and

connects that information to relevant actors for taking action. This systematic access to relevant actors is called an Actors' Catalogue and was the first element of REEGLE available online. It bases on a matrix of stakeholder requirements and targets for collaboration. The difficult task was then to systematize this information and make it accessible. To that end information from databases and websites evaluated by 40 experts was organized in a hierarchy and a navigational model was designed. The team of REEEP, which designed REEGLE, decided which industry sectors were to be included form which each an expert was interviewed. The information from these interviews was then modelled into a Knowledge Map. The REEGLE team continuously works in new knowledge from expert interviews, as Robert Klump, head of the team, explained at the REEGLE presentation at the REN21 Steering Committee meeting in New York 2006. Comparable to GVEP's Technical Secretariat staff, the members of this team, the administrators of REEGLE, are the gatekeepers in the knowledge management system of REEEP.
This Knowledge Map functions in the background of the online tool of a so-called Intelligent Search which guides the user along questions, linking different issues of knowledge, to knowledge relevant for the user. Apart from the Intelligent Search, a Basic Search is categorizing knowledge after sector, type of accessible knowledge, and region. The Actors' Catalogue uses similar categories of actors, sector, region, and issue on which the respective actor is knowledgeable. The Actors' Catalogue provides information on and links to relevant actors and contains information on their mission, i.e. sort of their interests and identity.
Both Actors' Catalogue and Knowledge Map must have a process nature and be continuously updated. Links must be evaluated and by some mechanism grow stronger in order to signal the user what knowledge and which knowledge holders are important and helpful. REEGLE is interactive and represents thereby a dynamic mechanism. An email alert is activated if a user's search is unsuccessful, and, vice versa, when new and needed information becomes available or new documents or organizations are added.
The knowledge map is supposed to have self-organizing elements through incentives to up-date the accessible knowledge. (Interview with Marianne Osterkorn, October 11, 2005) It is planned to introduce an incentive system in REEGLE to review provided knowledge and to control and ensure quality of contributed information, though it has not worked out how to do this, as well as an automated review system for updating contacts and checking technically online links in the Actors' Catalogue will be in use. Some sort of feed-back mechanism with incentives to provide that feed-back is supposed to organize that self-organizing process. (Interview with Marianne Osterkorn, October 11, 2005) For, only if self-organizing dynamics emerge, the knowledge sharing function of the REEEP network can exceed the effectiveness of the knowledge sharing of single knowledgeable experts in central positions of a network, managing and distributing relevant knowledge. The dependence on such experts is a severely limiting factor of effectiveness of networks.

GNESD

As GNESD is a network of research institutes which generate and disseminate knowledge all the time, the knowledge sharing function is at once the most important function of GNESD and the least specifically organized one. For, gatekeepers filtering and distributing knowledge in a wider network are the centres and their individual researchers anyway. It has ever been their daily business to link with other researchers and institutes and build their individual networks. Basically, GNESD is an epistemic community serving the other sustainable energy related networks. However, they do not have a particular strategy how to manage their generated knowledge or more specifically how to execute the knowledge sharing function to address certain lacks of information. This is done usually by the head of the GNESD secretariat and the information and outreach officer of the secretariat, addressing knowledge needs individually.
Although John Christensen, head of GNESD secretariat, argued for the strategy that renewable energies must develop competitiveness in OECD markets with the support of OECD countries

before RETs could be launched in developing countries. Therefore he suggested that REN21 should advocate renewable energies in developed countries first. Later, however, the GNESD renewable energy research theme found that renewable energies can have already today a great beneficial impact in developing countries for the poor.
Hence, it is possible that a GNESD corporate strategy how to execute the knowledge sharing function will emerge, considering that understanding for knowledge needs for sustainable development increases with continued research and access to cross-border and inter-regional comparable data and experiences.

EUEI
Most activities of EUEI base on knowledge sharing but they do not have an explicit, EUEI specific strategy for knowledge management in general or knowledge sharing in particular. They merely identify problems of information dissemination for sustainable energy policies.
EUEI supports Knowledge Sharing through working groups, "developing thematic papers, concepts, proposing solutions and exchanging views and experiences." (EUEI 2007a) Member states expressed their interest in exchanging information and experiences from existing development programs to collect information on what activities are carried out and what the general budget for certain countries is. To that end EUEI was launched as sort of an inventory of energy-related development activities of EU member states. Apart from that EUEI has developed topic-specific discussion groups and organizes the access to advisory group and other documents. Hence, apart from mapping activities and budgets, EUEI has not developed any institutionalized or strategic instruments to share knowledge, although, in fact, knowledge sharing is an integral part to all their operational activities.

REN21
REN21 executes its knowledge sharing function for the wider energy, environment and development community as co-initiator through REEGLE with the REEGLE administrator working as distributor of knowledge. Additionally, Molly Aeck from the WWI proposed at the Beijing Steering Committee meeting in 2005 to create a wiki for renewable energies. She argued that the quality and reliability of provided knowledge would increase with the number of users. For, more actors would contribute by correcting errors. Thereby, a wiki could be a bottom-up approach to generate ideas for strategic activities and spur self-organizing dynamics in the network. However, reluctance and reservation among the Steering Committee members towards the mechanisms, governing a wiki, and doubts in the quality and reliability of information hindered the realization of a wiki in the end.
In general, competition for best knowledge opens the network while the competition for knowledge leadership on a specific issue rather closes the network. This debate between the two positions was carried out amongst REN21 members who aimed to organize the network as open as possible and at the same time become a leader as excellent knowledge provider in the field of sustainable energy.
Apart from the institutionalized instrument of REEGLE for knowledge sharing, REN21 shares knowledge informally through personal relations amongst the high-ranking members of its Steering Committee.

3.7.4 Partner Selection
Developing countries often suffer from a lack of capacity to analyze and overcome energy market failures "leading to high transaction costs and the availability of a limited menu of financing options in many developing countries." (GVEP 2007a) The lack of human, institutional, or technological capacities can raise transaction costs in energy markets for sustainable energy systems prohibitively high. To bridge these gaps in capacities, global policy networks can serve communicative purposes and provide a forum to select appropriate partners with the adequate

capacities and support capacity development in strategic network activities. Hence, partners should always have complementary capacities.
As one interviewee from the private sector confirmed, through sharing of capacities networks can increase the efficiency of partnership project activities and even become an enabling condition. Companies look for partners not only if needed capacities cannot be bought in the world market but also to secure investments through the involvement of local partners. Another interviewee from the private sector pointed out that partners should be independent to bring in credibility, which is a precondition for collaboration particularly for environmental and social NGOs.
Global policy networks serve to broker contacts to connect SMEs with TNCs, as one interviewee from an IGO reported. Beside expertise and experience, personal contacts, particularly those to local actors, are pivotal for partner selection, emphasized one interviewee from the civil society, although activities addressing global issues require seeking for global partners. For, international partners serve a better understanding and increase credibility. They bring in new knowledge and different perspectives and enable to compare results. Whereas local actors often have the problem that they are contacted and invited repeatedly to global activities, thereby losing touch with the actual target group which might result in a lack of trust. Some interviewees from the civil society pointed out that the connection between global and local level in global policy networks is missing, even called it a myth, and criticized the link of global policy networks to the local level as rarely successful. Indeed, the outreach of global policy networks and the link between global, regional, national, and local level turned out to be a difficult task, as many interviews indicated, and outreach is more or less in all of the explored networks an issue in the network governance.

GVEP
GVEP helps to identify financing sources and access them. However, GVEP only informally helps to select partners from the network. There is no institutionalized mechanism to identify matches of potential partners, and the Technical Secretariat must maintain neutrality. Apart from that, GVEP does not know enough about partners to support partner selection pro-actively to bridge gaps in capacities and enable partners' strategic activities. GVEP only provides a list of partners and informally support at the country level through focal country persons. Additionally, the Technical Secretariat can contribute to partner selection through open communication because every secretariat member is responsible for one region and knows about relevant actors and potential partners from that region. Country level partners should come from different sectors in order to link the energy issue with needs from other industries. This demand for multi-sector networks is a big challenge and exceeds sometimes the capacities of the respective agency implementing the GVEP country action plan.
Partners should have different backgrounds. GVEP particularly seeks business contacts like Kurt Hoffmann, president of the Shell Foundation and new chair of the Board, and Sarah Adams from EdF and head of Technical Secretariat and new CEO of GVEP International.
Partner selection depends mainly on the personalities involved. Hence, a lack of neutrality can easily disturb and interfere with the personal relations of network partners. GVEP often faces the problem to be perceived as an initiative of UNDP and the World Bank. That's why the World Bank distanced itself intentionally to make GVEP more independent and less biased in the perception of partners. For instance, Dominique Lallement, one of the eminent GVEP Resource Persons, was told by the Bank *not* to attend GVEP's first Partners' Assembly.

REEEP
Although being aware of the lack of capacities to harness sustainable energy for development, so far REEEP contributes hardly to partner selection. However, there are plans to install a "market place" of ideas for projects in order to connect financiers and project developers to select one another for partnership activities. Thee partnership activities must consider lacking and existing capacities, mandates like those of development banks, and some sort of risk management through

guarantees provided by organizations. In general, REEEP provides mainly information services and leverages private funds, which will be critical for REEEP's overall effectiveness. Apart from these activities, REEEP addresses policy makers with regards to the design of regulatory frameworks of energy markets. REEEP does not intervene so much into operational activities.
In a way, REEGLE contributes to partner selection. It connects potential partners, who could share costs, as a matching service. However, the effectiveness of this service is uncertain so far. Another limit on REEEP's capacity to help select partners is simply that partner selection is a top management issue whereas REEGLE addresses rather middle management and the question how to use available budgets for projects most effectively and most efficiently. Due to the openness of REEGLE, partner selection can itself imply high transaction costs. Therefore, there is a need for quality control of partners in the Actors' Catalogue.
Hence, although partner selection may be a necessary function particularly for REEEP funded projects, REEEP's instruments to execute that function so far do not promise to be very effective.

GNESD
GNESD has a policy orientation focussing on analysis of structures in the power sector and policies reforming the power sector, less a process orientation. GNESD hardly involves in implementation of projects, and so it is hardly engaged in selecting partners to bridge gaps in capacities to implement action. However, GNESD is supposed to bridge gaps in capacities in sustainable energy related research. That’s why GNESD aimed to integrate at least one institute from every world region in order to maximize global outreach and create synergies in research by comparable data and cross-knowledge from different regions, thereby developing research capacities in partner institutes of the network.
Although, as one interviewee from GNESD self-critically conceded, GNESD has so far achieved to develop capacities neither of institutes nor of local communities. GNESD has not yet really started to successfully network among the partners. Merely the coordinators from partner institutes are responsible for management of comparable, coordinated research activities of the individual institutes, while the GNESD Secretariat facilitates this research collaboration. The problem of networking in general is that not everyone can know everyone else. To enhance and facilitate collaboration, therefore, increased transparency is needed.
Partners from outside of the network of the twenty centres of excellence are mainly addressees for the dissemination of GNESD's research results. The public domain is in GNESD's focus as it is traditionally responsible for the energy sector, although it might be reasonable to select private actors for certain activities, which might be done in future.

EUEI
EUEI mobilizes “appropriate combinations of public and/ or private resources for specific actions and instruments”, thereby matching resource endowments. (EUEI 2007a) However, EUEI does not select certain partners for action pro-actively. The function of networks to support partner selection must be executed at the action level of policies, while EUEI rather identifies problems of technical cooperation at the framework level of policies.
In general, EUEI aims at capacity development even though this is merely upstream and addressing policy makers, not the implementing actors. EUEI’s local outreach is rather small. Although the strategies, developed with the help of EUEI, are supposed to be designed in a participative way, EUEI is not visible at the local level. Nevertheless, there are participative instruments at all levels.

REN21
Capacities, know-how, and technologies must be available. If these resources lack, an adequate partner must be selected. Considering the role of REN21 in the wider energy, environment and development community and for the other networks, one interviewee, involved in the design

process of REN21, made the appraisal that a strategy for the selection of adequate partners might be developed at a meta level, but the selection itself cannot be made at that meta level. Capacity, financing, and policies must match one another, then research and development, workers' skills, and industry will develop their own capacity.
REN21 selected partners for specific tasks and built strategic alliances with REEEP to develop REEGLE and with GNESD, GVEP, and EUEI through individuals involved in REN21 and one of the other networks. Basically, these relations work through high-level, personal relations. The reputation of such individuals as well as the quality of output has the effect of an incentive for partners to cooperate.

3.7.5 Coordination

Sustainable energy needs a level playing field to be able to compete. Therefore, different energy sources must internalize their external costs, which is an often repeated demand by many stakeholders and observers of sustainable development. (see, for instance, Christine Lins (Secretary General of EREC) at the GFSE-5 in IISD 2005e) Usually, proposals for problem solutions address macroeconomic mechanisms and regimes to internalize external costs into market prices. However, as soon as these macroeconomic solutions imply redistributive effects, not being Pareto-optimal, there is always strong resistance to any suggested policy. The democratic process to the realization of and the compliance with macroeconomic regimes particularly at the international level of policies is hard to achieve. Therefore, voluntary action of autonomous actors, communicating and thereby coordinating their individual activities to internalize external effects on partners might prove to be effective in the absence of an effective international regime.
The success and effectiveness of that communicative action depends on the openness for new ideas. Networks must not define a fixed goal or a hierarchy of operational goals, but a common cause and plural approaches are all necessary and, in fact, available for networks. Mutual respect instead of being on a mission allows for an alliance of organizations enriching each other through semi-public resources like knowledge. In general, coordination through communication is an ongoing, in-depth process, generating the more benefit the more effort is put into it, as one interviewee, representing a private company, described the experiences of that company.
One interviewee from an IGO even asserted that networks' foremost purpose is the facilitation of communication among the network partners. However, another interviewee from an NGO expressed his doubts that communication could achieve coordination in large groups of actors. Only direct communication among a limited number of actors can be effective. Due to the limited man-power of network secretariats, global policy networks must harness personal contacts and foster self-organizing communication processes among the network partners. One interviewee from an IGO, indeed, described such dynamics to coordinate among the different initiatives of this IGO.

GVEP

Coordination of activities of actors from different sectors is critical to avoid unnecessary duplication and thereby increase efficiency of action and reap synergies. (GVEP 2007a) In specific countries, different actors coordinate individual activities of partners and avoid inefficient donor competition. UNDP has always an important role to play in the coordination of activities of different actors in one country. In general, GVEP finds out quickly if there is a need to coordinate external effects. For, everyone in the Technical Secretariat is responsible for one region and puts relevant actors informally in contact if necessary.
GVEP's Communications strategy uses different tools or channels for communication. These channels must apply to different necessities: Partners from the energy and development communities must be integrated, connected and selected to reach out to. These partners translate into who is target audience and how the strategy of partnership engagement must be designed.

Basically, the questions of communicative action are who is an internal actor in the network, which knowledge is available and accessible, which knowledge is usable, and how to provide access to this knowledge.

REEEP

REEEP aims to avoid duplication of activities internally through clear-cut roles of partners and externally through cooperation with other networks. Hence, coordination is executed as a management task mainly by the International Secretariat. Communications among partners are supported through the newsletter. However, this instrument is hardly adjusted to individual actors, and can therefore only be of limited effectiveness for coordination.

GNESD

GNESD considers in its research external effects separately. While climate change is an external effect mainly of developed countries' energy systems, developing countries still need more big scale staple energy. Hence, there will hardly be a global agreement on climate change in near future although climate change needed to be linked to many issues like aid, trade, etc., as John Christensen, head of GNESD secretariat believes. Therefore partnership action beyond regimes is necessary

There are no one-size-fits-all technological solutions, like renewable energies are often discussed to be one. Renewable energies can contribute to poverty reduction by creating decentralized, local value chains as well as to security of energy supply by being available independently of limited energy commodities or targets of terrorist attacks. However, other energy sources can make contributions to socially, economically, and environmentally sustainable energy, too. While renewable energy helps to mitigate climate change, other technologies do that too. Research must, therefore, address manifold local capacities and opportunities, and balance different social, economic and environmental external effects of different energy technologies and policies.

The generated outcomes and information materials are distributed among specific actors. There is no scheme down to detail to target the right people with the right knowledge. GNESD's head of secretariat and the information and outreach officer decide what information material might be appropriate for whom because they know most of the addressees. Therefore, GNESD produces target group specific knowledge and information materials, though these materials might be more or less specific and hence be distributed fairly wide, or rather narrow for certain multipliers like policy makers, leveraging the effectiveness GNESD's knowledge generating activities by considering GNESD's outcomes in implementation, or regionally as with the help of UNDP providing funds for regional outreach activities.

EUEI

> The EU Advisory Group of representatives from European governments and the Commission "takes an overview of activities, identifying gaps in co-ordination, as well as new opportunities. The group serves as a vehicle for seeking complementarity between this and other initiatives and programmes and to develop networking." (EUEI 2007a)

Although EUEI hardly considers external effects strategically and has no particular focus on economic sustainability, they do consider problems of developing countries with negotiation skills when it comes to issues which have effects on or are affected by energy systems.

The coordination function without centralized, hierarchical governance structure might become the most important one of EUEI, for EUEI aims to map and inventory individual activities to identify and bridge gaps in the EU's and member governments' energy-related aid. Additionally, EUEI has a strong link to operational action, which might turn out as an advantage to establish effective donor coordination. However, so far, EUEI does neither have a strategy to execute that coordination function nor does EUEI have the mission to coordinate. If EUEI executes effective coordination of energy-related activities at all and considers external effects of energy systems,

individual consultants, implementing EUEI's activities, can claim to achieve such strategic coordination.
The EUEI network is supposed to merely create synergies and coherence. It shall provide tools and spaces for communication and manage those through information management and face-to-face events in order to bring people together and focus activities on certain topics. This quite costly part of network governance cannot be substituted by electronic communications.

REN21
REN21 must engage in the debate on technology alternatives and on levelling the playing field by abolishing subsidies for non-sustainable energy thereby deleting negative external effects. However, unlike in national energy policies there is no opposition of utilities and renewable energy industries, which REN21 has to address.
The Steering Committee meetings work as a forum to present own activities and receive feedback as well as to identify opportunities for collaboration and synergies or to avoid mutual negative effects. However, there have been developed no strategies or institutionalized mechanisms for coordination. It still has to be organized which and how ideas shall be fed into the network.
In fact, none of REN21's activities executes a coordination function neither does REN21 have the mission to coordinate the activities of its network partners, as there was clearly strong opposition to REN21 assigning this task in the process of designing REN21.

3.7.6 Implementation
Long-term effects of energy systems are hardly considered in markets because either negative effects will not affect current market actors or benefits of today's investments and action have long amortization periods. Global policy networks on sustainable development deal with such long-term effects by implementing needed activities in spite of the missing incentives of present markets to do so. The 'network effect' sums up to implemented action which would have not at all or only later been taken without the network.
The reason why networks might be able to organize activities, which might pay only in the long-term or produce even non-appropriable benefits, is in theory that needed resources of partners complement and thereby costs and risks can be lowered and shared. Sharing risks and costs is indeed a way private companies can secure their investments and create a friendly social investment environment, as one interviewee from a private company confirmed. One interviewee from an IGO involved in several of the explored networks described the motivation to join a network in general terms with the usefulness of networks to link actors from different countries, regions, the public, private and civil sectors, borrowers, and multilaterals, thereby broadening views of diverse partners.
In fact, however, many networks do not comprise so many partners from different sectors with complementary resource endowments. Apart from that demands and needs are not known in sufficient detail and contracts can hardly be as detailed as activities would require. Hence, the achievement of networks comes rather from the generalized trust among partners which creates a readiness to cooperate without which transaction costs for partnership action would be prohibitive. Nevertheless, the rationale of many actors to join a network is to find complementary partners who are credible as well as independent, as several interviewees confirmed and as at least the big size of the explored networks indeed promises.
While partners from the private sector either themselves seek funding or do not seek partners for financing but only to access other complementary to their own resources and capacities, partners from the private sector nearly never contribute financing to partnerships. Depending on their core business they join networks hoping to find financiers for their activities for sustainable development or they need partners' expertise and capacities to implement business projects and secure investments. Their contribution to partnerships is only rarely financial in nature but rather equals a donation in kind. In general, private actors separate their commitment in global policy

networks from their financing unless the commitment to sustainable development itself represents the core business of the respective private actor. These actors, however, have hardly the financial leverage to sponsor partnership activities.

GVEP

Interviewees, actually, could not answer the question what GVEP's effect has been. In fact, this question was raised at GVEP's first Partners' Assembly, and the answer among participants was simply that GVEP "just did it", meaning the people from the ground "just did it" and made GVEP a success. Monitoring and evaluation of GVEP's effectiveness at the project and national level found that, basically, successful implementation depends on GVEP's efforts to raise and organize funding for a project or a country's activities.

The counterfactual approach behind the question 'What would have happened without the network?' is particularly important for knowledge networks in order to answer the question 'Would we know less?'. Now, it is too soon to tell. GVEP is in its second phase of development challenged by scarce financial resources, though gradually moving towards phase three. Only in the third phase networks can realize their advantage. It takes approximately ten years time to reach that stage, which poses the investments of sponsors at considerable risk.

REEEP

There is no strategy how to share costs and risks of activities among partners to enable them to implement strategic action for sustainable development and thereby contribute to the production of benefits for the society, which are often not appropriable by individual investors. In general, REEEP organizes "action on the ground". Projects must generate a network effect by having an impact and being new and additional, and projects shall be replicable and leverage new funds from other donors. As all action of REEEP is supposed to aim at frameworks for policy and financing for renewable energy and energy efficiency, the value-added of the network emerges indirectly from activities and unfolds bit by bit over a longer time.

GNESD

As GNESD's Centres of Excellence carry out research, GNESD's functions do not address implementation of projects apart from implementation of research activities. So far, GNESD did not use the relations among partners but only contracted partners for certain research assignments and provided funding accordingly. Thereby, GNESD could organize research activities in all world regions on common research questions and analyze energy policies in various countries in order to produce data for comparison. Although GNESD aspires to enhance their networking, they have not so far achieved to harness the knowledge and relations contained in the network for the implementation of network activities and to foster self-organizing collaborative processes among network partners for the identification of knowledge gaps, the generation of relevant and usable knowledge, and the distribution of that knowledge.

EUEI

> EUEI "is mobilising appropriate combinations of public and/or private resources for specific actions and instruments, both from domestic and international sources, following the procedures and priorities established with respect to development strategies." (EUEI 2007a)

So far, EUEI-PDF has helped to develop three regional strategies of ECOWAS, together with UNDP and US$10 million funding from EU's Energy Facility, of CEMAC, and of EAC. The problem of these regional strategies is the overlapping of the various economic, monetary, political, trade-related communities in Africa. EUEI's projects aim to set up policy frameworks which foster and govern long-term sustainable development of energy systems.

In general, however, it is too early to evaluate effectiveness of EUEI, remarked Ray Holland, EUEI-PDF manager.

REN21

A strategy for activities to address long-term effects depends pretty much on who cooperates and shares which burdens to start such long-term activities. Such a strategy is not yet developed in REN21, although the high-ranking partners, who already participate in REN21 and its Steering Committee, will be able to use and even increase their reputation and influence strategically through their cooperation. This effect of cooperation will probably always be REN21's biggest advantage and allow partners to become most effective in implementation of whatever activities for sustainable development.

