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Governing Clean Development in LDCs: do CDM rules promote renewable energy in Ethiopia?

Stephan Hoch

University of East Anglia

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For further information on the Working Paper Series, please contact:

Jon Phillips
International Development,
University of East Anglia,
Norwich NR4 7TJ
E: jon.phillips@uea.ac.uk
W: www.clean-development.com

For further information on DEV and International Development UEA, please contact:

School of International Development
University of East Anglia
Norwich NR4 7TJ, UK
T: +44 (0) 1603 592807
F: +44 (0) 1603 451999
E: dev.general@uea.ac.uk
W: www.uea.ac.uk/dev

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Stephan Hoch

Abstract

Climate policy is becoming more important for the sustainable development of non-Annex I countries, for instance by supporting access to renewable energy. In order to better adapt the CDM and future climate policy instruments to the circumstances of low-income societies, it is important to understand how the CDM's institutional dimensions impact governance processes in host countries. Hence, this paper presents a case study on how CDM rules for renewable energy generation impact climate and energy governance in Ethiopia. First, the paper develops a theoretical approach to analyze climate governance processes which is grounded in sociological institutionalism. Second, the paper applies these concepts to the CDM as a governance institution that is nested within the overarching regime, in order to develop a more nuanced understanding of CDM rules. CDM rules for renewable energy will be discussed with regard to their relevance for LDCs in a process-oriented perspective that accounts for ongoing CDM reforms. Third, these preparations guide the inductive analysis of the impact of these CDM rules on climate and energy governance in Ethiopia. This case study draws on a comprehensive analysis of academic and grey literature, content analysis of key documents, and a series of semi-structured expert interviews conducted in Ethiopia, Kenya and during several sessions of climate negotiations between 2009 and 2011.

Key words: Clean Development Mechanism (CDM); Ethiopia; governance; renewable energy; Least Developed Countries

About the author: Stephan Hoch is a PhD student at Albert-Ludwigs-Universität Freiburg, Germany. e: stephan.hoch@politik.uni-freiburg.de

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Abbreviations and acronyms

AGF	High-Level Advisory Group on Climate Change Financing
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER	Certified Emission Reduction
COP	Conference of the Parties
CIF	Climate Investment Funds
CRGE	Climate-Resilient Green Economy
DOE	Designated Operational Entity
DNA	Designated National Authority
EEA	Ethiopian Electricity Agency
EEPCo	Ethiopian Electric Power Corporation
EPA	Environmental Protection Authority (of FDRE)
EU	EU Emissions Trading Scheme
FDI	Foreign Direct Investment
FDRE	Federal Democratic Republic of Ethiopia
GCD	Governing Clean Development (Research Project)
GCF	Green Climate Fund
GF	Grid-Emission Factor
GHG	Greenhouse Gas
GTP	Growth and Transformation Plan
PoA	Programme of Activities
PPA	Power Purchase Agreement
IEA	International Energy Agency
IGES	Institute for Global Environmental Strategies
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
LDC	Least Developed Country
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
PM	Prime Minister
SREP	Scaling Up Renewable Energy Program in Low-Income Countries
tCO2/MWh	Tonnes of Carbon Dioxide per Megawatt hour (of electricity)
UN	United Nations
UNEP	UN Environment Programme
UNDP	UN Development Programme
UNFCCC	UN Framework Convention on Climate Change

1. Introduction

Enhancing access to renewable energy is critical to master the urgent and intimately related challenges of advancing development in many regions of the world, while mitigating climate change (Bazilian et al 2011; IPCC 2011). The magnitude of these tasks will require tremendous efforts and the utilization of all available resources, including international climate finance. Notably, renewable energy now contributes the largest share of the global project portfolio of the Clean Development Mechanism (CDM), the Kyoto Protocol's main mitigation instrument for developing countries.[1] The CDM's relevance for exploiting both renewable and fossil energy sources may be limited compared to conventional official development assistance (ODA) and private investment. Still, it has mobilized significant investment and facilitated the market penetration of advanced renewable energy technologies in many countries.[2] Especially poorer countries, however, are struggling to harness benefits from the market-based CDM. Navigating the CDM's complex and costly project cycle involves project developers, government and UN institutions, accredited auditors, and often consultants, financiers or donors. In addition, CDM projects are by definition linked to underlying projects (e.g. a wind farm) with sector- and country-specific challenges. This results in complex governance processes which challenge the capacity of many potential host country organizations to successfully participate in the CDM (DeLopez et al. 2011). At the same time, vast parts of Sub-Saharan Africa remain severely undersupplied with modern energy services (Eberhard et al. 2008).

This unsatisfactory situation raises questions about the continued relevance of the CDM. Is it more effective if the CDM cedes ground to new approaches that may be better adapted to the specific circumstances of low-income countries? Or are these better addressed by building on the evolving CDM? In late 2011 in Durban, the Conference of the Parties, serving as the Meeting of the Parties (CMP), has provided a clear signal that the Kyoto Protocol's institutions, including the CDM, will continue to play an important role in the climate regime. Some progress on new instruments like the Green Climate Fund (GCF) or Nationally Appropriate Mitigation Actions (NAMA) has been achieved, but these are still far away from becoming operational. Hence, it is important to consolidate the lessons from the first ten years of CDM implementation. A particularly relevant aspect is to develop a better understanding of the impact of CDM rules on low-income countries. Who sets those rules, how do they constrain or enable project development, who is driving their reform, and how?

This working paper seeks to shed light on a distinct aspect of these larger puzzles by analyzing the impact of CDM rules for renewable energy projects on climate and energy governance processes in Ethiopia.[3] Although formally still a least developed country (LDC), Ethiopia has put forward an ambitious vision for a 'climate-resilient green economy' (FDRE 2011), even if no CDM project contributes to developing the country's enormous renewable energy potential. The working paper seeks to explore this case in three steps: First, I define my analytical approach by grounding climate governance concepts in sociological institutionalism. This approach draws attention to the role of institutions in governance processes, and the Governance of Clean Development (GCD) research framework will further guide this analysis. Second, this theoretical vantage point will be used to develop a more nuanced understanding of CDM rules and their embeddedness in the overarching climate regime, drawing on the renewable energy sector with regard to its relevance for low-income countries. The third section explores the impact of these rules on CDM implementation as well as broader climate and energy governance processes in Ethiopia. This working paper is research in progress, based on a comprehensive literature and content analysis of primary documents, and semi-structured expert interviews in Ethiopia, Kenya and on the side of UNFCCC meetings

between December 2009 and December 2011.

2. Governing Clean Development in an Unequal, Carbon-Constrained World

The CDM purposefully triggers activities by both public and non-state actors across all levels of governance, and its regulatory framework has been constantly evolving. Therefore, the CDM is a case in point of why the study of environmental issues through regime analysis has been challenged by scholars that explore "governance beyond the regime" (Okereke et al. 2009; Bulkeley and Newell 2010). The burgeoning governance literature loosely comprises diverse lines of thinking rather than forming a coherent theory. Jordan and Adger (2009) categorize these research strands into empirical, normative, and critical works (see also Bäckstrand et al. 2010). Most of these approaches share common conceptual cornerstones as they seek to shed light on the interactions of public and non-state actors, how these exercise various forms of political authority, on the interactions between multiple levels and scales of governance, and by paying attention to processual dimensions.[4]

The CDM has received a lot of attention from scholars who contribute to this literature. The great majority of empirical studies have focused on emerging economies (Benecke 2009; Schroeder 2009; Newell et al. 2011), and reveal a great diversity of governance patterns in different host countries (Fuhr and Lederer 2009). The mechanism's relevance for LDCs, however, has remained understudied. A few recent exceptions focus on the effects of preferential treatment of Certified Emission Reductions (CER) from LDCs in the European Union's Emissions Trading Scheme (EU ETS) (Castro and Michaelowa 2011), levelized statistical analysis to challenge conventional wisdom on the CDM in LDCs (Luetken 2011), and the CDM potential of African LDCs (Arens et al. 2011), including Ethiopia (Kelly 2009). De Lopez et al are among the few who discuss the impact of CDM rules on barriers in LDCs (2009). More theoretically, the CDM has been conceptualized as a public-private partnership (Streck 2004, Benecke et al. 2008), actor-centered perspectives have been used to shed light on transnational CDM governance (Pattberg and Stripple 2008), and concepts of effectiveness (Lederer 2010) and legitimacy have been tested (Bäckstrand et al. 2009). Still, Paulsson's comprehensive review of academic literature on the CDM concludes with a need for more theoretical grounding (2009). The CDM's institutional dimensions, for instance, have been analyzed mainly before implementation had reached scale (Yamin and Depledge 2004; Haites and Yamin 2001), although Bulkeley and Newell (2010) touch on this aspect. Recent findings on transnational energy partnerships conclude that their degree of institutionalization is critical for their effectiveness (Szulecki et al 2011).

