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Transnational Action Fostering Climate Protection in the City of São Paulo and Beyond

Laura Valente de Macedo, Joana Setzer and Fernando Rei

Abstract: This article examines the local outcomes of São Paulo city's engagement in transnational networks for climate protection. The participation of municipalities in such networks has been an important driver in fostering local initiatives to protect global climate. There have been accounts of many cases of mitigation measures implemented successfully at the local level, demonstrating significant carbon emissions reductions, thus helping national governments in their emissions reductions efforts. However, few studies have explored the linkages between transnational engagement, implementation of subnational climate action, and the actual national commitments in developing countries. This paper assesses the role of local engagement in transnational networks in the adoption and implementation of climate policies and legislation in the city of São Paulo, and its impact on the Brazilian government's climate action, in the period between 2002 and 2014. São Paulo was an active member of ICLEI's Cities for Climate Protection campaign and the C40 network during this period. The city was the first government to adopt legislation establishing reduction targets in 2009. However, while transnational action influenced the inception of the city's climate change policy, it has had limited impact on the implementation of climate action beyond the municipal level. The role of transnational action, in this context, is yet to be determined.

1 Introduction

The 21st Conference of the Parties (COP21), held in Paris in December 2015, concluded with a binding agreement between nations on climate commitments beyond 2015 that despite its ambition, falls short of the action needed to keep global temperature below 2°C in the coming decades¹. Progress towards action remains slow at the national level and results so far are more process-oriented (Ott et al. 2014; UNFCCC 2014; ICLEI 2015). Nevertheless, the role of non-state actors has been increasingly

acknowledged, as demonstrated by the establishment of the Non-state Actor Zone for Climate Action (NAZCA), a UN-hosted portal to report commitment and action by non-state stakeholders² in Lima during COP20, in 2014.

Responses to the problem of climate change are formulated not only through *intergovernmental* (i.e. the United Nations Framework Convention on Climate Change – UNFCCC), but by *transnational* processes as well. Transnational climate governance occurs when cities, companies, non-governmental organisations (NGOs), and other sub- and non-state actors coordinate across borders to govern climate change. Attempts to map transnational climate governance have identified between 60 and 75 transnational climate 'institutions', 'initiatives' or 'experiments' introduced since the 1990s (Bulkeley et al. 2012; Hale, Roger 2014; Hoffmann 2011).

Cities and networks of cities acting transnationally to address climate change receive particular attention in the literature on transnational climate governance. The proliferation of voluntary subnational action during the past decade reveals the multiple levels – local, regional, national, transnational and global – involved in climate governance (Andonova, Mitchell 2010). This transnational action undertaken by subnational governments to address climate change can be understood as a form of paradiplomatic activity. In recent years the term paradiplomacy started being used to describe the international activities of subnational governments in the formation and implementation of climate policy (Chaloux, Paquin 2012; Eatmon 2009; Rei et al. 2012).

The paper first presents the context for local climate action in Brazil, with an overview of the legal and institutional framework. It then reports on the development of São Paulo's municipal climate change policy, and considers how São Paulo's paradiplomatic action contributed to the adoption of Law 14.933 (Municipal Climate Law) in 2009. The following section considers different mitigation and adaptation measures in place, as well as some of the challenges of implementing lo-

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cal climate policies in São Paulo. The analysis confirms that paradiplomatic action was paramount in introducing the topic of climate change onto the municipal agenda (Back 2012; Setzer 2009). However, paradiplomatic activity lost importance at the implementation stage of the municipal climate change policy (Setzer, Valente 2014). While transnational climate governance offers a fascinating laboratory in which to study larger shifts in the nature of global governance (Hale, Roger 2014), evidence of its effectiveness in the implementation of local policies and measures is insufficient. Furthermore, to assess the contribution of local action to achieving national commitments in Brazil will require integrated action between the different levels of government, systematic and harmonized accounting of greenhouse gas emissions, as well as monitoring, reporting and verifying (MRV) mechanisms in place. An investigation of opportunities to present Nationally Adequate Mitigation Actions (NAMAs) in discussion with national government could lead to progress in integrating local climate action in Brazil's future.