Conclusion of Phase II

In the second phase the designed network governance becomes operational, the secretariats as network hubs must prove that the network governance is effective and assume operational leadership and initiate activities. This phase can overlap with the first phase but starts with implementation of strategic action of the global policy network. Many type II partnerships never reached this stage. Often this second stage of network development goes together with the exchange of central leaders of the first phase, who strongly influenced the design of the network governance but withdraw for different reasons when the operational work starts.

On this second stage first reforms of the original network governance can already occur and adapt the network governance to external requirements of what the network is engaging in. GVEP's launch of an independent international NGO and the initiative to develop a strategy for the effective use of the managerial resources of knowledge and social relations at hand give an example for this move on the second stage. More such moves might follow.

Operational activities of all networks gave evidence for what hypothesis 2 asserts: Global policy networks harness the semi-public resources of knowledge and social capital contained in the network as resources for action, although the explored networks are still in the process to develop or refine a knowledge- and contacts-related network governance strategy, which will be described and analyzed in the following section 3.8. GVEP has put a focus on the organization of effective knowledge exchange, GNESD provides a global knowledge base and aims at networking with other sectors, EUEI connects its knowledge management with managing relations to partners, REEEP manages contacts and lessons learnt amongst network partners, together with REN21 REEEP has developed REEGLE, an institutionalized tool for the efficient management of knowledge and contacts, and REN21 has set itself the goal to generate and disseminate knowledge and network key actors. All networks harness knowledge and contacts as resources for action in their partnership activities. Hard resources like power or financial assets for projects are accessed and leveraged with the help of the soft resources knowledge and contacts. Hence, the management of knowledge and social capital has become the core business of the explored networks.

Due to the pivotal role of knowledge and social capital, networks need a strategy how to manage these resources in network governance. However, demands for an efficient management of these resources deny defining specific management interventions, only self-organizing dynamics can support the emergence of spontaneous order. Therefore, – as already discussed in the context of the knowledge sharing at the World Bank in section 2.9.3.3 – the institutionalization of continuously up-dated and developing instruments to manage knowledge and contacts in a decentralized way by the individual users need to be installed. The knowledge map and the actors' catalogue contained in REEGLE serve this purpose.

Concluding, **hypothesis 2 (a)** *a network governance strategy should help to organize the semi-public resources of* ***knowledge*** *and* ***social capital*** *in networks efficiently and effectively for collective action* can be confirmed but should be amended by **hypothesis 2 (b)**: *The management of knowledge and social capital needs institutionalized instruments of a* ***knowledge map*** *and an* ***actors' catalogue*** *growing and developing in a self-organizing way through the selection and rating by users of the contained links to knowledge holders and partners.*

Apart from the hypotheses on Governance in Networks, section 2.9 developed six theses on Governance through Networks, referring to how to execute network functions. Networks execute governance functions, indeed as assumed, through autonomous partners following their individual strategies without central coordination, nevertheless a spontaneous order and a common strategy can emerge. However, observations suggest that partners, in general, do not follow incentives to collaborate but rather are willing to cooperate depending on personal relations. The way *how* the individual autonomous partners contribute to the execution of network governance functions confirm in large parts the theses on Governance through Networks, but the great variety of actors and activities indicate that theses on strategic action for effective governance through networks need to be amended.

Thesis 1 on how and which actors should be integrated in a network can be confirmed. All explored networks targeted certain actors like local partners, actors from certain sectors, boundary spanners, or certain leaders and "innovators", and invited them to join the network and assume important roles. Additionally, all networks apart from GNESD are open for actors willing and committed, although in the case of EUEI, which has to distribute the most financial means, it has to be taken into account that clear-cut boundaries are needed as well if private resources are provided. Hence, **thesis 1** should be expanded: *While **openness** and **clear-cut boundaries** need to be balanced, networks need to **build relations in a targeted manner** to trusted multipliers, innovators, boundary-spanners, and local partners, who have access to needed resources, or hold knowledge on local conditions, or increase organizational advantages like flexibility and specialization of the network.*

With regards to the interest mediation function of networks, it turned out that leadership is, indeed, considered to be important, but actors are reluctant to assume leadership. For, networks connect autonomous actors, power asymmetries might hurt the independence and thereby the ability and readiness to collaborate. In general, conflicts are avoided not solved in networks and rather terminate the partnership if controversial issues cannot be deleted. The free flow of information through transparency, communication, and openness is considered to best avoid conflicts. Hence, mutual learning is fostered and fosters cooperation without conflicts. Issue-linkage is, indeed, considered important to overcome conflicts effectively and identify integrative solutions. Complementary resources and capacities allow identifying project-related common interests, so that independent and autonomous actors, who might even be competitors, can cooperate in spite of conflicting interests, which must be acknowledged and understood as such, at a more general level, and responded to at an operational level somehow. On the other hand, clear-cut roles were mentioned by nearly all interviewees as supporting the network governance effectiveness.

Concluding, **thesis 2**, *adverse interests in distributive conflicts can be mediated through establishing leadership, disseminating knowledge, and building trusted relations in order to reach **integrative solutions** and to recognize and harness opportunities for collaboration by linking intersecting issues, connecting partners, and defining roles*, can be confirmed completely.

The thesis 3 that knowledge sharing of partners in global policy networks should pro-actively distribute needed knowledge by targeting and connecting stakeholders and knowledge holders can be confirmed in so far as all explored networks indeed have a focus on pro-actively managing and distributing knowledge and also on connecting partners. In fact, even the idea to map available knowledge resources has been realized by REEEP and REN21 with the launch of the REEGLE instrument. However, the empirical research showed that in the context of knowledge sharing other problematic constellations must be considered.

In order to avoid an information overload through increased access to knowledge and information, networks and certain partners should serve as gatekeepers. This role can be a very powerful one which is why this actor needs to be neutral and a widely trusted partner. The pro-active distribution of knowledge comes always close to lobbying for vested interests. Hence, transparency and openness must not only foster exchange and sharing of knowledge but also ensures a control of exertion of influence through interest-led provision of knowledge. At the same time, transparency and openness as well as overlapping activities and knowledge capacities of various network partners serve as self-enforcing control of accessible knowledge and foster self-organizing processes of knowledge sharing.

Therefore, **thesis 3** should be modified as follows: *Where markets fail due to a lack of information, knowledge sharing of network partners should **pro-actively distribute needed knowledge** by targeting and connecting network partners through the installation of neutral and trusted **gatekeepers** within the network, and should control quality, relevance, and reliability of accessible knowledge through **openness** of and **transparency** in the network to support effective network governance.* Such gatekeepers might be institutionalized and realized as a knowledge

map backing the self-organizing process of building relations to better inform and support partnership activities. As described in hypothesis 2 (b), such knowledge maps should be connected to an actors' catalogue of the respective knowledge holders to foster the building of relations between knowledge holders and knowledge users. An institutionalized frame might thereby form a marketplace of accessible capacities and expertise of actors, where partners might find each other for collaborative activities. Thus, an incentive structure could be created to make knowledge seekers to knowledge sharers, as one interviewee framed it and described the problem of networks of not being able to incentivize partners to share their knowledge.

Transparency fostering knowledge sharing supports also the execution of the network function of partner selection. No matter if global policy networks pro-actively identify and connect partners with complementary capacities or not, networks always provide the forum to find partners and build trust to lower transaction costs among these partners. In fact, the explored networks aim to select partners and connect them. GVEP does that informally, while REEEP and REN21 have established the REEGLE tool for this purpose. Hence, thesis 4 can be confirmed, though in reality some other important features are considered by network partners when partnering. Partners choose each other usually strongly relying on personal relations less considering strategic issues like who matches one's own needs most or with whom a win-win situation might be created. Nevertheless partner selection is a strategic issue and therefore an issue of senior management level. That's why the effectiveness of governance through networks strongly depends on high-ranking individuals from partner organizations personally committed to the case of the network. Only through these high-ranking individuals and personal relations among them networks are able to effectively select partners and connect them for action for sustainable development.

Concluding **thesis 4** should be specified as follows: To avoid prohibitive transaction costs when local capacities lack, *networks* ***provide transparency and a forum****, where potential partners can find one another, and at the same time networking along personal relations among high-ranking individual partners can* ***pro-actively identify and connect partners with complementary capacities*** *for action for sustainable development in the short-term and for capacity development in the long-term.*

All networks support free communication among partners and thereby contribute to coordination of the activities of autonomous actors. However, these free communications mainly base on personal contacts of high-ranking individuals, but not on strategies for communicative action. Intentional matching of messages, recipients under consideration of their respective rationales for action, and channels of communication bases on individual communicative solutions. The networks which engage in such management of communication among partners, namely GVEP, GNESD and EUEI, give an example for this practice of individual, strongly personal contact based communications.

Hence, although as free as possible communications are supported in all networks and are supposed to generate consensus as well as to inform policy-makers in bottom-up processes, thesis 5 cannot be fully confirmed because network partners do not follow a common strategy for intentional matching of message, audience and channel. Therefore, only part one of **thesis 5** can be stuck to: *Network governance may be enhanced by* ***as free as possible communications*** *to enhance effectiveness in communicative action for coordination among actors through generating consensus and enabling bottom-up processes to inform policy-makers.* Nevertheless, such strategic communicative action of network partners to add to effectiveness of communications by matching messages with target audiences, i.e. actor-/ recipient-specific rationales, and communication channels *could* enhance the effectiveness of coordination in networks in particular and of network governance in general.

Networks addressing long-term effects require to be judged by their long-term effectiveness which is particularly justified in the context of sustainable development. However, many interviewees agreed that it is still too early to measure the long-term effectiveness of type II

partnerships. Nevertheless there are indications for what network governance strategy might enable actors to start effective collective action.

Actors' orientations, as asserted in thesis 6, are indeed very important for collaboration as most cooperative action bases on personal relations. Collaboration among network partners can enhance effectiveness by producing synergies and thus sustainable outcomes because networks increase capacities of individual partners, as one interviewee described the advantage of networks explicitly. Hence, **thesis 6** can be confirmed: ***Orientations of partners must match*** *to enable partners to collaborate and to implement long-term strategic action because they are more capable and ready to share risks and costs of activities producing sustainable outcomes.*

In general, strategy to increase effectiveness of action on long-term issues seems to be self-energizing. Interviewees emphasized the significance for successful implementation of network activities to produce a value-added, of action on the ground as in the cases of GVEP and REEEP, of a good reputation of the network and high-ranking partners as in the case of GNESD and REN21, and of the credibility and independence of network partners. All these features might increase with the effectiveness of network governance in the long-term, and are all supportive for the effectiveness.

3. D Phase III: Long-term Strategies and Outputs of Global Policy Networks

Long-term outputs depend on strategy. Stability is an indicator for long-term network development. Long-term outputs in the sense of producing effective impacts on the network environment and the sustainable development process at large must be judged by effectiveness of network governance which is tested by progress towards ex ante goals and by comparing capacities and limits of network governance in general. Thus analysis identifies success factors. Effectiveness, however, must relate output and input. Thereby, efficiency of network governance is tested and compared to postulated hypotheses on efficient governance in global policy networks.

3.8 Strategies

The necessity of a network governance strategy was confirmed by the fact that three out of the five scrutinized global policy networks already had, or developed a strategy while this thesis was elaborated. These Knowledge Management and Communication strategies will be discussed in this section, although, in fact, they are not designed to govern the respective network as such but rather the management of certain pivotal tasks. The two networks, which did not develop an explicit strategy, have at least so far relatively strong centres – the EU Commission in the EUEI network, and the German BMU and BMZ as leaders in the beginning of REN21, later on the Steering Committee – deciding on what activities to implement.

3.8.1 GVEP's Strategy Development Process

> "(…) one of the objectives of this work (the development of a Knowledge Management and Communications Strategy, S.W.) (is) the overcoming of market failures through improved knowledge and the communication of that knowledge. Networks will certainly be a key factor and the best way to establish these will surely be part of the communications strategy." (Jones 2004b)

To this end, the GVEP Board mandated the Technical Secretariat at the second Board meeting to develop a Communications Strategy, (GVEP 2003a) whereupon the Technical Secretariat sought for consultancy of network experts in 2004, when they were ready to move on after having nominated a full time and a management team at ITDG (later PA).

GVEP then posted the Terms of Reference for consultants to develop that Knowledge Management strategy. The objective was described as follows:

> "GVEP aims to provide a clearinghouse for information and wide-spread dissemination of findings, lessons learned, experiences, innovations and project prototypes. In addition, it reaches out to non-energy organizations such as in the health, education, agriculture, water, transport and other sectors, with a range of technology solutions as needed. GVEP is seeking to develop a knowledge management and information sharing strategy as a framework for these activities." (GVEP 2004d: 1/2)

The consultants were supposed to answer questions of "what knowledge to generate and to share", what the "purpose of collecting the knowledge and connecting those who know and with those who need to know", who are the partners sharing their knowledge, how the knowledge can be shared, how the "people (especially at the community level) find out/know about the potential sources of knowledge/information regarding energy alternatives", and "what impact the knowledge strategy and actions have". (GVEP 2004d: 2)

Ongoing as well as planned knowledge-related activities were partly IT-based, but followed an actor-centred approach, too. GVEP wanted the consultants to develop the strategy in a participatory manner in order to make the partners the owners of the strategy.

Additionally, the terms of reference for the development of a Communication strategy were posted. This strategy was supposed to "outline goals/objectives, key stakeholders and audiences, key messages, recommended communication channels and instruments, expected impact of results, metrics for success, appropriate implementation timelines, resources needed, and

guidelines ensure consistency and strategic alignment with the partnership goals." (GVEP 2004e: 5) This strategy should position GVEP in relation to other partnerships, namely EUEI, REEEP, GNESD. (GVEP 2004e: 5)

The Communication strategy clearly aimed at the management of the contacts and harnessing of relations among GVEP partners. While the Knowledge Management strategy addressed the management of knowledge resources contained in the GVEP network, the Communication strategy targeted the other semi-public resources for action in the network to allow GVEP "to go ahead in a more strategic way". (Jones 2004a)

The Board decided to contract IISD due to their expertise in the management of knowledge networks on sustainable development to develop both strategies. In February 2005, IISD disseminated a questionnaire widely among GVEP partners to identify most effective ways to communicate and share knowledge in order to create an actors' catalogue of knowledge holders and channels to connect these knowledge holders most effectively, (GVEP 2005b) and presented their findings at the Eleventh Board Meeting. (GVEP 2005e: 3/4)

The survey focused on structures and agents of knowledge management of GVEP partners, i.e. the relations among knowledge holders and the knowledge held by them. The process dimension of the analysis comprised the practices of partners to harness their relations to other knowledge holders. However, dynamics of change of agents and structures were hardly considered, although effective knowledge and relationship management requires a continuous review process or some dynamic mechanism when applying a strategy what has to be addressed in action. Hence, the findings of the survey showed what worked and what did not. They did not show how knowledge and relationship management could work better.

The online survey had a response rate of only 9%, but those can represent the "'engaged' stakeholders" at least and were backed-up by 26 field interviews. (IISD 2005a: 9)

The survey found that partners use GVEP, indeed, to access knowledge. This purpose was valued most by more than 50% of partners, while the next highly valued purpose was access to funding (15%). (IISD 2005b: 9) The preferred channels to access knowledge were face-to-face contacts as on conferences or through personal contacts. The web and print materials were rated lower. (IISD 2005b: 18) GVEP functions to link people. (IISD 2005a: 11) Hence, the idea to link partners in a network, in order to organize knowledge management by collecting and connecting, matches the expectations and needs of partners in sustainable development.

The findings from field consultations, part of the survey, resulted in that optimal knowledge management strategy combines top-down and bottom-up as well as people-to-information and people-to-people approaches.

> "GVEP should be both pro-active (sending information, making links between partners), and reactive (a clearing house for partners to find reliable information, help to make personal contacts on issues)." (IISD 2005c: 6)

Communications must be audience-specific, although it has to be stated that GVEP has despite its relatively big outreach still a problem to link in the local and national level. Online communications have proven to be not sufficient for this purpose. So far, there has already been some frustration in developing countries about GVEP's lack of strategy, and some interviewees even found that there has been a lack of clarity on what GVEP's purpose was supposed to be.

Recommendations from field consultations, what GVEP's strategy should address, were that all GVEP activities should be integrated with and linked to knowledge management. Correspondingly, Susan McDade, UNDP, expressed the need for a "strategy on how energy is to be included, as funding will be tied to this MDG-PRSP mechanism." (GVEP 2005f)

GVEP should enhance other networks. However, demanded knowledge is not so much of a strategic nature how to organize partnership activities most effectively but rather of technical and financial quality.

GVEP's Knowledge Management Strategy

IISD was assigned to develop a knowledge management strategy "as a framework for a range of activities" (IISD 2005a: 8) which were supposed to provide an institutionalized mechanism like a clearinghouse and resources for action which are cross-sector knowledge and good contacts to partners. (IISD 2005a: 8) The strategy was expected "to map how gaps in knowledge products and services can be filled from within the partnership, and from the Technical Secretariat." (IISD 2005a: 8)

IISD's research finally concluded to recommend a strategy which bases on networking to connect people to people and people to knowledge. The recommended focus is on the local to national level. Knowledge demands as well as external resources of needed knowledge should be identified, and GVEP should pro-actively build, manage and moderate relationships to meet those knowledge demands and set incentives for knowledge users, knowledge providers and mobilizers of gathering and sharing of knowledge. An incentive for key knowledge holders to provide their knowledge can be to provide them vice versa with a solid knowledge base. (IISD 2005a: 4-7)

To build national knowledge networks, GVEP must establish a *central organizational hub* with focal points and the Technical Secretariat, *dedicated staff* with interns and volunteers, and a *small share of the budget* of 1 to 2 percent to mobilize knowledge sharers. Particularly in the beginning such leadership might be necessary. Certain *electronic tools* must support the networking. IISD suggested, for instance, "a contacts management system to track (GVEP's) interactions with key stakeholders". (IISD 2005a: 5) To access external knowledge sources, IISD recommended to establish sort of a *clearinghouse* and to cooperate with other networks, namely REEEP and GNESD. To maximize the impact of knowledge management for sustainable development, knowledge should come from *different sectors* and connect to key contacts in other than the energy sector. And by defining clear *roles and responsibilities*, GVEP can harness the network as instrument and structure for knowledge management. (IISD 2005a: 5/6)

IISD suggested installing a Communication and Partnership Officer as member of staff to take care of the "personal touch" of building relationships, mobilizing partners, contacting external sources and other sectors, and sharing their knowledge. (IISD 2005a: 18/19)

National focal points need clearly defined roles and responsibilities as mobilizers of "country level partners and other interested and targeted actors" (IISD 2005a: 24) and specific channels with the Technical Secretariat. These clear roles and responsibilities will support the knowledge mobilization process.

The knowledge contained in the network and made accessible by networking among partners shall be captured in a clearinghouse mechanism supporting the networking processes. IISD recommended that GVEP should contribute to REEEP's REEGLE and cross index GVEP's knowledge contents. Additionally, IISD proposed to present accessible knowledge "as a navigable 'map' of major energy knowledge bases", (IISD 2005a: 28) which is, in fact, what REEGLE aims to provide. Apart from that, IISD recommended that GNESD should gather and generate the knowledge needed. (IISD 2005a: 27/28) GVEP's knowledge management has now been reorganized as the "Energy Gateway" which harnesses the cooperation with the other networks, while the activities of capacity development, finance facilitation and monitoring & evaluation are now forming GVEP's knowledge base which will include information on activity mapping and technologies as well as suppliers.

Although IISD admits that "current expectation that partners themselves will contribute content voluntarily to a clearinghouse may be unrealistic," (IISD 2005a: 17) GVEP partners have, in fact, contributed knowledge to the knowledge management service line. For, GVEP offers an opportunity for partners to advertise their services and products by sharing their knowledge. Hence, knowledge management should be closely connected to activities and vice versa activities to knowledge management. Therefore, IISD concluded:

> "Knowledge sharing is most effective when it takes place closest to the ground. Members will be more likely to share their knowledge among themselves at the national/local level. GVEP

> needs to reinforce their interaction and knowledge sharing at those levels, combined with means to document and share that knowledge back to the national level and up to the 'global level'." (IISD 2005a: 17)

While local knowledge might be easier to apply, knowledge from other world regions can be of great value, too. In order to combine that knowledge management with specific activities, IISD recommended building trust and encouraging interaction:

> "Within each national network, provide opportunities for members to interact and share knowledge on a more tacit basis (learning by doing), around the country actions being fostered by GVEP. GVEP national focal points should track knowledge of expertise and activities, and document key interactions and lessons. GVEP Technical Secretariat will monitor and guide these efforts as necessary." (IISD 2005a: 17)

Additionally, partners can use electronic tools to support their knowledge management and make their explicit knowledge accessible. (IISD 2005a: 17)

GVEP partners are interested particularly in knowledge on RETs, on energy for development and productive uses of energy services, and in financing mechanisms and business models. (IISD 2005a: 10 and 13) These knowledge areas are a niche for GVEP and its focus on energy access for poverty reduction, as IISD analyzed. Other networks can work as partners for GVEP and provide complementary knowledge, as EUEI on energy policy, GNESD on research in energy policies, and REEEP on financing. (IISD 2005a: 14/15) In the beginning there will be a need for leadership to instigate the knowledge management process between different sectors. GVEP "needs to move information to the key contacts pro-actively in the initial stages of building the relationship." (IISD 2005a: 28)

Although the recommended strategy might create conditions fostering self-organizing processes, IISD explicitly recommended strong pro-active even if demand-driven management. Defining roles and responsibilities of partners is recommended as one of the pivotal management instruments. In one of the field consultation interviews IISD heard that GVEP were "to some extent held together by the secretariat – quite top heavy." (IISD 2005a: 10)

> "GVEP was not seen as a mechanism where partners can learn from each other – rather, it is seen to be a highly centralized mechanism to gather knowledge for the benefit of those who manage GVEP." (IISD 2005a: 12)

Though this suspected bias of the GVEP management might be flawed, GVEP's network governance, indeed, hardly functions through self-organizing processes among network partners but strongly depends on the management by the secretariat. After all, however, there exists a certain balance and in spite of critiques GVEP partners are aware that knowledge management requires sort of gatekeepers, "strong information intermediaries or knowledge brokers". (IISD 2005a: 13) Therefore, IISD recommended to install national focal points for knowledge management as well as a central mechanism at the Technical Secretariat, (IISD 2005a: 13) thereby balancing top-down and bottom-up approaches, strong management and local ownership.

GVEP's Communication Strategy

Communications refer to the management of relations among network partners. The Communication Strategy is supposed to help GVEP "to bring together the diverse group of stakeholders." (IISD 2005d: 3) As GVEP's strength is its outreach GVEP should focus on this strength and the connections of GVEP partners. (IISD 2005d: 4)

All vehicles of communications should focus on success stories and "be anchored by story-telling, one of the most powerful tools available", (IISD 2005d: 19) and leverage talents and resources of partners by creating synergies. (IISD 2005d: 7)

> For, "GVEP's biggest asset is that it is a whole which is greater than the sum of its parts, and its collective skills, knowledge and reach are far beyond the capabilities of any one organization." (IISD 2005d: 22)

Although most partners prefer face-to-face interactions those are too time- and resource consuming in a global network. Therefore IISD's field consultations found that "GVEP should stay as an informal network". (IISD 2005d: 4) Nevertheless, IISD recommended "at least two major communications initiatives" (IISD 2005d: 9) for each targeted sector of actors, the public, the private, that one of the IGOs, the civil society's, in order to create personal contacts. (IISD 2005d: 9) IISD analyzed the key drivers for each of these "target markets", as they are called, and recommended key messages and communication initiatives. (IISD 2005d: 10-14) This scheme of *audience-specific communications* is supposed to reflect the different rationales of the different sectors. It represents a "focused, tightly managed way" to benefit from GVEP's international name recognition and is supposed to sustain GVEP's *international presence*, maintaining and building relations at an international level as an asset to take strategic action. (IISD 2005d: 9)

As a general approach to strategic communications, IISD developed a flowchart how to apply the Communication Strategy to country actions. This flowchart reveals that the Communication Strategy supports the use of social relations for all network functions by identifying key partners, stakeholders and audiences, clarifying the desired relationship to them, defining objectives and key messages, choosing tactics and considering resources needed, and evaluating to identify new key partners and re-start the process. (IISD 2005d: 8) The identification of key partners aims to integrate partners across barriers; their interests are taken into consideration. Partners' resource endowments and capacities are considered to select adequate partners for implementation of activities at the local or *national level*. Specific audiences are targeted through coordinated key messages.