Major gaps in the literature therefore include the need to strengthen its theoretical foundations, as well as to extend empirical case studies to 'underrepresented countries'. This working paper seeks to contribute to closing these gaps by shedding light on how the CDM's institutional dimensions impact on climate and energy governance processes in Ethiopia, drawing on sociological institutionalism to refine climate governance concepts. Yet, the ambition in is not to contribute to a 'theory of governance', but rather to deduce salient analytical categories to guide the inductive analysis of the empirical case. Moreover, I refer to theoretical governance concepts as analytical perspectives rather than normative prescriptions about 'good governance' (e.g. abiding by democratic ideals).

2.1. Governance as an Analytical Concept

Tanja Börzel and Thomas Risse define governance as "the various institutionalized modes of social coordination to produce and implement collectively binding rules or to provide collective goods" (2010: 114). Their terminology establishes a link to what can be broadly

referred to as the 'new institutionalism' in the social sciences (Scott 2008). This line of thinking focuses on how social practice is influenced by institutions, understood as "sets of rights, rules, and decision-making procedures that give rise to social practices, assign roles to the participants in these practices, and govern the interactions among the occupants of the various roles" (Young et al. 2008: 1). A critical difference to earlier institutionalist theory is that institutions not only constrain the behavior of actors in some ways while empowering them in others, but that these actors in turn continuously shape institutions. This notion draws on Giddens' concept of the 'duality of social structure', which functions as both "product and platform of social action" over time and space (Scott 2008: 77, Giddens 1984). Critically, social structure is made up both of rules, understood as "generalized procedures applied in the enactment of social life", and "resources, that can be used to enhance or maintain power" (Scott 2008: 77, Sewell 1992: 9). Hence, the essence of this perspective rests in the appreciation of the constant interplay between agency and structure, driven by both ideational and material dimensions of authority.

Such an understanding of institutions and their role in social practice is closest to constructivist regime theoretical approaches, which reach beyond the positivism of neoliberal and neorealist regime analysis (Bulkeley and Newell 2010: 11). In his argument for the continuous potential of regime analysis to inform environmental governance research, John Vogler conceptualizes environmental regimes as specific types of social 'governance institutions'. Dominant neoliberal and neorealist regime analysis would embody a contradiction between ontology and epistemological premises of the original regime concept (Vogler 2003). Vogler therefore attempts to realign this research with its original premises in order to harness its achievements, which include insights into the formation, effectiveness and interplay of global governance structure. As a consequence, paying attention to the role of institutions, which can take the form of "a nested hierarchy [...] reaching down from the interstate to the local level" (Vogler 2003: 30), in governance processes can be seen as a way to shed light on the blind spots of (constructivist) regime analysis.

Therefore, for the purposes of this paper, I examine the CDM as a 'governance institution' that is nested in the overarching climate regime. This requires accounting for notions of governance architecture and institutional complexity (Oberthuer and Stokke 2011, Biermann 2009). In brief, these concepts attempt to capture interplay between institutions within and beyond the climate regime, e.g. how the CDM relates to the CMP, or conflicts between the UNFCCC and the WTO. The focus of this paper, however, rests on intra-institutional interplay, e.g. how norms and principles diffuse from the climate regime into the CDM.

2.2. Governing Clean Development

Focusing on institutional dimensions may not allow for a full understanding of governance processes. For instance, the power of multilateral development banks (MDBs) may be ignored, even if it strongly influences project origination or the discourses that frame clean development. A more sophisticated understanding of the CDM's institutional dimensions, however, will arguably allow us to comprehend how these constrain and empower actors both in implementation and rule-setting, and how these in turn shape the CDM. CDM rules are formally set by intergovernmental regulatory bodies, projects require approval by host country governments and operate in the respective domestic context. Hence, the CDM triggers processes of 'governance with government' (Rosenau and Cziempel 1992). For the multi-level nature of climate governance, however, it is more appropriate to think of public authority at various levels. Furthermore, distinguishing between public and the private authority exercised by non-state actors helps to

appreciate the relation between governance architecture and agency more clearly, even though such categories become fuzzy in the hybrid constellations that emerge in practice (Newell 2010).

An additional layer of complexity that is intrinsic to environmental governance is that the biophysical qualities of the respective resource need to be reflected in the social response. The complexity of climate governance processes

> stems from three related factors: the multiple scales of political-decision-making involved; the fragmented and blurred roles of state and non-state actors; and the deeply embedded nature of many of the processes that lead to emissions of GHG in everyday processes of production and consumption." (Bulkeley and Newell 2010: 2)

The atmosphere is a global commons, and climate policy is essentially an attempt to regulate access to the atmosphere (Ostrom 2005, Vogler 2000). The inclusive multilateralism of the climate regime's governance architecture is directly contingent on this characteristic. Even if sustainable development is conceptually only vaguely defined, the rationale behind such vagueness is that it can and should be interpreted in its relevant context. For instance, while energy consumption varies greatly among emerging economies and low-income countries, it is uncontroversial that GHG emissions strongly correlate with human development (Michaelowa and Michaelowa 2009). Consequently, the IPCC emphasizes that the emission trajectories of countries at different stages of development will differ (2007). Moreover, institutions that govern common pool resources are most likely to be effective if they reflect different local contexts through polycentric structures and rule systems (Ostrom 2009). These findings are primarily distilled from empirical studies on local level systems and Ostrom concedes that interactions between levels of governance are largely unchartered terrain (2005). Yet, the CDM's embeddness in the multilateral climate governance architecture suggests that it is reasonable to conclude that the CDM should accommodate a range of sustainable development needs, including those of low-income countries. This issue has surfaced in proposals for a 'differentiated' CDM (Bakker et al 2011), although this has focused mainly on end-of-pipe interventions such as CER discounting.

The Governance of Clean Development Research Framework proposes straightforward analytical categories to deal with such complex causality and thus allow for some level of comparability. 'Governance from above' then sheds light on how global institutional structure (e.g. CDM rules) or actors influence domestic governance processes. 'Governance from below' (country/project-level) draws attention e.g. to how domestic sectoral regulation affects a CDM project, or how public and private actors interact. A key ambition of this categorization is to arrive at a better understanding of who the "recipients" and "drivers" of governance of clean development are in a multi-level context (Newell et al 2009). The GCD framework notes that governance in practice extends well beyond the climate regime, and is influenced e.g. by different sources of energy finance, institutions and actors (Newell 2010). Still, this paper will focus on the impact of CDM rules for renewable energy on climate and energy governance in Ethiopia in order to allow for analytical depth. Broadening the scope of this framework to an LDC context contributes to appreciating the understudied impact of climate policy instruments to enable such countries to leap-frog 'dirty phases' in conventional development paths (UNEP 2011b).

