Climate Change Governance and Accountability: Dilemmas of Performance Measurement in Complex Governance Networks

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Workshop 4: Transparency and Accountability in Governance: Evolving Concepts of Accountability for Governmental and non-Governmental Actors

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Abstract

Drawing on some of the contemporary theories of network governance, accountability and performance management, we develop an integrated actor-, process- and outcome-based accountability framework to analyze accountability in three types of climate change governance networks: (1) public-public); (2) private-private and (3) public-private. Our analysis reveals four performance measurement dilemmas that require resolution through political processes for institutionalizing accountability in climate change governance networks:

(1) Dilemma of Strategy: Which governance networks, and the actors operating in them, are proposing which performance measures, such as GHG/year, GHG/BTUs and GHG/capita and why?

(2) Dilemma of Uncertain Science: How different governance networks translate scientific uncertainty into policy action/inaction?

(3) Dilemma of Integrating Multiple Scales: Whether different governance networks incorporate the GHG emission reduction credits by global, regional and sub-national actors into a consistent scale of performance measurements?

(4) Dilemma of Verification: How different governance networks verify different performance benchmarks, e.g. GHG emission reduction credits?

1. Introduction

Sustaining global atmosphere is a complex international environmental policy problem and has been described as a "tragedy of commons" (Hardin 1968; Harrison and Sundstrom, 2007). Under current institutional arrangements, each nation-state that is polluting the atmosphere with Greenhouse Gas Emissions (GHGs) has the over-riding incentive to free-ride and not pay for GHG clean-up, which leads to a collective failure at the global scale in sustaining atmosphere. Although United Nations Framework Convention on Climate Change (UNFCCC) has initiated important international negotiation process to require GHG polluting countries to reduce their GHG emissions, this process has so far failed in reducing GHG emissions (Cass 2007). Many international relations and global governance theorists have modeled UNFCC negotiation process as a "prisoner's dilemma" game that underlies the "tragedy of commons" (Luterbacher and Sprinz 2001). According to this prisoner dilemma model, it is in the strategic interest of each nation-state involved in the UNFCCC process to provide plentiful rhetoric about reducing their GHG emissions, but in practice they are not taking the costlier actions to reduce GHG emissions.

The complexity of global climate change governance has led to formulation of "novel" forms of public-public, private-private and public-private partnerships at multiple geographical scales (Backstrand 2008). A growing number of studies characterize these types of partnerships as "governance networks" (Betsill and Bulkeley 2004; Bogason and Musso 2006; Coen and Thatcher 2008; Haas 2004; Ingram et al. 2005; Jones et al. 1997; Kickert et al. 1997; Klijn 1996; Klijn and Skelcher 2007; Lowndes and Skelcher 1998; Meyer and Baltes 2004; O'Toole 1997a;

Park 1996; Provan and Kenis 2007; Skelcher 2005; Sorensen 2002; Sorensen and Torfing 2005; Torfing 2005; White 2001). While multi-disciplinary enthusiasm about the characterization and analysis of governance networks has grown considerably in recent literature, much more theoretical and empirical work remains to be done to understand how accountability is institutionalized in governance networks (Agranoff and McGuire 2001; Benner et al. 2004; Bradach and Lesser 1996; Fredrickson 1997; Harlow and Rawlings 2007; Kettl 1996; Koliba and Mills, under review ; May 2007; Milward 1996; Milward and Provan 1998; O'Toole 1997b; Papadopoulos 2003; 2007; Provan and Milward 1995; Slaughter 2004; Scholte 2004; Wondolleck and Yaffee 2000). The evolving dynamics of climate change governance networks present an interesting empirical test-bed to investigate how different forms of governance networks institute accountability in their governance mechanisms.

The UNFCCC driven international process to address climate change mitigation and adaptation issues at the global scale with voluntary participation of representative country governments represents an example of a public-public governance network. Under the UNFCCC process, the Kyoto treaty was a first significant step in setting up a global governance regime for reducing anthropogenic GHGs. Notwithstanding its significance as a milestone in global environmental policy, the Kyoto treaty has failed on many accounts in setting up an effective and accountable governance mechanism for reducing GHGs. Many large emitters of GHGs did not even bother to sign the treaty, as described in terms of the so-called US-China suicide pact (Romm 2007). Some rich industrialized countries signed the treaty and agreed to GHG emission reduction targets but do not appear on track to meet their 2012 targets, such as Austria, Canada, Greece, Ireland, Italy, Japan, New Zealand, Portugal, Spain and Sweden, as shown in

Figure 1 derived from UNFCCC database. The U.S. did not ratify the treaty, but had it ratified the treaty, it would have also been on track not to meet the targeted GHG reductions. Some emitters that signed the treaty and met their targets were able to do so because their economy went in recession, e.g. many eastern European states.

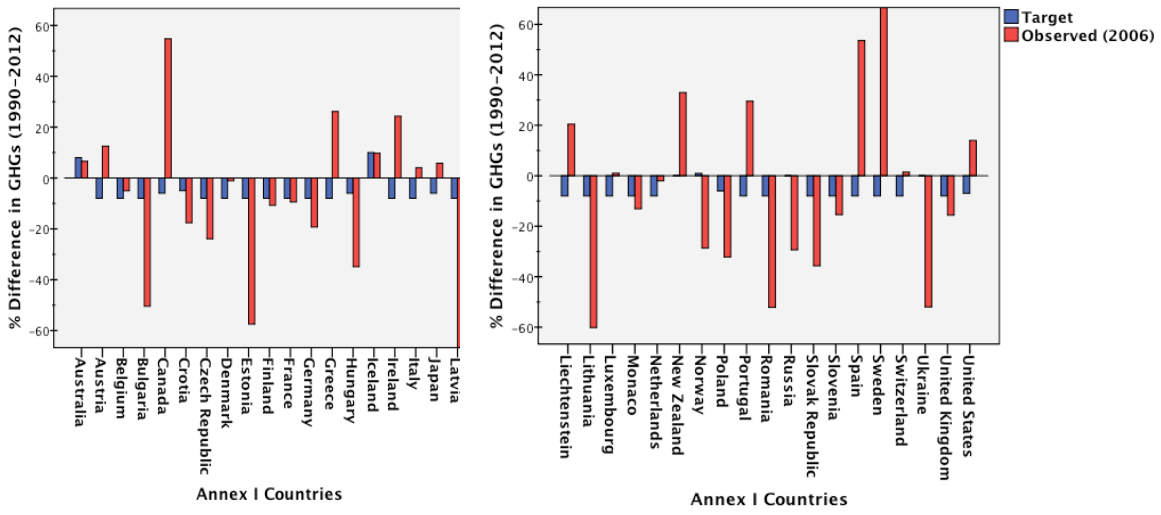

Figure 1: GHG reduction targets for Annex I countries under Kyoto protocol and observed GHG patterns 6 years prior to the target year (2012). Data Source: UNFCCC

Parallel to UNFCC process, there are numerous other public-public, public-private and private-private governance networks that are simultaneously trying to address climate change mitigation and adaptation issues. Some examples of public-public climate change governance networks include the Asia-Pacific Climate Change Partnership (APP), International Partnership for the Hydrogen Economy (IPHE), Carbon Sequestration Leadership Forum (CSLF), Cities for Climate Protection (CCP) and Clinton Climate Initiative (CCI). Similarly, some private-private governance networks addressing climate change include International Climate Change

Partnership (ICCP), World Business Council for Sustainable Development Climate Partnerships, Combat Climate Change (3C) and Greenhouse Gas Protocol (WRI and WBCSD). Finally, some examples of public-private climate change governance networks include Renewable Energy Policy Network for 21st Century (REN21), Renewable Energy and Energy Efficiency Partnership (REEP), WSSD Climate and Energy Partnerships (~91 reported), Joint Implementation projects (JI) under Kyoto Protocol (~170 projects), Clean Development Mechanism (CDM) projects under Kyoto Protocol (~1620 projects), World Bank Prototype Carbon Fund (PCF) projects and US EPA's Methane to Markets (M2M) projects. In these examples, regulations, grants and contracts give structure to networks organized through inter-organizational projects or programs.