Apart from these strategic communication activities, IISD proposed a number of specific *communication materials* and events. To be effective, these materials should address specific interests of targeted actors as well as GVEP's attendance at *events* should pursue specific purposes like influencing key people or enhancing relationships with certain partners. (IISD 2005d: 19/20) In this context, *media relations* can be very effective tools to inform and influence decision makers. (IISD 2005d: 21)

Like in the Knowledge Management Strategy IISD recommended that a *small share of the budget* of 1 to 2 percent should be dedicated to communication activities, (IISD 2005d: 7) and that a *Communication Coordinator as member of staff* of the Technical Secretariat should be hired, while a seconded officer from a partner organization and volunteers and interns could be cost effective solutions to support the communication work. Much of the communication and media work can be outsourced to a professional company, which might be a cost effective alternative, too. (IISD 2005d: 23/24)

Additionally to the development of a strategy how to manage communications, IISD worked on several sort of marketing proposals how to establish GVEP as a brand and increase its reputation as leverage of GVEP's activities. However, this part of the Communication Strategy leaves the focus of both strategies on the management of the network resources.

The two strategies of GVEP prove that GVEP focuses on knowledge and contacts as managerial resources through which they mobilize financial, human, or power resources of partners. The Knowledge and Communication strategy is supposed to mobilize those resources most effectively. Just like the Knowledge Management Strategy the Communication Strategy sees the Technical Secretariat as the central hub in the network, which it is, in fact. However, the strategy hardly develops how to foster communications amongst partners. This network governance approach of instigating and merely complementing self-organizing processes might come later. For, in the meantime GVEP implemented these strategies and moved on to focus its activities on a strategic area: the enabling environment for multi-sector partnership actions, as Dick Jones mentioned at the CSD-14.

3.8.2 REEEP's Work Program and Communication Strategy

REEEP's Strategy and Work Programme 2005/2006

REEEP's strategy pursues goals of environmental, social, and economic sustainability by aiming to reduce greenhouse gas emissions, to improve access to reliable and affordable clean energy services, and to generate economic benefits through an increased share of indigenous renewable energy resources within the overall energy mix. (REEEP 2005a: 1)

REEEP's strategy is no 'one size fits all' approach but addresses the problems of energy security, climate change mitigation, poverty reduction, and creation of employment from country to country in a "bottom up, project based approach". (REEEP 2005a: 2) The Programme Board defines key priorities for strategic activities, the regional secretariats develop action plans, donor interests have to be considered, and proposals are submitted from local and national actors. (REEEP 2005a: 5)

REEEP works as an "enabler, multiplier and catalyser" to increase global investments in renewable energy, energy efficiency measures, and the access to sustainable energy services for the poor. (REEEP 2005a: 2)

REEEP's management executes all overhead functions, including the pro-active integration of certain actors and the coordination of activities. The actual services of REEEP comprise the provision of REEGLE, a dialogue platform, a project market place, and awareness raising and capacity building, thereby executing the network functions of knowledge sharing, interest mediation if needed, and partner selection for specific projects. REEEP's programs engage in immediate implementation of strategic activities and produce thereby an added value directly and indirectly through replicability and leverage of partnership projects. (REEEP 2005a: 6)

The program activities implement projects which overcome barriers for sustainable energy. Those barriers can be the perception of high risks and low return investments of renewable energy and energy efficiency (REEEP 2005a: 1) and the related high up-front capital costs and long-term payback periods. (REEEP 2005a: 7) Because of those cost-benefit ratios, or the high transaction costs associated with small-scale and modular investments in renewable energy and energy efficiency, there is considerable underinvestment in sustainable energy. Therefore, REEEP addresses these failures with innovative financing, making sustainable energy partnership projects bankable to attract private investors, and provides affordable energy services for consumers. (REEEP 2005a: 1 and 7) To overcome the lack of quality information, REEEP engaged in the execution of the knowledge sharing function and established REEGLE combined with mechanisms for networking and matchmaking between public and private investors, donors and project developers. (REEEP 2005a: 7 and 11)

REEEP basically manages knowledge and contacts among their partners. (compare REEEP 2005a: 12) The governance of the network grows increasingly self-organizing, while at the same time a strong management is maintained. REEEP has implicitly a strategy contained in their systematic roster of projects. However, REEEP's resources, governance, and strategy are hardly connected and integrated in a consistent approach. This short coming impairs REEEP's effectiveness. For, due to this somewhat fragmented approach REEEP addresses only problems they observed but none which must be recognized and understood from a more systematic standpoint. Apart from that REEEP does not have a strategy for outreach to the local poor, although partners of REEEP have that capacity and are able to outreach.

REEEP's Communication Strategy & Plan 2005-2008

> "Alongside REEEP projects and services, communications is one of the most important factors for the success of the partnership." (REEEP 2005b)

The Communication Strategy outlines the principles of internal and external communications aiming to govern relations among actors in order to contribute to sustainable development. Messages should be audience-specific and "culturally 'aware'", encourage dialogue and reflect the "open, inclusive and empathetic" nature of REEEP, contribute mutually to activities through

"constructive criticism as well as ideas for development", and build trust by communicating success stories and demonstrate added value. (REEEP 2005b) However, these principles do not define or provide an instrument how to organize messages for target sectors or audiences of actors in order to adapt messages to different rationales as well as capacities and endowments with resources for action of those actors.

REEEP's Communication Strategy aims, indeed, at fostering and managing communications and contacts among partners, although many communicative assignments lie in the responsibility of the International Secretariat. A position of a Communications Manager with defined tasks is established and outsourced to a professional company. These tasks include the support for sort of a REEEP corporate identity to strengthen the relationships to partners, to hold the network together, and to establish a high reputation of REEEP, which can have a leveraging effect for various activities.

REEEP produces a monthly newsletter and plans to publish further periodicals in future. Correctness, actuality and breadth of information depend strongly on the information flowing from partner and the overall network. Hence, although the Communication Strategy sets objectives and develops plans how to achieve these objectives, decentralized individual activities of the partners across the network are necessary. To this end the Communication Strategy developed a systematic roster (REEEP 2005b) of general goals and key audiences and a list of activities to which partners can contribute with their individual activities in order to contribute to the overall network goals without being centrally coordinated. Thereby, autonomous network partners can contribute individually and independently to the strategic network activities, while the network as such can at the same time pursue and achieve its goals. Thus, the individual network partners support a common network governance strategy. This roster allows complementing the activities of the International Secretariat with local and regional bottom-up approaches to network action. However, the roster could be more problem-oriented and guide strategic action to overcome certain market barriers for sustainable energy. So far the Communication Strategy focuses merely on the development of REEEP's internal and external relations and the potential roles REEEP could effectively play in those relations.

3.8.3 GNESD's Communication Strategy

As GNESD is a network of knowledge generating research institutes, the Communication Strategy refers mainly to the distribution and management of knowledge internally among network partners and externally among target groups in order to support the implementation of some broad and long-term objectives. (GNESD secretariat 2003: 1) Apart from that, the Communication strategy aims to support the network functions of selecting partners for enhancing capacities to develop policies, of coordinating policies on energy, environment and development problems, and of all sorts of knowledge sharing activities that link energy and sustainable development.

Internally, GNESD uses a "quite dense" intranet to share knowledge. Externally, they merely present their work and results through various forms of publications. (Christensen 2004)

> "The basic principle of the GNESD communication strategy is to identify the target groups and then match them with the Network outputs (…)." (GNESD secretariat 2003: 1)

Although the strategy lists the target groups of actors for network activities, it does not provide a scheme how to match which target group with which message. The strategy only defines in general that communications should "present an added value in supporting GNESD activities" (GNESD secretariat 2003: 1) in order to integrate target groups in GNESD activities and set incentives for those groups to contribute and consider GNESD's messages. Additionally, the strategy lists several "basic communication principles" for the communication between GNESD and the target groups and amongst the target groups. The Communication strategy selects certain communication channels to target the different groups of actors. These channels are various forms of publications of explicit knowledge. The only not publication-based channels considered are

workshops where actors can connect personally, and networking with other partnerships, namely GVEP, allowing to disseminate knowledge through cooperation. (GNESD secretariat 2003: 2)
The Communication Strategy illustrates GNESD's role as composite actor within a wider network comprising the other sustainable energy-related global policy networks. GNESD works as an epistemic community informing all kinds of policy makers in those global policy networks, providing knowledge for informed decisions on policies and strategic action, and, thereby, contributing to the execution of network functions.

3.8.4 EUEI's Proceedings Instead of a Strategy

There is no common EUEI strategy. EUEI functions as an umbrella for all EU energy-related development cooperation. EUEI as such does not have a common strategy and is not meant to have one. Only the different EUEI instruments have individual issue-specific approaches though no unified strategy. That's why EUEI has no clear governance structure, but works rather on the basis of informal communications. Nevertheless, they do address energy market failures, which hinder a sustainable development, although EUEI-PDF's recommendations are developed by individual consultants.
The strategic instruments are dialogues between governments. EUEI generally works demand-driven. Countries request a certain policy support. EUEI locates consultants and contributes certain inputs like identification of potential problems, which are checked as a matter of routine by donors. In the end the developing country government chooses among recommendations what to implement. Hence, there is a focus on the policy framework level in EUEI's activities. Nevertheless, EUEI aims at the action level as well, without intervening directly into specific projects. EUEI designs its activities participatory at all levels being hardly visible at the local level.
EUEI-PDF supports the design of strategies, plans and preparations for investments in order to help the countries to develop a plan before they are provided with financial means for implementation. Regional strategies are supported strongly as they are based on and allow establishing common markets, mutual support, sharing of knowledge, standard setting, common policy designs, trade expansion, and sharing of resources.
EUEI's focus is on energy access. They consider mainly problems of social sustainability and partly of environmental sustainability. For, the regional focus of EUEI's activities is on Africa which has so little environmental impact on a global scale that climate change is no issue for EUEI's scope of activities. Nonetheless, EUEI reacts to the global debate on energy security and climate change.

3.8.5 REN21's Involvement with Strategies

REN21 like other global policy networks on sustainable energy addresses two difficult issues, stated one interviewee involved in the design of REN21: the switch to a new energy system and a new form of organization under the conditions of globalization. Therefore a strategy on network governance must provide a strategy for governance *through* and governance *in* networks. REN21 is positioned to contribute to these challenges.
REN21 has an initiating and clearing function as the interviewee involved in REN21's making stated. REN21 works on a meta-level and engages in strategy development. There was a big debate initially on the term of an umbrella function, which REN21 was supposed to perform. For, REN21 shall not coordinate other networks but rather provide a platform for communication and initiate projects and debates without providing financing.
In general, a policy network must deliver answers to policy questions: a strategy how to overcome which problems, a strategy for global environmental governance through networks. The energy security issue will be central in REN21's activities since the rise of the oil price has produced costs for developing countries exceeding the ODA. What all REN21 partners are convinced of is

that renewable energy can contribute to the solution. Hence, the support of initiatives in countries where renewable energies are not subsidized will be an issue in REN21's strategic activities.
Nonetheless, the development of a common long-term strategy for governance through and in networks, though needed, will only emerge in a long process. REN21 might be well positioned to contribute to this process. The individual activities of REN21 partners may be redundant but it is questionable if they will contribute to the execution of network functions. It is necessary to give these activities common direction in order to foster thereby self-organizing processes promoting sustainable development.

3.9 Stability

Although all of the explored Global Policy Networks are still young and on the initial stages of their development, different stages in their development seem to be recognizable and even their future seems to be already salient, allowing a smart guess at least.

The three-phase process, as described by Heather Creech from the IISD, (Interview November 16, 2005) of launching the network and designing its governance, beginning to reform the network due to lack of (financial) resources, and finally realizing advantages compared to public regimes or interaction of private actors in markets takes approximately ten years from the original launch of the network. The observations in the five explored networks correspond in large parts with these phases though the development of the phases, which overlap and coexist at times, seem to have been slightly faster.

Global policy networks can exist on the fringes for a long time if not supported by partners and if networks do not achieve to deliver tangible outcomes for sustainable development. Basically, global policy networks will have to decide for a role to play in the field of sustainable development. They will always execute functions harnessing the semi-public resources of networks, but in the long-term global policy networks will probably either orient more towards public actors and serve the patterns of interaction of command like in hierarchical organizations or towards private actors and serve the patterns of interaction of exchange like in markets. For those patterns of interaction make the sort of privatized goods of financial or power resources accessible, and those resources are still the sine qua non condition for being effective.

If global policy networks develop to be able to execute functions for sustainable development effectively and serve actors from markets or public regimes, and harness the semi-public resources of knowledge and social relations contained in networks, global policy networks can play an effective role in the long-term, while if they do not achieve that and do not support either markets or public regimes they will grow insignificant and if not die and disappear completely exist on the fringes in a sort of entropic manner.

GVEP

Initially, the Partnership Board designed the network governance of GVEP and the organizational model of the secretariat, while the Technical Secretariat developed their working structures and which activities how to implement. The question of where to move the secretariat to and assigning responsibilities for certain activities occupied time and capacities of the Board until 2004. Board member Griff Thompson, US State Department, even remarked in 2005 that the question of who and what GVEP is and what its purpose is supposed to be kept coming back in every meeting. (GVEP 2005d: 6) Only around that time GVEP turned to become to be more operational.

First reforms of operational activities, like the decision to develop a strategy (see section 3.8.1), were discussed already in 2003. The contract with IISD to carry out research on that strategy and to develop a model was closed in 2004 and the actual strategy was ready for implementation in 2005, when the Board still kept discussing the shortcomings due to the lack of strategy. (compare GVEP 2005d: 7) With regards to the processes to execute network functions, "(i)t must be noted from the interviews (of the field consultations for the research for GVEP's strategy development, S.W.) that some stakeholders believe that GVEP itself has not developed into a real partnership." (IISD 2005a: 12) GVEP was criticized as a "highly centralized mechanism", (IISD 2005a: 12) failing to harness the mutual benefits of synergies among network partners.

Another important organizational reform, the founding of an independent legal body to be able to receive and channel funding, was proposed for the first time in 2005. (GVEP 2005f) First major changes on the Board were connected to this new development of GVEP International.

The first chair of the Partnership Board Paul Hassing from the Dutch government, and Jamal Saghir, Director for Energy and Water in the World Bank, strongly influenced the design of GVEP’s network governance. They had to leave the Board, however, when the governance was arranged and the network started to become more operational in 2005 respectively 2006. Hassing

had to resign in 2005 when GVEP International was going to be founded because his home organization, the Dutch Department for Environment and Development, was going to channel funding through the new organization and, thereby, creating a conflict of interest for Paul Hassing as chair of the GVEP Board and representative of the donor organization. (GVEP 2005f; and GVEP 2006b: 3) Kurt Hoffmann, president of the Shell Foundation, joined the Board in 2006 as the new chair and announced to develop the network towards a market-orientation and strengthen the ties with actors from the private sector. (GVEP 2006b: 3)
In 2006 the lead of the Technical Secretariat changed as well from the academic Abeeku Brew-Hammond from KITE to the business woman Sarah Adams from EdF. Thereby, the orientation of GVEP, which was already directed to the private sector, focused even more to serve the market and cooperate with and support private companies. This propensity may now develop to a long-term role of GVEP. This development was confirmed by the members of the Technical Secretariat Dick Jones and Ellen Morris, responsible for Capacity Building, at the CSD-14. They described the new direction of GVEP to develop an environment of private sector investments in energy for the poor.

REEEP
Compared to the other networks REEEP left phase one later but stayed shorter in that phase, preparing the governance structure and being relatively passive. However, this was not due to a longer process of governance design but rather to the fact, that when REEEP was launched at the WSSD, it was an initiative primarily of Tony Blair and the British government and had no foregoing process of network development, leaving alone an institutional predecessor, like GVEP had it in the Global Village Power conferences and the World Bank as first host of the Technical Secretariat. One interviewee, who was involved in other networks of the explored ones, even criticized that REEEP was neither properly prepared, nor coordinated with the other big sustainable energy type II's.
As soon as Marianne Osterkorn took over as full time International Director the operational activities could increase. She also soon set new foci of action, initiated new activities, attracted increased funding, and instigated and developed the network's strategy. As this has been a continuous process, it is debatable if REEEP is still on stage two and reforming and developing itself continuously, or if REEEP has made already a leap forward and established as service supplier in the development of global markets for renewable energy and energy efficiency. However, it seems beyond doubt that REEEP will achieve to establish in a market setting, although so far REEEP has become sort of a financing mechanism channelling public funds to local private actors.
REEEP follows in its activities predominantly market-focused approaches, which makes it to a sort of natural partner of private companies and aspires to use a usual 10% margin of projected funding for overhead costs like the financing of all secretariat related costs. (Interview with Marianne Osterkorn, October 11, 2005) That's why REEEP promises to become a partner for a variety of actors and be able to supply a service for which the International Secretariat, the network hub, can charge prices covering its costs.

GNESD
GNESD could right from the beginning rely on structures and working mechanisms of the academic sector and cooperation among excellent researchers. That might have spurred their development so that they could shorten stage one and keep the governance structure rather simple and focused on only two research themes as fields of GNESD's activities.
GNESD could move to stage two and started to become operational already in 2003 and could finish first project phases already in 2004. Since this phase has begun GNESD carries out continuous research, addressing gaps of earlier research phases and disseminating the research results. Only after these first phases have been concluded GNESD and particularly the secretariat

has something to disseminate and to target at specific audiences and actors for implementation. That's why the stage GNESD is now on will be decisive for the long-term future of GNESD. Basically, this stage two is the test if GNESD can effectively contribute new and relevant knowledge for implementation of strategic activities for sustainable development.
So far, however, GNESD is not yet a network complementing the capacities of network partners. GNESD rather works like a community of practice servicing the other networks GVEP, REEEP, EUEI, or REN21. GNESD is comparable to an epistemic community consulting policy makers. Therefore, John Christensen, head of GNESD secretariat would like to see GNESD developing into a real network. (Interview with John Christensen, August 16, 2005) If this is going to happen, GNESD will be able to provide actors with usable knowledge.
As knowledge, however, is a semi-public resource which can only at great difficulties be privatized and priced and traded on markets like usual private goods, GNESD will have to find a way how to secure funds for their activities. Therefore, GNESD will probably always depend on the funds from public donors unless they can establish themselves as sort of an institution in global energy markets to enhance transparency and informed decisions in these markets. Thereby, GNESD could theoretically generate utility for all market actors so that they were willing to share the costs for the maintenance of this market institution. With regards to the acting players in GNESD – scientists, hardly used to market their knowledge products – the orientation to public regimes securing funding for GNESD as an institution to provide all actors in energy markets with usable knowledge for sustainable development is more realistic.

EUEI
EUEI has stayed for a comparatively long time on the first stage in the development of global policy networks, approximately from the launch in 2002 at the WSSD to 2005. It did not take all this time to design the governance structure of the network, but to identify needs for action. As EUEI could rely on the organizational structures in the Commission, there was no need to invest too much time and thoughts into the design of the governance of future activities. They rather missed a clear analysis of what partnerships could serve for. Only after having thoroughly sorted out what action in ownership was needed for and capable to achieve, EUEI moved to the next stage.

> Experiences of EUEI showed "that engaging in dialogue and specific partnerships with developing countries has led to strong ACP ownership of this initiative. But it has also revealed the need for allocation of more resources by the EU to this area (…)". (EUEI 2006a)

As one interviewee from another network observed, has EUEI never developed into a network. Thus, the "revealed" lack of resources might be due to a conventional use of these resources instead of a more flexible and more efficient use as global policy networks and partnerships are supposed to deliver. For, this need for a more efficient use and the mobilization of new sources of funding were the intention behind the development of type II partnerships: to organize solutions for sustainable development without having big assets at hand or investing huge financial means, but by compensating the lack of resources through a smart use of the resources available and, thereby, leveraging the mobilization of new sources.
With the proposal in 2004 to launch an Energy Facility, providing funding from public sources, and the funding of first projects through PDF and COOPENER in 2005, EUEI turned to implementation-oriented activities. They moved to stage two and became operational. In this phase the created partnerships started to coordinate and implement their activities. Compared to the other big energy-related Type II partnerships the EUEI funded projects had comprehensive financial instruments. Nevertheless, those were not sufficient and had to be increased. In 2007 the Energy Facility started operations. However, even with an amount of €220 million it is still questionable if that amount is sufficient and if in partnerships the collaborative provision of sustainable energy for development can merely be reduced to a question of funding. EUEI has simply developed into a new financing mechanism of the Commission. The role of networks,

bringing together independent, autonomous actors and enabling them to cooperate in flexible ways through the use of semi-public resources for network governance, will hardly be the long-term role of EUEI. Therefore, the long-term stability of EUEI will very likely depend on the single most important donor of the network – the EU, as well as EUEI will be relatively public sector prone and orient its activities to the patterns of action typical for the public sector.

REN21

To date, REN21 has not yet diversified their sponsors very much, which makes them relatively dependent on the main sponsor, the German government. It is unclear where future funding will come from and on which activities REN21's focus will be. They already started operational work after the official launch in 2005 and explored which additional activities would expand their portfolio, moving the network to stage two in its development, while they were actually still defining their governance, who can become participant or hold which status, and what strategy should govern their activities. Until these questions are undefined, future sources of funding will be uncertain, and it is hard to predict if REN21 will serve either the market or national and international public regimes and whom they might charge for services to keep their activities going. Hence, REN21 is still in what one could call a limbo state between the first stage, where the network governance is designed, and the second stage, where the network turns operational and might already reform its governance design.

Overall, however, REN21's activities aim at sort of a meta-level of global environmental governance, as one interviewee who was involved in the early development of REN21 confirmed. REN21 develops policy recommendations and is providing services that might be useful for other actors when they implement their individual activities in sustainable development and execute certain functions of global environmental governance. Hence, patterns of interaction neither of market nor of hierarchical organizations will determine REN21's network governance, and the influence of private as well as public actors will balance in REN21.

Probably, the influence of IGOs will always be strong as REN21 emerged immediately from and addresses directly the process of international conferences. Thus certain patterns of action from the public sector will likely be dominant. Nevertheless, actors from the private sector are pro-actively integrated and initiate successfully activities within the network, like the support for the WIREC 2008 was proposed by ACORE originally and is now of major importance for the process REN21 aims at.

3.9.1 The Future of Global Policy Networks

After all, the global policy networks explored seem to develop a propensity to one sector depending on – not surprisingly – the partners they cooperate with and the sectors their managers come from.