3. Governance from Above: Do CDM rules promote sustainable energy in LDCs?

3.1 CDM Governance Architecture and Implementation

The Kyoto Protocol (KP) operationalises the UNFCCC's ultimate objective to prevent

dangerous climate change, and the CDM is one of its key building blocks. The mechanism embodies a political compromise: CDM projects shall promote sustainable development without placing mitigation burdens upon developing countries. In turn, buying CERs from CDM projects allows industrialized parties to supplement their domestic mitigation actions by 'offsetting' one tonne of CO_2-equivalent each. The CDM had initially entered COP7 as a Brazilian proposal for a Clean Development Fund, which transformed into the flexible mechanism it is today only in the final conference hours. After long debates, the modalities for its project-based baseline-and-credit approach were worked out by 2002. A 'prompt start' had been agreed, although the CDM only reached scale after the KP became effective in 2005. The Executive Board (EB) is the CDM's regulatory body and receives assistance from several expert panels and the UNFCCC Secretariat. The EB is accountable to the intergovernmental CMP, which provides authoritative political guidance.[5]

After ten years of implementation, the maturing CDM has been acclaimed for its achievements and criticized for its shortcomings. As of December 2011, there are 6930 active projects, of which the EB has registered 3577, and 3413 have entered the validation process. 1439 additional projects have been rejected or withdrawn. Most observers agree that early expectations have been exceeded by the 2,73 billion CERs that are forecast to be issued from these projects until 2012, the end of Kyoto's first commitment period.[6] In recent years, the project portfolio has shifted firmly towards renewable energy, with >50% coming from electricity generation alone. In terms of CER shares, renewable energy projects have increased from 17% CERs to 35% in 2012, and are predicted to reach 47% by 2020. Yet, the CDM has been widely criticized for the dominance of niche sectors (industrial gas), flawed additionality assessments and, in isolated cases, human rights abuses. Perhaps the most relevant issues for 'underrepresented' countries are the lack of meaningful incentives for sustainable development, and, in part as a consequence, the unequal geographical distribution of CDM projects. Only 2,6% are located in Africa (183 total, of which South Africa: 42, Kenya: 22, Morocco, Egypt: 17), and are expected to earn 96 million CERs until 2012 (3,53%), and 396 million until 2020 (3,9%). A highly relevant recent development is the stronger uptake of CDM Programme of Activities (PoA), which allow for adding up many dispersed emission reductions. Although PoAs have only really started entering the validation process in 2010, Africa already hosts 27%, even if 23 out of 39 are located in South Africa (146 global).

Still, Luetken argues that LDCs have performed quite well relative to the size of their emissions baselines, and questions increased public spending on the CDM in LDCs (2011). The relevance of geographical distribution for the legitimacy of the CDM, however, can be traced in the CDM's original wording and subsequent CMP and EB decisions. In anticipation of potential imbalances, Art. 12.6. asserts that "the clean development mechanism assists in arranging funding of certified project activities as necessary" (UNFCCC 1997). Yamin and Depledge conclude that "the COP/MOP has an explicit function to review the regional and subregional distribution of CDM projects with a view to identifying systematic or systemic barriers to their equitable distribution and take appropriate decisions" (Yamin and Depledge 2004: 185). Early calls to regulate the regional distribution of CDM benefits (Sokona et al 1998) and to account for unmet development needs (Winkler 2002) initially remained unheard. The continuing relevance of this issue, however, can be illustrated with the latest CMP guidance relating to the CDM. It contains a dedicated section on regional distribution and capacity-building, in which the CMP "requests the Executive Board to continue promoting the equitable distribution of project activities, […] enhance its support for countries underrepresented in the clean development mechanism, in particular LDCs, SIDS and African countries", and continues with a detailed list of interventions. These brief

examples suffice to show that there is a clear sensitivity for the specific circumstances of 'underrepresented' countries within the global regime level, while a huge gap between rhetoric and practice persists. This raises the question to which extent domestic factors or CDM rules contribute to this situation.

3.2 Analyzing CDM Rules

In order to allow for a clearer understanding of CDM rules, I introduce the distinction between *design principles* and *operational rules*.[7] Drawing on notions of intra-institutional interplay, design principles can be *exogenous* or *endogenous*. The former mainly refers to norms and principles that may not be legally defined in CDM documents, but which diffuse into the CDM from the overarching regime, such as the principle of common, but differentiated responsibilities (CBRD). While equitable distribution is not explicitly defined as a CDM goal, the normative foundations of the concept of sustainable development, which is endemic to the larger Rio process from which the UNFCCC originates, clearly stress both intra- and intergenerational equity, and have already been found to guide subsequent CDM regulation. Endogenous design principles are intrinsic to the CDM, e.g. offsetting, the related concepts of additionality and supplementarity, or third-party verification by Designated Operational Entities (DOEs). These design principles may evolve such as the CDM's quality as a project-based mechanism, which decreases in importance through programmatic approaches, or technology neutrality by excluding nuclear energy. *Operational rules* are directly relevant for implementation such as baseline methodologies, crediting periods, various methodology tools, e.g. for demonstrating additionality, and EB decisions that shape practice through evolving case law. The objective of this categorization is not to provide a complete overview of the CDM's regulatory framework, but to provide a more nuanced analytical understanding of the impact of CDM rules including where, how, and by whom political authority is exercised by developing, implementing and adjusting such rules. Although private authority by business or civil society associations influences discourses and decision-making, CDM regulation remains primarily a sphere of public authority, even if project implementation is to a large extent contingent on private actors. For instance, endogenous design principles are defined by the intergovernmental CMP, whereas operational rules are set either by the EB. These can also be proposed by project participants, e.g. baseline methodologies, although they will eventually have to be approved by the EB. In order to provide more substance to these abstract categories, the next subsection will apply them to CDM rules for the renewable energy sector, with a focus on geographical distribution.

3.3 CDM Rules for Renewable Electricity Projects

The CDM has become a diverse mechanism with over 190 approved methodologies.[8] Methodologies define key operational CDM rules, as they establish baselines from which emission reductions are calculated and monitoring procedures. Very few methodologies have been widely used, however, and most of them apply to grid-connected renewable electricity projects.

3.3.1 Grid-connected renewable electricity generation

The methodologies ACM0002 for large-scale and AMS-I.D for small scale grid-connected renewable electricity generation account for 53% of all CDM projects (UNEP 2011a). With regard to operational rules, the grid-emissions factor (GF) is the most important baseline parameter and describes the emissions intensity of a power grid. The 'dirtier' a grid, the more CERs can be earned. Monitoring primarily requires measuring the amount of power that is supplied to the grid. Simplified requirements apply to AMS-I.D., but the approach and scope are similar. The significance of the GF applies to all methodologies for all grid-connected projects, and creates an incentive to inflate its value. A recent study

commissioned by CDM Watch found "substantial inconsistencies with [...] the 'Tool to calculate the emission factor for an electricity system'", including incomplete data, lack of coverage of power plants and imports (Michaelowa 2011: 19). Furthermore, data availability constrains the applicability of these methodologies particularly in lower-income countries, where DNAs often do not have the capacity or resources to publish GFs (DeLopez et al 2009). Even more severe, the poorest countries tend to have the lowest GF values and receive correspondingly lower incentives for renewable energy projects (Blodgett 2011, De Gouvello et al 2008). Current baseline rules would result in greatly different amounts of CERs for the same hypothetical CDM project if it was implemented in different countries. For instance, a moderately sized wind farm with an output of 100,000 MWh would earn 92,000 CERs per year if constructed in China, 88,000 CERs in India, or 104,000 CERs in South Africa. In countries with moderate GF values such as Kenya, this same wind farm would receive 61,000 CERs. Strikingly, in countries like Ethiopia, Congo, Zambia, or Mozambique with GFs close to zero due to their dominant share of hydropower, such a project would yield only 650 CERs.[9] This is less than 1% of of the 83,000CERs which the average GF for all registered grid-connected CDM projects of 0,83tC02e/MWh would yield (IGES 2011). As a consequence, while renewable electricity projects are formally eligible in these countries, the lack of incentives de facto rules such projects out, independently of the often grossly insufficient and unreliable energy infrastructure. This issue is on the regulatory agenda, as documented for instance in the 'Policy Options to Assess Grid Emission Factors" (UNFCCC 2010c). Two revisions of the grid-tool have resulted in incremental changes.

