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Urban Climate Governance Experiments in South Africa: *Insights from Johannesburg, Cape Town, and Durban*

Paper presented at the ISA Annual Convention held in Baltimore, 22-25 February 2017

First Draft (as of 13 February 2017)

Abstract

In the past few years, several scholars have pointed to the increasing importance of cities and municipalities in the global response to climate change. Despite the burgeoning literature on urban climate policy-making, we still lack empirical evidence how individual urban responses to climate change emerge and evolve over time. In particular, the precise nature and specific conditions under which local climate actions arise in developing countries and what role transnational city networks play in these developments have not been analyzed in enough detail. Therefore, in the present paper, we focus on the individual climate governance experiments of three major cities in South Africa and place emphasis on the impact of transnational city networks on climate policy-making in Johannesburg, Cape Town, and Durban. Interestingly, instead of developing similar approaches to the issue of climate change, the individual responses of the three cities to cope with climate change differ in several respects. Thereby, transnational city networks have provided considerable support to South African metros in the past few years. Yet, it is clear that domestic political-economic barriers for enhanced climate action, such as the gridlock situation in the energy sector, will not be resolved through the participation of local governments in transnational city networks alone.

1. Introduction

In the past few years, several scholars have pointed to the increasing importance of cities and municipalities in the global response to climate change. These authors have provided numerous insights into the broad range of local climate actions and considerably increased our understanding of the local level in climate policy-making. They have, for instance, assessed the opportunities and limits of cities to contribute to climate change mitigation (Betsill 2001; Dodman 2009). They have shown that local governments have employed various modes of governance to tackle climate change in urban areas and studied their interplay with higher levels of government (Bulkeley, Betsill 2005; Kern, Alber 2008; Schreurs 2008). They have highlighted the great significance of available institutional capacities for adapting to the adverse effects of climate change (Adger, Arnell, Tompkins 2005; Dodman, Satterthwaite 2008; Agrawal 2010). They have emphasized the crucial role of leaders and policy entrepreneurs in local public-administrative systems (Bulkeley, Kern 2006; Bahadur, Tanner 2014). And they studied the development of transnational city networks which create best practices for dealing with climate change at the local level (Kern, Bulkeley 2009; Toly 2008; Acuto 2013).

Despite this burgeoning literature on urban climate policy-making, we still lack empirical evidence how individual urban responses to climate change emerge and evolve over time. In particular, the precise nature and specific conditions under which local climate actions arise in developing countries and what role transnational city networks play in these developments have not been analyzed in enough detail. Therefore, in this paper, we focus on the individual climate responses of three major cities in South Africa. Due to the absence of national leadership on the issue of climate change, local governments in South Africa essentially act in a climate change policy vacuum. While the national government of South Africa has so far not developed a binding national legislation to tackle climate change, Johannesburg, Cape Town, and Durban have adopted various mitigation and adaptation measures in an attempt to address existing and expected local climate risks. Interestingly, instead of developing similar approaches to the issue of climate change, the individual responses of the three cities to cope with climate change differ in several respects and can be understood as urban climate governance experiments (Bulkeley, Castán Broto 2013; Castán Broto, Bulkeley 2013). Thus, the present paper explores the particular positions of the three cities with respect to the issue of climate change and traces the evolution of their local climate experiments with respect to their involvement in transnational city networks over the past decade.

We show that all three cities have formulated their own strategies and implemented action plans to tackle climate change in their jurisdictions. They made some remarkable achievements in climate policy-making in certain fields and specific sectors. However, several obstacles hinder these urban actors to undertake more progressive actions to address climate change. This can be explained by the lack of a conducive national policy framework, opposing national interests, and powerful veto players. Moreover, we argue that an often neglected factor is the specific local environment in which the cities find themselves and in which have to act. With regard to the impact of transnational city networks, it is apparent that the *C40 Cities Climate Leadership Group* has provided considerable support to South African metros in the past few years. Yet, it is clear that domestic political-economic barriers for enhanced climate action, such as the gridlock situation in the energy sector, will not be resolved through the participation of local governments in transnational city networks alone.

In this study, we adopted a qualitative case study approach and employed the method of structured focused comparison (George, Bennett 2005). In particular, we conducted an extensive literature review of scholarly and grey literature on climate policy-making in South Africa. Furthermore, we carried out a qualitative content analysis of official documents, such as budget plans, organograms, and policy briefs (Mayring 2004). Finally, we carried out 18 semi-structured expert interviews with public officials at the national, provincial, and subnational level (Bogner, Littig, Menz 2009). The statements given in these interviews were supplemented by eight in-depth discussions with renowned scholars and representatives from governmental and non-governmental organizations concerned with the role of South Africa's public sector in the environmental domain (for a full list of interviews and expert talks conducted, see Annex 1).

This paper proceeds as follows. In the following section, we refer to the current state of research on urban climate governance experiments. After that, we provide an overview of South Africa's multi-level governance system and depict the country's position in the policy domain of climate change. Then, we portray and analyze the individual climate governance experiments undertaken by South Africa's three major cities Johannesburg, Cape Town, and Durban. In this section, we describe the cities' specific environment and focus on the evolution of their climate policies, institutional structures, climate-related projects, and their involvement in transnational city networks. In the final section, we highlight the achievements and obstacles of urban climate governance in the three cities, before we draw some general conclusions.