2 Overview of Brazilian context

Brazil is ranked fourth in the largest emitters of greenhouse gases (GHGs), accounting for approximately 3% of global emissions in 2005. This is largely due to the agricultural and land-use change (LUC) sectors, which contribute 55% and 19%, respectively, to Brazil's national emissions, and which thereby distinguish Brazil from most other developed and emerging

economies. Brazil's LUC emissions primarily originate from clearing of the Amazonian and Cerrado biomes, driven in a large part by the rapid expansion of agricultural, frontiers and agrarian speculation.

Brazil's energy generation mix is still one of the cleanest in the world: over 46% of sources are renewable (2010) – mainly hydropower for electricity and bioethanol as fuel – according to official data (BEN 2014). This energy fed a population of just over 190 million inhabitants in 2010, of which 84% lived in urban areas (IBGE 2011).

Electricity distribution is basically from renewable sources, which in total account for almost 80% of the sources in 2013, mostly hydropower³. The biggest energy consumers in Brazil are the industry and transport sectors.

During the Fifteenth Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC), held in December 2009 in Copenhagen, Brazil announced its voluntary targets for GHG emissions reduction⁴. The National Policy on Climate Change (PNMC) commits to an expected reduction of greenhouse gas (GHG) emissions from 36.1% to 38.9% by 2020 (Art. 12, Law no. 12187-2009) in relation to a historical average calculated by sector and projected to 2020. The Policy's targets should be achieved through the implementation of the sectorial plans, as follows: a) Action Plan to Prevent and Control Deforestation in the Amazon (PPCDAm); b) Action Plan to Prevent and Control Deforestation and Fire in Cerrado (PPCerrado); c) Ten Year Plan for Energy Expansion (PDE); d) Plan for Low Carbon Emissions in the Agriculture Sec-

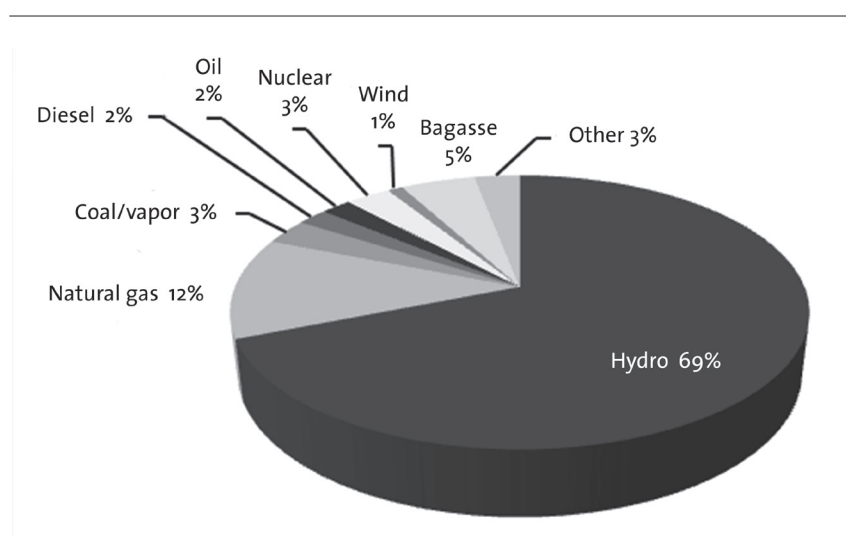


Fig. 1: Power Generation by Source in 2013 in Brazil. (Source: BEN 2014)