3.3.2 Off-grid renewable electricity

Rural areas in many countries can be expected not to be covered by electricity grids soon. Still, off-grid technologies may provide modern energy services. These typically operate at much smaller scales, which the project-based CDM has remained unable to support (DeLopez et al 2009). The recent uptake of PoAs in Africa, however, hints at the relevance of regulatory innovation. As methodology development for such dispersed reductions has been cumbersome, top-down methodology development for such project types has been proposed. The efficient lighting methodology AMS-III.AR, which is typically implemented with solar home systems, provides a recent example. The EB Small Scale Working Group commissioned Lawrence Berkeley National Energy Laboratory to review existing methodologies and link technical standards with emission reduction default values (Mills 2010). The crediting period is set at only two years unless the device matches these benchmarks, in which case the project is eligible for the common renewable seven or ten year periods. Hence, the revised CDM methodology is not only simpler to apply, but may even act as a quality driver in a market that has been flooded with low-quality products. While this particular methodology still needs to demonstrate its practical impact due to a natural implementation delay, all solar technologies combined now comprise 16% of all PoAs, in contrast to only 2,3% in project-based and programmatic CDM combined (UNEP 2011a).

3.3.3 Relevant Reform Processes

The inequitable incentives for grid-connected renewable energy and the cumbersome uptake of offgrid applications are in conflict with exogenous design principles such as equity and CBRD. Yet, ongoing reforms address these issues. An early regulatory intervention was to simplify operational rules for small scale projects, which now comprise 47% of all registered projects. Programme of Activities (PoA) can be developed across borders, which may simultaneously achieve scale and learning effects in several countries. A recent survey found that practitioners see PoAs as "essential in providing access to the CDM for LDCs with impacts potential far beyond any other international efforts" (Sehlleier and Michaelowa 2011).[10] The most recent attempt to address scale is

the new category of 'microscale' projects: Energy generation up to 5MW or energy efficiency below 20 GWh per year are automatically additional if the host country is an LDC (UNFCCC 2011e). The 2010 Cancun Agreements aim at further facilitating the CDM participation of 'underrepresented' countries by developing 'standardized baselines' and factoring in 'suppressed demand'. Standardization aims at simplifying data collection, baseline setting and monitoring for projects with high sustainable development impacts. Through both top-down and bottom-up methodology development, e.g. for energy generation in isolated areas, this process may facilitate new project types and greater host country influence. For countries with less than ten registered projects, the UNFCCC Secretariat offers to cover the costs of developing up to three standardized baselines, and the EB develops a loan scheme for PDD development. In the absence of historic GHG emissions due to poverty, sustainable development requires greenfield development rather than cleaning up existing pollution. Factoring 'suppressed demand' into CDM methodologies aims at accounting for 'reductions of future anthropogenic emissions', defined as minimum service levels. Although the first modalities and procedures for the CDM state that "the baseline may include a scenario where future anthropogenic emissions by sources are projected to rise above current levels, due to the specific circumstances of the host Party" (UNFCCC 2006), this issue has only recently led to a dedicated EB work program (UNFCCC 2011c). In sum, these potentially far-reaching reforms demonstrate that the CDM's regulatory institutions are sufficiently responsive to adjust rules, even if these reforms still need to demonstrate their effectiveness. The final section will explore how these evolving CDM rules affect climate and energy governance processes in Ethiopia.

4. Governing Clean Development from Below? The CDM's Impact on Climate and Energy Governance in Ethiopia

4.1 Climate Governance and the relevance of the CDM for Ethiopia

Climate change has only recently gained prominence as a political issue in Ethiopia, but has since been driven from the highest level. Since 2009, Prime Minister (PM) Meles Zenawi acts as Chair of the African Heads of State and Government on Climate Change, and has co-chaired the UN Secretary-General's High-Level Advisory Group on Climate Change Financing. His chief economic advisor Newai Gebre-Ab is a member of the Transitional Committee for the GCF. At CMP7 in December 2011, the PM launched Ethiopia's 'Climate-Resilient Green Economy' (CRGE) strategy. Besides forestry, agriculture and other sectors, renewable energy development is at the heart of this ambition. Ethiopia is endowed with potential for hydro in the river systems that descend the Ethiopian highlands (45,000MW), wind (7000MW) and geothermal power across the Eastern African Rift Valley (700MW) (HBF 2010). Ethiopia's five year Growth and Transformation Plan (GTP) aims at adding 8,000MW to the existing 2,000MW installed capacity, predominantly from hydropower (FDRE 2010). The government has submitted potential NAMAs to the UNFCCC, which include 10 hydro power plants 'in construction', 11 further 'under study', 7 wind projects, 6 geothermal projects, and 12 offgrid projects (UNFCCC 2010b). Despite this physical potential and political commitment, none of these projects has been submitted as a CDM project. With the exception of large-scale hydropower, many projects remain on the drawing board. A brief overview of CDM institutions, actors and the nascent project pipeline will provide the context for understanding the impact of CDM rules on climate and energy governance, taking into account the Scaling-Up Renewable Energy Program (SREP) and CRGE.

4.1.1 CDM Institutions and Actors

Since 2006, the Environmental Protection Authority (EPA) has been acting as DNA, hence, the formal requirement to host CDM projects is in place. The CDM has not been

integrated into sectoral policies and regulation yet, but the EPA has drafted "Regulations for Licensing Carbon Finance Related Activities in Ethiopia" (EPA 2010, Haddush 2010), which are currently shelved because of the uncertainty of the CDM's future. The DNA has institutionalized exchanges with the 'Carbon Finance Working Group', an association of Ethiopian climate policy and CDM experts. One of its members, Ambachew F. Admassie of Ethan Biofuels, is currently a member of the CDM Methodology Panel, and acts as a private sector observer of SREP. Beyond this narrow community of practice, however, CDM capacity in the public and private sector remains low and even part-time staff assignments are rare (GTZ 2007). Ethiopia participates in UNEP/UNDP's regional CDM capacity building program, which has contributed to raising awareness through workshops, a website, and country-specific resources (UNDP 2009, Kelly 2009). These have not been updated, however, and the resulting PINs have not translated into projects yet. The EPA and international development agencies occasionally arrange CDM training workshops. Ethiopian financial institutions have not yet become involved with the CDM.

4.1.2 CDM projects and potential

The only registered CDM project is World Vision's 'Humbo Assisted Natural Regeneration' A/R-project, which seeks to restore 2728 hectares of degraded land. Humbo was first contemplated as early as 2004, submitted for validation in 2008 (UNFCCC 2010a), and was registered in April 2011. As a consequence, a national 'Scaling-up the Humbo experience' workshop has been held, and World Vision Ethiopia is planning a replication A/R PoA, as well as an improved cook stove PoA (Tofu 2011). Furthermore, Ethan Biofuels and Derba MIDROC's 'Midroc Clinker optimization in cement types production at Derba MIDROC cement plant' has entered validation in late 2011. A cook stove PoA by the World Food Program, as well as a waste management project by the Horn of Africa Regional Environment Centre and Network and Addis Ababa City administration are in more advanced planning stages.