2. The Emergence of Urban Climate Governance Experiments

For many years, scholars and policy-makers have considered multilateral treaty-making to be the only instrument for dealing with climate change. Accordingly, the global response to climate change was initially concentrated on the creation and evolution of the international climate regime based on the *United Nations Framework Convention on Climate Change* (UNFCCC) which was adopted at the 1992 *Earth Summit* in Rio de Janeiro (United Nations 1992). While the Convention did not contain any binding targets for nation-states, it laid the foundation for the negotiation of the *Kyoto Protocol* that was agreed upon in 1997 and introduced obligations for most industrialized countries to limit their *greenhouse gas* (GHG) emissions (UNFCCC 1997). After the widely perceived failure of the Copenhagen Climate Summit in 2009, however, multilateral treaty-making as the only means to tackle the problem of climate change has come under intense scrutiny. Numerous observers have expressed their disappointment with the modest accomplishments achieved at the annual international climate conferences (e.g. Rayner 2010; Victor 2011). While the latest rounds of negotiations held in Paris and Marrakesh have delivered some promising results, we are still far away from avoiding dangerous climate change (Rockström, Schellnhuber, Hoskins, et al. 2016).

Given the difficulties among national governments to agree upon effective means to address the problem of climate change, the past few years have witnessed the development of myriad climate initiatives next to the UNFCCC process (e.g. Abbott 2012; Bulkeley, Andonova, Betsill, et al. 2014; Hickmann 2016). They have been launched by a plethora of different actors, such as private corporations, non-profit organizations, and public sub-national entities. Among these, the activities undertaken by local governments and transnational city networks have received particular scholarly attention. Several scholars have put forward the argument that cities are particularly suited to cope with the problem of climate change (Kousky, Schneider 2003; Campbell, Fuhr 2004; Campbell-Lendrum, Corvalán 2007; Lebel, Garden, Banaticla, et al. 2007; Barber 2013). They contend that local governments have considerable experience in tackling environmental impacts and are well-positioned to produce co-benefits from sustainable climate policies, such as economic savings, better air quality, or improved liveability of communities. Moreover, they stress that cities have very good chances of agreeing on cooperative solutions because city networks often involve face-to-face communication promoting the development of trust and reciprocity among stakeholders (Ostrom 2010). And they highlight the fact that transnational city networks act as engines of change that seek to overcome constraints imposed by the lack of national and international regulatory environments (Toly 2008; Lee, van de Meene 2012).

Against this backdrop, the actions undertaken by local governments around the world to tackle the problem of climate change have been perceived as urban climate governance experiments. This concept brings different academic disciplines together and builds upon insights from the climate governance literature, the work on niches and grassroots innovations in socio-technical regimes, and the idea of urban laboratories (Castán Broto, Bulkeley 2013; Bulkeley, Castán Broto 2013). Castán Broto and Bulkeley identify three characteristics of climate governance experiments:

> "[F]irst, an intervention is experimental when it is purposive and strategic but explicitly seeks to capture new forms of learning or experience; second, an intervention is a climate change experiment where the purpose is to reduce emissions of greenhouse gases (mitigation) and/or vulnerabilities to climate change impacts (adaptation); third, a climate change experiment is urban when it is delivered by or in the name of an existing or imagined urban community" (Castán Broto, Bulkeley 2013: 93).

In general terms, the concept of urban climate governance experimentation emphasizes the advantages of 'bottom-up' approaches to deal with the issue of climate change. It conveys the idea that the various climate governance experiments which have emerged in the past few years provide new opportunities to foster the necessary transformative shift towards a low-carbon economy. In the remainder or this paper, we focus on three individual urban climate governance responses undertaken by three South African cities and analyze their emergence and evolution over the past decade.

3. Multi-Level Climate Governance in South Africa

South Africa's national GHG emissions added up to approximately 512 Mt of CO_2e in 2013, putting the country on place 17 of the biggest emitters in the world (World Resources Institute 2016). Emissions from energy use account for almost 80 percent of the total emission level, caused by an economy that relies on mining, heavy industry, and cheap energy (Republic of South Africa 2011). Until 2009, South Africa's government subsidized fossil fuel based energy generation in order to support national economic growth (Edkins, Marquard, Winkler 2010; Baker, Newell, Phillips 2014). About 94 percent of South Africa's electricity is generated from domestically produced coal (Climate Action Tracker 2015; International Energy Agency 2015). This underlines the fact that one of the main challenges for the country is to decouple economic growth and GHG emission levels (Vorster, Winkler, Jooste 2011).

3.1 The Role of the National Level

South Africa's national climate policy started with the *National Climate Change Response Strategy* issued in 2004. In 2011, the *National Climate Change Response Policy White Paper* (NCCRWP) was issued by the *Department of Environmental Affairs* (Republic of South Africa 2011). This document constitutes the cornerstone of the national government's climate change policy, but has until 2016 not been legally adopted by parliament. Beyond that, South Africa's national climate change strategy solely consists of a number of sectoral programs and initiatives, for example in the energy sector. The state-owned entity for energy generation *Eskom* occupies the monopoly on this crucial sector for urban action on climate change (Interview 21). In 2008, as a reaction to shortcomings and load shedding in the energy generation by *Eskom*, the national government established the DoRA (Division of Revenue Act) *Municipal Energy Efficiency Demand Side Management* (EEDSM) program to support energy efficiency in municipal infrastructure to overcome supply constraints in the country. The national grants for energy efficiency of up to Euro 1 million per year and city have been an important financial mechanism for setting up mitigation activities at the metropolitan level (Kruger, Tait 2015).

3.2 The Role of the Provinces

The national *White Paper on Climate Change* stipulates the formulation of provincial climate change response strategies and mandates the provinces to support municipalities in implementing climate change mitigation and adaptation measures. The cities we analyze in this paper are located in three different South African provinces: Johannesburg in Gauteng, Cape Town in the Western Cape, and Durban in KwaZulu-Natal. This section provides a brief overview of the respective provincial characteristics in environmental governance and analyzes the relation between the regional and metropolitan level.