In recent climate change governance literature, efforts have been made to develop an accountability framework for evaluating these public-public, public-private and private-private climate change governance networks. Backstrand (2008) develops a process-based notion of accountability framework, which include three accountability criteria: (1) Transparency; (2) Monitoring Mechanisms; and (3) Representation of Stakeholders. While process-based criteria are important components for evaluating accountability of governance networks, it has been suggested in the broader literature on pluralistic concepts of accountability in governance networks that actors (both individuals and organizations) and outcomes/performance measures should also be considered as important criteria, in addition to process based criteria, for comparing the institutionalization of accountability in governance networks (Benner et al. 2004).

With the explicit aim to extend Backstrand's (2008) process-based model of accountability for climate change governance networks by incorporating the additional criteria of actor-accountability and outcome/performance measure-based accountability, we analyze accountability in a variety of climate change governance networks and explicate various dilemmas pertaining to setting up, evaluating and verifying outcomes/performance measures in the "tragedy of commons" situations.

In the sections to follow, we review relevant literature on the evolution of the concept of accountability for actors, processes and outcomes in governance networks and develop network-based theoretical framework that can be used to analyze the accountability of alternate governance networks. We then focus on four performance measurement dilemmas, revealed by our analysis of climate change governance, that require resolution through political processes for institutionalizing accountability in climate change governance networks. We characterize these dilemmas as (1) dilemma of strategy, (2) dilemma of uncertain science, (3) dilemma of integrating multiple scales, and (4) dilemma of verification. Finally, section 4 discusses the applicability of our proposed actor-process-outcome accountability framework to the evolving negotiations on climate change governance regimes in post-Kyoto (post-2012) time frame.

2. Evolution of the concept of accountability from Inter-Organizational Networks to Complex Governance Networks

"Accountability is traditionally defined as the obligation to give an account of one's actions to someone else, often balanced by a responsibility of that other to seek an account"

(Scott, 2006, p. 175). In essence, accountability structures arise when a certain measure of interdependency exists between those rendering account and those to whom accounts should be rendered. In this paper, we discuss governance as a matter of accountability, with feedback taking place as processes of rendering accounts to particular constituencies, relying on certain explicit standards and tacit norms to do so, as shown in Figure 2. Therefore, we assert that network accountability is a system-level construct; one that is shaped by the accountability structures of the individual parts of the network, and the emergence of "hybridized accountability regimes" of the network as a whole (Mashaw, 2006).

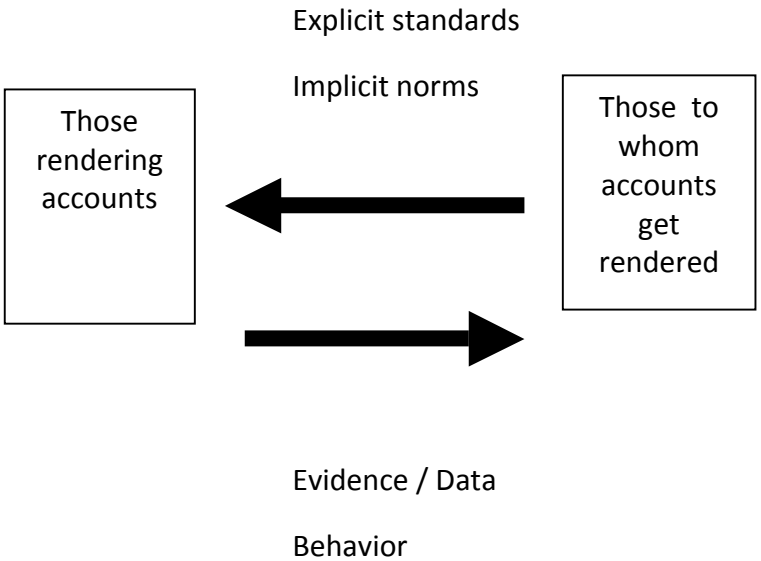

Figure 2: The feedback role of standards and norms in the accountability of actors. Source: Koliba and Meek (In Preparation)

Page (2004), Posner (2002), and Behn (2001) have all noted the accountability challenges associated with governance networks, recognizing their complexity and the potential competing aims inherent to the organizations operating within them. Mashaw calls for the comparison of accountability regimes operating within and across network structures in

order to, “evaluate their differential capacities, and perhaps articulate hybrid regimes that approximate optimal institutional designs” (Mashaw, 2006, p. 118). In cases where a governance network is comprised of non-profit and for profit organizations working with governments, the accountability regimes historically ascribed to governments are not sufficient. “Conventional accountability narratives, emphasizing ex post and hierarchical forms of accountability, with only very limited reach beyond the state actors, are unable to support the burden of providing a narrative of accountability that can legitimate governance structures involving diffuse actors and methods” (Scott, 2006, p. 190). Here we propose an alternative actor-, process- and outcome-based accountability framework for complex governance networks.

2.1. Actor Accountability Frames in Governance Networks

Many have noted how the shift from a mono-centric system of *government* to a polycentric system of *governance* raises some serious actor accountability challenges (Behn, 2001; Posner, 2002; Page, 2004; O’Toole and Meier, 2004; Pierre and Peter, 2005; Goldsmith and Eggers, 2004; Scott, 2006; Mashaw, 2006; Mathur and Skelcher, 2007). Because it can no longer be assumed that the nation-state possesses the same kind of authority as traditionally ascribed to public organizations, governing the actors in inter-organizational networks gives rise to new accountability challenges. These challenges arise when nation-states are displaced as central actors; market forces are considered; and cooperation and collaboration is recognized as an integral administrative activity. We introduce a tripartite accountability framework for discerning how actor accountability is structured within governance networks that include

democratic, market and administrative accountability frames (Figure 3), through which eight types of actors emerge that can be held accountable by different constituencies (Table 1).

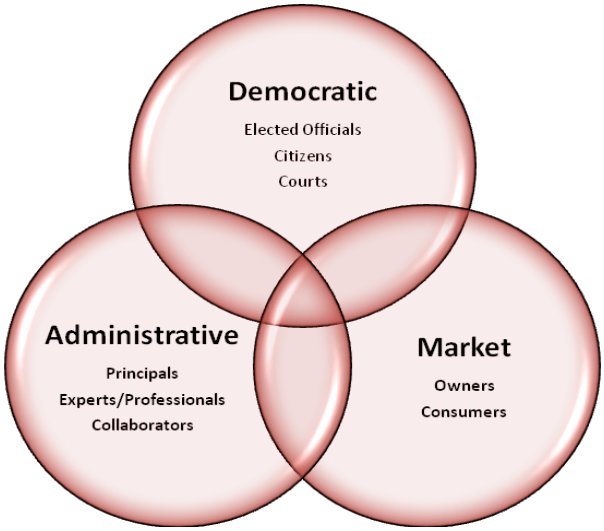

Figure 3: Democratic, market and administrative frames for accountability of actors in public, private and non-profit sectors

Discerning the accountability structures amidst the complexity that emerges in cross-sector, cross-jurisdictional settings requires us to consider the dynamics at work when the accountability structures of one network actor comingle, compete or complement the accountability structures of other network actors. As a result of unpacking these dynamics we may be able to ascertain the extent to which "hybrid accountability regimes" (Mashaw, 2006, 118) emerge within governance networks.

We suggest that governance networks will likely draw upon a combination of some or all of the accountability types identified above, ultimately creating hybrid accountability regimes

(Scott, 2006, p. 185). These regimes are structured by the sectoral characteristics of network actors, with state and non-profit actors bringing with them the democratic anchorage to representatives and citizens, and the private sector actors bringing a market frame of owners and consumers. These regimes are also structured as a complex array of vertically and horizontally aligned relationships, some of which persist through the operational characteristics of bureaucracies, markets, and collaborative arrangements.