Further projects have expressed 'prior consideration' of the CDM, which is a formal operational rule to demonstrate additionality (UNFCCC 2011f). Among these are two cement projects that submitted notification in November 2009. Additionally, there is another reforestation project (8/2010), the "Ethiopian National Railway Network Development Project" (11/2010), and two more cement projects (10,11/2010). In December 2012, a public-private wind farm developer (Lafto Turbines 'Aysha II'), an Ethiopia-Kenya power interconnector project by the state-owned Ethiopian Electric Power Corporation (EEPCO), as well as lead and aluminium recycling projects (Neuerth Group), and a carbon sequestration project joined this list. It remains to be seen how many projects many will actually be validated. What this pipeline indicates, though, is the potential diversity of the CDM as well as an increasing inflow that commenced only recently with three projects in 2009 and 2010, respectively, but seven in 2011, four in December 2011 alone. This indicates that the CDM is not seen as a hopeless cause. Indeed, more than 40 PINs of varying quality had already been submitted to the DNA by 2010, which included one off-grid electricity, but not a single grid-connected electricity project idea. None of those PINs have progressed, which is particularly striking as Arens et al (2011) estimate Ethiopia's CDM potential to be the highest among all African LDCs.[11] In short, there are clearly profound capacity and resource constraints, as well as country and sector risks for underlying projects, which contribute to why this potential has not been exploited yet. The complete absence of the globally most important grid-connected electricity sector in potential studies and practice, however, suggests that CDM rules contribute to preventing such projects. Their broader impact on climate and energy governance processes in Ethiopia will be explored below.

4.2.1 Governance from Above: The Impact of CDM Rules on Climate and Energy Governance in Ethiopia

The absence of electricity projects confirms the practical impact of CDM rules for grid-connected renewable electricity introduced above. While some of the proposed NAMA projects are formally eligible, the low GF prevents economic incentives. Several feasibility studies for Ethiopian wind sites have assessed CDM potential and concluded that CER revenue would hardly cover transaction costs (GTZ 2006 a,b). It is not clear whether two recent grid tool revisions have not been applied due to lacking international support or whether it has been judged unwise to spend scarce resources on what would improve CDM incentives only marginally. The CDM does create incentives, however, for cross-border clean power export from a 'clean' to a 'dirty' grid, as practiced between Bhutan and India. Indeed, the Ethiopian Electric Power Corporation (EEPCo) has expressed prior consideration of the CDM for power export to Kenya (UNFCCC 2011f). It should not be overlooked that such deals may raise the necessary foreign currency to develop domestic infrastructure, which is an explicit ambition of the Ethiopian government (CRGE 2011). Yet, the impact of energy poverty on economic productivity and human development in Ethiopia suggests that current CDM rules create a perverse incentive by denying support for domestic power consumption while crediting exports. This lack of CDM incentives is clearly a consequence of determining baselines uniformly on historical emissions, which does not account for the circumstances of countries that require greenfield development as discussed above.

Awareness for this issue is high in Ethiopia and undermines the CDM's legitimacy. When the EB had recently called for public inputs on new approaches to baseline determination, the Ethiopian DNA responded that "the existing [GF] calculation tool is [...] illogical in many ways to be applicable uniformly to all nations", and does not properly address the circumstances of "nations like Ethiopia with huge clean plants […], even if they are not meeting national demands" [EPA 2011a: 2]. The EPA has consecutively been invited to present its views during a regional DNA Forum (Abebe 2011). Such institutionalized UNFCCC fora on global and regional levels are important venues for consultations and experience-sharing, which may eventually feed into reform processes. Emerging standardization procedures explicitly empower DNAs to submit country-specific standardized baselines, which may account for unmet demand in countries like Ethiopia.

4.2.2 Implications for Renewable Energy Governance in Ethiopia

The full impact of these CDM rules can only be understood by exploring their broader energy governance implications. Ethiopia's "greatest infrastructure challenge lies in the power sector, where a further 8,700 megawatts of generation plant are needed over the next decade", which is four times the present capacity at an estimated $3.3 billion annually (World Bank 2010: 4). Per capita electricity consumption has increased from 30KWh in 2004 to 51KWh in 2010, which is still less than half the low-income country average (EEPCO 2011). Still, more than 90% of Ethiopia's energy use is traditional biomass, which leads to extensive deforestation and environmental degradation. Even without CDM support, the government prioritizes developing Ethiopia's energy potential. Several large dams have recently been connected to the grid (Gibe I&II, Tekeze, Beles), while others are in planning or construction (EEPCO 2011). The Ethiopian government is confident enough in the country's ability to develop this potential to initiate major power export programs through a future Eastern African Common Power Pool. This draws attention to the political implications of energy governance beyond an economic rationale. These can be most clearly illustrated with the plan to build the gigantic 5640MW 'Ethiopian Renaissance Dam', which was unveiled in April 2011. By framing the

dam as the solution for the nation's power needs and a source of foreign currency, the government is mobilizing Ethiopian society at levels that are possibly unprecedented for a civil works project.[12] The transboundary implications of utilizing the Blue Nile through this dam, however, have to be seen in a larger strategic and geopolitical context (Cascão 2008). Environmental and social aspects of this massive infrastructure development are sensitive issues, although the climate vulnerability of hydropower is more consensual. Drought has previously required using expensive and emissions-intensive diesel generators (Eberhart et al 2008). Mitigating this vulnerability by diversifying power infrastructure has been challenging. Two wind farms are under construction, while geothermal capacity remains at 7,5MW since the 1990s. The absence of CDM incentives for renewable electricity beyond least-cost hydropower is only one factor besides domestic institutional and regulatory constraints. In brief, the power sector effectively operates under a state monopoly. The Electric Energy Agency regulates the power sector, while EEPCo is responsible for construction, generation, transmission and distribution. Even if Ethiopia's Energy Policy allows independent power producers (IPP) to supply to the grid (EEA 1996), this has been limited to short-term rentals of diesel generators. Underpricing has prevented power purchase agreements (PPA) that would make the development of power plants above cost recovery levels viable (Eberhart 2008: 31). PPAs, however, are key for the certainty that large-scale infrastructure investments without ODA require, for instance through the CDM. However, EEPCO is said to have recently applied to EEA to raise consumer tariffs to cost recovery level (SREP IP 2012). EEA has been working on a renewable electricity feed-tariff for several years, although it is not clear when this potentially important policy instrument will become effective.

As 85% of the Ethiopian population lives in offgrid areas, there is a large recognized potential for such applications, which is unaffected by the non-conducive baseline for grid-connected renewable electricity. Yet, not a single CDM project aims at harnessing this potential, which draws further attention to the viability of underlying projects. A voluntary solar home systems PoA developed by Ethio-German Solar Energy Foundation and Swiss non-profit Myclimate Foundation, however, seeks registration from the Gold Standard (Gold Standard 2010). Gold Standard projects are modeled on the CDM but require meeting more stringent sustainable development criteria. Although it is formally not a CDM project, this PoA uses the CDM small-scale methodology I.A "Electricity generation by the user", and demonstrates additionality according the CDM guidelines for microscale project activities (UNFCCC 2011e). Meeting their target of distributing 200,000 solar home systems by 2019 would be a considerable achievement as such decentralized approaches require high administrative and logistical efforts.