The *Western Cape Province* has had its own climate change response strategy in place since 2008. In 2011, the provincial government founded *Green Cape* as an agency to foster the collaboration between government, business, academia and other stakeholders on green economic development and to support local action on climate change. Provincial officials state that the City of Cape Town with its ambitious targets has influenced and enhanced action on climate change at the provincial level (Interview 4). On the political agenda of the Province of KwaZulu-Natal, climate change plays a minor role. The drafting of a climate change response has only started in 2016 with support from the national level. Several activities around COP 17 took place in 2011, but most of them could not be sustained. Durban is partially perceived as a competitor in environmental governance and is said to

bypass the provincial level in dialogues with the national level and other actors (Interview 5). The Province of Gauteng is less advanced than the Western Cape in its action on climate change, but has undertaken some important steps. The Gauteng City Region Observatory (GCRO) is a research institute advising the province on climate change issues. Since 2012, Gauteng has a climate change strategy in place that is currently being updated with support from the national level. A public official from the provincial government describes the relationship with the City of Johannesburg in environmental governance as mutually good and without tensions (Interview 6).

3.3 The Role of the Local Level

Municipalities in South Africa have the constitutional right to govern, which is defined as "to conduct the policy and affairs" within a given jurisdiction and to "constitute a rule, standard, or principle" (South African Concise Oxford Dictionary 1990, in De Visser 2012). Nonetheless, when it comes to governing environmental aspects, cities are acting in a space that could be described as a *confined vacuum*: in the absence of a national legislation on climate change, cities have a certain leeway for setting their own regulation, creating particular institutional structures, and implementing own projects that can be described as *experiments* which will be analyzed in the fourth section.

However, the political economic context of the country is limiting the impact these local *experiments* can yield: The *Municipal Finance Management Act* (MFMA) leaves space for municipalities to finance necessary infrastructure adjustment measures to mitigate climate change and adapt to it (Republic of South Africa 2003). However, two main features of the MFMA lead many municipalities to an overly conservative interpretation. First, municipal projects are limited to a duration of a maximum of three years, and second, severe control and restrictions from the *National Treasury* aiming at minimizing local corruption lead municipalities to avoid the investment in new, risky, or long-term solutions to climate change. Nonetheless, there are ways in which cities can circumvent these barriers, and blaming the MFMA can be seen as an excuse to justify for non-action on climate change (Interviews 3, 9, 22).

Moreover, the national *White Paper on Climate Change* acknowledges the crucial role and function of local governments in climate policy-making. Yet, while it calls for a critical review of the legal mandate of the local sphere of government and an according revision of fiscal regulations, no transfer of funds related to climate change activities in municipalities has been established until now; apart from exceptional grants such as the municipal energy efficiency program *EEDSM*. Since 2005, only one function has been decentralized to the

metro level with an according budget, which is the monitoring and controlling of air quality (Interviews 1, 17). Still, while the fee structure should capacitate and finance these offices, their income currently only consists of administrative fees which cannot provide finance for larger projects.

In addition, cities do not possess the constitutional mandate to generate energy, and they do not have much leeway regarding the question of how the electricity they use is being generated. But increasingly, they are trying to gain influence on these matters; partially due to their climate sensitivity and to control the stability of generation and prices against the background of past experiences, where insufficient capacities in *Eskom's* electricity generation lead to load shedding across the country (Interviews 11, 25). Several municipalities are pleading for a decentralized grid, but the definition of feed-in tariffs and tariff structures to remunerate household or small scale generated renewable energy remains unresolved or is slowed down (Interviews 25, 26).

When it comes to the representation and coordination of local preferences in national or international law making and negotiating processes, the influence of the local level can be described as increasing, but until now in a rather formal than effective way. In preparation of South Africa's INDCs for COP 21, cities were for the first time included in a national drafting process of climate change legislation (Interview 24). But this process took place only a few days before the conference, and some city officials have raised doubt about whether their comments were really taken into account. Also, a working group has been set up as a multi-level governing body on climate change, attended by public officials from the national, provincial, and local environmental departments. But again, some officials describe it as having a purely administrative function and not as contributing to an intergovernmental dialogue (Interviews 7, 11, 15).

Beyond that, activities on the local level have been supported by internal and external state and non-state actors. For example, one of the seeds for improving and starting municipal action on climate change in the aftermath of the regime change in 1994 was a program run by the South African non-governmental organization Sustainable Energy Africa (SEA) (Interview 8). Funded by the *Danish Development Cooperation* (DANIDA), the *Sustainable Energy for Environment and Development* (SEED) program started in 1998 to capacitate urban administrations on climate change issues by training 'sustainable energy advisors' at a junior level with links to a senior person in each of the cities administrations (Borchers, Euston-Brown, Mahomed 2008).

4. Urban Responses to Climate Change Mitigation and Adaptation

South Africa's biggest cities are Johannesburg (4.4 million inhabitants), Cape Town (3.4 million inhabitants), and Durban (3.1 million inhabitants). About 60 percent of the country's population lives in urban areas that suffer in large part from structural deficiencies. As a result of the spatial segregation and the neglect of the townships during the apartheid regime, South African cities are facing major development challenges and are particularly vulnerable to the effects of climate change (Pasquini, Shearing 2014). Most interesting for the focus of our article, these three cities have implemented their own strategies and action plans to tackle climate change. The following sections trace their individual climate governance experiments with regard to three categories: (i) policies, strategies, and projects, (ii) institutional structures and changes, (iii) and the respective relationship of the cities to C40.