GVEP and REEEP seem to develop towards the market end of the dichotomy. This may be due to the fact that GVEP was hosted in Great Britain and supported strongly by DFID and the World Bank, two actors prone to market-based solutions. REEEP was launched and is still supported by the British government, too. Additionally, both GVEP and REEEP are led by managers who come from the private sector. Sarah Adams, head of GVEP's Technical Secretariat, has worked for EdF, as Marianne Osterkorn, head of REEEP's International Secretariat, held a position in the private sector before. As one interviewee, who is partner of both networks, remarked, whoever holds this leader's position must be a good manager, other capacities may be subsidiary.

GNESD, in contrast to GVEP and REEEP, seems to develop toward the public end of the dichotomy because of the acting persons in GNESD who come from the academic sector. Researchers, however, need independence in order to avoid influence from interested sponsors on research results, and generation of knowledge is always difficult to market. Therefore, GNESD might have a natural propensity towards funding from public donors and IGOs and accordingly servicing and targeting mainly public actors.

Although EUEI harnesses knowledge and social capital to enhance collaborative activities, the focus is on financial resources provided by one public actor and only leveraging additional funds from private partners. Hence, it is highly likely that EUEI will develop a pattern of action oriented to the public sector which makes funding accessible for EUEI partners.

Whatever role each global policy network might assume, in the long-term their activities must link into an international climate and energy regime setting the framework for global policies on sustainable development. For, voluntary strategic action may be effective, it can hardly substitute for incentive structures to govern industries and consumers by signalling sustainable prices of global commons like the climate.

Top runner programs might be the perfect match for strategic action in global policy networks. As these networks can support the leaders in an industry, the top runners, producing at the least degree of depletion of global commons, while the top runner program secures the first mover advantage of the leader and forces laggards to follow the leaders and comply with the standards set by the leader, not by legislators. Thereby, the actors governed by the standards set those standards themselves, whereas standards imposed from outside are usually criticized as being inefficient regulation and either too detrimental or too soft for the economy.

Emissions certificate trade as laid out by the Kyoto regime, for instance, could generate wealth in economies in the short-term and at the same time avoid long-term losses in GDP growth through climate change if an optimal cap is defined. For, investments in emission reductions are costs in the first place for an economy, but if these reductions can be traded, the investment might generate a positive financial output. This positive output can even surmount opportunity costs of alternative beneficial investment opportunities. Therefore an efficient cap reflects and creates economic scarcity in the global public good of stable climate. Certificates distribute property rights in that public good, which allows companies to trade and make profits.

If the cap is too high, economic scarcity will not set incentives to invest in emission reductions. If the cap is too low, companies must invest in opportunities to cut emissions which have profit margins below opportunity costs. Therefore, top runner programs, which set the cap depending on the most efficient – in terms of greenhouse gas emissions – product or process, will define an efficient cap and force competitors to follow the industry leader. The leader has thus an incentive to be a leader, as the top runner program allows her to skim profits from her early action and to enjoy first mover advantages. An efficient cap will force companies to innovate, and makes new markets.

By fostering partnerships with industry leaders as well as followers innovative solutions for climate protection can be spurred and the process of dragging the sector-wide cap can be supported and accelerated. Sector-wide caps and minimal standards can become after a certain time binding gradually and be extended to other sectors in reference to efficiency of greenhouse gas emissions per GDP output.

3.10 Effectiveness

Although interview questions aimed at problem solving effectiveness, as Young coined that, (see section 2.1.1) interviewees rather referred to goal attainment effectiveness in terms of progress towards their own ex ante goals. Therefore it was necessary to widen the question in order to include problem solving effectiveness. That's why interview questions also asked for capacities and limits of global policy networks and thereby created sort of counter factuals to compare the networks in scrutiny to. Finally, a short-list of success factors for effective network governance will be identified.

3.10.1 Effectiveness In Terms of Progress Towards Ex ante Goals

As one interviewee, knowledgeable in the research of strategic alliances and policy networks, mentioned, there are no standard benchmarks for the progress of networks. Nevertheless, networks need to evaluate their progress – at least in justification of their spending if demanded by sponsors. Although ex ante goals in networks can be object of change due to the process nature of strategic interactions of actors in networks and, hence, ex ante goals can only be of limited value for the evaluation of effectiveness of network action,[63] some of the type II partnerships have defined such ex ante goals.

GVEP

GVEP aspires to support over 30 countries to develop national action plans on energy access for poverty reduction, provide over 300 million people – later on GVEP raised that goal to 400 million people – with energy access, or over 50,000 communities by 2012. (IISD 2004b: 7; GVEP 2005a: 14) In 2006 the number of countries, in which with the support of GVEP the development of action plans on energy for poverty reduction was on advanced stages or already completed, was nearly ten (CSD Partnership Database 2006a) and could be considered on a good way. GVEP's action targeting the people and communities related goals, however, had only reached a tiny fraction of the numbers of the goals. Thus, to achieve these goals the leveraging effect of GVEP's activities must increase considerably, which is not impossible with regards to the newest development in the numbers of partners and commitments of funding. It seems that at least for the time being, GVEP should connect its activities stronger to climate issues and receive more attention through that linkage as well as link in their activities to more activities of globally growing markets and of the wider development and environment community.

Paul Hassing, then chair of the Partnership Board and representative of the Dutch Department for Environment and Development, stated in his closing speech of the First GVEP Partners Assembly in October 2005 in Brasilia:

> "…what is GVEP? Many people when I was out there have asked me that question. And most of you have given part of the answers. All of you said it is a new way of thinking, it is a new way of working together, it is about an integrated approach, it is about organising commitment, it is to bring together partners that haven't worked together before, it is about pilots, successful pilot projects, scale up and it is about mobilising funds." (Hassing 2005)

From the very beginning, GVEP held discussions on its effectiveness. While "(…) a lot of the effort in GVEP is not necessarily visible and is geared towards facilitating a gradual shift in the energy development paradigm," as Susan McDade, UNDP representative on the Partnership Board put it, (GVEP 2005c: 5) there has always been both debate and confidence in the effectiveness of GVEP. Griff Thompson, US Department of State's representative on the Partnership Board, saw the comparative advantage of GVEP as a model public-private-partnership in the ability to facilitate more donor coordination, interaction and leveraging resources. (GVEP 2005c: 5) This vaguely positive impression of effective work by GVEP culminated in the final conclusion of the debate on GVEP's effectiveness at the Partners Assembly: "They just do it!"

[63] Compare section 2.1, discussion on the definition of effectiveness of networks and how to measure it.

What sounds like a company's slogan from a commercial expresses an unspecific but common perception of GVEP's activities: partners commit to GVEP because partnership action achieves what these partners would otherwise not achieve, because it is "(…) beyond the scope and capabilities of any one organisation." (GVEP 2005a: 2) GVEP addresses directly what is necessary to produce sustainable outcomes but energy markets do not deliver.
On the other hand, there has always been a feeling, as for instance can be recognized in the discussions of the Partnership Board, that GVEP could be more effective if there were a more systematic approach or strategy in place. (compare GVEP 2005d: 7)

REEEP
REEEP has an impressive record with regards to funds raised and leveraged for the short time the network has been operational.

> "REEEP has as of July 2006 supported 102 projects with a total investment of over 7 million euros from REEEP leveraging 47 million euros through co-financing from the projects." (CSD Partnership Database 2007)

REEEP has defined for itself the following targets for the project cycle of 2006/2007:

Table 4: REEEP's Progress toward Defined Targets

Targets of the Work Programme 2006/2007:	Progress against targets:
1. Support establishment of at least two financial instruments funding and/or supporting financing of RE and EE	1. Four financial instruments funding and/or supporting financing of RE and EE are being supported
2. Establish and promote at least two networks, investor syndicates or initiate inter-network collaboration to achieve at least two instances in RE and EE financing	2. Two projects are proposing to achieve at least two instances of RE and EE financing
3. Carry out targeted information dissemination/media activity of RE and EE	3. Two Projects are planning media activity
4. Development of at least one market based innovative source of finance	4. Three market-based sources of finance are being developed
5. Support implementation of three or more ESCOs	5. Support to one ESCO is provided
6. Establish two city-twinning arrangements	6. Establishment of one city twinning arrangement is being supported
7. Support RE and/or EE policies in at least four countries	7. Support of RE and/or EE policies in four countries
8. Start and/or strengthen regional networks and inter-network collaboration in all regions	8. Five projects are proposing to strengthen/start regional collaborations
9. Aim to implement a significant share of projects that show that energy efficiency and renewable energy contribute to rural development	9. Seven projects are addressing rural development and rural energy issues
10. Convene/co-organize globally at least five workshops, fora and networking events	10. Support proposed for two events and on course to achieve the target
11. Aim to increase the proportion of projects addressing energy efficiency in order to achieve an even balance between EE and RE	11. Increase from a 22% share of financing to a 49% share of financing
12. At least a third of EE projects should address energy efficiency in buildings	12. Four out of 14 (28%) of EE projects propose to address EE in buildings

Source: CSD Partnership Database 2007: REEEP

Several interviewees from the external environment of the networks pointed out that REEEP has gained in relatively short time a strong reputation and achieved to make itself heard. One interviewee answered the question for REEEP's effectiveness by describing REEEP as an increasing investment, ever growing in its value, thus concluding there was no reason why REEEP should not be successful.

GNESD

GNESD secured funding for their operations for the period from 2003 to 2005, and then again from 2005 to 2007. Given the securing of funding is a recognition of usefulness and effectiveness, GNESD seems to produce outcomes which are needed for sustainable development and would not exist without GNESD. Apart from this signal for GNESD's effectiveness, however, the objectives of GNESD are less quantifiable as GNESD is fostering supportive conditions of sustainable development activities but not implementing itself. Thus, GNESD put rather soft goals on their score card. They achieved to finalize a Policy Summary and Compilation Report on their energy access research theme, they disseminated these research results in regional workshops in Rio, Bangkok and Nairobi in 2005 in collaboration with IEA, UNEP and UNDP, they achieved to finalize regional reports, a Compilation Report and a Summary for Policy Makers on their renewable energy technologies research theme, GNESD's network of institutes has reached a good geographic coverage, and they have signed Statement of Commitments with 34 partners to cooperate on GNESD's goals. (CSD Partnership Database 2006b)

One interviewee stated that GNESD's success came from GNESD's technology neutral focus and its approach to identify successful policies instead of following an implementation-orientation and organizing funding without being sure about what is needed and what works like many of the smaller, more specific type II partnerships.

As the base for all network activities, GNESD's communication strategy aims to "present an added value" (GNESD secretariat 2003) for the integration of actors in the network. Added value might be a comparative advantage and enhance competitiveness, but the members of GNESD do not make business in markets. If they are in competitive market-like situations at all they compete for research funds and personally for the improvement of reputation through research results and so for best research endowments. Indeed, one network effect of GNESD is the increased credibility of local research put in a global context, as it was discussed at a GNESD side event (GNESD Outcomes and the Role of Renewable Energy Technologies in Poverty Alleviation, June 2, 2004) at the renewables2004, Bonn.

The added value of GNESD is in the first place an internal incentive for sustaining cooperation within the network. Externally the added value will hardly help integrate actors in closed markets, but it might enhance transparency and competitiveness where 'monopolies of defining the truth' exist. The knowledge disseminated by GNESD may increase the power of arguments in debates about sustainable energy where so far only the arguments of certain actors are taken as authoritative.

The increase of transparency and the improvement of informed decisions in the energy market are the contribution of GNESD to sustainable development regarding all network functions: to insert cross-knowledge from comparisons among different countries and regions in the process of the policy cycle thereby improving self-organizing market dynamics by informing about long-term risks and opportunities, local differences and similarities, and policy and technology options, and additionally by pointing out differences in interests of different groups in the energy market without having the ambition to mediate those interests themselves, and building understanding of external effects without coordinating actors to internalize those effects. However, GNESD focuses less on the management of relations.

That's why some functions are executed only implicitly by GNESD, some not at all, and GNESD definitely focuses only on the knowledge management aspect of all functions. Therefore GNESD's action is certainly less effective than the action of networks executing all functions and

considering cognitive as well as social aspects. And due to the interrelatedness of functions GNESD's action is probably less efficient than it could be, but GNESD has neither the ambition nor the capacities to execute all functions and to manage relations additionally. They are rather contributing to the execution of functions within a wider network as an epistemic community by cooperating with other partnerships such as GVEP and REEEP.

EUEI

As the majority of EUEI projects is still ongoing, it is too early to properly and finally address the effectiveness of EUEI's activities. However, some COOPENER projects already include some lessons learnt which are not systematic by any means, and which regard merely the organizing process, while the results are still to come in the future. Additionally, the various intervening factors of policies make it hard to evaluate the effectiveness of policies which most PDF and COOPENER projects address.

The EUEI projects are supposed to and plan to execute all six functions of networks for sustainable development. As, however, most PDF projects develop recommendations for national energy policies, strategies, and action plans, or support policy development in general as in the case of the COOPENER projects, and as EUEI's strengths lie certainly in public policies, EUEI's activities always kept focus on the policy domain. Thereby functions addressing earlier, more policy planning-oriented phases in the project cycle are more often part of the projects.

Integration of actors into the network and cooperation on common agendas is part of poverty reduction to overcome entrance barriers for the poor into energy service markets. Knowledge Sharing is always part of the consulting of the projects. Partner Selection as identification of gaps in capacities and of potential partners to bridge these gaps is executed in basically all implementation-oriented projects. All COOPENER projects aim at capacity-building to sustainable bridge capacity gaps. Coordination of external effects is only considered if different applications of modern energy are taken into account. However, neither the policy dialogue nor the implementation-oriented projects address those potential conflicts of different energy sources. Interest Mediation and the solution of conflicts are hardly considered. Implementation of proposed strategic action rather aims at the policy framework level due to the recommendations' nature, less at immediate action.

EUEI started as an initiative to map individual energy-related activities of EU members, identify gaps, and should in the long-term coordinate their energy development policies. PDF and COOPENER addressed some market failures and executed the according functions to different degrees. In the beginning EUEI did not develop into a network. Now, after having analyzed and recognized what action is needed and which functions must be executed, EUEI proposed the Energy Facility which will address all energy market failures.

With regards to the resources managed – knowledge in all cases, social capital not systematically –, the strong management of all projects, and the functions executed, the expected effectiveness of EUEI activities could be improved by the systematic and thorough application of a strategy. Overall, EUEI's activities are not completely different from conventional development policies and cooperation and thus hardly significantly more effective.

If effectiveness of action depended solely on the amount of financial resources invested, EUEI would probably be the most effective among the big energy-related networks. Even the in terms of financial means smallest program of EUEI, the PDF, has easily the size in financial endowments of the other networks' secretariats' activity portfolios. The amount of financial resources which the COOPENER program and the Energy Facility have at their disposal exceeds the budgets of the secretariats of the other networks by far. Even if one considers what other networks might leverage in financing like GVEP's $100 million raised from public and private sector for investment projects, (GVEP 2005a: 15) the Energy Facility and its financial leverage effect outdoes all others.

However, this excessive financial endowment seems to be the result of being unable to mobilize other resources like knowledge and social capital for sustainable development. As a network EUEI or at least parts of it seemed to have failed. The allocation of a huge fund moves EUEI away from the genuine network idea and more towards a financing mechanism of the Commission. Hence, its effectiveness actually depends not any more or not so much on what the other networks depend on. Exactly this *lack* of scarcity in financial resources might be the reason why EUEI did not develop into a network: there was no need to. While the idea to launch type II partnerships originated in scarce public budgets for ODA and global sustainable development, the EUEI was supposed to collect figures on the already existing financial means dedicated to sustainable energy for development.
EUEI's network effect manifests rather in donor coordination as, for instance, in the Governing Board of EUEI-PDF. Members use the Board as a forum to inform each other, to identify opportunities to cooperate, and to coordinate other issues of EU energy- and development-related policies.

REN21
The follow-up on the IAP provides a quantifiable measure for the effectiveness of REN21. As the follow-up, however, rather controls for the goal-attainment effectiveness, the Steering Committee discussed that the follow-up should track the impacts of the IAP actions in terms of CO2 reduction and number of people having gained access to energy. (REN21 2006c: 2)
REN21's avowed goals are very general and soft, hardly quantifiable. They aim

- to promote understanding of the value of renewable energy,
- to build a community of key leaders and stakeholders,
- to influence the agenda-setting of international meetings and venues,
- to maintain the momentum of harnessing renewable energy for poverty reduction, climate change mitigation, and energy security, and
- to promote generation and transfer of knowledge by providing links.

The three reports financed and published by REN21 certainly contributed to the first goal. Particularly, the Renewables Global Status Report has received wide acknowledgement. REN21 definitely succeeded in gathering high-ranking individuals from the most important and influential international and non-governmental organizations and governments in the field of sustainable energy and climate change mitigation. There was some reluctance to integrate leading private companies, and there is still the plan somehow to integrate leading academics and researchers. The influence of REN21 on the international agenda-setting is a little unclear, for some individuals from REN21 most likely have a strong influence to frame priority issues at certain venues. How far this is an influence originating in REN21, its Steering Committee, or their activities is hard to tell. REN21 will definitely have a strong influence of the WIREC 2008. The momentum of the international process of energy for sustainable development and mitigating climate change is definitely strong and increased over the last years. However, this is hardly the achievement of REN21 but rather an international development, to which REN21 contributes ongoingly. To this end, REN21 will have to increase its visibility. The innovation and launch of REEGLE is the most systematic approach to achieve the fifth goal of promoting knowledge management in the sustainable energy community and can, indeed, be of great use to the knowledge users.
The most important effect of REN21 achieved is probably the network effect of high-ranking partners cooperating and thereby mutually increasing their reputation and influence and becoming more effective than individual actors could possible ever have become. The reputation of REN21 as a network may thus increase as well and become effective.
As the follow-up on the IAP controls rather for the goal-attainment effectiveness, the Steering Committee discussed that the follow-up should track the impacts of the IAP actions in terms of CO2 reduction and number of people having gained access to energy. (REN21 2006c: 2) This task

has been assigned to the Öko-Institut in 2007. Their analysis of the IAP and its implementation found a reduction of 86 million tons CO2 per year until the end of 2005, including reductions accounted for under the Kyoto-Protocol. If indirect reductions "through reducing barriers, raising awareness, reducing specific investment costs, or reducing transaction costs" (Fritsche 2007: 2) are added, reductions from the IAP amount to about 100 million tons CO2 per year. (Fritsche 2007: 9)
The network effect expected from REN21 comes from the knowledge management, REN21 is able to provide, the power and credibility through the mutual access of key decision makers, and the support from REN21 for member organizations to grow and access financial resources via the network. (REN21 2004c: 6)

3.10.2 Capacities and Limits of Global Policy Networks

Due to the lack of available energy markets in developing countries, as one interviewee from the public sector stated, energy services must be provided by networks at least as long as an energy market is not providing reliable and affordable access to energy services. Although this function of networks might be badly needed, this goal, however, might exceed the capacities of global policy networks.
Networks are no "silver bullet", as one interviewee from the civil society framed it, but they do represent enabling conditions. Thus, a climate regime must provide a necessary framework while partnerships have a role to play in implementing initiating activities. Global policy networks can support a rather long-winded process towards sustainable development, but they are time-intensive investments and often mainly talk shops.
An interviewee from the private sector pointed out that capacities of networks can benefit from economies of scale thanks to large numbers of partners. However, the larger networks are the less a single actor can have a leadership role and govern the whole network, which networks avoid in most of the time anyway. Leadership, on the other hand, can be a very effective mechanism, particularly to initiate strategic activities.
In general, the network partners are considered an important determinant of network governance effectiveness. Hence, the capacities of networks depend on the connection of partners with different sectors and different levels. Moreover, a global base of partners contributes to the legitimacy of networks because of individual capacities of partners applied in local projects. Network capacities need to focus on and are defined by core business-related activities to keep the corporate partners interested, said one interviewee from a private company, while another interviewee from the private sector meant that networks could effectively have an advocacy role and work thanks to the reputation of some powerful partners as door-opener to decision makers. Indeed, GVEP and REN21, for instance, are explicitly supposed to produce a contribution for partners. Thus, GVEP contributed to a number of programs of partners, linking energy and development issues, and achieved to convene partners who were even competitors.
Some quantitative studies evaluated the effects of type II partnerships:

> "They can, at least in theory, bring together an optimal coalition of partners from a global pool of development organizations, public and private, national and international." (Hale, Mauzerall 2004: 222)

Andonova and Levy see the ability to diffuse knowledge as well as to build capacity as the comparative advantages of networks. (Andonova, Levy 2003/2004: 20 and 25) Indeed, they acknowledge the capacity of networks to fill implementation gaps. (Andonova, Levy 2003/2004: 29) However, this capacity is limited so far because only few partnerships involve all major stakeholders – rich and poor countries, intergovernmental organizations, private companies, and NGOs. (Andonova, Levy 2003/2004: 24) Most are led by single actors, which are in three quarters of the type II partnerships developed countries' governments or intergovernmental organizations. (Andonova, Levy 2003/2004: 25/26) Therefore the conclusion appears to be that the partnership

approach did not change much in international politics with regards to financing and to which actors participate in which issues to represent their interests.
Interviewees highlighted that leadership might switch during the partnership process. One partner in one of the explored networks expected that the leadership might be dragged away from the central international secretariat, which performed the leadership role in the beginning, when the network would evolve. Little financial involvement, therefore, might mean little leadership in the beginning, but the more the network starts to work at an operational level, the more other resources might become relevant and establish new leadership.
Due to their bigger man-power and the potential of higher specialization of this man-power, networks can have a greater capacity than usual organizations with comparable resource endowments, one interviewee from an IGO stated. Nevertheless, many interviewees considered the resource endowments and mobilization the most important factor for the effectiveness of network governance. Particularly, the sharing of limited resources and the complementarity of strengths and capacities of individual network partners determine the effectiveness, as interviewees from NGOs emphasized. Networks can offer more flexibility and provide through the access to various actors with different resource endowments a wider range of resources for action.
Thomas Hale and Denise Mauzerall warn that imbalances of power and resources in partnerships could exclude the smaller partners. (Hale, Mauzerall 2004: 223) They criticize that the potential of the decentralized and complementary nature of the type II partnerships is not realized, (Hale, Mauzerall 2004: 231/232) but the usual power and resource dependencies in international relations affect the partnerships' activities as well. The knowledge sharing and the capacity building, respectively partner selection functions are not sufficiently executed and thereby hinder grassroots involvement. (Hale, Mauzerall 2004: 232)
Private companies have very strict limits on their financial budgets and capacities. That's why companies prefer to make in-kind contributions like time, personnel, technology, or intellectual property, which BP, for instance, often let have their partners after termination of collaboration. Additionally, companies like Shell or BP contribute to partnerships by implementing their core business with local partners. Smaller companies, as several interviewees described, hardly contribute financially to partnerships but rather hope to receive funding or contracts themselves. They use partnerships deliberately as marketplace for business opportunities.
In the long-term local capacities are more important for the effectiveness of network activities for sustainable development anyway, said one interviewee from an IGO. Therefore adequate to its purpose, the capacity of networks, often focusing on overcoming the information barrier, is the global dissemination of knowledge. The challenge in the dissemination of knowledge is to address the information overload which requires a strong knowledge management to enable actors to harness resources and capacities coherently and efficiently, as one interviewee from the academic sector explained. She added that the challenge comes not from the access to knowledge. The knowledge is available, globalization and speed of computers accelerates the flow of information. Limits in access to knowledge come from organization and organizational capacities to manage knowledge. To this end, global policy networks should provide coordination and strategy, one interviewee from an NGO emphasized.
Needed knowledge cannot be allocated by markets only, an interviewee from a governmental body stressed. Interventions in development cooperation as well as partnerships and networks, increasing the effectiveness of individual actors' activities, are necessary complements. At the same time differing goals of cooperating actors limit the capacity of networks to act effectively.
However, small size of networks is very limiting, too. Effectiveness of network governance is only comparable to governance through treaty-based international multilateral regimes if networks achieve to up-scale their partnership action. After all, the overall judgement on capacities and limits of global policy networks by interviewed experts was that the capacity of network governance is always limited and depends strongly on the following:

(i) if they can successfully foster the process towards sustainable development. One interviewee with experiences in promoting sustainable initiatives in markets in various countries described the right timing as pivotal for effective action, being "more art than science". Effectiveness of strategic activities depends on addressing the well-informed key people in politics and economics at the right time;
(ii) if leadership can be established among the many and various network partners to initiate effective activities;
(iii) if partners are credible, what one interviewee from an IGO rated as the basic prerequisite for trusted relations and partnership activities, and if the network contains sufficient complementarity and similarity to provide social capital for action;
(iv) if needed resources are accessible and partners are able to manage them effectively, particularly the strategic use of knowledge has a long-term leverage while financing brings about immediate effects;
(v) if a governance strategy is available to organize collective action.