As a result, both CDM rules and domestic constraints present obstacles to Ethiopia's grand ambitions. The impact of large-scale hydropower on baselines also affects CDM incentives for other technologies negatively as it lowers the GF, but does not capture the shortcomings of the existing Ethiopian infrastructure and fails to reward potential sustainability and climate resilience benefits. While the focus of this paper rests on the impact of CDM rules, both the CDM and domestic conditions require reform to realize Ethiopia's full renewable energy potential. The case of neighboring Kenya strengthens this argument: A sufficiently attractive GF provides CDM incentives which, in tandem with improving domestic regulation (including a feed-in tariff) and restructuring Kenya's energy agencies, have begun to initiate the development of geothermal, wind, co-generation and small hydro plants by both public and private investors. As all Kenyan wind and geothermal projects are supported through the CDM, the mechanism can be considered to be a significant causal factor (UNEP 2011a).

4.2.3 Outlook on Climate and Energy Governance

SREP presents an immediate opportunity to initiate such diversification. Unlike the CDM, SREP provides upfront co-financing for strategic projects with 'transformative effects'. Ethiopia expects to receive $69mn for one geothermal (Aluto Langano, 200MW) and one wind project (Assela, 120MW), as well as a 'clean energy SME facility' (SREP IP 2012). Although this alleviates an important CDM barrier, SREP resembles conventional multilateral lending, being top-down driven, capped and limited to individual pilot projects. Hence, the program may initiate, but will not be able to sustain the aspired transformation. Consequently, such programs can only be seen as an alternative to the CDM if they are upscaled, diversified and accessible to non-state actors. Possibly synergies, such as in Kenya's SREP investment plan in which SREP finance is used to leverage CDM revenue for solar water heating, show interesting approaches for integrating climate policy instruments.

The CRGE strategy's ambitions also offer interesting lessons on the broader impact of the CDM. CRGE sets out the bold ambition of reducing the already negligible "emissions on a per capita basis […] from 1.8 tCO2e to 1.1 […] while multiplying GDP per capita from USD380 to more than USD1,800", thereby achieving middle-income status by 2025 (CRGE: 28). Particularly in agriculture and forestry, "Ethiopia's green economy offers GHG abatement potential of 250Mt to the global community" (CRGE 2011: 28) for which it seeks climate finance support, including from the CDM. In the power sector, CRGE assumes that generation will be largely renewable-based, but the CDM is only mentioned for its export potential (96). Hence, CRGE focuses on current rules and does not explicitly mention intentions to engage in shaping CDM reform. As CRGE implementation strategies evolve, the question of whether CDM reforms or new climate finance instruments may address Ethiopia's circumstances better will become critical. As the technical subcommittee that coordinates CRGE's mainstreaming into respective ministries is headed by EPA's deputy director Dessalegne Mesfin, the DNA is in a prime position to coordinate such processes.

5. Conclusions

The theoretical vantage point of this working paper proposes to appreciate the CDM as a governance institution that is nested in the overarching climate regime, and analyzes the impact of its rules for renewable energy projects on climate and energy governance in Ethiopia. It is an unambiguous smoking gun observation that the CDM's rules for grid-connected electricity do not support renewable energy projects in countries with clean, but insufficient energy infrastructure. Even if Ethiopia may be the most salient case due to its size and its commitment to UN climate policy, the relevance of this finding extends to countries like DRC, Zambia, Mozambique, and others in similar circumstances.

Studying the impact of CDM rules in Ethiopia in this perspective, as well as the Ethiopian response, reveals important insights about the interface between governance architecture and agency. CDM reform processes seem to be strongly driven from a global regime level, as the regime's norms and bureaucracy shape the mechanism's regulatory evolution. With regards to governance from below in which domestic actors act as 'governance drivers', there seems to be a disconnect between Ethiopian efforts and the UNFCCC reform agenda. Yet, Ethiopia is not reduced to a 'governance recipient' even if its willingness to engage in international climate policy mechanisms, particularly by public actors, has not yet translated into the authoritative agency that would result in adjusted CDM rules. The agenda of domestic strategies such as SREP and CRGE clearly demonstrates a high level of ambition for renewable energy deployment, as well as the attempt to maximize benefits from the CDM and other climate policy instruments. The

window of opportunity of recent reform processes may be able to adjust this blind spot in CDM rules in the often-cited learning-by-doing manner. Yet, this situation raises the question of whether CDM host countries should be expected to develop the specialized expertise that is needed to push through such reform proposals, particularly in light of the volatility of carbon markets. While the CDM has demonstrated its ability to support renewable energy elsewhere, circumstances like Ethiopia's will require bold reform of the current CDM's baseline rules, alternative instruments or integrated approaches, such as combining an improved CDM with an international feed-in tariff (Castro et al 2011).

Some more general lessons can also be distilled from this analysis. First, a wealth of Ethiopian initiatives, ideas and strategies are influenced by the CDM, which shows that analyses of its impact should not be reduced to 'successful' projects. Second, it is clear that not only market forces, but also regulatory deficits provide obstacles for broader participation in the CDM. These rules have been shown to be dynamic, although the rationale behind current baseline setting – generating measurable emission reductions – is related to the nature of the CDM as an offset mechanism. Whether the reduction of 'suppressed demand' is eligible for CERs is a highly politicized question, even if it has recently climbed up the reform agenda. While a proliferation of offset credits undermines global mitigation efforts, climate finance alternatives such as NAMAs are currently not operational, with the exception of restricted instruments like SREP. Therefore, the CDM's purpose to support countries in their sustainable development and contribution to the UNFCCC's ultimate objective requires it to account for the conditions of countries with urgent development needs, particularly in light of the CDM's embeddedness in the climate governance architecture and its normative foundations. One possible avenue to handle this dilemma without major regulatory innovation could be to purchase suppressed demand credits through the GCF. If these would be retired instead of being sold as offsets, global emissions would not increase. Third, this case study indicates that broader access to market-based mechanisms also requires conducive domestic institutional and regulatory conditions which are often left out of a discourse that tends to focus on finance and technology. While neither the CDM nor other climate finance instruments can be expected to solve Ethiopia's development challenges, adjusting CDM rules to LDC contexts could not only support Ethiopia in realizing its renewable energy potential, but also strengthen the legitimacy of the CDM among developing countries.

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[1] 4478, or 65% of all projects. Unless otherwise indicated, all data on CDM projects is taken from UNEP (2011a), as of 12/2011.

[2] The UNFCCC Secretariat estimates an average of circa $45mn investment into each of the 3620 registered projects (UNFCCC 2011g).

[3] While LDCs are a relevant category for CDM regulation, many of these issues also affect the much larger group of low-income countries. Hence, if I do not refer to specific rules for LDCs but to broader issues, I will use either term.

[4] For a comprehensive overview see Bulkeley and Newell (2010).

[5] For a comprehensive account of CDM governance architecture see Yamin and Depledge (2004), and, with a particular focus on the objective to promote sustainable development from the perspective of international law, French (2005).

[6] All numbers are based on UNEP Risoe Pipeline as of December 2011 (UNEP 2011).

[7] This distinction is analytical and not legalistic. The categories seek to reveal the influence of the overarching regime in design principles beyond what may be legally defined, and capture dynamics of rule evolution. This approach is inspired by Ostrom's argument for systematic differentiation of rules, although her complex 'institutional grammar' seems to be overly positivist for my interpretive and inductive analysis of the empirical case (2005: 138). Instead, it seems more sensible to work with broader, more general categories. Yamin and Depledge mention cross-cutting issues, principles, and operational modalities with reference to the Marrakech Accords (2004: 143), but do not develop this further analytically.

[8] The methodologies can be found on www.cdm.unfccc.int, statistics and analyses of their application at UNEP (2011a).

[9] All calculations are based on IGES (2012). Ethiopia's GF of 0,006 tC02e/MWh has been calculated according to version 1 of the grid tool (Wetzer 2008), and has not been updated to the later versions. Yet, expected improvements are likely to be negligible.

[10] See also Africa Progress Panel (2009), Kickstarting Africa's Carbon Markets. The Potential for Programmatic CDM. Geneva: AAP.