4.1 Johannesburg

Johannesburg is still facing serious challenges in terms of taking action on climate change, but has implemented several advanced programs within the past few years, such as the rapid bus system *Rea Vaya*, and the fitting of low-income houses with solar water heaters in one of its suburbs. Johannesburg is a C40 member since 2006, and hosted the C40 Summit in 2014. The city won the C40 Award in 2015 for issuing a green bond at the Johannesburg Stock Exchange, attracting investors to fund green projects in the city (C40 2015). In its *Vision 2040*, the city has stated the goal to cover 50 percent of its total energy consumption with renewable energy by 2040 (Johannesburg 2011). Until 2016, Johannesburg was ruled by the national governing party African National Congress (ANC).

Policies, Strategies, and Projects

In 2009, the city created the *Climate Change Adaptation Plan* (CCAP) with a number of adaptation activities that resulted from it, including a Vulnerability Assessment and Risk Management Plan and a disaster response mechanism (Johannesburg 2009). In 2012, a climate change action strategy was developed. However, as city officials noted in interviews, neither the adaptation plan nor the strategy have ever been implemented. Institutional changes and capacity and budget constraints have kept the city from collecting coherent data on reductions of GHG emissions and the impact of green projects in place (Interviews 15-18, 23). In mid-2016, a reformulation process for the adaptation strategy started.

Budget constraints impede the implementation of projects, at least in the climate change unit. The budget for climate change is in average about 1 to 1.5 percent of the total annual city budget. It should be noted that this figure does not include several other sectoral savings or expenditures on climate change. Nonetheless, several local, national and international funds could be accessed to implement the following projects. *Corridors of Freedom* is a city densification project which contributes to climate change adaptation and mitigation through new pathways of transport and the densification of city quarters. The *Rea Vaya* bus rapid transit network will be extended for the project and parts of the city bus fleet will be replaced by more fuel-efficient vehicles. Components of the project are financed directly with about 820.000 Euro from the GEF (*Global Environmental Facility)* and 120 Million Euro from the French development cooperation *Agence Française de Développement* (AFD) (Johannesburg 2016: ; Interview 18; Website of the French Embassy in South Africa 2015).

Several energy projects with solar, landfill, and biogas have been set up in the past few years. In most cases, there has been no interference from the national level (Interview 17). Planning processes for the establishment of landfill gas to energy projects started in 2007. Five plants entered into power until 2016, which are expected to produce a total of 13 megawatt of energy and achieve equivalent carbon dioxide emissions savings of approximately 542,495 metric tonnes per year (UNFCCC 2016). In October 2013, the *Department of Energy* approved the first project and agreed to sign a *Power Purchase Agreement* with *Eskom* for an 18 megawatt contribution as part of the *Renewable Energy Independent Power Producer Procurement (REIPPP)* program. The project is the first and largest municipal-driven renewable energy project in South Africa. In 2015, Johannesburg issued a $140 million Green Bond with the Johannesburg Stock Exchange to fund the implementation of climate change mitigation strategies and adaptation investments, such as the installation of 43 000 solar water heaters by City Power. The green bond will allow the city to access funding for environmental solutions and sustainable modification of infrastructure (C40 2015).

Institutional Structures and Changes

Within the institutional structure of the city, a few mechanisms have been established to secure the integration of climate change as a cross-cutting issue. The Executive Director for the Department of Environment and Infrastructure Services supervises the implementation of climate change programs and heads a Sustainable Services Cluster which comprises the oversight of city owned semi-private service providing entities Pikitup (waste), JoBurg Water,

CityPower (energy), CityParks, and JoBurg Roads, which have been established from 2000 onwards (Johannesburg 2003).

The *Department of Environmental Management and Infrastructure* (DEMI) has undergone several restructuring processes over the past few years. Currently, one manager and two staff members are working on climate change with one staff member covering mitigation, and the other one adaptation aspects. The number of staff working on climate change has not significantly changed. In personal interviews, public officials point out that although climate change was a priority of the previous Mayor Parks Tau, who was in office from 2012 to 2016; this has not been reflected in a considerable increase of the number of staff working on climate change issues. Moreover, they argue that the shortage of staff and capacity has restrained the city from being able to establish a coherent GHG emission inventory. The position of the head of the climate change unit was vacant for more than two years (Interviews 15, 16, 18).

According to several interviewees, the strong changes in the institutional setting of climate change within the city's public administration are also the major reason why the city is still lagging behind other South African cities in terms of strategic efforts, policy formulation and the salience of climate change on the political agenda. Constant changes within and between different departments have weakened its political clout, both towards the mayor and towards service providing entities which the department is supposed to steer. The establishment of the position of a sustainability officer within the executive mayor's office did apparently not lead to an improved position of the topic on the political agenda, but has further increased tensions and unclear mandates in the institutional set up of the city (Interviews 15-19).

The lack of a cross-sectoral working group within the city's public administration renders coherent action on climate change almost impossible. Even though several departments are implementing aspects of climate change mitigation and adaptation in their day-to-day work, the climate change unit is often not involved or informed about these initiatives. In sum, what challenges action on climate change, is the absence of a strategic vision on climate change at a high level within the city's administration. Furthermore, weak reporting and data collection result in a lack of knowledge about the actual impact of projects and makes the prioritization of carbon-intensive areas impossible. Interviewees state that it was mainly capacity constraints that have held the city from being able to report, collect, and measure emission data. Now, C40 is supporting the city in establishing the emission registry (Interviews 16, 17, 18).