Table 1. Accountability Frames for Actors in Complex Governance Networks. Source, Koliba and Mills, under review

ACCOUNTABILITY FRAME	Actors	TO WHOM IS ACCOUNT RENDERED?	RELATIONAL POWER	EXPLICIT STANDARDS	IMPLICIT NORMS
DEMOCRATIC?	**Elected Representative**	Elected officials	Vertical over public sector	Laws, statutes, regulations	Representation of collective interests; Policy goals
	Citizen	Citizens	Horizontal accesses to public sector organizations/ elected officials	Maximum feasible participation; Sunshine laws; Deliberative forums	Deliberation; Consensus; Majority rule
	Legal	Courts	Vertical legal authority over society	Laws; Statutes; Contracts	Precedence; Reasonableness; Due process; Substantive rights
MARKET	**Shareholder/ Owner**	Shareholders/ Owners	Vertical over management/ labor	Profit	Efficiency
	Consumer	Consumers	Horizontal with owners	Consumer law	Affordability; Quality; Satisfaction
ADMINISTRATIVE	**Bureaucratic**	Principals; Supervisors; Bosses	Vertical over Agents; Subordinates;	Performance measures; Administrative procedures;	Deference to positional authority; unity of command;

			Contractees	Organizational charts	Span of Control
	Collaborative	Collaborators; Peers; Partners	Horizontal with peers	Written agreements; Decision-making Procedures; Negotiation regimes	Trust; Reciprocity; Durability of relationships
	Professional	Experts; Professionals	Vertical over lay persons; Horizontal within profession	Codes of ethics; Licensure; Performance standards	Professional norms; Expertise; Competence

Accountability structures require that actors in any governance network be responsive and responsible to particular constituencies. Table 1 shows eight different types of actors *to whom* accountability must be rendered. These actors, be they elected representatives, public administrators, citizens, courts, supervisors, professionals, owners, consumers or collaborators, are placed in the position of judging the performance of the agents that are being held accountable. Those *to whom* account is rendered will inevitably prioritize different combinations of policy goals, performance measures, and other desired procedures and outcomes in a governance network, placing value on and rendering judgment of performance differently (Gruber, 1987; Radin, 2006). It is also imperative that those to whom account is rendered are capable or interested in fulfilling their roles.

Table 2 below illustrates a basic overview of the differences among actor accountability between the public, private and non-profit sectors. We define interests to mean those points of view and perspectives that either in theory or practice, govern organizations' capacities to act and exchange resources. We define representative interests as the formal or informal agents "to whom" accounts must be rendered. As contributors to organizations' accountability

structures, interests influence how organizations behave, make decisions, and distribute resources. We describe accountability structures in terms of the governance characteristics of governments, corporations, and non-profit organizations.

Table 2: Characteristics by Sector. Source: Koliba and Meek (In Preparation)

Characteristics Unique to the Sector	Private Sector	Public Sector	Non-profit Sector
Organizational Actors	For-Profit firms, businesses, corporations	National, state, regional, local level governments (including legislative, judicial and executive branches)	Nonprofit organizations; non-governmental organizations (NGOs); informal community groups
To Whom Accountabilities are Rendered	Board of directors; shareholders/owners; consumer	Elected officials; citizens	Board of directors; clients; citizens
Predominant Performance Standard(s)	Profit	Meeting public needs; delivering public policy	Fulfilling mission

By considering sectoral differences of the governance structures of organizational actors within governance networks, we recognize the importance that "nodal governance" plays vis-a-vis the governance of the entire system. "Nodal governance… [focuses] attention on and bringing more clarity to the internal characteristics of nodes and thus to the analysis of how power is actually created and exercised within a social system. While power is transmitted across networks, the actual points where knowledge and capacity are mobilized for transmission is the node" (Burris, 2004, 341)" (Crawford, 2006, p.458). At this juncture, very little is known about how the different governance structures of the nodes (informed, at least in part through sectoral characteristics) inform the governance of the entire governance

network. A view of the difference in performance standards across the public, private and non-profit sectors connotes a continuum of clearly defined measures: nears universal measures (such as profit) to the ambiguity-riddled challenges of measuring successful public policies (Stone, 2002), to the highly context specific and mostly localized performance standards ascribed to individual nonprofit organizations (Stone and Ostrower, 2007).

A governance network's capacity to support or hinder democratic accountability of its actors hinges on its capacity to be what Sorensen and Torfing (2005) describe as "democratically anchored." Sorensen and Torfing assert that, "Governance networks are democratically anchored to the extent that they are properly linked to different political constituencies and to a relevant set of democratic norms that are part of the democratic ethos of society" (2005, p. 201). They go on to define democratic anchorage as comprising some kind of combination of:

A. Control by democratically elected politicians;
B. Accountable to the territorially defined citizenry;
C. Representation of the membership basis of the participating groups and organizations; and
D. Following the democratic rules specified by a particular grammar of conduct" (Sorensen and Torfing, 2005, p.201).

The democratic anchorage of actors in a governance network is, thus, construed as a matter of degree, not in absolute terms. Governments, as sovereign entities, play a critical role in governance networks. States contribute to the democratic anchorage of a governance

network most directly through the privileged position that elected officials play as representatives of territorially defined citizenry. If government actors play informal or weak roles in a governance network, the anchorage that their ties to the network bring will be limited. The resultant networks tend to "resist government steering, develop their own policies and mould their environment" (Kirkert et al., 1997, p.xii).

Another dimension of democratic anchorage of a governance network will hinge on the extent to which democratic norms, rules, and "grammar of conduct" are employed in the coordination of network activity. Presumably, a democratic grammar of conduct is shaped by legal standards (Constitutional law, the rule of law, etc.), political norms (appeals to equity, liberty and fairness), and administrative practice (sound and fair bargaining and negotiation practices). Democratic rules are also informed by the central norms associated with building horizontal ties: honesty, trust and reputation.

Democratic anchorage is one of the central governance features of the governance networks, but governance networks at international scale are confronted with "democratic deficit" as there are no international democratic norms (Haas 2004). International governance also needs to be considered in the light of network structure—the roles that vertical, horizontal, and diagonal relations play in relation to the leadership structure and flow of power and authority. Governance thus needs to be understood in the context of the accountability frameworks that persists within each node as well as across nodes. If nation-states, and to a certain extent, interest groups, play a role in bringing democratic anchorage to a governance network, other sectoral characteristics need to be considered as well. The confluence of

sectoral governance characteristics need to be considered in the light of an accountability framework that 1.) allows for the consideration of accountability across sectors (particularly the public and private sectors); and 2.) draws upon the existence of vertical, horizontal and diagonal ties within and across governance networks.

Table 3 below shows the complexity of various types and scale of actors involved in a small sample of climate change governance networks. Under public-public type of governance networks, actors are shown for UNFCCC and APP networks. Both the networks are represented by country level government agencies. UNFCCC virtually includes all countries of the world, but it has classified these countries in Annex I (industrialized) and non-Annex I (developing) categories. In contrast, APP is a network of merely seven countries, but these seven countries account for more than 50% of global GHGs per year. In contrast to public-public climate governance networks, Table 3 shows two private-private governance networks: ICCP and 3C. Both of these private-private networks contain large transnational or national level corporations as major actors. ICCP typically contains emitters of major industrial GHGs, while 3C contains most of the corporate actors from energy production and transmission sectors. Finally, a small sample of CDM and JI projects are shown in Table 3 to demonstrate the nature of public-private actors that are involved in climate change mitigation actions.

Tables 3: Types of actors in various types of climate change governance networks

Type of CGN	Example from Climate Governance	Actors Involved
Public-Public	**UNFCCC**	**Annex I Countries** Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic,

		Denmark, Estonia, European Community, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America **Annex II Countries** Annex II Parties consist of the OECD members of Annex I, but not the Economies in Transition (EIT) Parties, which include the Russian Federation, the Baltic States, and several Central and Eastern European States. Annex II countries must provide financial resources to help developing countries undertake emissions reduction activities. **Non-Annex I Countries** Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Cuba, Cyprus, Côte d'Ivoire, Democratic People's Republic of Korea, Democratic Republic of the Congo, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Fiji, The former Yugoslav Republic of Macedonia, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran (Islamic Republic of), Israel, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Lao People's Democratic Republic, Lebanon, Lesotho, Liberia, Libyan Arab Jamahiriya, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia (Federated States of), Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Nicaragua, Niger, Nigeria, Niue, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Republic of Korea, Republic of Moldova, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Solomon Islands, South Africa, Sri Lanka, Sudan, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Republic of Tanzania, Uruguay, Uzbekistan, Vanuatu, Venezuela (Bolivarian Republic of), Viet Nam, Yemen, Zambia, Zimbabwe
	APP	Australia, Canada, China, India, Japan, Korea, and the United States
Private-Private	**ICCP**	3M Company, Air Conditioning and Refrigeration Institute, Alliance for Responsible Atmospheric Policy, Association of Home Appliance Manufacturers, Association of International Automobile Manufacturers Arkema, Boeing, Carrier, CH2M Hill, Dow Chemical, DuPont, General Motors Hewlett Packard, Honeywell, Intel Corporation, Japan Fluorocarbon