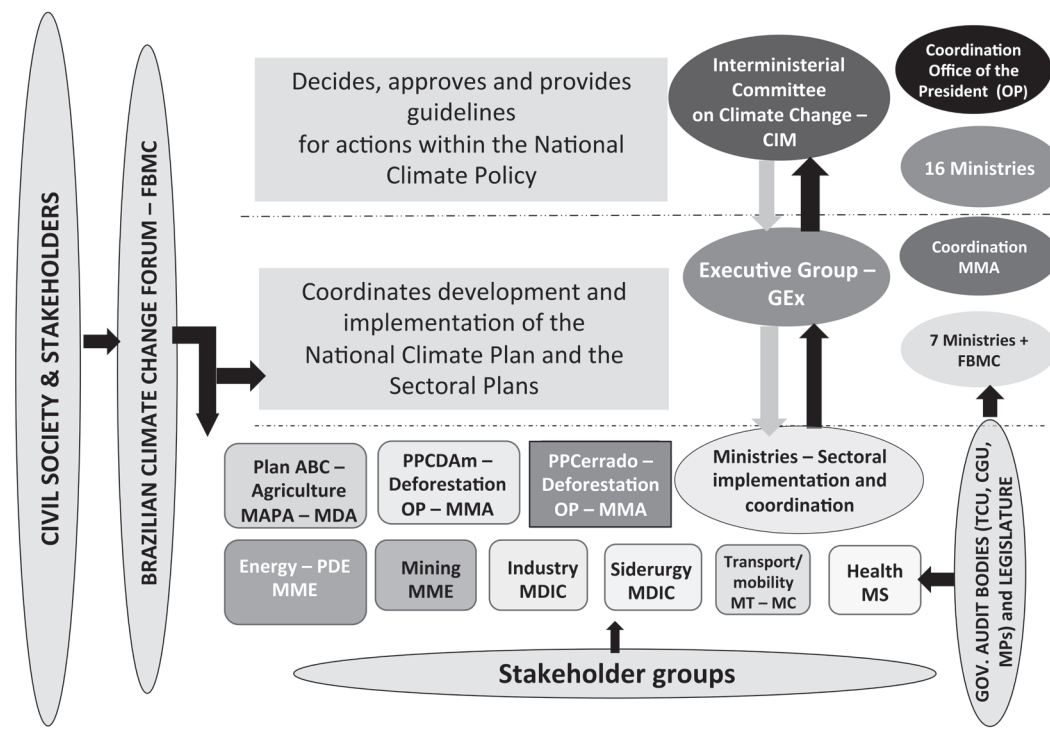


Fig. 2: Climate Governance structure in Brazil. (Source: Adapted by the authors from Environment Ministry MMA)

tor (Plano ABC); e) Plan to Reduce Emissions from Steel (Plano da Siderurgia); and f) Transportation (Plano de Transporte), Industry and Mining, (Plano da Indústria e da Mineração), Health (Plano da Saúde) and Pisciculture (Plano da Piscicultura). Those most relevant to urban activities are energy and transport.

Climate governance in Brazil is centered in the Interministerial Committee on Climate Change and the Executive Group at federal level. Development, coordination and implementation of the sectorial plans is shared with some stakeholders in specific sectors.

3 The case of the city of São Paulo

The city of São Paulo is located in the southeast of Brazil. It is the capital of São Paulo state and the largest urban conglomeration in South America, with a population of about 11.5 million inhabitants in a territory of 590 square miles. The capital is the centre of a metropolitan region comprising 39 municipalities, with almost 20 million inhabitants. In the past decades the city's economic profile has witnessed a deep transformation, from a strongly industrialised base economy towards service- and technology-oriented activities. The city of São Paulo is the largest municipal economy of Brazil, with

a GDP of approximately USD 200 billion, 11.5% of the national economy (IBGE 2011). The scale of the aforementioned figures is comparable to those of entire countries. For example, the city's GDP is equivalent to that of Bolivia, and its population is equivalent to Annex I countries (those with GHG emissions reductions targets within the UNFCCC) such as Portugal, Belgium and Denmark.

In São Paulo's first municipal GHG inventory in 2003, emissions in the city were estimated at 15 million tons of carbon equivalent (CO₂e) per year (UFRJ 2005). Of these emissions, 76.12% were generated by the energy sector and 23.48% by solid waste management. Road transport accounted for 88.78% of the energy sector emissions, or 68.6% of the total municipal CO₂ emissions. The inventory presented road transport, particularly passenger vehicles running on gasoline, as the major factor responsible for GHG emissions in the municipality. Solid waste management came second, followed by public and freight transport. Action on transportation and waste management, therefore, presented major opportunities for public administration to reduce GHG emissions.

Acting upon the city's first GHG inventory, São Paulo became the first city in Brazil – and one of the first major cities in the world – to address climate change through policies aimed at

reducing GHG emissions. The city also engaged in transnational networks promoting climate change adaptation and mitigation strategies among subnational governments. This policy agenda was led by the city's Environment Secretariat, which is responsible for planning, coordinating and regulating environmental protection at the municipal level.