Johannesburg and C40

Johannesburg was in 2006 the first African C40 member. During the first years of its membership, however, not much action of C40 in the city is documented, except for the support of the *Rea Vaya* bus project, where C40 supported a financial arrangement which included a contribution from the *Clinton Foundation*. Mayor Parks Tau bought into the agenda of C40, although climate change was initially not one of his priorities. But while his focus was mostly set on development and spatial reforms to overcome the results of spatial segregation under apartheid, he soon realized the potential of including climate change into developmental processes of urban growth. C40 now sits directly in the city administration with the regional director for Africa. This close proximity has brought considerable results. C40 is involved in planning processes at the city level and supports several internal processes, such as the establishment of a GHG emission baseline and inventory. The role of C40 has changed from supporting contacts to finance projects to a focus on administrative and technical support. In the advent of COP 21 in Paris, cities signed to the Convent of Mayors, which comes with certain duties. This has brought the city to enforce its efforts. C40 is now supporting the city of Johannesburg in renewing its adaptation strategy through a peer review procedure. Also, the new climate change strategy has undergone such review process from C40 experts (Interviews 16, 17, 19).

In sum, Johannesburg can be portrayed as lagging behind when it comes to establishing a strategic framework and efficient institutional structures conducive for action on climate change. However, the city has been far more advanced in implementing and funding large scale infrastructural projects that take a holistic approach to sustainable urban development than other South African cities.

4.2 Cape Town

Cape Town is often cited as a best case example of urban sustainable development, and is the country's second largest economic hub after Johannesburg (Holgate 2007). Its beautiful coast lines attract international tourism, a main part of income for the city's economy. There is no heavy industry in the region, but per-capita GHG emissions are with 6.4 Mt still higher than in the Gauteng region with a strong mining and manufacturing sector. Cape Town is the only metropolis in South Africa that is governed by the country's' strongest opposition party, the Democratic Alliance (DA), in power since 2006.

The city is a member of ICLEI and became a member of the C40 group in 2014. Besides establishing a rapid bus system, the city has undertaken climate action in the sectors of

buildings, transport, waste, and energy supply (CDP Cities Report 2013). The majority of Cape Town's emissions is caused by the transport sector covering almost two-thirds (65 percent) of all energy consumption. Again, almost two-thirds of transport energy (61 percent) is consumed by people in cars, amounting to 39 percent of total energy consumed in Cape Town (SEA 2015).

Policies, Strategies, and Projects

Compared to most other South African Cities, Cape Town stands out when it comes to planning and the strategic integration of climate change. It was the first South African City that approved an Energy and Climate Change Strategy in 2007, which set out a vision, objectives, targets and measures targeting all energy related activities of the city. Also, the city commissioned consultants from the *University of Cape Town* (UCT) in 2006 to write the *Framework for Adaptation to Climate Change* in the City of Cape Town (FAC4T), which establishes necessary action for adaptation to climate in the city (Taylor, Cartwright, Sutherland 2014). A further success by the Energy and Climate Change Unit was the inclusion of the strategic focus area '*Energy for a Sustainable City*' in the city's *Integrated Development Plan* (IDP) 2007/08 to 2011/12. In 2010, the city furthermore adopted an *Energy and Climate Action Plan* (ECAP) developed by the Energy and Climate Change Unit, which operationalised the targets of the Energy and Climate Change Strategy into 11 objectives and their according necessary planning and implementation measures.

Similar to Johannesburg, the budget for climate change in Cape Town is quite limited; being an average of 1 to 1.5 percent of the total annual city budget, excluding unidentified sectoral climate change activities. Even though Cape Town has been extremely successful when it comes to the adaptation of plans and strategies, it lacks behind when it comes to implementation and it has been difficult for the energy unit to bring through projects identified in the ECAP in the past (Interview 22).

Cape Town has been using the funds made available through the municipal energy efficiency program *EEDSM* and is successfully retrofitting street lights, traffic lights and buildings with energy efficient lighting, and installing rooftop photovoltaic systems, to an extent that the national *Department of Energy* is upscaling the good practice of the city in a nation-wide program (Interview 2). Further successful projects include solar water heating and the support to households to install solar panels. However, as stated above, Cape Town's major emissions result from the transport sector, and considerable emission reductions through public transport development have not been achieved thus far. Even though several projects

as the *MyCityBus* partially address transport issues, larger deficiencies resulting from the sprawling character of Cape Town's settlements and mushrooming townships in the city's outskirts have to be further tackled by transport and spatial planning processes (Interviews 22, 26).

However, as one of the interviewees pointed out, successful transformation to a greener city does less depend on sufficient budgets and numerous projects, but rather on a sector wide change of mindsets, institutional and social features, and a turn from a project-based to a process-based approach (Interview 22).

Institutional Structures and Changes

Public Officials within the *Environmental Resources Management Department* (ERMD) already began to develop the *Energy and Climate Change Strategy* in 2003, which was finally adopted by the *City Council* in 2007. These early steps were largely enabled by the participation of the City in the SEED program, and by an enabling institutional context of environmental non-governmental organizations and active research groups based at the surrounding universities (Interview 7). The adoption of the policy was accompanied by institutional changes, aiming at establishing the needed ownership, accountability, resourcing and alignment with institutional management within the administrative structures. In 2007, an additional focus area, '*Energy for a Sustainable City'*, was added to the city's Integrated Development Plan (Cape Town 2011: , see also Interviews 14, 15, 16).

Since 2008, the energy and climate change unit, which is mostly developing and implementing mitigation projects, has grown from having one employee to nine permanent staff members and nine interns. However, with just one manager and one unskilled staff member, the adaptation unit is still severely understaffed (Interviews 8, 9). Other relevant units and focus areas are the coastal management unit around Gregg Oelofse, which has been able to achieve major results in protecting the Cape's coasts from erosion and pollution (Interview 22).