	3C	Manufacturers Association, Kodak, Natsource, United Technologies World Energy, York International ABB, AIG, Al-Almoudi Group, Alstom, Areva, Bayer, BC Hydro, BP, Centrica, CEZ Group, China National Offshore Oil Corporation, Citigroup, Constellation Energy, Corus, Deutsche Bahn AG, Deutsche Post World Net, DONG Energy, Dow Chemical, DTEK, Duke Energy, Endesa, EnBW, Enel, E.ON, Eskom, Fortum, GE, HP, Iberdrola, Lufthansa, Lukoil, MAN, Munich Re Group, MVM Zrt., Norske Skog, NRG Energy, Nuon, Otto Group, PG&E Corporation, PNM Resources, RAO UES of Russia, Reuters, Rusal, SAP AG, SAS Group, Siemens, Suez, Tata Power Company Ltd, TAQA Abu Dhabi National Energy, Union Fenosa, Vattenfall, Veolia, Volvo, and Wallenius Lines
Public-Private	**CDM***	
	Yiyang Xiushan Hydropower Project, P.R. China	Taohuajiang Energy Development Co., Ltd. (China) and KfW Carbon Fund (KfW Bankengruppe) (Germany)
	Casa Armando Guillermo Prieto - Wastewater treatment facility for a Mezcal distillery	Casa Armando Guillermo Prieto S.A.de C.V. (Mexico) and South Pole Carbon Asset Management (Switzerland)
	Heilongjiang Chemical N2O Abatement Project	Heilongjiang Chemical Group Co., Ltd (China) and Mitsui & Co., LTD. (Japan)
	JI*	
	Timisoara Combined Heat and Power Rehabilitation for CET Sud location	Swedish Energy Agency (Sweden) and SC Colterm SA (Romania)
	Debrecen landfill gas mitigation	City of Debrecen and Civis Biogaz Kft. (Hungary)

	project Revamping and Modernization of the Alchevsk Steel Mill	OJSC Alchevsk Iron and Steel Works (AISW) (Ukraine), Institute for Environment and Energy Conservation (Ukraine), and The International Bank for Reconstruction and Development (IBRD) acting as Trustee for the Netherlands European Carbon Facility (the Netherlands)

* Only small sample of projects are chosen to show the sector of actors in CDM and JI projects.

2.2. Process Accountability Frames in Governance Networks

The processes of institutionalizing accountability in climate change governance networks merit special consideration as they explicitly deal with the problem of ensuring procedural fairness in complex situations involving a myriad of private and public sector actors. We believe, as also emphasized by Backstrand (2008), three criteria of accountability process need to be explored. (i) Transparency and public provision of information by a governance network is critical for ensuring that actors to whom accountability is being rendered are able to access the information in a transparent manner. (ii) Monitoring mechanisms ensure whether the governance network has institutionalized monitoring of its stated goals and actions taken to meet those goals. (iii) Representation of stakeholders concerns "whether partnerships include government, market and civil society actors. To what extent is a wide range of stakeholder groups participating formally in the network, either as lead or as participating partners (Backstrand, 2008: 82)?"

In terms of democratic anchorage of governance networks, these three criteria for accountability process may be understood as democratic norms. Democratic accountability is

rendered when elected officials, citizens, courts, and interest groups are engaged as stakeholders in a transparent manner with monitoring mechanisms that are trusted by all engaged actors. At the international scale, this calls for reduction of "democracy-deficit" to enable accountability processes in global governance networks.

Table 4 below shows our qualitative analysis of accountability process for the same sample of climate change governance networks, for which actors are shown in Table 3. These are subjective scores and can be different from different perspectives (see Backstrand, 2008: 98 for comparison). We argue that UNFCCC scores high on transparency of their process, but their monitoring mechanism is rather weak as they rely on individual countries to submit GHG inventory reports on annual basis without any third party verifications. Representation of stakeholders is rather high in UNFCCC process. The APP, on the other hand, scores medium on transparency as all the information from the meetings of APP partners has not been made public, as they have also been selective in inviting stakeholders to their meetings, dominated by business interests and fewer civil society representatives. In terms of private-private partnerships, ICCP and 3C score low and high, respectively, on the transparency criteria. Both ICCP and 3C score low on monitoring mechanism and stakeholder representation. For public-private parternships, both CDM and JI score medium in terms of transparency, as some of the information is periodically made public about their projects, but some important information is also withheld from public purview. Both CDM and JI, in our view, have medium strength monitoring mechanisms, with the room for monitoring improvement.

Table 4: Process accountability scores of sampled climate change governance networks

Type of CGN	Example from Climate Governance	Process		
		Transparency and Information	**Monitoring Mechanism**	**Representation of Stakeholders**
Public-Public	**UNFCCC**	High	Weak	High
	APP	Medium	Weak	Low
Private-Private	**ICCP**	Low	Weak	Low
	3C	High	Weak	Low
Public-Private	**CDM**	Medium	Medium strength	Medium
	JI	Medium	Medium strength	Medium

2.3. Outcome/Performance Accountability Frames in Governance Networks

Those who have studied the role of performance measurement and management in public administration and policy studies, have often equated performance with questions of governance (Moyniham, 2008). Likewise, those proposing that the field advance a "logic of governance" often frame governance with, "performance or outcomes of public programs at the individual or organizational level as the ultimate dependent variable (Lynn et al., 2000)" (Stone and Ostrower, 2007, P.423). Performance and performance measurement may be viewed as attempts to apply systematic and, ultimately, standardized criteria through which to assess the success of a social entity, be it at the individual, group, organization or inter-organizational levels.

The application of fair and effective performance measurement in public administration and policy studies is no easy task. Beryl Radin, for instance, warns that, "despite the attractive quality of the rhetoric of the performance movement, one should not be surprised that its

clarity and siren call mask a much more complex reality…" (2006, p.235). Performance management is a complicated matter within *individual* organizations, let alone inter-organizational networks. Herbert Simon and Charles Lindblom were some of the first to discuss the limits of rationality within social organizations. We argue that the same factors that lead to "bounded rationality" and incrementalism in the course of day-to-day management and policy making cloud performance measurement.

Just what amounts to effective performance is a matter of perception. Performance data and standards come about through the social construction of knowledge (Moynihan, 2008). Gregory Bateson has noted that, "The processes of perception are inaccessible; only the products are conscious…" (Bateson, 1988, p.32). Performance data, performance measures, and ultimately, performance management is complicated by the question of whose perceptions matter? We assert that, presumably, those "to whom" accounts need to be rendered are in the best? (the most legitimate?) position to determine what it means for any social entity to "perform," and presumably, perform effectively.

Performance management systems are designed to take information from the environment, through consultation with the public, stakeholders, public representatives, and analyses of the external environment is so large, public officials need some criterion of relevance to make sense of it. Performance management systems provide a means by which public officials engage in coding—interpreting and refining information from the external environment and internal stakeholders into a series of information categories such as strategic

goals, objectives, performance measures, and targets. After this coding takes place, performance information can then be presented to decision makers (Moynihan, 2008, P.6).

Beryl Radin describes the traditional assumptions that have guided the introduction of performance measurement systems as:

- Goals can be defined clearly and set firmly as the basis for the performance measurement process.
- Goals are specific and the responsibility of definable actors.
- Outcomes can be specified independently of inputs, processes, and outputs.
- Outcomes can be quantified and measured.
- Outcomes are controllable and susceptible to external timing.
- Data are available, clear, and accurate.
- Results of the performance measurement can be delivered to an actor with authority to respond to the results. (Radin, 2006, P.19)

These assumptions mirror the kind of rational assumptions that have guided the traditional policy cycle. The clarity of goals, the measurability of performance standards, the availability and accessibility of data, and the utilization of that data to guide decision making and action are all said to be critical components of an effective performance management system.