[11] Ethiopia ranks first with an estimated potential for 32,000k CERs/year, primarily in agriculture, forestry and offgrid electricity, followed by Tanzania (24,500kCERs/y), DRC (18,000kCERs/y) and Uganda (17,650kCERs/y).

[12] In order to raise the estimated 80 billion Ethiopian birr, the government sells dedicated bonds in Ethiopia and to the diaspora (Davison 2011). The Ethiopian Renaissance Dam was formerly named Millenium Dam, and would be the 10th largest in the world.

References

Abebe, S.K. (2011), DNA's Perspective. Presentation during Plenary Session 5 Grid Emission Factor (GEF): DNA proactive role, 11th CDM Designated National Authorities Forum, March, 10-11 2011.

Arens, C., Burian, M., Sterk, W., Schnurr, J., Beuermann, C., Blank, D., Kapor, Z., Kreibich, N., Mersmann, F., Burtscher, A., and Schwan, S. (2011), *The CDM Project Potential in Sub-Saharan Africa with Focus on Selected Least Developed Countries*. Berlin: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

Bäckstrand, K. (2006), Multi-Stakeholder Partnerships for Sustainable Development: Rethinking Legitimacy, Accountability and Effectiveness. *European Environment* 16(5): 290-306.

Bakker, S.J.A., Van Asselt, H.D., Gupta, J., et al (2009), *Differentiation in the CDM: Options and Impacts, Climate Change Scientific Assessment and Policy Report*. Bilthoven: Netherlands Environmental Assessment Agency.

Bazilian, M., Nussbaumer, P., Gualberti, G. et al (2011), Informing the Financing of Universal Energy Access: an Assessment of Current Financial Flows. *The Electricity Journal* 24(7): 57-82.

Benecke, G. (2009), Varieties of Carbon Governance: Taking Stock of the Local Carbon Market, *Journal of Environment and Development* 18(4): 346-370.

Benecke, G., Friberg, L., Lederer, M., Schröder, M. (2008), From Public-Private Partnership to Market. The Clean Development Mechanism (CDM) as a New Form of Governance in Climate Protection, *SFB-Governance Working Paper Series*, No. 10, Research Center (SFB) 700, Berlin.

Biermann, F., Pattberg, P., Zelli, F. (eds.) (2009), *Global Climate Governance Post-2012. Architecture, Agency and Adaptation*, Cambridge: Cambridge University Press.

Blodgett, C. (2010), Grid emission factors and off-grid power generation, Presentation at African Carbon Forum 2011.

Börzel, T. & Risse, T. (2010) Governance without a State: Can it work? *Regulation & Governance*

4(2): 113–134.
Bulkeley, H. & Newell, P. (2010), *Governing Climate Change*. London: Routledge.
Busch, P. (2009), The Climate Secretariat. Making a Living in a Straitjacket, in: Biermann, F. and Siebenhüner, B. (eds.) (2009), *Managers of Global Change, The Influence of International Environmental Bureaucracies*. Cambridge, Massachusetts: MIT Press.
Cascão, A.E. (2008), Ethiopia–Challenges to Egyptian hegemony in the Nile Basin. *Water Policy* 10(2): 13–28.
Castro, P. & Michaelowa, A. (2011). Would preferential access measures be sufficient to overcome current barriers to CDM projects in least developed countries? *Climate and Development* 3(2): 123-142.
Castro, P., Hayashi, D., Kristiansen, K., Michaelowa, A., Stadelmann, M. (2011) Scoping Study – Linking RE Promotion Policies with International Carbon Trade (LINK), Study commissioned by International Energy Agency Renewable Energy Technology Deployment. Source: http://iea-retd.org/wp-content/uploads/2011/09/LINK-RE-policy-and-carbon-trade-2011-06.pdf, accessed January 6, 2012.
Davison, W. (2011), Ethiopia Sells Bonds to Finance Africa's Biggest Power Plant, Bloomberg 29 September.
De Gouvello, C., Dayo, F.B., Thioye, M. (2008), *Low-Carbon Energy Projects for Development in Sub-Saharan Africa – Unveiling the Potential, Addressing the Barriers*. Washington, DC: The World Bank.
De Lopez, T., Tin, P., Iyadomi, K. et al (2009), Clean Development Mechanism and Least Developed Countries: Changing the Rules for Greater Participation, *The Journal of Environment & Development* 18(4): 436-452.
Eberhard, A., Foster, V., Briceno-Garmendia, C., Ouedraogo, F., Camos, D., Shkaratan, M. (2008), Underpowered: The State of the Power Sector in Sub-Saharan Africa. *Background Paper 6, Africa Infrastructure Country Diagnostic*, IBRD/World Bank: Washington, DC.
Ethiopian Electricity Agency (EEA) (1996), *The National Energy Policy*, Addis Ababa: EEA.
EEPCO (2011) Facts in Brief. Source: http://www.eepco.gov.et/eepco.php, accessed July 15th, 2011.
EPA (2011a), Public input from Ethiopia, through the DNA to the current input towards the "Draft tool for baseline identification" and Draft tool for baseline emissions calculation", Bonn: UNFCCC.
EPA (2010b), *Regulations for Licensing Carbon Finance Related Activities in Ethiopia*, Addis Ababa: EPA.
FDRE (2012), *Scaling-Up Renewable Energy Program Investment Investment Plan*. Addis Ababa: Ministry of Water and Energy.
FDRE (2011), *Ethiopias Climate Resilient Green Economy*, Addis Ababa: FDRE.
FDRE (2010), *Growth and Transformation Plan 2010/11-2014/15*. Addis Ababa: Ministry of Finance and Economic Development.
French, D (2005), *International Law and Policy of Sustainable Development*. Manchester: Manchester University Press.
Fuhr, H., Lederer, M. (2009), Varieties of Carbon Governance in Newly Industrializing Countries, *The Journal of Environment & Development* 18(4): 327-345.
Gold Standard Foundation (2010), Solar Lighting in Rural Ethiopia, GS911. Geneva: Gold Standard.
GTZ (2007), The Clean Development Mechanism in Relation to Energy. Status Quo, Obstacles and Recommendations: The Clean Development Mechanism. Nairobi: GTZ – Regional Energy Advisory Platform East Africa.
GTZ (2006), Feasibility Study for Wind Park Development in Ethiopia and Capacity Building. Ashegoda Wind Park Site Final Report. Eschborn: GTZ.
GTZ (2006), Feasibility Study for Wind Park Development in Ethiopia and Capacity Building. Mesobo-Harena Wind Park Site Final Report. Eschborn: GTZ.
Haites, E., Yamin, F. (2000), The Clean Development Mechanism: Proposals for its Operation and Governance, *Global Environmental Change* 10(1): 27- 45.
Haddush, Zekarias (2010), EPA regulation to invite Private Sector to Carbon Trading, *Addis Fortune*, May 23, 2010.
Heinrich Boell Foundation and Forum for Environment (2009), *Diversity and Security for the Ethiopian Power System. A preliminary assessment of risks and opportunities for the power sector*. Addis Ababa: Heinrich-Boell-Foundation.
IGES (2011), List of Grid Emission Factors (August 2011). Kamiyamaguchi, Hayama, Kanagawa,