Several other units within the city's administration have been established to coordinate and ensure that climate change is adopted across sectoral plans. The *Energy and Climate Change Committee*, which reports directly to the executive mayor, was established in 2008. In 2009, an *Executive Management Team Subcommittee on Energy and Climate Change* comprising of high level city officials was established to provide a back-up to the committee. To ensure the integration of the cross-sectoral topic into the council systems, three cross-

cutting work streams were established in the same year that address (i) energy security and carbon mitigation, (ii) adaptation and climate resilience, and (iii) communication and education (CDP Cities Report 2013). In the same year, the city also established a *Climate Change Think Tank* in collaboration with the *African Centre for Cities* at the University of Cape Town and SEA, which was possible through an external grant provided by the Danish Development Cooperation DANIDA (Taylor, Cartwright, Sutherland 2014).

Regarding institutional changes, one can observe both a healthy mixture of institutional continuity and flexibility within the city's public administration. Osman Asmal, the Director of the ERMD, has been in office since 2003. Sarah Ward, which leads the *Energy and Climate Change Unit*, has worked with the City of Cape Town first as a SEA consultant for the SEED program and since 2008 as the head of the Energy and Climate Change Unit. Gregg Oelofse has worked long term as the Head of Environmental Policy and Strategy for the department. Similarly, the city has experienced a long period of political stability, with the current mayor Patricia de Lille of the opposition party Democratic Alliance (DA) being in power since 2011.

Cape Town and C40

The membership in C40 has become much more significant for Cape Town in recent years, whereas ICLEI has lost importance. The city hosted the regional ICLEI office beginning of the 2000s within its administration for about 5 years, as well as the ICLEI congress in 2006, but has even considered giving up its ICLEI membership.

Cape Town's mayor Patricia de Lille was until recently not a fierce supporter of climate change topics. However, the regional director of C40, Hastings Chikoko, and staff members from the *ERCMD* managed to convince her to participate in COP 21 and several city related events, from which she came back as a climate change pioneer. Now, the C40 membership is driven quite strongly from within the mayor's office. C40 paid the study fees for a course on emission measurement and data collection for one employee from the energy and climate change unit (Interviews 8, 19).

In sum, one can observe that while Cape Town has been very successful in setting up strategies and institutional structures for energy efficiency and mitigation, the implementation of projects and actual emission reductions has been rather slow, compared to Johannesburg. While the local context of organizations, academia, and other stakeholders concerned with environmental aspects is highly conducive for setting up strategies and institutions to tackle

climate change, the national and regional political economic context might hinder the implementation of large scale green development projects.

4.3 Durban

Durban is the largest port city on Africa's eastern seaboard and can be characterized as an early adapter of local action on climate change (Roberts 2010). The city is a member of ICLEI since 1994 and joined the C40 group in 2015. The former mayor, James Nxumalo, was a Vice-Chair to ICLEI until the end of his term of office in 2016. Furthermore, Durban joined the *Cities for Climate Protection* (CCP) group in 2000. Action on climate change in the city was strongly supported by the event of COP 17 in 2011. The city is currently governed by the ANC. The main institutional actors pushing action on climate change in the city are the *Environmental Planning and Climate Protection Department* (EPCPD), founded in 1994 and nowadays endowed with matters of adaptation, and the EThekwini Energy Office, founded in 2008, and responsible for mitigation activities.

Policies, Strategies, and Projects

In 2003, EThekwini established a first GHG inventory and implemented a landfill gas to energy project under the CDM in 2004, co-financed by the AFD and the World Bank. These initiatives raised discussions around the topic of climate change, but were, according to Taylor et al (2014), not able to establish sustainable institutional drive within the city's administration. In 2006, Durban's city leaders launched an adaptation strategy, addressing the planning for water resources, human health and disaster risk management. The opportunity to implement action on climate change has been further supported by several external events. In 2007, strong storms and floods caused severe damages and claims of the adaptation lobby in the EPCPD gained political importance and received increasing support (Interview 11). Similarly, the shortcomings in *Eskom*'s energy generation in 2005 strengthened arguments for autonomous energy generation in the municipality and thereby projects on energy efficiency and renewable energy put forward by the *Energy Office* (Interview 13).

In 2008, the city adopted the *EThekwini Energy Strategy*, which had been developed in collaboration with the *Council for Scientific and Industrial Research* (CSIR) (City of Durban 2008). Furthermore, COP 17, which took place in Durban in 2011, helped to push the topic of climate change on the political agenda (Interview 12). However, some of the projects established in reaction to the events seem to have been halted and therefore put their sustainable character into question.

In 2014, the Energy Office started the *METIS* project with the CSIR, aiming to establish the *EThekwini Sustainable Energy Plan* (City of Durban 2014). Taking a precautionary approach, the project clarified the legal framework for sustainable municipal energy production, as the mandate of energy generation is not clearly defined by the constitution and the Energy Office did not want to take a change to break national legislation. The *EThekwini Climate Change Strategy*, which states goal to implement 40percent renewables by 2030, was adopted in 2015 and developed in collaboration between EPCPD and the Energy Office (Durban 2015b). Line departments provided input to the strategy, but the integration of the strategic objectives into their agendas still proves to be difficult.

Further projects have been implemented under the Energy Office, which finances its projects through external, national and municipal funds: A greenhouse gas emission inventory has been established, and the city has reported for the past years both to the *CarBonn* and *Carbon Disclosure Project* (CDP) inventories. It is furthermore complying with the *Compact of Mayors*. Other projects focus on non-motorized transportation, with a program in the city's administration to incentivize public officials to walk or use bicycles. An eco-industrial park is currently at a feasibility stage. The installment of PV charging stations for electric bicycles and PV panels on five municipal rooftops is in progress.