3.10.3 Success Factors For Network Effectiveness

Partnerships are perceived to be effective if they maximize each partners' capacities mutually by matching "one partner's weaknesses with another partner's strengths" (Bennouna 2005: 7) Therefore, to test the success and effectiveness of global policy networks means to test if strategic actions of partners match. Strategies must consider and anticipate the rationale of other partners. The success factors, named by the interviewees from certain sectors, can be interpreted as what rationale certain actors consider and anticipate when partnering with other actors and what rationale they follow to achieve their objectives. Hence the analysis will explore if rationales of other actors are considered and anticipated, and if these rationales are considered in strategies how to execute functions of governance in and through networks. If the success factors are considered in these strategies, it is reasonable to believe that network governance should be promoting partnerships successfully and contribute to overcome market failures effectively. Indeed, it appears that the success factors correspond with mechanisms described as the strategic activities to execute network functions.

There could be identified four success factors which interviewees from all sectors explicitly named:

- *Clear-cut roles*: Clear-cut roles in partnerships reduce complexity and make networks and partnerships more manageable. Interviewees from all sectors seem to have a propensity to prefer managed interventions to self-organizing dynamics. On the other hand clear-cut roles require management interventions and in some cases formalized agreements which decrease flexibility and increase the danger of institutional sclerosis. Nevertheless, partners demanding of each other to define and stick to clear-cut roles might more easily collaborate.
- *Communications*: All sectors have an interest in free and open communications. In fact, many use networks predominantly for communication purposes, hoping to reap synergies, thereby, and that all partners might contribute something to the common case of sustainable development. Due to a lack of strategies to manage and control communications, they are, indeed, fairly open and free.
- *Leadership*: As identified to be of particular importance in phase one of network development, interviewees from all sectors, indeed, considered leadership to be a necessity as well as success factor. All networks have some sense of leadership, though most interviewees reported that partners tend to be reluctant to engage as leaders since networks are supposed to avoid hierarchical relationships. Hence, certain partners lead informally by their capacities and only in a limited area of operations in order to manage certain activities.

- *Credibility*: Credibility and personal trusted relations are no precondition but an enabling condition for cooperation. However, as credibility is attributed by other actors and reflects the perception of partners, it can hardly be influenced; it is rather a given. Hence, in order to answer the question of how global policy networks can be effective and what strategy might organize effective network governance, credibility might represent a beneficial constellation, but it cannot be an issue of strategic action.

Apart from these success factors which all interviewees highlighted, there are a number of success factors, which correspond with the hypothesized mechanisms of governance in networks, listed by interviewees from several different sectors but not all, in the different phases of network development. This finding might indicate that some success factors are not considered in the rationale of certain actors and hence that this lack of consideration might inhibit collaboration.

While leadership was considered by all interviewees important, a *process-related approach*, namely an ongoing process of relationship-building and internal dynamics of networks, allowing changes in the network governance strategy, was recommended only by interviewees representing organizations with larger endowments in terms of financial assets and man-power. Other actors might simply not have the capacities and resources to continuously address and manage ongoing processes and prefer therefore less time and man power consuming one-off interventions. That asymmetry in abilities to manage processes in the networks can limit effectiveness of collaboration.

The *access to information* and the managed distribution of relevant information was considered by nearly all sectors to be a success factor. However, NGOs and academics might have different expectations of their involvement with networks and hope to receive funding or get access to powerful policy makers. Moreover, NGOs and academic institutes have themselves to provide relevant and usable knowledge and seem to be less interested in receiving new information. Correspondingly, they together with IGOs consider the access to *multisectoral partners* and the diversity of partners a success factor of networks. It seems that actors from different sectors provide and look for different network resources to access and, hence, differ in their perception of these resources as success factors, each considering only what they aim to access – either knowledge or social capital. The different perceptions and expectations of what resources a network might provide can limit opportunities for collaboration if actors miss to provide what other actors expect. That's why the institutionalized and linked instruments of a knowledge map and an actors' catalogue must incentivize network partners to make their knowledge and good contacts accessible for other partners. Indeed, this significance of knowledge and good contacts for the effectiveness of network governance corresponds with other studies on global policy networks. Benner and Reinicke identified network relations, which are even more important than the related actors, the stability of rather weak ties, and communications, together with learning and knowledge management as the determining factors for network governance effectiveness. (Benner, Reinicke 1999: 30)

Additionally to the management of network resources, there are some success factors which were named by a number of interviewees and which can be **managed** in order to support and foster collaboration among the network partners:

- *Common goals*: As global policy networks and collaborative partnership action are voluntary and undertaken by autonomous actors, whoever joins the network will share common goals with partners. However, in order to increase the effectiveness of networks, they need to pro-actively integrate relevant and as many actors as possible. To this end, goals can be defined in an inclusive way and actors who can commit and contribute to these goals can be integrated pro-actively.
- *Clear objectives*: Inclusive goals, however, must not make these goals vague. One interviewee emphasized that networks need to have plural goals – he even preferred plural goals at the cost of definitiveness, but the majority of interviewees from nearly all sectors recommended to have clear objectives and orientations, at least clear definitions of

objectives at the project level. Particularly, immediate action through partnerships calls for clearly defined objectives, being a success factor for effective partnership action of network partners. (compare also Bennouna 2005: 7) However, the dynamic process-related approach of networks requires more flexible goals and objectives. Goals can and do change due to strategic interactions or opportunities in the communication process. (Kickert, Klijn, Koppenjan 1997b: 172) Indeed, the partnership forum's summary acknowledges that flexibility is "(k)ey to effective partnerships". (Bennouna 2005: 9)

- *Good management*: Good management means lean management of and through the network secretariat, performing roles of gatekeepers. This success factor actually highlights a dilemma of networks as governance instruments. For, networks require on the one hand costly investments in terms of time and man-power, on the other hand networks represent an additional commitment which should be as cheap as possible in order not to exclude actors who cannot afford their participation although they have something relevant to contribute. That's why many interviewees explicitly pointed to good and lean management as a success factor or even a prerequisite for networks to be able to organize collective action and to function as effective governance instruments. If networks are not well managed or participation is too costly, partners will simply abstain and not start any collective action, and, hence, the network will become completely insignificant and ineffective.

Apart from the management of available network resources, good and efficient management in networks depends on creating enabling conditions for **self-organizing** dynamics among the network partners to start strategic action. Among the success factors listed by interviewees were repeatedly three creating an environment in networks which is supportive to instigate collaboration among partners:

- *Openness*: Openness allows to integrate both as many actors and, thereby, as much diversity of needed resources or accessible holders thereof as possible which might foster collaborative partnership action. However, a large number and diversity of actors is hardly manageable. Therefore, self-organizing dynamics are needed to create spontaneous order and foster collective action. Another downside of openness is perceived by several actors who wish to monopolize the semi-public network resources, or to exclude certain actors from access to these resources. After all, this perception is shared clearly by a minority of network partners. Nevertheless, reluctance to share network resources can limit potentials for collaboration among network partners.
- *Transparency*: Transparency allows actors to identify partners for action and find needed resources among the diverse and many actors. It is a factor to enable actors to harness networks. Accordingly, partners with lesser capacities to use the vast contacts and knowledge contained in networks who aim to harness networks for a priori defined purposes value transparency less as a success factor. That's why a network governance strategy must entail mechanisms to pro-actively instigate and support partnership action, while at the same time fostering enabling conditions like transparency for self-organizing dynamics.
- *Synergies*: Particularly those actors with strictly limited budget constraints depend on the emergence of synergies, representing themselves self-organizing processes, in order to produce and benefit from a value-added. Only if such synergies emerge, networks are viable for partners, but if they emerge, they represent a self-amplifying success factor.

As sort of counterpart to good management of network centres, *local ownership* can foster self-organizing dynamics within networks. Interviewees from nearly all sectors highlighted the significance of local ownership for sustainable development in general. Strong and autonomous local actors contribute immediately to the systemic characteristics of networks allowing them to self-organize (see section 2.8.2). However, most interviewees felt some reluctance toward redundancy in action and rather wanted to avoid overlaps at all.

In order to achieve a bigger outreach and higher effectiveness, several interviewees emphasized the role of *reputation* and *high-ranking partners* and the commitment to global policy networks of those partners in public. Basically, networks depend in their effectiveness on these individual partners because networks themselves can hardly have a strong impact for sustainable development on a global scale. They can only support and leverage activities of partners. That's why *up-scaling* was another needed success factor listed at least by those interviewees representing organizations committed to sustainable development as their core business. On the other hand, this *network structure or network idea as such* was called by some interviewees a success factor because only through the instrument of global policy networks certain solutions can be effectively disseminated.

After all, the identified success factors, indeed, correspond fairly wide with the 'Bali Guiding Principles for Partnerships for Sustainable Development'. The WSSD's "Framework for Action on Energy" lists certain steps in "Building and Implementing Partnerships" which correspond with the identified phases of network development and success factors: All partnerships start with a lead partner; in general, partnerships are "dynamic processes or works in progress"; partnerships need to define clear objectives; on a later stage partnerships must mobilize resources; at this advanced stage of the partnership's development modifications of the partnership must be possible; and finally, in the long-term, partnerships should scale-up and link with other partnerships and adopt a strategy. (WEHAB Working Group 2002: 24/25)

3.11 Efficiency

The efficiency of network governance depends on how network governance is executed. The governance in networks must make effective governance through networks efficient. The basic assumption of this thesis was that efficient network governance must not crowd out self-organizing dynamics but harness and foster them. This section tests if the global policy networks which have installed mechanisms obeying the principles of self-organizing systems as identified by systemic organizational theory are indeed more efficient.

3.11.1 The Efficiency of Partnership Action

The summary of the International Forum on Partnerships for Sustainable Development recognized that partnership governance should "minimize the time spent on 'managing partnerships'" (Bennouna 2005: 7) This recognition demands that partnerships should work more self-organizing with less management interventions, which promises to increase efficiency of partnership action independently of size of partnership.

> "These collaborative initiatives are an acknowledgement of the principle that the 'sum of parts is greater than the whole' and that by pooling interests and resources, partnerships can accomplish goals that a single organization could not achieve on its own. Within the area of stakeholder engagement, there is a need for both top-down and bottom-up processes, in other words, leadership at all levels. There is a particular need to engage the private sector especially for service delivery and technological know-how, and the poorest of the poor, as they are key end-users." (Bennouna 2005: 10)

The report of the Secretary General on partnerships for sustainable development for the CSD-14 also observed synergies in partnerships. It emphasized the value added through the linkage between the sustainable energy issue and other issues of the sustainable development agenda, like climate change or air pollution, and the goals of environmental protection, poverty reduction and economic growth, (Annan 2006: 17) which indicates a higher degree of efficiency of partnership activities. For, the creation of "(…) employment and income generation through the use of locally available renewable energy resources, the provision of affordable energy services and the development of rural energy systems" support each other. (Annan 2006: 17/18)

The five explored networks, indeed, all engage in such issue linkages. However, their governance approaches differ to some degree with respect to how they support the systemic characteristics for network capacities to self-organize as identified by systemic organizational theory (see section 2.8.2). These characteristics were the complexity of systems, their autonomy, their self-reference, and their redundancy of units' capacities to organize and lead the system. The *complexity* of networks depends on the openness to and diversity of partners in a given network and on interrelatedness and quality and intensity of interactions among these partners. The *self-reference* of networks signifies the capacity of the network to access the needed resources and information to determine its direction and purpose. A network achieves to be self-referring if the number and diversity of accessible partners and information in the network is sufficient to support and organize effective partnership action. The *autonomy* of networks depends on the independence of the network from single partners and their resources, particularly from sponsors, and on the autonomy of the individual partners. The *redundancy* of partners, their capacities, and the relations amongst them characterizes the distribution of knowledge across the network enabling various partners to lead activities without having one center or leader capable to control the whole network.

The degree to which the explored networks meet these four characteristics is decisive for their ability to self-organize and thereby to allow for efficient network governance generating a value added according to the principle of self-organizing, spontaneous order that the 'sum of the parts is greater than the whole'.

GVEP

One interviewee from one of the networks criticized GVEP for its attempt to start new businesses and rather recommended supporting and improving the framework conditions for existing businesses, which feeds into the general question of how much intervention in development processes is needed. Another interviewee, representing a governmental agency, criticized GVEP's sector-specific approach at all and preferred an unspecific budget support for developing countries' governments. Indeed, governance through global policy networks might crowd out or distort self-organizing or individual actor's activities. That's why the governance of global policy networks always has to combine strategic management with self-organizing dynamics, where management is supposed to complement self-organizing dynamics.

GVEP's network governance characterizes basically as one that is fostering partnership action without having anywhere in the network a center or leader capable to manage the partnership activities throughout the network. Therefore, GVEP aims to manage network resources enhancing the capacities of partners to start strategic action for sustainable development. The huge number of partners should be sufficient to enable GVEP to support effectively the access to needed resources particularly that to local knowledge and contacts at the local level due to GVEP's big outreach.

While the number and with reservations the diversity of GVEP partners due to GVEP's openness is enormous, their little interrelatedness and interactions amongst them, as IISD's research found out, (IISD 2005a: 11) limits the complexity in the network. Nevertheless, GVEP is likely to be of sufficient complexity to allow for the emergence of self-organizing processes within the network.

Although most partners come from the energy sector and GVEP certainly should aim to diversify the partner base, the huge number of contacts provided allows access to a fairly wide and diverse array of needed resources and capacities from partners. Hence, it can be assumed that GVEP is able to organize effectively strategic activities for energy access for the poor and sustainable development and thereby determine its direction.

GVEP achieved to become relatively independent from the World Bank, which was originally a leading actor to launch and sponsor GVEP. In the meantime, GVEP achieved to diversify its sponsors and successfully raised funds for different activities from different donors. Thus, GVEP's autonomy developed and grew to a satisfactory state.

The overall efficiency of GVEP's governance is both necessity and opportunity for GVEP. Due to the slim budget of the secretariat for the management of the network and the funding of some leveraging activities, GVEP *must* be very efficient in its resource use for effective governance. And GVEP *can* be very efficient in its resource use for effective governance due to its very nature of being a network and the large number of via the network connected partners, as one interviewee from GVEP's inner circle stated. Although there is a certain tendency among the GVEP secretariat and board members to create enabling conditions for self-organizing processes among network partners, the partners nevertheless prefer a sense of management direction, which, in fact, is hardly deliverable in a network of GVEP's size.

REEEP

REEEP takes to some degree the shape of a "lean management" organization, as one interviewee from the International Secretariat described REEEP, rather than a decentralized network. The international secretariat as a center and the regional secretariats as sub-centers try to offer the partners services and resources to support their activities and to establish channels for communication and coordination with and among partners. This shape of organization is dominated by the strong personal capacities to manage the network of the International Director Marianne Osterkorn in the International Secretariat. At the same time, partners have expectations and demands for services and resources provided by and in the network, but maintain their independence and call for more decentralization. Though there does not seem to be a lack of

cohesion, rather cohesion and impact of REEEP bases on a good reputation and the public commitment of high-ranking individual partners.
Due to the fact that REEEP admits only organizations and that they have to sign a Mission Statement, REEEP's membership is more restrictive and has, thus, lesser partners compared to GVEP (compare section 3.4.2). Nevertheless, REEEP connects through its member organizations and its communicative tools a sufficiently high and diverse number of individual actors to reach a critical systemic complexity to allow for self-organizing processes in the network. These individual actors represent the access to needed partners and information for REEEP to support effective action and to govern the network effectively. However, the central role of the secretariat(s) clearly limits REEEP's capacity to self-organize through the enabling conditions of REEEP's complexity and self-reference and drags the network governance toward a more management-related model.
REEEP as such as well as REEEP's partners are independent. REEEP has a number of sponsors so that one would leave REEEP the network does not collapse. Neither does any partner or group of partners have the power, resources, and abilities to control other partners or the activities in the network. Relevant knowledge to lead activities is spread across the network among many partners who indeed collaborate. However, with regards to strategic network activities to leverage, support, and instigate action of partners, it has to be stated that the International Secretariat certainly has a strong leadership role. The picture of the lean management organization already tells about reluctance toward allowing too much redundancy.

GNESD
The network activities of GNESD are supposed to generate and distribute new knowledge. GNESD's contract-based, centrally coordinated research serves this purpose. Networking in the sense of connecting actors and exchanging resources for action has not yet really emerged among the GNESD partners and the individual researchers of GNESD's Centres of Excellence, but works mainly through the secretariat. Hence, a management model better describes GNESD's governance than self-organizing processes.
The purpose to engage in research and generate new knowledge requires excellence which is the reason why GNESD is not an open network but selects pro-actively which research institute to admit. GNESD is diverse in terms of geographical origin of the member institutes but comprises only a very limited number of actors, though the number of individuals affiliated with the member institutes is quite large. Although GNESD's biggest asset is to generate comparable data for analysis from different world regions and countries and thus generate cross-knowledge, the interrelatedness and interactions among the network partners has not grown very dense. The networking process has not yet taken off successfully. Hence, the complexity of the network is limited; hence, the GNESD lends itself to a management-related governance model.
Nevertheless, the excellence of partners is certainly sufficiently high to include boundary-spanners and thus to make needed contacts and knowledge accessible to support effective research cooperation and distribute knowledge to key people. The problem of GNESD is rather a downstream one: some member institutes able to provide knowledge do not pro-actively engage in the distribution of knowledge, and some member institutes from those in developing countries could so far not really connected to the collaborative activities of the other partner institutes.
GNESD works on a small and lean budget, but it is supported by only a small number of actors. Hence, its financial autonomy similar to that of other academic organizations is always questionable. However, the independence of science is in modern, democratic societies a highly protected value. Moreover, the researchers in GNESD are of high excellence and could easily evade limitations on their research by joining another institute in another country. Thus, the autonomy of GNESD as well as of its members can be considered as relatively certain.
Although interviews showed that the GNESD secretariat prefers a management understanding as reason for the success of networks, they create an organizational environment in which network

management is active but fosters self-organizing dynamics, in fact. The preference for a flat hierarchy, the redundancy of research activities, and the high quality of output as well as the high reputation of participating actors contribute to instigate self-organizing processes. Hence, GNESD gives example that management can complement self-organizing dynamics even without aiming at it.
This view lends itself to the argument that self-organizing dynamics are an epiphenomenon of effective network activities and positively feed back and contribute to the effectiveness of the network. However, it is hardly fostered by management on purpose, merely through the redundancy of activities of individual network partners, ensuring high quality of outcome by avoiding gaps and errors in activities.

EUEI
The EU's Energy Facility managed by EUEI and being EUEI's biggest financial tool brought EUEI close to a new financing mechanism, not so much to a global policy network. All EUEI projects have a strong management and a top-down organization, although they follow a demand-led approach to initiate projects – not to organize them. Hence, there are only little self-organizing dynamics or process management to foster those dynamics. If at all, such dynamics emerge in the more implementation-oriented COOPENER projects. Therefore efficiency of EUEI projects is hardly significantly better than in conventional top-down organized management approaches of development aid and cooperation.
Nevertheless, EUEI's managers of individual activities may be more open to process-approaches fostering self-organizing dynamics and instigate individually connections and collaboration among EUEI partners. The EUEI-PDF is supposed to create spaces for communications among autonomous actors to enable them to self-organize.
The openness and diversity of EUEI and its activities is limited because basically they are government-to-government collaborations to which partners from other sectors might contribute. Hence, projects are usually organized as cooperation between the EU and a partner developing country. Number and diversity as well as interrelatedness and interactions among partners thus limit the systemic complexity of EUEI. This top-down approach receives needed contacts and information through individual consultants to the respective projects, which can hardly create a network effect. As the EU is the only sponsor of activities and – though projects develop in a demand-led manner – is the virtual leader and central actor in the EUEI, the EUEI governance model neither creates systemic characteristics as enabling conditions for self-organizing processes nor does EUEI's governance designs strategic management to foster these dynamics.

REN21
REN21's network governance bases mainly on communications and creating spaces for communications and face-to-face meetings of network partners. The high-ranking individual partners from international politics would hardly accept any governance imposed on their organizations except from emerging self-organizing governance amongst themselves. Therefore, REN21 has little management-related institutionalized governance structures but rather follows a process-related strategy harnessing openness, transparency, absence of hierarchies, synergies between partners with diverse and multisectoral backgrounds, and the accessible knowledge held by partners, while at the same time acknowledging and benefiting from leadership in specific activities.
Indeed, the openness and diversity of partners and the growing density of network relations and interactions among partners fosters complexity as prerequisite for self-organizing collaborative processes. The high-ranking individual partners can bring in sufficient contacts and high quality information and knowledge to support effective collaborative network activities.
The independence of partners is a given as REN21 gathers the relevant and powerful actors from international politics on energy, environment, and development. The financial independence of

the network is guaranteed by these actors, too, because the organizations they represent and whose budgets they rule in parts have the capacities to fund the network. Thus, as long as the inner circle of REN21 gathers sufficiently high-ranking individuals from relevant and powerful countries and organizations, the network as such can maintain its autonomy. Leadership emerges always strictly as leadership among equals. However, compared to the other networks the secretariat of REN21 has less power to govern operational activities as these activities are usually decided by individuals outside of the secretariat and carried out by hired experts, although such operational activities are for some of the top level managers connecting through REN21 not part of their day-to-day business. They rather commit to more strategic oversight functions above the level of operations. REN21 thus takes the shape of a network focusing on a more strategic level above the more operational level of the activities of the other explored networks.
The redundancy in resources and potentials for action and relations among partners can be taken for granted in REN21 in consideration of which actors partner in this network. The capacity to lead is distributed across the network, and at the same time there is no leader capable to control the other actors and their activities.
Concluding, REN21 meets all criteria of systems capable to self-organize and fosters these enabling conditions. The efficiency of RNE21's network governance can be considered as very high, but, as REN21 commits less to activities for sustainable development at the operational level, the network governance might be less effective in terms of problem solving at the local level, which may be a downside of REN21's governance though it still aims to outreach to the local level.