Japan: IGES.
IPCC (2011), IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation. Prepared by Working Group III of the IPCC [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schlömer, C. von Stechow (eds)]., Cambridge and New York: Cambridge University Press.
Kelly, R. (ed.) (2009), *Bio-Carbon Opportunities in Eastern and Southern Africa. Harnessing Carbon Finance to Promote Sustainable Forestry, Agro-Forestry and Bio-Energy*, New York: UNDP.
Lederer, M (2010), Evaluating Carbon Governance: The Clean Development Mechanism from an Emerging Economy Perspective, *The Journal of Energy Markets* 3(1): 1–23.
Michaelowa, A. (2011), *Rule consistency of grid emission factors published by CDM host country authorities. Report commissioned by CDM Watch*. Zuerich: Perspectives.
Michaelowa, A., Michaelowa, K. (2009), Does Human Development Really Require Greenhouse Gas Emissions? Paluoso, Elija (ed.) (2009), *Rethinking Development in a Carbon Constrained World. Development Cooperation and Climate Change*, Helsinki: Ministry for Foreign Affairs. 170-183.
Mills, E. (2010), From Carbon to Light. A New Framework for Estimating Greenhouse-Gas Reductions from Replacing Fuel-based Lighting with LED Systems, Lumina Project Technical Report #8. Source: http://light.lbl.gov/pubs/tr/lumina-tr5-summary.html, last accessed: January 6, 2012.
Mulugetta, Y. (2007) 'Renewable energy technology and implementation mechanisms for Ethiopia', *Energy Sources* 2(1): 3-17.
Newell, P. (2009), Varieties of CDM Governance: Some Reflections, *The Journal of Environment & Development* 18(4): 425-435.
Newell, P. (2010), The Public, the Private and the Hybrid: Mapping the Governance of Energy Finance*, The Governance of Clean Development Working Paper Series No. 10*. University of East Anglia.
Newell, P. Jenner, N. Baker, L. (2009), Governing Clean Development: A Framework for Analysis. *Working Paper 001, The Governance of Clean Development Working Paper Series.* School of International Development, University of East Anglia, UK.
Newell, P., Phillips, J., Purohit, P. (2011), The Political Economy of Clean Development in India: CDM and Beyond, *IDS Bulletin* 42(3): 89-96.
Oberthür, S. and Stokke, O.S. (2011), *Managing Institutional Complexity: Regime Interplay and Global Environmental Change*, Cambridge: MIT Press.
OECD and IEA (2010), *Energy Poverty. How to make modern energy access universal?* Paris: IEA.
Ostrom, E. (2009), A Polycentric Approach for Coping with Climate Change, *Background Paper to the 2010 World Development Report,* New York: World Bank.
Ostrom, E. (2005), *Understanding Institutional Diversity*, Princeton: Princeton University Press.
Pattberg, P., Stripple, J. (2008) Beyond the Public and Private Divide: Re-Mapping Transnational Climate Governance in the 21st Century, *International Environmental Agreements* 8(4): 367-388.
Paulsson, E. (2009), A review of the CDM literature: from fine-tuning to critical scrutiny? *International Environmental Agreements* 9(1): 63-80.
Rosenau, J.N., Cziempel, E.O. (1992), *Governance without Government: Order and Change in World Politics*, Cambridge: Cambridge University Press.
Sathaye, J., Najam, A., Cocklin, C., Heller, T., Lecocq, J., Llanes-Regueiro, J.P., Petschel-Held, G. , Rayner, S., Robinson, J., Schaeffer, R., Sokona, Y., Swart, R., Winkler, H. (2007): Sustainable Development and Mitigation. In Metz, B., Davidson, O.R., Bosch, P.R., Dave, R., Meyer, L.A. (eds), *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
Schröder, M. (2009), Varieties of Carbon Governance: Utilizing the Clean Development Mechanism for Chinese Priorities, *Journal of Environment and Development* 18(4): 395-424.
Sehlleier, F., Michaelowa, A. (2011), GIZ CDM Highlights Newsletter, December 2011. Bonn and Eschborn: Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ).
Szulecki, K., Pattberg, P., Biermann, F. (2011), Explaining Variation in the Effectiveness of Transnational Energy Partnerships, *Governance: An International Journal of Policy, Administration, and Institutions* 24(4): 713-736.
Sokona, Y., Humphreys, S., Thomas, J.P. (1998), What Prospects for Africa? In: Goldemberg, J. (ed), *Issues & Options. The Clean Development Mechanism,* New York: UNDP.
Streck, C. (2004), New Partnerships in Global Environmental Policy: The Clean Development

Mechanism, *The Journal of Environment and Development* 13(3): 295-322.
Tofu, A. (2011), Learning from Ethiopia Humbo Assisted Natural Regeneration CDM. Presentation of Insights from A/R CDM projects: Reforming current rules to expand LULUCF opportunities, October 2nd, 2011. Panama City: WB Biocarbon Fund.
UNDP (2007), CDM Opportunities and Challenges in Ethiopia, Source: http://www.undp.org/climatechange/carbon-finance/CDM/ethiopiaOpp.shtml, accessed: October 18, 2010.
UNEP (2011a), UNEP Risoe CDM/JI Pipeline Analysis and Database, December 2011. Roskilde: UNEP.
UNEP (2011b), Why a Green Economy matters for the Least Developed Countries: Tapping New Green Growth Options for Improved Development Prospects. UNEP: Nairobi.
UNFCCC (2011c), Executive Board of the Clean Development Mechanism Sixty-Fourth Meeting Report, Annex 30: Work Programme on Suppressed Demand. Bonn: UNFCCC.
UNFCCC (2011d), Further Guidance Relating to the Clean Development Mechanism, Bonn: UNFCCC.
UNFCCC (2011e), Guidelines for Demonstrating Additionality of Microscale Project Activities. EB 63 Report,Annex 23, Bonn: UNFCCC.
UNFCCC (2011f), Prior Consideration of the CDM, Host Party: Ethiopia. Bonn: UNFCCC.
UNFCCC (2011g), Input to the high-level panel for the CDM Policy Dialogue. Background Paper by the Secretariat. Bonn: UNFCCC.
UNFCCC (2010a), Project 2712: Humbo Ethiopia Assisted Natural Regeneration Project, Source: http://cdm.unfccc.int/Projects/DB/JACO1245724331.7/view, accessed: October 18, 2010.
UNFCCC (2010b), Appendix II – Nationally Appropriate Mitigation Actions of Developing Country Parties – The Federal Democratic Republic of Ethiopia. Bonn: UNFCCC.
UNFCCC (2010c), EB 54, Proposed Agenda – Annotations, Annex 4. Policy Options to Assess Grid Emission Factors Published by National Authorities. Bonn: UNFCCC.
UNFCCC (2006), Modalities and Procedures for a Clean Development Mechanism as defined in Article 12 of the Kyoto Protocol (decision 3/CMP.1), Bonn: UNFCCC.
UNFCCC (1998), Kyoto Protocol to the United Nations Framework Convention on Climate Change, Bonn: UNFCCC.
Vogler, J. (2003), Taking Institutions Seriously: How Regime Analysis can be Relevant to Multilevel Environmental Governance Global, *Environmental Politics* 3(2): 25-39.
Vogler, J. (2000), *The Global Commons. Environmental and Technological Governance*, Chichester: John Wiley & Sons.
Wetzer, W. (2008), Calculation of the Combined margin emission factor of Ethiopia´s electric power system according the UNFCCC Methodological tool "Tool to calculate the emission factor for an electricity system", Vienna: Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austria.
World Bank (2010), Ethiopia's Infrastructure: A Continental Perspective. *Africa Infrastructure Diagnostic Report*, *Country Report*. Washington, DC: World Bank.
Yamin, F., Depledge, J. (2004), *The International Climate Change Regime: A Guide to Rules, Institutions and Procedures.* Cambridge: Cambridge University Press.
Zenawi, M. (2011), Address by H.E. Mr. Meles Zenawi, Prime Minister of the Federal Democratic Republic of Ethiopia, Hydropower for Sustainable Development Conference, 31 March 2011, Addis Ababa, Ethiopia. Source: http://www.uneca.org/eca_resources/Speeches/2011_speeches/110331_speech_MelesZenawi.html, accessed