Finally, a feed-in tariff for small scale production of renewable energy has been defined. Most of the projects the Energy Office are trying to implement target to establish a lighthouse effect by showcasing positive effects and potential opportunities to save costs. Nonetheless, the work of the *Energy Office* is hindered by the fact that until now, no large energy generation license has been handed out to the municipality by the *National Energy Regulator South Africa* (NERSA) and small scale energy generation is still in a legal grey area (Interviews 11, 14).

Institutional Structures and Changes

With the launch of the Adaptation Strategy in 2006, an adaptation work stream was initiated in the same year by the EPCPD. Over the years, the department underwent changes in its role and scope: Founded in 1994, it has increased its staff from one single employee in the founding year to 30 employees at present, gaining considerable political influence in the meantime (Roberts 2010; Taylor, Cartwright, Sutherland 2014). The department's original mandate of controlling sustainable development across sectors has been mainstreamed since 2002 through the municipal Integrated Development Planning (IDP) process; turning sustainable development formally into a cross-cutting issue for which every department is

responsible (City of Durban 2015a). The department was then able to focus on more specialized activities of environmental management and took leadership in the development process of the *Municipal Climate Protection* (MCPP) program in 2006, resulting in the establishment of a Climate Protection Branch within the Department and demonstrating the municipality's commitment through the provision of additional human and financial resources (City of Durban 2015a). However, Roberts and O'Donoghue state that the MCPP did not result in a significant influence on sectoral plans or on the *Integrated Development Plan* (Roberts, O'Donoghue 2013).

While the adaptation component in the municipality of Durban is traditionally quite strong, the mitigation component in the city administration is comparably weak. This is mostly due to the important role that the director of the environmental department Dr. Debra Roberts has played in setting climate change on the political agenda. In 2008, the city accessed the energy efficiency grant made available by National Treasury and founded the *EThekwini Energy Office* in order to overcome the shortages in *Eskom*'s electricity generation. Nowadays, the Office has several working streams. Besides energy efficiency, which was the offices initial mandate, the climate mitigation mandate was located within the office. Other work streams comprise work on renewable energy and energy efficiency.

Over the years, the Energy Office grew up to a size of 17 staff members, out of which 5 positions are currently vacant. This fact is apparently due to dysfunctionalities in the general public sector appointment system, but has weakened the energy office for the past two years and has overloaded the current staff members. One challenge mentioned by interviewees within the city administration is that unattractive working conditions create incentives for officials to leave their jobs for positions in the private sector. This brain-drain creates both gaps in the institutional memory and disrupts the work of units, due to the long reappointment process (Interviews 11, 13).

The previous Mayor Nxumalo set up a subcommittee on climate change under the executive committee, which is chaired by the Mayor and the Deputy Mayor. It provides strategic guidance and approval by counselors on the topic when requested by public officials. However, no cross-sectoral working group on climate change exists within the administration. The units working on mitigation and adaptation have established good channels of communication over the years and wrote the climate change strategy in collaboration, but still work quite separated. Even though other line departments have provided their input into the strategy, coordinated and regular cross-sectoral communication and cooperation on climate change issues seems difficult (Interview 14).

An *Energy Steering Committee* with senior officials had been set up in the past, but was recently stopped. One public official stated that the work of the Energy Office was not embedded enough in the institutional landscape of the city administration, possibly because the Department of Electricity is still a more powerful actor, both in terms of size and influence (Interview 13). In general, the traditional line departments apparently do not sufficiently integrate the topic into their agendas.

Durban and C40

During the past years, Debra Roberts has strategically used networks to push climate change on the political agenda of EThekwini and from 2000 until 2006 Durban was a member of the ICLEI's *Cities for Climate Protection* (CCP) program. The membership fee was financed through external funding (Taylor, Cartwright, Sutherland 2014). ICLEI and the Compact of Mayors have been the most important networks for Durban, while C40 has only recently become more important, with the pursuit of membership coming from the Energy Office (Interviews 11, 13, 19, 20). Nonetheless, the city is not particularly active in the network and is only participating in a few working groups (Interviews 13, 19). Furthermore, Durban is also part of the 100 resilient cities program by the Rockefeller Foundation (Interview 12)

In sum, Durban has been quite successful in using transnational networks for overcoming domestic barriers at the national and local level, mostly when it comes to adaptation activities and to a lesser extent on the mitigation side. However, the implementation of projects has been either incidental when related to the event of COP 17 in the city, or has been taken up very slow.

5. Conclusion

In this article, we analyzed the individual climate governance experiments of Johannesburg, Cape Town, and Durban. In this context, we described particularities in the vertical collaboration of the multi-level system, we identified internal factors influencing climate policy-making in the cities, and we placed emphasis on the impact of the horizontal collaboration by focusing on the cities' involvement in transnational city networks.

First of all, we observed influences on urban climate change responses in the vertical dimension of the South African multi-level system. Action on climate change is a constitutional grey zone, and no binding national policy on climate change exists to define the functions of the governmental levels (De Visser 2012). Informal transfers of functions to

the municipal level are not accompanied by a transfer of funds. Climate change is hence perceived by municipalities as an unfunded mandate and does not have a high influence on the political agenda. However, the *Municipal Energy Efficiency Demand Side Management* (EEDSM) program has enabled the implementation of energy efficiency projects in all three cities and fostered institutional change by providing continuous funding.

Moreover, climate policy-making in South Africa's cities is shaped by the particularities of the provinces in which they are located in. The provincial governments of the Western Cape and Gauteng have both implemented climate change response strategies and established independent institutional bodies to develop pathways for sustainable development, the GCRO in Johannesburg and Green Cape in Cape Town.