Theodore Poister describes performance measurement as a continuous cycle of inquiry that encompasses the collection and processing of data, the analysis of this data, and the utilization of this analysis to adjust actions and behaviors. Poister posits that the analysis of data is carried out through the act of rendering comparisons over time, against internal targets,

across units, and against external benchmarks (2003, p.16). The analysis of data may lead to decisions regarding strategy, program delivery, service delivery, day-to-day operations, resource allocation, goals and objectives, and performance targets, standards and indicators (2003, p.16).

Performance measurement implies certain assumptions regarding causality, namely that inputs into the system (however defined) shape the processes undertaken, which in turn, produce certain outputs leading to short, intermediate and long term outcomes. The model of systems dynamics, in terms of inputs, processes, outputs and outcomes, has been adopted in some types of performance measurement initiatives, particularly those associated with the evaluation of programs. The input, process, output, outcome model is often called the "logic model" (Poister, 1978; 2003). The logic model is a commonly adopted form of performance evaluation used in government and non-profit organizations.

Input measures are often framed in terms of resources contributed to the system that may take any number of different forms of capital (financial, physical, human, social, natural and knowledge). "Performance advocates often argue that organizations emphasize the importance of inputs to the exclusion of other elements and, as a result, equate the availability of these resources with success" (Poister, 1978, P. 15). "Information in this category deals with the amount of resources actually used in the operation of a policy or program…" (Radin, 2006, p.191). "Inputs are recognized as valuable only insofar as they produce desired outputs and measurable results" (Savas, 2005, p.12).

Process measures usually involve information that may be collected about the activities being undertaken within the social system. Variables employed to study and evaluate organizational behavior and management practices are sometimes defined as process measures. Process measure may also include actors' perceptions of the practices undertaken. Given the wide array of potential process dynamics, "[p]rocesses are often counted in varying or inconsistent ways: as a result, aggregated statistics about processes can be misleading…" (Radin, 2006, p.191). *We argue that more attention needs to be paid to the development of process measures that are constructed around democratic norms and rules (Klijn, 2001).*

Output measures hinge on results that may be directly ascribed to the activities undertaken within the system. Outputs are generally the most tangibly visible, often most measurable representation of "the amount of work performed or the volume of activity completed…" (Poister, 2003, p.40). "Outputs are products and services delivered. Outputs are completed products of internal activity: the amount of work done within the organization or by its contractors" (Poister, 2003, p.15). "This category measures the amount of products and services completed during the reporting period… tabulations, calculations, or recordings of activity or effort that be expressed in a quantitative or qualitative manner. In some cases, process measures are subsumed within this category" (Radin, 2006, p.191). "Outputs are best thought of as necessary but insufficient conditions for success" (Poister, 2003, P.38-39).

Outcome measures are often the most difficult to determine because they are constructed out of a chain of causality that must take into account all of the input, processes, and outputs implicated in the social system. "Outcomes… are the substantive impacts that result from producing these outputs" (Poister, 2003, P.40). Much has been written regarding

the complexities of coming to agreement around the construction of causal relationships. Outcome indicator—"A numerical measure of the amount or frequency of a particular outcome…" (Radin, 2006, p.15). Often implicated in society's most "wicked problems," governance networks operate in highly politicized environment through which policy outcomes get framed by stakeholders differently (Stone, 2002). Outcomes are an "event, occurrence, or condition that is outside the activity or program itself and is of direct importance to program customers or the public" (Poister, 2003, P.15). "Outcome information defines the events, activities, or changes that indicate progress toward achievement of the mission and objectives of the program…" (Radin, 2006, p.191). Outcomes may be registered in the shorter to longer term. "Intermediate outcomes are activities that are expected to lead to a desired end but not ends in themselves…" (Radin, 2006, p.192). While, an "end outcome" is described in terms of "the end result that is sought…" (Poister, 2003, p.15).

Viewed outside the context of governance network, performance measurement initiatives face a number of challenges that have been summarized by Durant as, "confusion around outputs and outcomes; inadequate training and technical know-how for developing performance measures; lack of resources for measurement design, data collection and monitoring; different expectations about what performance measures are designed to do and for what they will be used; fear by agencies that they will be asked to develop outcomes measures for results that are not easily measured, that are shaped by factors outside their control… and, that are not amenable to assigning responsibility to particular actors…" (Durant, 2001, p.702-703). Studies of performance measurement initiative across governance networks accentuate all of these factors as being major challenges to applying performance

measurement frameworks to the networks (Posner, 2002; Page, 2004; Frederickson & Frederickson, 2006).

The definition of what constitutes effective outcomes for a governance network is a critical question to be addressed. There have been some studies conducted that look at the efficacy of network structures in achieving ascribed outputs or outcomes (see as a representative: Marsh & Rhodes, 1992; Heinrich & Lynn, 2000; Koontz et al., 2004; Frederickson & Frederickson, 2006; Koliba & Mills, under review; Rodriguez, et al., 2007). The highly contextual nature of the environments that governance networks operate within, coupled with the highly contextual nature of most of the perceptions of the network actors within the network, render the development of consensus around common definitions of viable network performance measures very difficult to achieve.

Despite these challenges, the application of performance measurements to governance networks is important because of the links between measurement and accountability. Those to whom accountability must be rendered may be inclined to rely on certain kinds of performance measurement data (construed here in terms of both quantitative and qualitative forms) in the execution of their obligations as accountants. As we have argued, governance networks are held accountable by a complex array of accountants operating through one of several different accountability frameworks, shown in Tables 1 and 2.

As an alternative to logic model of performance measurement, complexity science model is attracting some attention in recent literature. It has been argued that “complexity approaches to performance management need to give more emphasis to the entanglement of

the stages of performance management that go further than a cause and effect understanding. Complexity accounts will again focus on the interaction and resulting feedback between different elements of the process and outputs. Complexity theory implies that it is the feedback process itself that offers us the best understanding of how performance is constructed" (Haynes, 2003, p.96). We argue that global environmental political processes enable the construction of performance management systems in alternate governance networks.

Table 5 presents outcomes/performance measures that have been developed so far by various types of climate change governance networks. For public-public climate change governance network of UNFCCC, outcome/performance measure of reducing GHG/year by ~5% below 1990 level by 2008-12 was set as a binding commitment for Annex I parties who ratified the treaty. This performance measure is an example of "grand-fathering", which has been compared in the literature with some other outcome/performance measures, such as GHG/capita that was not adopted by the UNFCCC governance network (Najam and Sagar, 1998; Biermann, 2005). The choice of outcome/performance measures is thus fraught with political maneuvering and strategizing that cannot be treated as something outside the accountability framework. This is obvious because it is in the interest of rich industrialized countries, who happen to be major GHG polluters as well, to choose an outcome/performance measure that by definition minimizes their GHG emission reduction goals. Grandfathering, as compared to GHG/capita, apparently does exactly what serves the interest of rich industrialized countries. The political analysis of UNFCCC governance network thus shows that the choice of outcome/performance measure is an artifact of political power and scientific knowledge, which

overrides ethical concerns of equity raised by developing countries who have consistently argued that GHG/capita outcome/performance measure must be chosen by UNFCCC (Najam et al. 2003, Pettenger 2007, Cass 2007).

In contrast to UNFCCC governance network, the APP has remained vague in setting any goals, as shown in Table 5 below. The APP in fact argued that there should be no binding outcome/performance measures, which again demonstrates the tragedy of commons as APP represents the most sizeable GHG polluting countries. Similar vagueness is obvious from the outcome/performance measures developed by private-private climate change governance networks – ICCP and 3C – shown in Table 5. Under public-private partnerships of CDM and JI case study projects, there are specific outcome/performance measures that have typically very long target dates (as shown in the last column of Table 5).