3.11.2 Preferences for Management Interventions or Self-organizing Dynamics

Most interviewees unveiled personal preferences for a management-based governance, as opposed to a network governance based on self-organizing processes. One interviewee from an IGO, for instance, stated that the reason for success in sustainable development activities of this IGO is the strongly formalized organizational structure, while she criticized some networks for a lack of clear-cut formal structures and too much ad-hocism.
In fact, however, network governance combines in every phase of network development both: the creation of enabling conditions for self-organizing processes to govern the network and execute certain network functions, and management interventions to foster and complement those self-organizing dynamics for governance in and through networks.
The two decisive features in phase one of network development, to establish process-related governance approach and leadership to initiate processes, complement each other throughout the whole network development. Leadership represents a mechanism that requires strategic management interventions in processes by the leaders and at the same time offers a mechanism that can be influenced strategically if the right people are identified and addressed at the right time. To cooperate with innovators in certain industries or regions can thus instigate followers to make their businesses and policies more sustainable, as a strategy of one interviewee was described in section 3.7.1. Thereby a self-organizing process towards sustainability can emerge. In general, such dynamics in networks usually develop. To harness them for network governance requires to integrate relevant actors pro-actively and to cooperate with certain partners, as one interviewee from the public sector explained. For this management of social capital, a process-related approach to relation- and trust-building is most suitable.
In phase two of network development the network governance strategy should adjust the management of the semi-public network resources of contacts and knowledge. There are several mechanisms, described by interviewees, to foster self-organizing processes to provide access to partners for collaborative activities. Networks offer always spaces for partners to connect. Without any management interventions contacts can grow and partners can link for collective action. To this end, networks should be open and transparent, and gather diverse and multilateral

partners from different regions and sectors. In this plural environment mutually beneficial partnerships might self-organize.

Network governance mechanisms to manage knowledge were described as more management-related. The role of gatekeepers should be created in networks as well as instruments to distribute the available and accessible knowledge. As knowledge and knowledge holders can hardly be separated, as explained in section 2.6.4.2, knowledge management must be connected to the management of contacts. Due to the complexity of the available social capital and knowledge resources, management instruments themselves need to build in self-organizing processes to allow efficient network governance. Again, self-organizing processes and management interventions must complement each other.

In the long-term, the efficiency of network governance depends on how the network governance strategy is designed, and how the strategic management interventions foster and complement self-organizing dynamics in the network governance. While a strategy for network governance as a management tool is considered by some interviewees as necessary, one interviewee from the public sector doubted that a common strategy can be designed due to the individual strategic goals and action every actor brings in. However, the same interviewee thought it might be possible that a common strategy could emerge dynamically. The other way around, to develop a scheme of targeted action to which partners can individually contribute with independent strategic action might be another possibility. In general, a network governance strategy must always be kept simple and focused, as one interviewee from one of the explored networks emphasized.

Apart from the above mentioned management tools for network governance, many interviewees highlighted the importance of clear goals and clear-cut roles for strategic management as well as free and open communications to foster self-organizing dynamics, which corresponds with the success factors listed by interviewees.

In order to promote enabling conditions for collective action, synergies with other partnerships and the creation of win-win situations incentivize network partners to collaborate, as one interviewee from one of the network secretariats described the network experience. Thereby, individual partnership activities might self-organize without being centrally planned and coordinated. However, the strategic management interventions to promote the enabling conditions are a necessary prerequisite without which no self-organizing processes emerge.

In conclusion, the different managed or self-organizing mechanisms show that most of them are interrelated and cling together. The six theses on governance through networks base on many of those mechanisms and balance the management interventions with the self-organizing processes for collective action for sustainable development.

In order to compare the efficiency of network governance of the different networks, the ratio of effectiveness of network governance to costs of network governance of each network had to be compared. These data are, however, hardly comparable because all networks differ in the foci of their activities and have different leverages to achieve their different goals. Thus, REEEP, GVEP and EUEI engage in project activities with REEEP having a focus on sustainable development and GVEP and EUEI on pro-poor energy access policies. They all address regulatory frameworks of energy markets and energy policies as REN21 does, but REN21 enjoys more legitimacy as outcome of the declaration of an international conference and has thus stronger leverages. While GNESD is not at all engaged in project implementation activities but provides knowledge for the wider sustainable energy community. Hence, it is difficult to determine which network is most effective in terms of contributions to problem solving of their specific area of activities.

Like effectiveness and efficiency, which is in Keohane's understanding (see section 2.1.1) the "impact of financial transfer mechanisms on the solution of significant environmental problems", (Keohane 1996: 14) the budgets the networks have at their disposal are considered the costs of network governance, leaving aside the costs of network partners to participate in network activities. These budgets again differ to some degree. EUEI managing the Energy Facility have

most funds for partnership projects, with REEEP and GVEP following, whereas REN21 and GNESD have smaller budgets because they do not fund project implementation activities.
Therefore, these quantitative measures of neither cardinal nor ordinal ranking do not lend themselves to a comparison of efficiency of network governance. However, the effectiveness achieved by REN21, REEEP, and GVEP whatsoever in consideration of their tiny budgets and at the same time the fact that these networks had the best systemic conditions to enable self-organizing dynamics suggest that self-organizing dynamics, indeed, contribute to efficiency of network governance.

Conclusion of Phase III

In the third phase, the long-term development of a global policy network will be decided. If a network survived the first stage, there are good reasons to believe that the network is fairly stable and has the support of institutional actors to survive in future. However, the long-term form or identity according to its relations to actors of global policy networks can differ a lot, as is already recognizable. At the latest on this stage, the initial funding for global policy networks ends, and the network must either find new sponsors or develop new mechanisms to tap needed funding, like REEEP successfully did that. The initial funding is bound to the achievement of certain targets and to establish some leadership in order to instigate initial network activities. This pattern might help and force to start self-organizing processes and the growth of the network. After that initial funding, financing for specific strategic activities and network management is supposed to be raised from the network partners. For, no public actor wants a permanent burden on anyway scarce public budgets, which is the reason why a global policy network instead of an IRENA was declared to be launched at the renewables2004. In general, networks do not receive a permanent funding but only a limited funding to achieve and realize certain objectives. Sponsors aim neither to define how to reach that objective nor to prolong the funding. The individual network partners need to look for funding attached to the specific objective. Apart from some start-up funding to establish some leadership and instigate initial network activities, and continued funding for running a secretariat and covering small overhead costs, all funding must be raised from within the network. This mechanism forces network partners to let the network grow and to start self-organizing processes.

So far none of the explored networks has moved beyond the point where the initial funding ended and the network became completely independent from the initial sponsors, though GVEP, for instance, has already become less dependent from the World Bank and received increased funding from the British government, and REEEP has heavily diversified its sponsors and is already relatively independent of the British government, the initiator of REEEP.

For their long-term development global policy networks need establish a strategy how to execute certain functions for sustainable development. The examples of GVEP, REEEP and GNESD show that the explored networks have already embarked upon the development of strategies how to manage their network resources. These strategies are no overarching network governance strategies but can be perceived at least as centrepieces thereof.

In their actual execution of network functions and strategic activities the explored networks combine the fostering of self-organizing dynamics, as the described success factors for effectiveness and related mechanisms for efficiency give example for, and the complementary strategic management of collaborative partnership action. Hence, although hypothesis 3 on Governance in Networks was not confirmed explicitly by any interviewee, the actual network practices give indication that mechanisms of effective network governance indeed depend on both self-organizing processes and complementary strategic management interventions. Thus, **hypothesis 3**, *an efficient network governance strategy must foster and harness **self-organizing dynamics** by executing network functions in a way that creates enabling conditions for collective action of independent network partners to self-organize in their individual activities for sustainable development*, can be confirmed through analysis of network practices.

The governance in networks must translate into governance through networks and govern the execution of network functions in order to organize effective and efficient network governance and contribute to problem solving. Thereby, self-organizing dynamics help to avoid network failures which Messner described (see section 2.2.2). Basically, openness, transparency, spaces and channels for communication, participation, free access to knowledge, and the building of trust help to manage complex problems of great numbers of actors, to mediate adverse inter-generational interests or conflicting interests of competitors, to balance the advantages of weak ties to access plural knowledge with the advantages of strong ties to create common identities and interests, and to level power asymmetries. The mapping of knowledge with the help of

institutionalized instruments in networks allows to access knowledge and other resources of weak ties, while the mapping of contacts supports to make the relationships in networks more dense and complete and can form thereby common identities and interests and trust. The downside of trusted relations in networks is that they might have distorting effects, in the worst case lead to corruption. This problem can be addressed through maximized openness, transparency, participation, and fostering free access to knowledge, as the work of Transparency International basically demonstrates. (compare Eigen 2003)

Power asymmetries are a fact in networks, but network partners are aware of them and handle this issue with care. Powerful actors as Germany in REN21 or the World Bank in GVEP try to avoid taking on leadership roles in order not to be perceived as a hegemon. For this perception might corrupt and destruct the whole network. Knowledge as resource for action, however, is a form of soft power that levels power asymmetries. (Keohane 1984: 221)

Hence, global policy networks can through their network nature and the soft resources which they share and distribute among partners effectively and efficiently overcome market and government failures and even avoid falling prey to network failures if they achieve to combine effective strategic management interventions for sustainable development and the fostering of self-organizing dynamics. Interventions must not crowd out those dynamics, for they represent the capacity of global policy networks to address complex global issues efficiently and to avoid failures in parts of the network disabling the whole network and leaving behind a stalemate situation.

4. Analyzing Global Policy Networks: The Emperor's New Suit?

"The increasing significance of global policy networks must not distract attention from the fact that there is on part of the decision makers no long term strategy how to deal with global political processes so far. Every effort in this arena was the result of important but uncoordinated standing alone decisions."[64]

(Thorsten Benner, Wolfgang Reinicke, Jan-Martin Witte: *Globale Politiknetzwerke – eine neue Art des Regierens*, 2002)

4.1 The Story So Far: Comparing Network Governance in Five Type II Partnerships

Energy spurs social and economic development and has multiple effects on the ecological and social environment of societies. Energy access for socially equitable development, energy security for sustainable economic growth, and the mitigation of climate change all represent issues of long-term developments, whose effects are not fully reflected in incentive structures in energy markets. Consequently, this study distinguished six forms of market failures in energy markets impeding the sustainability of social, environmental and economic development.

International governance mechanisms are supposed to overcome these long-term problems. At the same time governance mechanisms must allow to consider short-term interests of various actors in order to incentivize and enable these actors to comply. Strategies for long-term policies, therefore, have to build in flexibility in governance mechanisms and include state as well as non-state actors. Thereby, networks can help to develop individual solutions for failures to generate sustainable outcomes, and to disseminate model solutions developed by individual partners, by providing flexible mechanisms to collect resources, to connect partners for effective action, and to scale up sustainable solutions.

Taken together this promises a new model of global governance interweaving several strands of academic debate in political science, political economy, and organizational theory. First of all the background of environmental governance and sustainable development in the specific context of energy and climate outlines the issues which global policy networks are supposed to address. Network governance functions are supposed to address certain energy market failures. The effectiveness of such governance mechanisms has already been subject of extended debates on regimes, governance, and networks, and was briefly recapitulated. These debates have been dominated by rationalist and constructivist paradigms like game theory and system theory represent. All these controversial and opposing theories have certainly something to contribute to the debate on network governance, though none of those can establish *the* one theory on network governance. Thus, different theories apply to different phases of network development, different aspects of network governance, and different issues of network governance functions. Resource dependency theory points out the significance of resources for short-term action. In the context of global policy networks, these resources are mainly the semi-public resources of knowledge and social capital. Systemic organizational theory highlights the importance of self-organizing dynamics in the long-term for effectiveness and efficiency of network governance. Finally, theories from the realm of international relations suggest how network governance functions can address effectively certain issues. These theories belong on the one hand to the constructivist strand of debate like strong and weak cognitivism and communicative action, and on the other hand to the rationalist game theory strand like actor-centred institutionalism and institutional

[64] The original quote was in German, reading: „Die zunehmende Bedeutung globaler Politiknetzwerke kann nicht darüber hinweg täuschen, dass es bisher keine langfristig ausgelegte Strategie auf Seiten der Entscheidungsträger für den Umgang mit globalen politischen Prozessen gibt. Jegliche Anstrengungen in diesem Bereich sind Resultate zwar wichtiger, jedoch unkoordinierter Einzelentscheidungen."

bargaining. When applying conclusions from different theories to the debate on network governance, those must be differentiated and combined.

Wrapping up all the promising potentials of voluntary and flexible cooperation in global policy networks for sustainable development the puzzle to be solved remains: Are global policy networks, indeed, the solution to all our trouble in international politics?

In the **first phase** of network development, slightly different organizational designs have evolved among the explored networks. While GVEP and REEEP are networks in the strict sense of the term, GNESD aspires to become one, and EUEI has never achieved to be one, as one interviewee from one of the five networks observed. The problem of EUEI seemed to be that this initiative was due to the EU Commission and the European governments as leading acting partners predestined for policy dialogue among partners from the public sector. In fact, however, the initiative intends to collaborate with partners from other sectors, although these partners are hardly integrated into the activities of the network itself but are considered only at the project level. That's why EUEI has started to evolve into an advisory body of the ACP-EU Energy Facility, (Commission of the European Communities 2004: 9) a new financing instrument, which hardly ever aims at generating synergies through network effects.

In fact, interviews showed for all networks that network partners expected the networks to provide funding and work like new financing mechanisms, while the designers of networks always wanted to avoid exactly that perception and intended to create a new organizational form. Nevertheless, the explicit aspiration is still that EUEI like an umbrella creates synergies and coordinates activities of a multitude of actors from different sectors. Hence, the EUEI rather works like a conventional intergovernmental organization or a body thereof.

However, all networks tend to be organized and managed like conventional organizations. The organigrams are basically such as of international organizations, the connected – networked – actors do not appear; only very few projects or activities are instigated by the network. The partners, it seems, would cooperate, too, without any network, although the collaboration within the network might increase after a time.

All those networks tend to overlap, for many individuals are partners of more than one network and at the same time holding leadership positions in their organizations of origin. The boards and secretariats of all five networks constitute a center of the respective network, and these centers build an *inner circle* of individual actors whose web of personal relations seems to be quite dense. In many interviews the impression was salient that the energy-for-sustainable-development community is sort of 'one big family'. There are individual actors, the virtual network partners, connected to each of the network centers, who constitute an *outer circle*. That sphere contains of relatively high-ranking individuals, like heads of departments. Those people do the actual networking and provide the networks with necessary material resources, while the secretariats are mainly concerned to organize the value-added activities of the networks as such.

The problem of that structure of networks is that the actors connected via the network are not identical with those actors who actually implement the activities in the field in the **second phase** of network development. The priorities for fields of action of the five explored networks differ. They aspire to complement one another in their activities, as already described in section 1.3.1, and to develop a division of labor amongst them. However, there emerge only slowly self-organizing dynamics from redundancy of action of autonomous actors. Hence, the executing actors, who are in need of knowledge and contacts to improve the effectiveness of cooperative action, still have to fend for themselves. Therefore, to give these actors in the field the necessary semi-public resources at hand global policy networks must provide them with instruments, like a *Knowledge Map*, connected to an *Actors' Catalogue*, and a *common decentralized strategy* how to manage network resources and to access those resources through the network, which become increasingly important in the long-term development of the network and has to be set up at least in the third phase of network development. These instruments are actually in the process of making: GVEP has contracted IISD in 2005 to design a Communications and Knowledge Management

Strategy, REEEP engaged in strategy development in 2005, GNESD has already in place a Communication strategy.
With regard to the managerial resources of the networks, it has to be stated that most of the financial resources for the technical secretariats of the networks are provided by public actors, like governments, ministries, or governmental agencies, and Intergovernmental Organizations. Their represenatives have consequently most influence in the initial phases when the conceptional planning, the design of the network governance, and the staffing and selection of personnel evolve. Private actors and actors from civil society make rather contributions in kind worth money and provide time of their staff, expertise, and services from their core businesses for network activities in later phases, but contribute hardly to the financial budget, on which the network and its central bodies operate. Nevertheless, the academic community, which is often related to and addresses the public sector as well as Intergovernmental Organizations, involves through their individual expertise and personal relations; private companies as well as NGOs have relatively more influence in operational activities and can contribute more knowledge and contacts as managerial resources to action for sustainable development.
For instance, GVEP was founded originally by the World Bank and UNDP and its Technical Secretariat received funding to large parts from the British DFID and the World Bank. But in 2006 Sarah Adams on a sabbatical from EdF took over as head of Technical Secretariat from Abeeku Brew-Hammond from KITE and Kurt Hoffmann from the Shell Foundation assumed the office of the chair of the board. Thereby, GVEP moved toward a market-orientation.
This orientation will become increasingly important in the long-term and becomes salient in the **third phase** of network development, when global policy networks serve functions in global markets of private actors or in international public regimes. In this regard, EUEI and GNESD have a propensity to state-oriented action, while GVEP and REEEP rather aim to cooperate with private actors and orient to markets. REN21's future between state and market is not yet certain.
Hence, although public actors and IGOs can exert more influence due to more hard resources at hand in the beginning of networks, this power can fade away over time. Where power seems to be distributed asymmetrically, the different partners rather balance their power across different phases of development of the network and different tasks for action of the network partners according to the resources which they can bring in. This phenomenon of distributed leadership in global policy networks corresponds with the 'principle of redundancy of potential command' ruling self-organizing systems, in which always the unit with the best and most information leads.

4.2 Exploring the Effectiveness of Global Network Governance

Global governance as well as cooperation for sustainable development represents basically problems of collective action. International regimes are outcomes of long winded negotiations of autonomous independent actors who must define a common interest and regulations or incentives, how to deal with the common issue. In most cases, these regimes are least common denominator solutions, avoiding relative gains or losses for all regime members; laggards might hinder leaders and have veto power, in fact. With regards to international climate policies one interviewee from the public sector believed that the partnership approach is an expression for the inability of international actors to agree to a regime on sustainable energy, and that it is unrealistic that one will be created in near future except a green US government will come to power. As long as international actors have to wait for that moment, global policy networks might be useful as sort of second best solution. Another interviewee with an academic background generalized the experience that all action for sustainable development depends on the right timing.

Global policy networks allow autonomous actors to commit as much of resources as they are willing to without running a risk to give in more than competitors, thereby creating a comparative disadvantage. Nevertheless, global policy networks enable leaders to commit the most they can to sustainable development and to find partners for collective action where possible and where synergies emerge. Global policy networks might contribute, therefore, to greatest common denominator solutions.

However, that potential for collective action does not necessarily mean that global policy networks instigate such international and multisectoral cooperation, they merely set the stage for such action, which actually might have happened without any network as well. Therefore, the biggest asset of global policy networks might be the social capital within them, i.e. the relations among actors and the connection of people to start collaborative action. One interviewee simply pointed out that the relations among partners and the projects resulting from these contacts indicate a considerable network effect. Therefore high-ranking individuals as partners in the network attract more partners of equal high rank, as one interviewee from one of the explored networks has observed. Whatever action networks might promote, it can be transported the easier into implementing agencies of autonomous actors the higher the position is, held by the involved individual network partner in the hierarchy of the respective organization. To be able to access financial assets and power is still the most attractive incentive for actors in international politics to join networks. The commitment to networks may be relatively expensive in terms of scarce time resources of the involved members, as one interviewee from an NGO explained. Those members are often expecting something more of global policy networks than merely being a talk shop fostering the potential for synergetic cooperation. In fact, differing cultural issues, expectations and perceptions of a network are considered by some experts as the biggest obstacles for networks. (compare, for instance, Creech, Willard 2001: 96)

Global policy networks are actually a quite costly form of international cooperation and global governance. Networking is time-consuming, requires manpower, and calls for expenses for travelling to face-to-face events. To participate in a network means to invest a lot and get back sometimes merely opportunities to exchange views and ideas, meet people and refresh contacts. Thus, for many actors, particularly those from developing countries, this networking is too costly. Networks are all strongly personalized, hardly institutionalized. As one interviewee from the public sector, who was strongly involved in the making of one network, phrased it: “Networks are a coffee party.” If they are well managed, they can produce a value-added through commitment, tangible outcomes, high-ranking individual actors, and as a result from all those factors a high quality of effective action. Networks consist of people who work at the more or less same organizational hierarchical level on the same topic and had relationships to a high degree before the networks came into being. Hence, the networks mainly do what the networked people already did before without networks. Much of what the networks do depends on these personal relationships, as, for instance, in the case of REN21. However, networks made the relation density

grew more complete: Granovetter's weak ties grew to strong ties, which are more effective when it comes to implementation but might limit potential effectiveness in the development of partnership projects or distort efficiency of network activities. After all, one interviewee put it as simple as that: partnerships do offer a value-added, for otherwise they would not exist.

Though, some networks have developed further in the meantime and not remained merely talk shops. GVEP and REEEP have achieved to develop local outreach; REEEP and REN21 have set up REEGLE as an institutionalized knowledge and contacts management tool for global policy networks – a product of REEEP which would not have developed without the network. Only if global policy networks achieve to produce such needed outcomes which would not have developed without the networks, they can deliver benefits outweighing the investment costs. And only if global policy networks achieve to instigate self-organizing processes, supported by common but decentralized strategies and such institutionalized instruments as a knowledge map or an actors' catalogue, they can lower their initial costs and become affordable for all actors and stakeholders.

However, the costly leadership, necessary to start a network, might always remain necessary to allow a network to function and develop smoothly. The "Business UNusual" report (Witte, Reinicke 2005) framed this combination of both action out of the network and leadership from a center as "strong management and local ownership", and summarized it as the major success factor for global partnerships. The success of any global policy network depends crucially on the collaboration of local and global level; local ownership and strong management must complement one another, i.e. self-organizing dynamics and intervening management must fit. Then network failures as that of distorting strong ties – actually the biggest asset of networks – can be overcome.

Networking is costly, that's why mostly the rich and the powerful can afford to harness global policy networks. However, for many actors global policy networks are the only instruments to access the rich and powerful and get involved with international politics at all. Therefore, it has to be concluded that global policy networks produce value-added only for those who pro-actively use global policy networks, and that a network governance strategy should enable all actors to harness the network for their individual purposes and sustainable development at the same time through the free and open access to instruments providing the semi-public network resources of knowledge and good contacts.

Now, the question is how to get most out of the costly investment in engaging in networks, i.e. how network governance can be most effective and execute certain network functions. To answer this question the identified mechanisms of network governance of the five explored networks on sustainable energy are summarized in table 5.

According to an internal World Bank study, GVEP and REEEP are most active at local level. The knowledge sharing function is what most partnership activities address, integration, partner selection and implementation are as well considered in many activities of GVEP and REEEP, while EUEI and GNESD seemed to be less active in this regard with GNESD due to its nature as cooperative network of research centres focusing only on knowledge sharing. Since this study focused on how networks contribute to leverage financial capital the issues concerning actors who are no market participants were not considered in the survey. Therefore activities to perform the functions of interest mediation and of coordination, which address internal and external conflicts of networks were not considered. In many interviews this sort of denial of conflicts in networks could be found so that activities aiming at these two functions were at least not perceived as such by many interviewees. Like markets are blind for their own failures because the interests of those who suffer from market failures are not represented in the market, networks aiming at accelerating market development are blind for interests of actors outside of the network. Nevertheless, as the explored networks all have a development focus, they do consider development issues and, thereby, carry out activities which might address interests of those market and network outsiders.

Regarding the overall effectiveness of sustainable energy related networks, the World Bank study came to the conclusion that knowledge management in networks must improve, referring to the mapping of renewable energy and energy efficiency activities of networks, but that no other institutional forms would be needed.