Despite the absence of a binding national legislation on climate change, the three cities have taken up several measures to deal with existing and expected climate risks. All three cities have adopted strategic plans on climate change, changed their institutional structure within the municipal administrative system, increased the number of staff working on climate change, and established partnerships with different external actors, such as research institutes, non-governmental organizations, and transnational city networks.

Interestingly, the climate responses of the three cities differ in several respects. In particular, Johannesburg has implemented various infrastructure projects based on sustainable development principles, introduced energy efficiency measures, and successfully accessed external funding. At the same time, the city lags behind with regard to a strategic framework and the monitoring and evaluation of activities. This can mostly be explained by a lack of efficient institutional structures to address the issue of climate change and a political emphasis on aspects of pro-poor (spatial) development. However, while the overall framing of climate change issues might be avoided for political reasons, the progress observed on a project basis speaks for the partially successful integration of climate change aspects into the different sectoral logics of the departments.

Cape Town has been very successful in formulating strategies and establishing institutional structures for energy efficiency and climate change mitigation. Successful lighthouse projects have been implemented that serve as national and international best practice cases. However, the city is rather slow when it comes to the implementation of projects addressing climate-related aspects on a larger scale, for instance, through infrastructural reforms. An explanation for this apparent contradiction can be found in the political logic of the city's government. While the protection of the environment is crucial for tourism, the mayor

pursues a strong focus on economic development and action on climate change was welcomed as a soft factor for advertising the city's quality of life.

Durban has been quite successful in using transnational networks for overcoming domestic barriers, especially in the field of climate change adaptation, but project implementation has also been slowed down in the past few years. Again, we can find a mixture of committed public officials and a long-term established institutional home as being conducive for progressive climate action. However, the underdevelopment of the region and the priority of a pro-poor developmental agenda in the provincial and city governments have had a restraining impact of the cross-sectoral integration of the topic.

Thus, existing problems can partly be explained by the lack of a conducive national policy framework, opposing national interests, and powerful veto players. Action on climate change that happens in the absence of a clear national legislation is mostly pushed through by highly dedicated public officials in order to tackle emerging problems and 'do at least something'. Moreover, we argue that an often neglected factor is the specific local environment in which the cities find themselves and in which they have to act. All of the three cities face tremendous development challenges in different sectors.

With regard to the horizontal collaboration and the impact of transnational city networks, it is apparent that C40 has provided considerable support to the three South African metros over the past few years. In interviews, city officials have described three ways in which C40 is supporting them in endeavor to address climate change (Interviews 7-18): Firstly, C40 has recently shifted their focus on supporting city officials with knowledge exchange on specific thematic areas through workshops, webinars, study tours, and project visits. Secondly, in the cases of Johannesburg and Cape Town, C40 has provided further individual and tailored support in reviewing strategies and funding trainings. Thirdly, C40 directly approaches the city mayors, establishes personal relations to them, and involves them in international diplomatic processes (Interviews 9, 10, 19). Most public officials in Johannesburg, Cape Town, and Durban have highlighted the important role of C40 in supporting the exchange between cities on solutions to climate change issues and to foster the political buy-in through directly engaging with mayors (Interviews 7-18).

To conclude, while the participation of local governments in transnational city networks has a positive impact on municipal action on climate change in South Africa, a series of other factors could be identified in shaping urban climate governance experiments. First, the absence of a binding national legislation on climate change causes non-implementation of

climate action through ill-defined functions and accordingly missing transfers of funds to the local level. At the same time, it allows cities to develop more individual responses to climate change, taking into account particularities of the local context. However, this leeway is constrained through rigid municipal financial management directives. Secondly, the regional and local socio-economic context as well as political aspects significantly determine the scope of urban climate governance experiments. Finally, larger political-economic factors, such as South Africa's dependency on coal-based energy, constitute barriers for urban climate action. Thus, we contend that a well-balanced horizontal and vertical collaboration is crucial for effective urban climate policy-making.

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ANNEX 1: List of Interviews

National Level	• Interview 1: XY, Department of Environmental Affairs • Interview 2: XY, Department of Energy • Interview 3: XY, National Treasury		
Provincial Level	**Western CapeC**	**KwaZulu Natal**	**Gauteng**
	• Interview 4: XY and XZ, Provincial Government	• Interview 5: XY, Provincial Government	• Interview 6: XY, Provincial Government
Local Level	**Cape Town**	**Durban (eThekwini)**	**Johannesburg**
	• Interview 7: XY, Energy and Resource Management Department • Interview 8: XY, Energy and Resource Management Department • Interview 9: XY, Energy and Resource Management Department • Interview 10: XY, Executive Mayors Office • Interview 11: XY, Executive Mayors Office	• Interview 11: Former staff member, Energy Office • Interview 12: XY, Environmental Resource Management Department • Interview 13: XY, Energy Office • Interview 14: XY, Former staff member Department of Infrastructure	• Interview 15: XY, Department of Environment and Infrastructure Services • Interview 16: XY, Department of Environment and Infrastructure Services • Interview 17: XY, Department of Environment and Infrastructure Services • Interview 18: XY, Department of Infrastructure
NGOs and Academia	• Interview 19: XY, C40 Regional Office Africa • Interview 20: XY, ICLEI Regional Office Africa • Interview 21: XY and XZ, Energy Energy Research Centre UCT • Interview 22: XY, African Centre for Cities UCT • Interview 23: XY, Wits University • Interview 24: XY, GIZ South Africa • Interview 25: XY, GIZ South Africa • Interview 26: XY, WWF South Africa		