Table 5: Outcomes/performance goals and targets of sampled climate change governance networks

Type of CGN	**Example from Climate Governance**	**Outcomes/performance measures**	
		Norm/goals	**Evaluation targets**
Public-Private	**CDM** Yiyang Xiushan Hydropower Project, P.R. China Casa Armando Guillermo Prieto - Wastewater treatment facility for a Mezcal distillery Heilongjiang Chemical N2O Abatement	Reduce CO2 emissions by 243,043 metric tons per year by using a consolidated methodology for grid-connected electricity generation from renewable sources Reduce CO2 emissions by 15,153 metric tons per year by using thermal energy with or without electricity and methane recovery in wastewater treatment	Crediting period of 05/10/09-05/09/16 with lifetime of project lasting 33 years from 08/18/05 Crediting period of 05/07/09-05/06/16 with lifetime of project lasting 25 years from 4/23/07

	Project	Reduce CO2 emissions by 279,319 metric tons per year by implementing catalytic reduction of N2O inside the ammonia burner of nitric acid plants	Crediting period of 05/07/09-05/06/16 with lifetime of project lasting 21 years from 07/17/07
	JI Timisoara Combined Heat and Power Rehabilitation for CET Sud location Debrecen landfill gas mitigation project Revamping and Modernization of the Alchevsk Steel Mill	Upgrade the existing heat production plant CET Timisoara Sud with cogeneration capacity Installation and operation of a new landfill gas collection system to capture and flare the methane content of the landfill gas. Reduction in CO2 emissions by 413,866 metric tons over crediting period Replacement of technology and upgrade of all major components of iron and steel making and finishes processes. The goal is to improve environmental performance, increase capacity and competitiveness	Project lifetime is 20 years as of September 2005 Crediting period of 01/01/08-12/31/12, with lifetime of project lasting 10 years from 11/30/07 Crediting period of 01/01/08-12/31/12, with lifetime of project lasting 40 years from 08/24/05
Private-Private	**ICCP**	Address continued growth of greenhouse gas emissions through mechanisms such as emissions trading. Business and industry expertise are important parts of this process. Technological innovation is crucial.	Ongoing
	3C	Businesses cooperate to reduce emissions for a stable climate by putting a price on carbon emissions, setting minimum efficiency standards, encouraging sustainable forestry and agriculture, and pushing low carbon technologies.	Ongoing
Public-Public	**UNFCC**	Countries coming together to consider what can be done to reduce global warming and to cope with whatever temperature increases are inevitable. The Kyoto Protocol sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas emissions by an average of five per cent against 1990 levels over a five-year period. Kyoto mechanisms include emissions trading, Clean Development Mechanism	Reductions must be met over the five-year period 2008-2012.

		(CDM) and Joint Implementation (JI).	
	APP	Overall goal is to accelerate the development and deployment of clean energy technologies. There are sub-goals regarding energy security, national air pollution reduction, and climate change. Goals should be reached in ways that promote sustainable economic growth and poverty reduction. The Partnership will focus on expanding investment and trade in cleaner energy technologies, goods and services in key market sectors. Task forces each have specific goals and include: Aluminum, buildings and appliances, cement, cleaner fossil energy, coal mining, power generation and transmission, renewable energy and distributed generation, and steel. (http://www.asiapacificpartnership.org/english/default.aspx)	Ongoing.

3. Dilemmas of Performance Measurement for Accountability in Climate Change Governance Networks

Overall, the application of actor-, process-, and outcome- based accountability framework to the burgeoning array of climate change governance networks has demonstrated the importance of underlying global environmental political studies. In particular, our analysis reveals four performance measurement dilemmas that require resolution through political processes for institutionalizing accountability in climate change governance networks. These are dilemmas of strategy, uncertain science, integrating multiple scales and verification.

3.1. Dilemma of Strategy: Which governance networks are proposing which performance measurement variables, such as GHG/year, GHG/BTUs and GHG/capita and why?

In the light of the prisoner's dilemma game being played at international scale, we propose that each polluting nation is also caught up in proposing a set of performance

measures that, by definition, either let that nation free ride or incur minimal clean up costs. So, under UNFCCC negotiated Kyoto protocol, "grandfathering" based performance measures were adopted despite calls for GHG/capita based performance measures by developing countries who are not big GHG polluters. UNFCC based public-public governance network was thus co-opted by the strategic goals of rich-developed countries into adopting a grand-fathered performance measure (reduce GHG/year emissions by a target year below certain baseline year). Initial analysis of negotiations for a post-Kyoto UNFCC based international treaty shows that grand-fathering based performance goals are also being considered for a post-Kyoto treaty.

We call this phenomena as "dilemma of strategy" in setting up performance standards in complex governance networks. This dilemma is even more obvious when we consider APP governance network. After the Bush administration in the US reneged on the US commitment to sign Kyoto treaty on the pretext that developing countries were not included in the Kyoto protocol, US government, in alliance with other countries that consider UNFCC process as too much burdensome and potentially a costlier enterprise, decided to engineer a governance network of 7 highest GHG polluting countries that they call APP. These 7 countries are responsible for 50% of the current global GHG emissions. And what is the performance standard that APP proposes: no binding commitments to reduce GHG emissions. So, APP does not want a performance standard at all. When criticized for this, some APP leaders called for GHG/BTU and BTU/GDP (i.e. intensity-based) performance standards, which are practically business-as-usual scenarios of growing GHG emissions in the atmosphere.

Dilemma of strategy thus demonstrates that different governance networks in tragedy of commons situations propose performance standards that minimize their individual cost of clean up action. When there are multiple governance networks in public, private and public-private domains with variegated performance measures, it becomes very difficult to hold any governance network accountable on a common performance measure because they do not agree with a common performance measure, to begin with. A more serious and intractable horn of the dilemma concerns the fact that the accountants for multi-actor configurations in different governance networks are not interested in holding network actors responsible on some unified performance metric due to the inherent nature of their value and goal conflicts.

3.2. Dilemma of Uncertain Science: How different governance networks translate scientific uncertainty into policy action/inaction?

In this unfolding tragedy of commons, actors in various governance networks have strategically deployed scientific uncertainty to their advantage. In the UNFCC governance network, for example, the controversy of whether to consider existing forests as carbon stocks or not provides an interesting case-study of this dilemma. While there is large scientific uncertainty about the carbon uptake functions of forest systems in evolving climatic conditions, some network actors with large standing forests argued for inclusion of forests as carbon sinks, while others argued against it, citing scientific research showing diminishing carbon uptake in higher CO_2 concentrations. Inclusion or exclusion of forests as carbon sinks presents one example of dilemma of uncertain science, as it might be too late to take policy action for or against deforestation by the time scientific uncertainty is reduced.

Another example of this dilemma concerns the different weights that are accorded to different GHGs based on their CO_2 equivalency. While UNFCC aimed at standardizing these weights, there has been since that standardization severe critique of the methods used to standardize the weights. Some private sector governance networks have expressed their concerns that industrial gasses are accorded much higher weights, while some other governance networks (especially NGO based) have argued the opposite, i.e. the industrial gases should have been accorded even higher weights due to their higher radiation potential. Additional questions about "latent" GHG emissions and their inclusion in UNFCC basket of post-Kyoto gasses remain largely unaddressed, as well.

3.3. Dilemma of Integrating Multiple Scales: Whether different governance networks incorporate the GHG emission reduction credits by global, regional and sub-national actors into a consistent scale of performance measurements?

Climate change mitigation actions are being taken at multiple space-time scales by different governance networks, which imply that the accountability challenges of measuring their respective performances also multiply with multi-scalar mitigation actions. Double, or even triple, accounting of same "mitigation" actions is the biggest concern here. Consider the example of a wind turbine installed in a small town in Europe, for which a city in CCP governance network claims credit, a firm in ICCP claims credit, and a country in UNFCCC claims credit. In fact, in some voluntary air travel GHG emission offset systems, gross instances of double or triple accounting have been reported for the same set of carbon sinks that are used as GHG emission offsets.

Resolving this dilemma at inter-governance network level will pose a huge challenge as each governance network and their respective actors have the incentives to undertake double or triple accounting. There has been some movement towards unifying these cross-scalar mitigation activities in some consistent scale, but this remains a huge challenge at many fronts. Consider the example of a huge multinational corporation operating in many countries. Should their mitigation actions in countries of their operation be ascribed to host countries or the country of their headquarters?

3.4. Dilemma of Verification: How different governance networks verify different performance benchmarks, e.g. GHG emission reduction credits?