Table 5: Summary of Effective Mechanisms of Network Governance

Phase 1: Design of Governance		
Hypothesis 1:	*Network governance strategy must harness a **process-related approach** and needs **leadership** to initiate processes.*	*Tested & modified*
Phase 2: Becoming operational and first reforms		
Hypothesis 2 **(a):** **(b):**	*A network governance strategy should help to organize the semi-public resources of **knowledge** and **social capital** in networks efficiently and effectively for collective action.* *The management of knowledge and social capital needs institutionalized instruments of a **knowledge map** and an **actors' catalogue** growing and developing in a self-organizing way through the selection and rating by users of the contained links to knowledge holders and partners.*	*Tested & confirmed & amended*
Thesis 1:	*While **openness** and **clear-cut boundaries** need to be balanced, networks need to **build relations in a targeted manner** to trusted multipliers, innovators, boundary-spanners, and local partners, who have access to needed resources, or hold knowledge on local conditions, or increase organizational advantages like flexibility and specialization of the network.*	*Tested & modified*
Thesis 2:	*Adverse interests in distributive conflicts can be mediated through establishing leadership, disseminating knowledge, and building trusted relations in order to reach **integrative solutions** and to recognize and harness opportunities for collaboration by linking intersecting issues, connecting partners, and defining roles.*	*Tested & confirmed*
Thesis 3:	*Where markets fail due to a lack of information, knowledge sharing of network partners should **pro-actively distribute needed knowledge** by targeting and connecting network partners through the installation of neutral and trusted **gatekeepers** within the network, and should control quality, relevance, and reliability of accessible knowledge through **openness** of and **transparency** in the network to support effective network governance.*	*Tested & modified*
Thesis 4:	*Networks **provide transparency and a forum**, where potential partners can find one another, and at the same time networking along personal relations among high-ranking individual partners can **pro-actively identify and connect partners with complementary capacities** for action for sustainable development in the short-term and for capacity development in the long-term.*	*Tested & modified*
Thesis 5:	*Network governance may be enhanced by **as free as possible communications** to enhance effectiveness in communicative action for coordination among actors through generating consensus and enabling bottom-up processes to inform policy-makers.*	*Tested & modified*
Thesis 6:	***Orientations of partners must match** to enable partners to collaborate and to implement long-term strategic action because they are more capable and ready to share risks and costs of activities producing sustainable outcomes.*	*Tested & confirmed*
Phase 3: Long-term Developments		
Hypothesis 3:	*An efficient network governance strategy must foster and harness **self-organizing dynamics** by executing network functions in a way that creates enabling conditions for collective action of independent network partners to self-organize in their individual activities for sustainable development.*	*Tested & confirmed*

The hypotheses describe effective and efficient governance in networks. The supposition is that only if governance in networks is effective and efficient, governance through networks, as asserted in the six theses, can effectively and efficiently help to solve problems. The hypotheses on governance in networks describe how the asserted activities in the six theses on governance through networks must be executed. However, only these activities have an impact on global issues. Hence, without effective governance through networks everything is nothing.
In order to assess if these hypotheses and theses account for effectiveness of network governance table 6 lists which of the mechanisms from the hypotheses and theses each network applies. If these networks, which apply the mechanisms completely or at least more completely, produce higher effectiveness, the causal link of the identified mechanisms and of effectiveness of network governance can be confirmed.

Table 6: Mechanisms of Network Governance in Global Policy Networks

Mechanism of network governance	GVEP	REEEP	GNESD	EUEI	REN21
Hypothesis 1 on Governance in Networks					
Process	✓	✓	✓	×	✓
Leadership	(✓)	✓	✓	✓	✓
Hypothesis 2 (a) on Governance in Networks					
Knowledge as network resource	✓	✓	✓	(✓)	✓
Social capital as network resource	✓	✓	(✓)	(✓)	✓
Hypothesis 2 (b) on Governance in Networks					
Instruments for resource mapping	(✓)	✓	×	×	✓
Hypothesis 3 on Governance in Networks					
Self-organizing dynamics *and* strategic management	✓	✓	✓	✓	✓
Thesis 1 on Governance through Networks: Integration					
Integrating multipliers, innovators, boundary-spanners pro-actively	(✓)	✓	✓	×	✓
Balancing openness with clear-cut boundaries	(✓)	✓	×	×	✓
Thesis 2 on Governance through Networks: Interest Mediation					
Leadership (to mediate conflicting interests)	✓	✓	✓	✓	✓
Disseminating knowledge	✓	✓	✓	×	✓
Building trusted relations and connecting partners	✓	✓	×	×	✓
Linking intersecting issues	(✓)	(✓)	×	(✓)	×
Defining roles	✓	✓	✓	(✓)	✓
Thesis 3 on Governance through Networks: Knowledge Sharing					
Distributing knowledge pro-actively	(✓)	✓	✓	×	✓
Connecting partners pro-actively	(✓)	(✓)	×	×	✓
Gatekeepers for knowledge	(✓)	✓	✓	×	(✓)
Openness	✓	(✓)	×	(✓)	✓
Transparency	✓	✓	✓	×	✓
Thesis 4 on Governance through Networks: Partner Selection					
Transparency and spaces for partnering	✓	✓	×	×	✓
Networking along personal relations	✓	✓	✓	(✓)	✓
Pro-active support through high-ranking individuals	×	(✓)	(✓)	(✓)	✓
Matching complementary capacities	(✓)	(✓)	×	(✓)	(✓)
Thesis 5 on Governance through Networks: Coordination					
Free communications	✓	(✓)	(✓)	(✓)	✓
Informing policy makers through bottom-up processes	✓	✓	✓	✓	(✓)
Thesis 6 on Governance through Networks: Implementation					
Sharing risks and costs	✓	✓	×	✓	(✓)

✓: mechanism applied in network
(✓): mechanism applied with limitations in network
×: mechanism not applied in network

Although the explored networks share certain features and work all on the energy for sustainable development issue, the effectiveness of their network governance and related activities is hardly comparable as the explored networks focus their activities on different goals and aim to complement one another, as explained at the beginning of section 1.3.1. Nevertheless, the explored networks can be grouped according to similarities of activities and the effectiveness of these activities, and thereby the mechanisms of network governance applied can be compared.

REN21 has due to its origin as outcome from the official declaration of an international conference and the consequential legitimacy to influence national policies, due to its capacity to work on strategic issues and instrumentalize partner organizations, and due to its high-ranking committee members representing national governments, not merely governmental bodies, REN21 has a stronger leverage than the other networks. If, for instance, the activities from the International Action Plan (IAP) from the renewables2004 are subsumed to the measures of the network, REN21 can account for climate mitigation and sustainable development activities which were announced as official commitments of national governments and large organizations at an international conference. No other network can act in that rank of international politics neither can any network achieve quantitative measures in the scale of the IAP. However, all networks might work as leverages for solutions, develop successful business models and policies for sustainable energy, and spread effective governance mechanisms for sustainable development. Again REN21 has the biggest potential to spread such solutions, while other networks might be more successful in developing sustainable solutions because they are closer to the ground. REN21 can be effective by influencing policies of whole countries and organizations through the high-ranking individuals connecting and communicating in REN21.

On the other hand, REN21's influence is, thereby, mainly indirect like GNESD's influence. GNESD and REN21 hardly engage in implementing projects on the ground which can decrease their immediate effectiveness, whereas EUEI, REEEP and GVEP engage in partnership project activities. EUEI administrates by far the biggest budget for project activities, but the effectiveness of REEEP's and GVEP's partnership projects may be higher because all their funded projects must be scalable and can thus have a gradually growing impact.

These groupings of the explored networks in combination with the mechanisms of network governance applied by the different networks allow a rough conclusion on the research question if and how global policy networks can be effective.

Controlling for EUEI's large budget for project activities and focusing on indirect and gradual effects, corresponding to the leveraging effect global policy networks are supposed to have, the identified *mechanisms of network governance*, as phrased in the three hypotheses and six theses, *enable global policy networks to increase the effectiveness of international policies for sustainable development*.

Global policy networks serve for more than window dressing purposes. If the identified mechanisms of network governance are not considered, more hard resources – as in the case of EUEI – must compensate for the lack or shortcoming of network governance. Nevertheless, hard resources, legislative rule-setting power and international regimes are still more important for the effectiveness of international policies which corresponds with the findings of other studies:

> "Finally, even though soft components such as knowledge and organizational arrangements can make a substantial difference (…) hard power (…) seems to be the critical asset." (Underdal 2002b: 458)

Global policy networks' effectiveness applies to what was described in section 2.1.1 as 'functional effectiveness'. (compare Underdal 2002b: 454)

Networks can work as a *leveraging instrument, not as the solution itself*. As long as there is no effective international regime, voluntary cooperation can pave the way to an international agreement and spur collective action even when an international agreement could already be reached. Global policy networks might be effective as an enabling condition in the process of an international regime, not as an alternative to a regime.

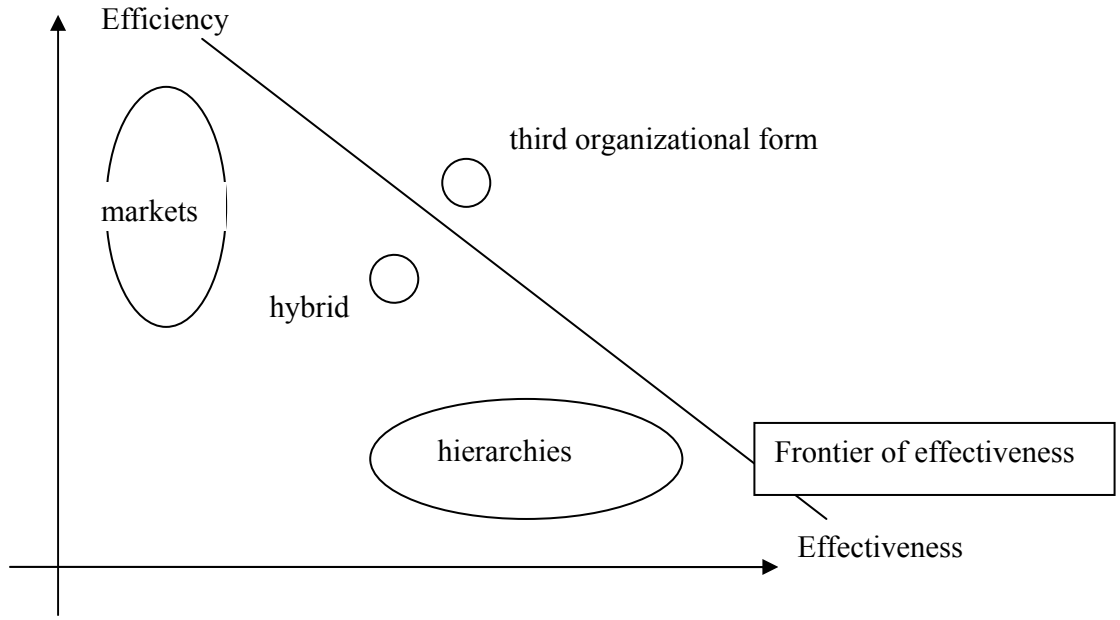
4.3 "Nothing On At All"?

Many interviewees admitted that the rise of networks is a trend which has its high tide at the moment and will certainly go down again. The question is how much will stay and what networks will be able to deliver in the long-term.

Schematically, markets are efficient in the use of resources but ineffective in the satisfaction of certain needs as that one for sustainability, whereas organizations or states – hierarchies – are effective in the satisfaction of certain needs but can be very inefficient and costly in their use of resources. Now, if networks increase effectiveness and efficiency, they can hardly be a hybrid form of markets and organizations as some network theorists like Williamson or Ibarra (Ibarra 1992: 185) believe. On the other hand, networks are indeed some organizational form between markets and hierarchies and disintegration into market relations or institutional sclerosis of hierarchical relations are always looming. (Sydow 1992: 304) Other network theorists like Walter Powell, Dirk Messner, or R.A.W. Rhodes (Rhodes 1997b: 52) assert networks are an independent third form and alternative to markets and organizations.

However, in fact, it is hard to measure whether global policy networks hold only a middle position between markets and hierarchies, or whether networks are beyond the frontier of other organizational forms to promote sustainable development most effectively and most efficiently.

Diagram 5: Chart of Network Effectiveness – Market, Hierarchy, Hybrid or Independent Third?



Are networks hybrid organizational forms of markets and hierarchies, or are networks a third organizational form?

The answer to that question may be quite different from what the puzzle implies. Together with markets and hierarchies networks as neither hybrid nor third organizational form but as a complementary one might, indeed, increase both effectiveness and efficiency. For only networks might mobilize public *as well as* private goods as resources for action for sustainable development, for only networks maintain the autonomy of actors in free markets, integrate hierarchical actors, and identify and organize opportunities for collective action of these actors. (compare Ivanova 2003: 13)

If global policy networks really achieve to keep these promises, depends on the network governance strategy. Any strategy is only as good as its application to real world challenges is. Therefore, the effectiveness of network governance strategies depends strongly on network managers, not on institutionalized mechanisms.

> "In principle, every actor involved can perform a management role." (Klijn 1997: 33)

Every network partner can contribute to network activities individually and independently by applying a common strategy without being coordinated by any network center. Hence, nothing really changed to how things worked before: no international institution is established, every actor still acts independently and autonomously. If they achieve to contribute to collective action for sustainable development, synergies might emerge and will effectively and successfully support sustainable development. If they do not, there is no force in place to sanction non-sustainable action.

After all, the effectiveness of global policy networks depends on strategy for governance through networks obeying the principles of governance in networks and how this strategy is applied by network managers. Therefore the research question whether global policy networks might organize effective policies and deliver sustainable outcomes for development must conclude somewhat like "It works if it works". Only the future development will show if global policy networks are the "Emperor's New Suit".

Appendix

Annex I: Interview Guideline

The following framework of questions was adapted to every individual interviewee' expertise and the organization he or she represented. The general topics – the strategies of network governance of the various actors – were the same in every interview, but the list of questions was never discussed completely.

Interview guideline – Global Public Policy Networks:

a) Network Formation, Actors, Interests:

Why is an increasing number of networks emerging in global public policy? Is that due to new policy instruments used by governments or due to the natural forces of change and globalization? How do the instruments and forms of governance selected by networks differ at all from those selected by governments, companies, NGOs or intergovernmental organizations?

Which problems does the network adress? What are the goals of the network? What are the reasons of the individual network member [interviewee] to engage in network cooperation? Which market failures shall be overcome? How can the network avoid to crowd out self-organizing dynamics?)

How and which actors are actively integrated? Which incentives are created? Which actors are deliberately excluded? What criteria are used to select partners, like multipliers, for instance? *[network function: integration]*

How have the partners been selected in the implementation of a collaborative project? Which institutionalized features, resources, capacities, interests, relations among actors are considered? *[network function: partner selection]*

Sector specific hypothesized motivations and roles of actors in networks:

Private sector: Do you expect international regulations in the next 2-5 years? Which regulations?

(Are there companies taking voluntarily early action to avoid inefficient regulation?)

Governments, IGOs, IFIs: Will net investments and transfers grow through partnership-/ network-approaches? Will costs and burdens be shared by more actors, or will actors have to carry the same burden? How will burdens be shared? How will that affect power and capacities of actors?

(Are public actors trying to maintain or extend their power while budgets are shrinking?)

IGOs: Depend networks on personal relationships, or are network relations of an interorganizational and institutionalized character? What is a forum for the network relations? By whom is it organized?

(Are IOs necessary to build international and transorganizational links?)

NGOs: Does the network address distributive questions? Which actors do that? What goals are pursued in distributive bargaining?

(Are there goals of poverty reduction conflicting with goals of wealthy and powerful actors?)

Academic community: To what end do academics use the network for? How are they doing that? Does the network allow academics new insights and tests of their theories? Does the network contribute to the reputation of its members?

(If academics aim to approach the truth, do networks enhance their realm of influence and thereby their reputation and power to define truth?)

b) Network governance

Are there strategies which can serve as a basis to establish, design and manage (control) networks? Does the individual network member [interviewee] have a strategy for network activities? What are those strategies like? How are strategies of other actors considered? How do strategies of individual network actors fit in an emergent or collective strategy of the whole network? Is the execution of network functions redundant and kick off self-organizing dynamics?

Financing: Who finances the network? Which interests have those actors? How can financing be secured and increased for certain activities?

What is being financed by the network? What is financed by the network members themselves?

Leaders: Are there and who are the actors who have the authority and trust building capacity to negotiate and mediate conflicting interests? Are there anything like lead agencies, and who are those?

Rules: To what extent has the network been "formalized", i.e. have partners agreed to explicit rules and signed a written contract, created a secretariat, etc.?

Human Resources: Can networks be 'managed' at all? How can network managers deal with a lack of trust or conflicts among network members?

How is ensured that the network is open for new actors and more participation? Or are the working routines carried out in relatively closed groups? How is the access to new, plural, and external knowledge organized? Are there 'gatekeepers' (distributors of knowledge)? *[network function: knowledge sharing]*

How are decisions made in the network? Who takes part in the decision making? How do competing actors cooperate in the network? *[network function: interest mediation]*

How is the process of negotiation (matches of messages and actor specific channels) as well as implementation (matches of interests and capacities of actors) organized? How can channels of communications be established between actors whose activities have external effects on activities of partners or in the environment of the network? How can be ensured that those channels of communication are appropriate for the respective actor? *[network function: coordination]*

How are relations being used deliberately to share costs of investments and activities? Are endowments of actors, interests, identity, and how actors relate to one another considered? *[network function: implementation]*

c) Effectiveness

What would You [interviewee] say are the most important factors contributing to effectiveness of action by networks? Does the network execute network functions to overcome market and government failures efficiently?

What are the capacities of networks? What are their limits?

What knowledge is exchanged for network activities? Technical, political, economic, socio-cultural information? Where does it come from? *[network function: knowledge sharing]*

Which advantages in the long run do network members gain? Which incentives are there not to veto policies or to leave the network to gain short term advantages? *[network function: integration]*

What resource deficiencies do networks plug? How can networks in comparison to hierarchies and markets secure multiple resource contributions, i.e. money, human resources, information, technology? How can networks contribute to sharing such resources? Do networks leverage such resources easier than hierarchies or markets? Why is one organizational form more successful than another one in mobilizing resources? *[network function: partner selection]*

Which activities are carried out although there are conflicting interests among individual network actors? Which interests, actors, conflicts, collaboration? *[network function: interest mediation]*

Which external effects on other actors, network members, and the network environment are internalized by individual actors, and by which sectors? *[network function: coordination]*

What is the 'network effect', i.e. what action would not be taken without the network? *(counterfactual question) [network function: implementation]*

When collaborative action is planned, how are social and cultural features considered? How are local capacities and local knowledge considered?

d) Stability – Change, and Comparison

How stable is the network?

Who and what is instrumental in ensuring the stability of the network?

What measures of a shared vision or goal, trust, dependence or interdependence, and management or collaborative capacity are needed to hold networks together? How can these cohesive forces be used by the network manager intentionally to reach the aims of the network? When does the network collapse if there are deficits in these cohesive forces?

How do existing networks differ from one another? Why do some succeed, and why do others fail?

Annex II: List of Interviews Conducted

Name	Position	Organization	Personal/ Telephone	Date	Sector[65]	Expertise[66]
Sascha Müller-Kränner	Director Foreign Policy	Heinrich-Böll-Foundation	personal, Berlin	15 June 2005	civil	outer circle
Brigitta Wortmann	Political Adviser	German BP AG	personal, Berlin	12 July 2005	private	outer circle
Dr. Jan Schwaab	Knowledge Manager	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)	personal, Eschborn	19 July 2005	public	outer circle
Klaus Hornberger	Project Officer (regional networks)	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)	personal, Eschborn	18 July 2005	public	outer circle
Dr. Marianne Moscoso-Osterkorn	International Director	International Secretariat of REEEP	telephone personal, Vienna	3 August 2005 11 October 2005	Technical Secretariat of REEEP	inner circle
Christine Lins	Secretary General	European Renewable Energy Agency (EREC)	telephone	4 August 2005	private	wider circle
Fatima Denton	Senior Energy Scientist	UNEP Risoe Center	personal, Risoe, near Roskilde	16 August 2005	academic	wider circle

[65] I subdivided the sectors into public, private, civil, academic, Intergovernmental Organization, and differentiated from the network partners the interviewees of Technical Secretariats of the different networks.

[66] I differentiated the expertise of interviewees into such from an *inner circle*, which is basically the Technical Secretariat of the network, these interviewees provide an internal reflective perspective; from a *wider circle* of the network, these interviewees have expertise referring to internal action; from an *outer circle* which constitutes the external environment to the networks, these interviewees' expertise is on external action of networks and in the area of energy for sustainabele development.