Verification of claimed mitigation actions poses another set of challenges. While there has been a movement towards third party verification of claimed emission reductions (e.g. growing California Climate Action Registry Contracts), there are some verification issues that cannot be easily resolved. Let us take the example of CDM public-private partnerships established under flexibility mechanisms of Kyoto protocol: There is no consensus about how to establish what are the baseline "deforestation" or "afforestation" scenario in developing countries that are eligible to claim CDM based emission reduction credits depending upon how one calculates the baseline scenario. In fact, some critics argue that CDM has provided perverse incentives to many developing countries to enhance their deforestation rates so that they could receive more GHG emission reduction credits when lower deforestation rate (as opposed to exaggerated baseline rate) is verified.

Verification of some GHGs is relatively easy (e.g. some industrial gasses), while other GHGs pose persistent dilemmas. Point sources of GHG emissions (e.g. industries) can be easily tracked, but non-point sources (e.g. transportation systems) are not easily amenable to verification. Accurate measurement of transportation activities and transportation behaviors poses age-old modeling dilemmas. The variance of estimates tends to be high. There are also strategic problems with respect to some transportation activities, e.g. military-based transportation operations are typically not reported. Accurate quantities of energy consumed by military activities are not verifiable due to strategic/security problems with revealing the nature and extent of these activities. Overall, the governance networks need to develop the capacity to become more effective in verification processes, especially third party certifications.

4. Actor-, Process- and Outcome- Based Accountability Framework for Governance Networks and the Negotiations of International Environmental Agreements

Although we do not argue that multiple governance networks should not be allowed to participate in GHG emission reduction activities, we argue that a systematic accountability framework must be developed to consistently "account" for the GHG emissions that are emitted or not emitted by various actors in multiple governance networks. The actor-process-outcome based accountability framework presented in this paper might provide a systematic way to resolve the dilemmas discussed in section 3 through international political processes.

If a post-Kyoto climate governance regime, which will be negotiated in UNFCCC's 2008 and 2009 annual meetings in Posnan and Copenhagen respectively, also attains the same performance levels as the Kyoto treaty, human civilization is very likely to initiate a dangerous

spiral of positive feedback loop of GHGs under business-as-usual scenarios, which will be difficult to reverse due to atmospheric complexity and non-linear lagged effects (IPCC 2007). It is critical that a post-Kyoto climate governance regime incorporates accountability-driven design features, which ensure that anthropogenic GHGs stay well within planetary resilience, prior to the initiation of dangerous positive feedback loops.

UNFCCC has taken baby steps in this direction by setting up a "compliance committee." It is very early to evaluate the performance of this compliance committee, but so far, it seems that Kyoto annex I countries that do not comply with their targets will be penalized by the compliance committee by requiring non-compliant countries to demonstrate additional GHG emission reductions in the next (post- 2012) period. Is this enough?

A more serious challenge is how to deal with the countries that do not sign a post-Kyoto UNFCC treaty, e.g. what if US-China suicide pact continues to plague post-2012 international treaty? Should there be a sanctioning mechanism instituted by UNFCC based governance network against those countries that are not part of the governance network? The question of imposing sanctions on non-network parties poses serious international law challenges, which are magnified when these non-network parties hold major military and financial power that is needed to enforce the sanctions.

5. Conclusions

Governance networks defy traditional forms of accountability mechanisms. We have developed an actor-, process- and outcome-based accountability framework for governance networks and applied this framework to analyze the complex climate change governance

networks. The inherent complexity of climate change governance networks due to the perverse incentives set up under a global prisoners' dilemma game for the engaged actors, less transparent processes, ineffective monitoring mechanisms, inadequate stakeholder representation and lack of consistent performance measures gives rise to at least four persistent dilemmas that require iterative political negotiations for institutionalizing accountability mechanisms in governance networks. We call these the dilemmas of strategy, uncertain science, multiple scale integration and verification.

If humanity remains trapped in these dilemmas, nothing but worst-case climate change scenarios are very likely to materialize. We have argued that this trap must not be inevitable. The climate change governance networks, both at political and strategic levels, must institute systematic accountability frameworks and promote transparent processes to enable cooperative and win-win resolutions of these dilemmas. The reduction of "democracy-deficit" in international/global governance networks could be the first step in this long political journey. The challenges of asymmetric power and knowledge distribution among the actors in governance networks will nevertheless continue to bedevil political efforts aimed at resolving these dilemmas. More research is needed to understand the feedback loop of institutionalizing accountability mechanisms in climate change governance networks and their effects on the emergence of power and knowledge distribution asymmetries at the global scale.

Citations

Agranoff, Robert and Michael Mcguire (2001). "Big Questions in Public Network Management Research." Journal of Public Administration Research and Theory **11**(3): 295-326.

Bäckstrand, Karin (2008). "Accountability of Networked Climate Governance: The Rise of Transnational Climate Partnerships." Global Environmental Politics **8**(3): 74-102.

Bardach, Eugene and Lesser Cara (1996). "Accountability in Human Services Collaboratives: For What? And for Whom?" Journal of Public Administration Research and Theory **6**: 197-224.

Bateson, G. (1988). Mind and Nature. New York, Bantam.

Behn, R. D. (2001). Rethinking Democratic Accountability. Washington, D.C., Brookings Institution Press.

Benner, Thorsten, Wolfgang H. Reinicke and Jan Martin Witte (2004). "Multisectoral Networks in Global Governance: Towards a Pluralistic System of Accountability." Government and Opposition: 191-210.

Betsill, Michele M. and Harriet Bulkeley (2004). "Transnational Networks and Global Environmental Governance: The Cities for Climate Protection Program." International Studies Quarterly **48**: 471-493.

Biermann, F. (2005). "Between the USA and the South: Strategic Choices for European Climate Policy." Climate Policy **5**: 273-290.

Bogason, Peter and Juliet A. Musso (2006). "The Democratic Prospects of Network Governance." The American Review Of Public Administration **36**(1): 3-18.

Burris, Scott (2004). "Governance, Microgovernance and Health." Temp. L. Rev. **77**: 335.

Cass, Loren R. (2007). The Failures of American and European Climate Policy: International Norms, Domestic Politics, and Unachievable Commitments (SUNY Series in Global Environmental Policy). New York, NY, State University of New York Press

Coen, David and Mark Thatcher (2008). "Network Governance and Multi-Level Delegation: European Networks of Regulatory Agencies." Journal of Public Policy **28**(1): 49-71.

Durant, R. F. (2001). "A Way out of No Way? Strategy, Structure, and The "New Governance"." Public Administration And Public Policy **87**: 689-724.

Frederickson, G. David and H. George Frederickson (2006). Measuring the Performance of the Hollow State, Georgetown University Press.

Frederickson, H. George (1997). The Spirit of Public Administration. San Francisco, Jossey-Bass.

Goldsmith, S. and W. Eggers (2004). Governing by Network. Washington D.C., Brookings.

Gruber, J. (1987). Controlling Bureaucracies: Dilemmas in Democratic Governance. Berkeley, CA, University of California Press.

Haas, Peter M. (2004). "Addressing the Global Governance Deficit." Global Environmental Politics **4**.

Hardin, Garrett (1968). "The Tragedy of the Commons." Science **162**: 1243-1248.

Harlow, Carol and Richard Rawlings (2007). "Promoting Accountability in Multilevel Governance: A Network Approach." European Law Journal **13**(4): 542-562.

Harrison, K. and L. M. Sundstrom (2007). "The Comparative Politics of Climate Change." Global Environmental Politics **7**(4): 1-18.

Haynes, Phillip (2003). Managing Complexity in the Public Services. Berkshire, England, Open University Press.

Heinrich, Carolyn J. and Laurence E. Lynn Jr., Eds. (2000). Governance and Performance: New Perspectives, Georgetown University Press.

Ingram, Paul, Jeffrey Robinson and Marc L. Busch (2005). "The Intergovernmental Network of World Trade: IGO Connectedness, Governance and Embeddedness." American Journal of Sociology **111**(3): 824-58.

IPCC (2007). Climate Change 2007: Synthesis Report, Intergovernmental Panel on Climate Change, Fourth Assessment Report. Available at www.ipcc.ch.

Jones, Candace, William S. Hesterly and Stephen P. Borgatti (1997). "A General Theory of Network Governance: Exchange Conditions and Social Mechanisms." Academy Of Management Review **22**(4): 911-945.