John Christensen	Head of UNEP Risoe Center, and Head of GNESD Secretariat	UNEP Risoe Center, and GNESD Secretariat	personal, Risoe, near Roskilde	16 August 2005	Technical Secretariat of GNESD	inner circle
Per Kolbeck	Information and Outreach Officer	GNESD Secretariat	personal, Risoe, near Roskilde	16 August 2005	Technical Secretariat of GNESD	inner circle
Robert Klump together with:	Project Manager of REEGLE	International Secretariat of REEEP	personal, Vienna	12 October 2005	Technical Secretariat of REEEP	inner circle
Claudia Cernohuby	Product Manager of REEGLE	International Secretariat of REEEP			Technical Secretariat of REEEP	inner circle
Dr. David Crossley	Managing Director Energy Efficiency Advisor	Energy Futures Australia REEEP			private	wider circle
Ambassador Irene Freudenschuss-Reichl	Director General of Development Cooperation	Austrian Ministry for Foreign Affairs (BMAA)	personal, Vienna	12 October 2005	public	wider circle
Heather Creech	Director Knowledge Communications	International Institute for Sustainable Development (IISD)	telephone	16 November 2005	academic (developed strategy for the GVEP Technical Secretariat)	inner circle

Dieter Uh	Thematic Adviser	Interim Secretariat of REN21, Organization Committee of the renewables2004 – International Conference, and GTZ	personal, Berlin	18 November 2005	Technical Secretariat of REN21	inner circle
Dr. Martin Schöpe	Adviser	Germany's Federal Ministry of Environment, Nature Conservation and Nuclear Safety (BMU)	personal, Berlin	1 December 2005	public	wider circle
Dr. Manfred Konukiewitz	Head of Division	Germany's Federal Ministry for Economic Cooperation (BMZ)	personal, Berlin	14 December 2005	public	wider circle
Dean Cooper	Managing Director	Parallax	telephone	15 December 2005	private	wider circle
Sven Teske	International Climate Campaigner	Greenpeace	personal, Hamburg	3 January 2006	civil	wider circle

Jörg Haas	Senior Officer Ecology and Sustainable Development	Heinrich-Böll-Foundation	personal, Berlin	11 January 2006	civil	outer circle
Dick Jones	Senior Adviser	GVEP Technical Secretariat, and UK Department For International Development (DFID)	telephone	23 February 2006	Technical Secretariat of GVEP	inner circle
Christine Wörlen	Program Manager	Global Environment Facility (GEF)	telephone	27 February 2006	Intergovernmental Organization	wider circle
Dr. Janice Hamrin	Executive Director	Center for Resource Solutions	telephone	15 March 2006	academic	wider circle
Kathrin Gutmann	Policy Coordinator	World Wide Fund For Nature (WWF) Global Climate Change Programme	personal, Berlin	21 March 2006	civil	outer circle
Dr. Antonio Pflüger	Head of Division	International Energy Agency (IEA) - Energy Technology Collaboration Division	telephone	31 March 2006	Intergovernmental Organization	wider circle

Dr. Lutz von Meyerinck	Director Health, Safety, Security, and Environment Policy	German BP AG	telephone	5 April 2006, continued on 20 April 2006	private	outer circle
Clemens Triebel	Founder and Project Manager	SOLON AG	personal, Berlin	6 April 2006	private	outer circle
Janet Sawin	Program Director	World Watch Institute - Energy and Climate Change Program	telephone	12 April 2006	civil	outer circle
Marc Beckmann	Project Coordinator	UNDP – Growing Sustainable Business	telephone	20 April 2006	Intergovernmental Organization	outer circle
Jamal Saghir	Director	World Bank - Water and Energy	telephone	5 July 2006	Intergovernmental Organization	wider circle
Alex Nevill		Royal Dutch Shell – Sustainable Development team	telephone	10 July 2006	private	outer circle
Ray Holland Lucius Mayer-Tasch	Manager Management Unit	EUEI – Partnership Dialogue Facility (EUEI-PDF) EUEI – Partnership Dialogue Facility (EUEI-PDF)	personal, Berlin	8 March 2007	EUEI-PDF Management Unit (at GTZ) EUEI-PDF Management Unit (at GTZ)	inner circle inner circle

One expert replied by email to a specific selection from my questionnaire:

Laurent Dittrick		EU Commission DG Development EU Energy Initiative	email	2 December 2004	public, Technical Secretariat of EUEI	inner circle

Additionally, two experts replied to my questionnaire by providing me with internal documents from the World Bank:

Dominique Lallement	Adviser Energy and Water Department	World Bank – Energy Sector Management Assistance Programme (ESMAP)	email	15 June 2005	Intergovernmental Organization, resource person of the GVEP Technical Secretariat	inner circle
Judy Siegel	President Managing Director	Energy and Security Group Winrock International Clean Energy Group	email	15 June 2005	civil, resource person of the GVEP Technical Secretariat	inner circle

Research of the Type II partnerships included two international conferences, at which some of the networks hosted side events and steering committee meetings, in which I participated:

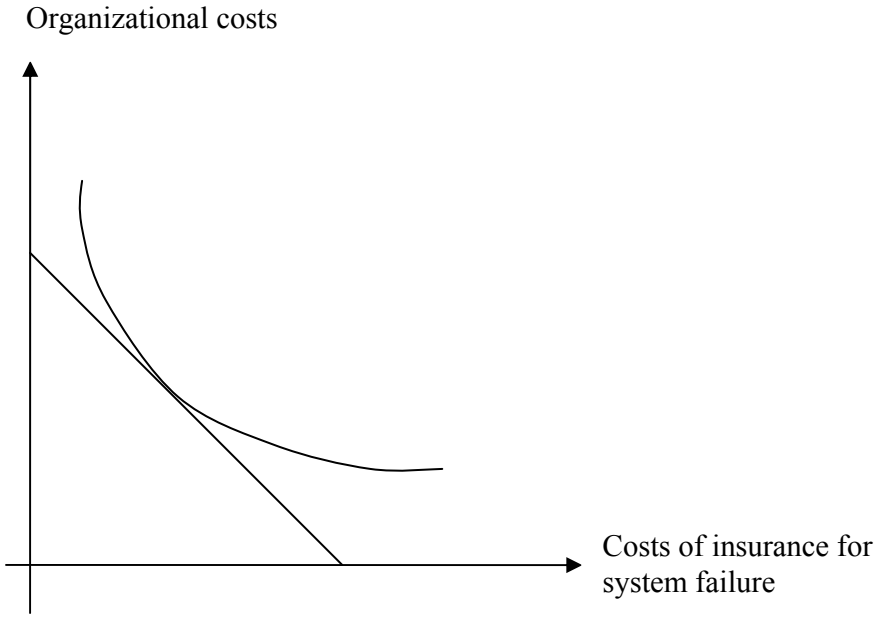
conference	time	place	networks present	nature of network's event
renewables 2004 – International Conference on Renewable Energies, Bonn	June, 1st–4th, 2004	Bonn, Germany	GVEP	side event
			REEEP	side event
			EUEI	side event
			GNESD	side event
			(REN21)	(foundation of REN21 in Conference Political Declaration)
Commission on Sustainable Development 14	May, 1st-12th, 2006	New York, USA	GVEP	side event
			REEEP	side event and Assembly of Partners
			EUEI	side event
			GNESD	side event
			REN21	side event and Steering Committee Meeting
			GVEP, REEEP, EUEI, GNESD	joint side event

Annex III: Redundancy and the Cost-Effectiveness Ratio

In the point of maximized efficiency the individual marginal costs (MC_{ind}) of redundancy of action equal the utility of additional action ($u(a_{add})$). In a regime situation, which force actors to insure their activities against the failure of their activity to produce sustainable outcomes, for instance against related environmental risks implied in their activities, the additional action will equal the saved costs of insurance (C_{ins}). These insurance costs depend on the calculated probability of failure of the system to be insured. The additional action for sustainable outcomes is supposed to decrease the probability of failure.

(1) $MC_{ind} = u(a_{add}) = C_{ins}$

Basically, actors obey a budget constraint as the following graph shows:



Along the curved graph, representing an isoquant of an effectiveness level, redundancy is increasing from the South-East to the North-West.

Redundancy	Probability of system failure	Organizational costs
low	high	low
high	low	high

The straight line represents the budget constraint of an organization or a network as discussed. The budget must be distributed between costs for organizing effective action, which is increasingly difficult and costly with growing redundancy. On the other hand the probability of system failure and costs for repair or insurance decrease with growing redundancy. Hence, there is a trade-off between costs for insurance and costs for organization along the curve of increasing redundancy with the point of maximized effectiveness at a given budget where the slopes of the budget constraint and the isoquant of effectiveness are equal.

The slope of the budget constraint reflects the ratio of today's costs to tomorrow's costs, i.e. the costs of today to organize action and the costs of tomorrow to repair the damage of lack of sustainability due to unsatisfied needs or needs satisfied in a non-sustainable manner. If these costs of repair are insured, the costs of tomorrow are transferred into insurance costs which are calculated with regards to the probability of system failure. Landau's argument is that the more redundant action is the lower is the probability of system failure. (Landau 1969)

Thus, after all the question of optimized cost-effectiveness ratio is again one of paying today or tomorrow and thereby of who is going to pay, which is, in fact, the question of sustainable development in general. And it is again a tragedy of the commons, for, today's costs of organizing effective action are individual costs of employed man power, while tomorrow's costs are social costs because non-sustainable action implies costs of social and environmental damages, governmental costs to control the action of various actors, and costs to be shared by all including the actors who did not pollute or exploit the commons.
Global policy networks are now supposed to communicate these negative external effects and thereby help to consider them in individual strategic action. If partners achieve to do that with the instrument of a common strategy, they will achieve to optimize their redundant action and maximize efficiency of strategic action.

Annex IV: Interrelatedness of Network Functions

Complex connections of networks do not allow simple, one-to-one problem-solution relations. Indeed, problem constellations always comprise and combine several failures of systems, in which networks are supposed to intervene, and several network functions to address these failures. This phenomenon is referred to as interrelatedness[67]. The purpose of the simple, one-to-one relations of failures and functions is to form a strategy, what has to be considered at every policy level to address these failures. The interrelatedness of failures as well as functions will rather help to address all failures or – more general – problems with intervening action, fostering synergies and self-organizing processes to solve these problems, and to contribute to solutions, without having to consider situations in their total complexity. The simple, one-to-one failure-function relation is a method to reduce complexity and enable actors to handle highly complex systems by strategically complementing self-organizing network processes.

The following matrix summarizes the interrelated connections among the different network functions.[68]

[67] Interrelatedness refers to one function interfering with the execution of another function. Interrelatedness must be differentiated from interdependence and interconnectedness according to the definition by Robert Keohane and Joseph Nye as reciprocal transactions having – in the case of the former – costly effects and in the case of the latter reciprocal transactions without such costly effects. (Keohane, Nye 2001: 8)

[68] For technical reasons the six network functions are abbreviated as follows:

IN = Integration;
IM = Interest Mediation;
KS = Knowledge Sharing;
PS = Partner Selection;
CO = Coordination;
IP = Implementation.

Table 7: Interrelatedness of Network Functions

	IN	IM	KS	PS	CO	IP
IN		By integrating new actors in the market, asymmetries in market power are decreased and, thereby, interests of former outsiders mediated.	Market barriers and monopolists can have an interest to control knowledge in order to control "their" markets. The integration of new partners increases the knowledge base of collaborative networks and can make markets thus more transparent and efficient.	The integration of new and more relevant actors is often the prerequisite for an effective PS.	Barriers and exclusion are the reasons why effects on outsiders are not considered. The integration of those who cause and those who bear external effects into networks helps to communicate the external effects and to internalize them into the considerations of actors when taking action.	Overcoming market barriers makes the consideration of long-term effects reasonable. For, if former outsiders like consumers, who were not connected to the grid before, become insiders and represent their interests, their integration sets incentives to implement action paying only in the long-term.
IM	Market insiders have interests to maintain barriers and use their market power. By creating win-win situations through integrative bargaining new partners from inside as well as outside the market have incentives to cooperate.		IM is often simply a form of KS. Mediating interests and resulting trust ease KS.	To mediate among partners with conflicting interests and asymmetrical power can feed into to supporting cooperation among partners with different capacities.	IM and CO can be identical if IM helps to consider interests of other actors.	To mediate conflicting interests today avoids long-term costs if positive-sum games can be created. This contributes immediately to opportunities to implement collaborative projects and action.

	IN	IM	KS	PS	CO	IP
KS	Lack of knowledge itself is often a market barrier. KS thus contributes to the overcoming of these barriers.	A lack of knowledge can result in asymmetrical market power and conflicting interests. KS helps to overcome both.		KS is always part of capacity development.	External effects often result from a lack of knowledge. Target group oriented knowledge sharing supports communication to consider other parties' interests. Thereby, KS improves coordination, but avoids duplication while maximizing synergies through redundancy in targeted action.	KS, especially the access to local knowledge, must always be element of IP of projects for sustainable development.
PS	Lack of capacities and skilled workers is a market barrier for local communities and raises transaction costs prohibitively high. To select partners in order to access capacities and collaborate helps to integrate excluded communities as new customers and as a new market potential, which in turn might set incentives for market insiders to join a partnership or network.	If there is a lack of capacities to act because of a lack of trusted relations, asymmetrical relations and conflicting interests can hardly be mediated. Personal trusted relations, important to select partners, will later on help to mediate interest conflicts. The creation of positive-sum games might depend on the right selection of partners.	A lack of capacities always goes together with a lack of knowledge. KS is therefore always part of capacity development, and capacity development increases the capacity to share and access knowledge.		The selection of appropriate partners can be a prerequisite for and support the coordination of activities in order to internalize external effects. Other actors might not be relevant for CO.	Only if selected partners and their individual activities have potentials for synergies, cooperation in IP is possible and effective. Factors that promote the PS function like trust, neutrality, personal relations, and an Actors' Catalogue can all help in the implementation process as well, when selected partners implement what they selected each other for.

	IN	IM	KS	PS	CO	IP
CO	Coordination through communicative action serves not only to make actors internalize their external costs but as well to overcome market barriers by persuading other actors.	As external effects are in the first place a zero-sum game, their internalization is simply a question of conflicting interests and asymmetrical (market) power, for instance, to influence policy-makers. Coordination of external effects through communicative action is always the first step to mediate conflicting interests and find a positive-sum game solution.	External effects are often merely not considered because they are not properly understood by those who cause them. Therefore, communicative action must contribute to KS in order to make external effects understandable and internalize them into strategic considerations.	External effects set no incentives to develop certain capacities to overcome negative external effects. Coordination through communicative action can support to identify gaps of capacities and appropriate partners to bridge these gaps.		External effects equal long-term effects if they are understood intertemporally. Coordination through communicative action can support to identify potential partners and share costs with them to implement action which pays only in the long-term.
IP	Market barriers will block the long-term development of markets and have long-term detrimental effects in the future. To implement action which considers long-term effects can overcome market barriers though market prices set no incentives for such action.	Long-term effects, which affect future interest groups not yet present in the market can be understood as asymmetrical power distribution with conflicting interests. By implementing action in favour of these future interests, though the investment pays only in the long-term, long-term costs and related future interests are, in fact, considered.	Long-term effects are often unknown or uncertain due to a lack of knowledge. Thus IP overcomes the market failure of imperfect information although the lack of information distorts incentives to invest.	Capacity development is an investment which pays only in a far future. Although it might be necessary and beneficial there will occur underinvestment. IP combined with PS may overcome the lack of capacities in the short-term, and should be made sustainable in the long-term by investing in capacity development through PS of local partners.	Partnering for implementation with actors with matching identities, interests and capacities for action supports a common base for communication to coordinate activities including their external effects.	

Annex V: How To Harness Network Governance for Sustainable Development

A.V.1 Scheme for a Common Decentralized Strategy for Network Governance

Table 9 summarizes the strategic action to be considered by individual independent actors in global policy networks to harness mechanisms of network governance to execute certain network functions and overcome market failures for the benefit of sustainable development.

Table 8: Market Failures and According Functions to be Executed by Networks

Market Failures	Functions of networks	Strategic action to be considered by network partners in their individual action
Social sustainability		
Barriers to enter the market	Integration	• Integrate local partners, boundary-spanners, and 'innovators' • Balance openness and clear-cut boundaries
Lack of sustainability/ misallocation of resources	Interest mediation	• Create win-win situations by connecting partners with complementary resources and linking intersecting issues • Build trust, disseminate knowledge, establish leadership • Define clear-cut roles
Environmental sustainability		
Imperfect information	Knowledge sharing	• Connect actors to knowledge holders • Work as gatekeeper for information flows in the network • Create a dynamic, continuously up-dated knowledge map • Increase transparency and openness
Lack of capacities/ prohibitive costs of transactions	Partner selection	• Connect knowledge map to an Actors' Catalogue • Connect partners with complementary capacities and resources • Use personal relations • Target high-ranking individuals • Use credibility and independence to identify opportunities for cooperation • Support capacity building
Economic sustainability		
External Effects	Coordination	• Create opportunities for free communication • Inform policy makers through bottom-up processes • Match messages with audiences
Long term effects	Implementation	• Connect partners to share risks and costs • Match partners with complementary orientations • Start action on the ground • Use reputation of high-ranking network partners • Produce value-added

The idea of the scheme of strategic action above is that all network partners can individually, independently, and autonomously act on their behalf in their own interest. If they consider the

sketched strategy to address certain market failures, their action can contribute to sustainable development, as the individual actor's strategic management matches that of the network partners. Thereby, the network as such can fulfil the four criteria for self-organizing dynamics, as outlined in the last section. The variety of actors and interactions represents a complex system, which is nevertheless able to organize itself towards certain goals in a self-referring manner, and to interact with and influence its environment autonomously. Actions might be redundant, but thereby they can feed into one another and provoke synergies, and thus increase effectiveness and efficiency of global policies.

A.V.2 Creating Instruments for Harnessing Semi-public Network Resources

A.V.2.1 Knowledge Map: How to organize relevant knowledge for sustainable development effectively

A knowledge map for sustainable development is supposed to identify *links among interconnected factors* of societal development and the qualitative and causal character of these links. Thereby, the complexity of available knowledge shall be reduced. A knowledge map can never have a final form due to the preliminary and never absolutely certain character of knowledge itself. Therefore, a knowledge map needs to be *dynamic* at all times; as experts may disagree about effective links of factors or their qualitative character, a knowledge map must always represent plural views. However, the use and the corroboration of some interconnections and the hypotheses about their quality must be made discernible simply by the number of how often a certain link of two interconnected factors in an online knowledge map was tapped in by users, or by adding information on experiences with knowledgeable activities on a certain issue. Thereby, a ranking of knowledge and experts on asserted and corroborated links of interconnected factors of sustainable development should become discernible, so that potential users can identify more and less relevant knowledge and relations for their individual activities.

The puzzle is how to organize that knowledge map. As it is supposed to provide knowledge on issues or relations to actors relevant for sustainable development, the knowledge map must be oriented to the *failures of markets and states* to produce sustainable outcomes and the possible impacts of activities on the *vulnerability* of development in societal compartments. Possible are six kinds of market failures, which are related to three kinds of state failures (Jänicke 1991):

- Socially distorting effects (injuring social sustainability, "political state failure"),
- Socially excluding effects (injuring social sustainability, "political state failure"),
- Lack of capacities (injuring environmental sustainability, "economic state failure"),
- Lack of information (injuring environmental sustainability, "economic state failure"),
- External effects of activities (injuring economic sustainability, "functional state failure"),
- Long-term effects of activities (injuring economic sustainability, "functional state failure").

Those are sorts of unsustainable effects of development activities, which can affect various needs or issues and various compartments or subsystems of society. These failures can affect the vulnerability of the following four *societal compartments* of development:

- Social organization,
- Economy (and all material subsystems of society like the environment),
- Politics,
- Culturally formed world view, or all subsystems of society which constitute the life world of individuals like arts, science, etc.

In order to create a knowledge map, identifying links among interconnected factors of societal development, experts need to analyze the effects of changes and development activities on the vulnerabilities of the named four societal compartments. This analysis should be standardized to fit in the specific system of the knowledge map. The knowledge accessible through a knowledge map should identify the links among interconnected factors of development, the quality of these links, and what has to be considered in order to organize development in a sustainable manner.

Development experts should contribute with regards to their individual area of expertise to the questions on: the satisfaction of which need (*issue*) can have which unsustainable effects in which societal compartment? Additionally, specialists in *technologies* could contribute to this analysis, how to implement development activities in a sustainable way when addressing certain development issues.

Table 9: Issue of activity specific matrix for analysis of potential effects on sustainability

ISSUE and TECHNOLOGY	Social organization	Economy	Politics	Culturally formed world view
External effects				
Long-term effects				
Socially distorting effects				
Socially excluding effects				
Lack of capacities				
Lack of information				

Local experts could contribute to the questions in which social as well as physical environment (*region*) which activities can have which unsustainable effects in which societal compartment.

Table 10: Region-specific matrix for analysis of potential effects on sustainability.

REGION	Social organization	Economy	Politics	Culturally formed world view
External effects				
Long-term effects				
Socially distorting effects				
Socially excluding effects				
Lack of capacities				
Lack of information				

Experts on governance can finally contribute to questions of which dynamics and interventions have which unsustainable effects in which societal compartments and how to organize (*technique*) sustainable development.

Table 11: Technique of governance specific matrix for analysis of potential effects on sustainability.

TECHNIQUE of governance	Social organization	Economy	Politics	Culturally formed world view
External effects				
Long-term effects				
Socially distorting effects				
Socially excluding effects				
Lack of capacities				
Lack of information				

In order to start the creation of such a knowledge map, a global policy network must select some experts and consult them about their individual field of expertise to identify certain knowledge linkages and – starting from those first few experts – identify more experts to consult. Only after

the launch of an initial version of a knowledge map, this one might develop in an over time increasingly self-organizing manner.
Experts must answer the question 'What has to be considered when taking strategic action for sustainable development?' and if possible 'How can those potentially arising problems be dealt with?' for all boxes. Though, not all boxes of the schemes above can be filled necessarily. The provided knowledge should comprise reflections on inter-issue links, interregional links, and interconnections of governance techniques, like the mutual crowding out of respective governance mechanisms, with regards to their effects on sustainability. Of course, relevant knowledge can at times comprise recommendations on who else might be most knowledgeable in one field of expertise.
One possibility to introduce a self-organizing system of information quality control could be to make the frequency of tapped information visible. Links used more often will grow stronger and signal the user the relevance, reliability and quality of the information source. If the source tapped at the first access to the knowledge map is not relevant, reliable or of good quality, users will return and check links to other sources. Over time the worse links to information will be deserted just like bad suppliers in markets. This mechanism of market-like selection organizes the knowledge map as a self-organizing process in the long-term.
The accessible knowledge must always be linked to the respective knowledge holders, so that the knowledge map is, in fact, a mirror of an actors' catalogue of development experts, technology specialists, local experts, and governance experts. These experts again may provide access to a wider pool of relevant actors and resources and build the social capital of the network.

A.V.2.2 Actors' Catalogue: How to generate a catalogue of possibly relevant partners for sustainable development

An Actors' Catalogue is supposed to pro-actively manage the social capital, i.e. the social relations in a network, and help identify potential partners for action on sustainable development to address certain problem constellations and failures in the development process in collaborative partnership action. Hence, the Actors' Catalogue works as a market place of business opportunities, thereby, incentivizing knowledge holders to provide their knowledge and make their expertise accessible. Thus, actors can supply their expertise, services and products for the solution of certain problems. If there are competitors, addressing the same problem, the user can all access them as the Actors' Catalogue links them all to the respective problem to solve. Thus, Knowledge Map and the linked Actors' Catalogue enhance transparency in the market and, thereby, contribute to the efficiency and effectiveness for sustainable outcomes of markets.
Knowledge management in global policy networks identifies the needed resources for taking action and, thereby, to which actors access is necessary. The Actors' Catalogue can be an *institutionalized instrument to identify and access certain actors*, foster partnering and thereby provide needed resources for action like knowledge, human capacities, social relations – respectively the resources inherent in these relations, financial resources, and decision-making power.
An actors' Catalogue of a global policy network bases on (i) a common strategy, identifying which failures must be addressed and what has to be considered when taking strategic action to overcome these failures, and (ii) a knowledge map as an institutionalized instrument for the management of knowledge. For, knowledge and social capital are basically the managerial resources for network governance.
The common but decentralized, i.e. not like in ordinary organizations from top-down imposed, strategy shall help independent, autonomous actors to contribute to collective action on sustainable development while still pursuing their individual interests. If that strategy works for the individual strategic benefit, actors will list themselves in the actors' catalogue and update the information on their activities voluntarily and automatically.

To initiate an Actors' Catalogue for the pro-active provision of a list of potential partners for strategic action on sustainable development, experts like those forming a knowledge network and a knowledge map should be consulted which actors might have which relevant resources to bring into partnership action. The knowledge map supports the knowledge management and thereby the identification of needed action and resources and links this information to people: to the knowledge holders, including actors who can provide technology, local knowledge, or knowledge on governance issues. These initial contacts and the knowledge contained in the knowledge map might help to identify further actors who must be accessed for proposed ways to deal with certain failures. Thus, the Actors' Catalogue will grow and change and add new contacts, which have proven to be effective in earlier partnerships. Just like a knowledge map or a knowledge network itself, an Actors' Catalogue will always be dynamic and evolve over time.
Due to that way of generating an actors' catalogue, the information provided should help to identify which actor could contribute which resources – knowledge, human capacities, social relations, financial resources, or decision-making power – to partnership action and what kind of mission and interests the actor subscribes to.

A.V.2.3 REEGLE: example for an instrument to harness knowledge and contacts
The REEGLE tool of REEEP and REN21 basically aims to provide these instruments and, indeed, links an information search engine to an Actors' Catalogue. REEGLE's Intelligent Search is based on a knowledge map and shall help to access best available information from real experts. REEGLE's Actors' Catalogue provides information on and links to institutions, organizations, initiatives and partnerships from the sector.
The information search engine organizes knowledge into three categories, comparable to the suggested categories in the schemes above how to organize a knowledge map. However, REEGLE's search engine and the Knowledge Map behind it are still in their initial stages. Only a few initial experts have been consulted, further experts will follow. These experts are selected in a way that different sectors are represented. However, the interconnections of different knowledge areas have not been systematized from the beginning.
The Actors' Catalogue contains the mission of the respective actors and organizes them into three categories: the sector from which the actor comes, the issues the actor is involved in, and the region where the actor works.

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