Kettl, Donald F. (1996). Governing at the Millennium. Handbook of Public Administration. James L. Perry. San Francisco, Jossey-Bass.

Kickert, Walter J. M., Erik-Hans Klijn and Joop F. M. Koppenjan (1997). Introduction: A Management Perspective on Policy Networks. Managing Complex Networks. Walter J. M. Kickert, Erik-Hans Klijn and Joop F. M. Koppenjan. London, Sage.

Klijn, Erik-Hans (1996). "Analyzing and Managing Policy Processes in Complex Networks." Administration and Society **28**: 90-119.

Klijn, Erik-Hans (2001). "Rules as Institutional Context for Decision Making in Networks." Administration and Society **33**(2): 133-164.

Klijn, Erik-Hans and Chris Skelcher (2007). "Democracy and Governance Networks: Compatible or Not?" Public Administration **85**(3): 587-608.

Koliba, Chris and Jack Meek (In Preparation). Exploring Governance Networks.

Koliba, Chris and Mills (In Review). "Accountability in Governance Networks: Lessons from Hurricane Katrina." Public Administration Review.

Koontz, Tomas M., Toddi A. Steelman, Joann Carmin, Katrina Smith Korfmacher, Cassandra Moseley and Craig W. Thomas (2004). Collaborative Environmental Management: What Roles for Government?, RFF press.

Lowndes, Vivien and Chris Skelcher (1998). "The Dynamics of Multi-Organizational Parternships: An Analysis of Changing Modes of Governance." Public Administration **76**: 313-333.

Luterbacher, Urs and Detlef F. Sprinz, Eds. (2001). International Relations and Global Climate Change. Cambridge MA, The MIT Press.

Lynn Jr., Laurence E., Carolyn J. Heinrich and Carolyn J. Hill (2000). "Studying Governance and Public Management: Challenges and Prospects." Journal of Public Administration Research and Theory **10**(2): 233-262.

Marsh, D. and R. A. W. Rhodes (1992). Policy Networks in British Government, Oxford University Press.

Mashaw, J. L. (2006). Accountability and Institutional Design: Some Thoughts on the Grammar of Governance. Public Accountability: Designs, Dilemmas and Experiences. M.W. Dowdle. Cambridge, Cambridge University Press**:** 115-156.

Mathur, N. and C. Skelcher (2007). "Evaluating Democratic Performance: Methodologies for Assessing the Relationship between Network Governance and Citizens." Public Administration Review **67**(2): 228-237.

May, Peter J. (2007). "Regulatory Regimes and Accountability." Regulation and Governance **1**: 8-26.

Meyer, Wolfgang and Katrin Baltes (2004). Network Failures -- How Realistic Is Durable

Cooperation in Global Governance? Governance for Industrial Transformation. Proceedings of the 2003 Berlin Conference on the Human Dimensions of Global Environmental Change. Klaus Jacob, Manfred Binder and Anna Wieczorek. Berlin, Environmental policy research center**:** 31-51.

Milward, H. Brinton (1996). "Symposium on the Hollow State: Capacity, Control, and Performance in Interorganizational Settings." Journal of Public Administration Research and Theory **6**: 193-95.

Milward, H. Brinton and Keith G. Provan (1998). "Principles for Controlling Agents: The Political Economy of Network Structure." Journal of Public Administration Research and Theory **8**: 203-21.

Moynihan, Donald P. (2008). "Learning under Uncertainty: Networks in Crisis Management." Public Administration Review **68**(2): 350-361.

Najam, Adil, Saleemul Huq and Youba Sokona (2003). "Climate Negotiations Beyond Kyoto: Developing Countries Concerns and Interests." Climate Policy **3**: 221-231.

Najam, Adil and Ambuj Sagar (1998). "Avoiding a Cop-Out: Moving Towards Systematic Decision-Making under the Climate Convention." Climatic Change **39**: iii-ix.

O'toole, Laurence J (1997a). "Treating Networks Seriously: Practical and Research-Based Agendas in Public Administration." Public Administration Review **57**: 45-52.

O'toole, Laurence J (1997b). "The Implications for Democracy in a Networked Bureaucratic World." Journal of Public Administration Research and Theory **7**: 443-59.

O'toole, L. J. and K.J. Meier (2004). "Public Management in Intergovernmental Networks: Matching Structural Networks and Managerial Networking." Journal of Public Administration Research and Theory **14**(4): 469-495.

Page, S. (2004). "Measuring Accountability for Results in Interagency Collaboratives." Public Administration Review **64**(5): 591-606.

Papadopoulos, Yannis (2003). "Cooperative Forms of Governance: Problems of Democratic Accountability in Complex Environments." European Journal of Political Research **42**: 473-501.

Papadopoulos, Yannis (2007). "Problems of Democratic Accountability in Network and Multilevel Governance." European Law Journal **13**(4): 469-486.

Park, Seung Ho (1996). "Managing an Interorganizational Network: A Framework of the Institutional Mechanism for Network Control." Organization Studies **17**(5): 795-824.

Pettenger, Mary E., Ed. (2007). The Social Construction of Climate Change. Burlington VT, Ashgate.

Pierre, J. and G. Peters (2005). Governing Complex Societies: Trajectories and Scenarios. New York, Palgrove Macmillan.

Poister, T. H. (1978). Public Program Analysis: Applied Research Methods. Baltimore MD, University Park Press.

Poister, T. H. (2003). Measuring Performance in Public and Nonprofit Organizations, Wiley.

Posner, P. (2002). Accountability Challenges of Third-Party Government. The Tools of Government: A Guide to the New Governance L. Salamon. New York, Oxford.

Provan, Keith G. and Patrick Kenis (2007). "Modes of Network Governance: Structure, Management, and Effectiveness." Journal of Public Administration Research and Theory.

Provan, Keith G. and H. Brinton Milward (1995). "A Preliminary Theory of Inter-Organizational Effectiveness: A Comparative Study of Four Community Mental Health Systems." Administrative Science Quarterly **40**: 1-33.

Radin, B. (2006). Challenging the Performance Movement: Accountability, Complexity and Democratic Values. Washington, D.C., Georgetown University Press.

Rodriguez, Charo, Ann Langley, Francois Beland and Jean-Louis Denis (2007). "Governance, Power, and Mandated Collaboration in an Interorganizational Network." Administration and Society **39**(2): 150-193.

Romm, J. (2007). Hell and High Water: Global Warming—the Solution and the Politics—and What We Should Do. New York, Harper Collins.

Savas, E. S. (2005). Privatization in the City: Successes, Failures, Lessons. Washington D. C., CQ Press.

Scholte, Jan Aart (2004). "Civil Society and Democratically Accountable Governance." Government and Opposition: 211-233.

Scott, C. (2006). Spontaneous Accountability. Public Accountability: Designs, Dilemmas and Experiences. M.W. Dowdle. Cambridge, Cambridge University Press**:** 174-194.

Skelcher, Chris (2005). "Jurisdictiional Integrity, Polycentrism, and the Design of Democratic Governance." Governance: An International Journal Of Policy, Administration, And Institutions **18**(1): 89-110.

Slaughter, Anne-Marie (2004). "Disaggregated Sovereignty: Towards the Public Accountability of Global Government Networks." Government and Opposition: 159-190.

Sorensen, Eva (2002). "Democratic Theory and Network Governance." Administrative Theory and Praxis **24**(4): 693-720.

Sorensen, Eva and Jacob Torfing (2005). "Network Governance and Post-Liberal Democracy." Administrative Theory and Praxis **27**(2): 197-237.

Stone, D. (2002). Policy Paradox : The Art of Political Decision Making. New York, Norton.

Stone, Melissa M. and Francie Ostrower (2007). "Acting in the Public Interest? Another Look at Research on Nonprofit Governance." Nonprofit and Voluntary Sector Quarterly **36**(3): 416-438.

Torfing, Jacob (2005). "Governance Network Theory: Towards a Second Generation." European Political Science **4**: 305-315.

White, Leroy (2001). "'Effective Governance' through Complexity Thinking and Management Science." Systems Research and Behavioral Science **18**: 241-257.

Wondolleck, Julia M. and Steven L. Yaffee (2000). Making Collaboration Work: Lessons from Innovations in Natural Resource Management. Washington D.C., Island Press.