On the regulatory front, São Paulo passed municipal laws and decrees that directly or indirectly address climate change. The enactment of such regulations is based on the municipality's constitutional competency to address environmental protection. In fact, the 1988 Federal Constitution establishes a shared jurisdiction between the national government, subnational states, the Federal District and municipalities to protect the environment and fight pollution in any form (Article 23, VI). Consequently, the national and state governments share responsibility with the Federal District in ruling on environmental protection and pollution control (Article 24, VI). Municipalities are responsible for ruling on local issues and complementing federal and state legislation when applicable (Article 30, I and II).

The 2009 Municipal Climate Law stands as the most important act in this regulatory framework. It asserts that mitigation of and adaptation to climate change in the city will contribute towards Brazil's compliance with the UNFCCC objectives. Furthermore, the Law establishes principles and measures to be adopted by several sectors in the economy engaged in climate mitigation and adaptation. The Municipal Climate Law also establishes an ambitious mandatory reduction target for the municipality.

Article 5 of the Law determines a 30% reduction of aggregate municipal GHG emissions in CO₂e by 2012, relative to the 2003 baseline values reported in the municipal inventory published in 2005.

In 2011, the municipality commissioned a second GHG emissions inventory, expanding the scope of the first inventory to include emissions from the energy and waste sectors (solid and effluent) until 2011, using the Intergovernmental Panel on Climate Change's (IPCC) 2006 revised methodology. A preliminary version was presented in November 2012 and its results were discussed in technical workshops held in 2013 (São Paulo 2012). According to the revised assessment, the 30% reduction target was not reached. In fact, results indicated a 4% increase in the city's overall GHG emissions (Instituto Ekos Brasil and GEOKLOCK Consultoria e Engenharia Ambiental 2013). Assessment of the reasons why the city failed to achieve the targets specified by the Law is beyond the scope of this study. Yet, it is possible to explore aspects of the adoption and implementation of São Paulo's municipal climate policy by examining both the transnational and local processes involved therein.

3.1 São Paulo's *paradiplomatic action and the adoption of the municipal climate policy*

Several studies within the multilevel governance literature find that there is a relationship between adopting a subnational climate agenda and participation in transnational networks (Andonova, Mitchell 2010; Betsill 2006; Bet-

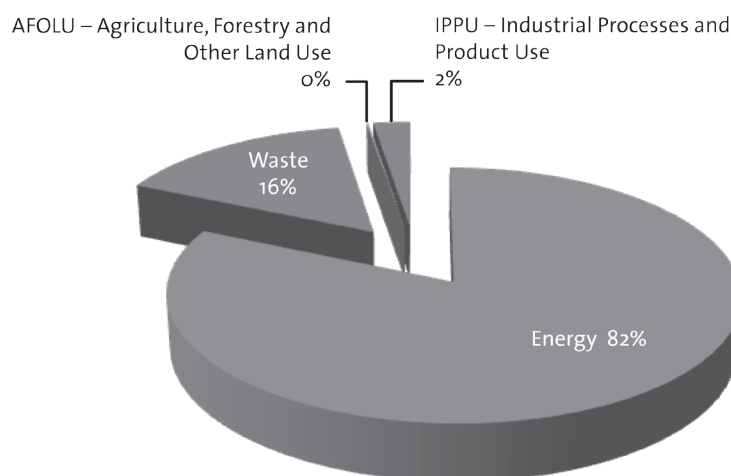


Fig. 3: São Paulo City's Greenhouse Gas Emissions by Source in 2009.

(Source: Secretaria do Verde do Meio Ambiente da Prefeitura de São Paulo – SVMA/PMSP)

sill, Bulkeley 2004; Broto, Bulkeley 2013; Gore 2010). Drawing upon these studies, we examine the impact of São Paulo's international agenda on the development of its climate change policies and legislation.

The first measures specifically addressing climate change in São Paulo resulted from the city's participation in ICLEI's international campaign, Cities for Climate Protection (CCP). In 2003, São Paulo signed a technical cooperation agreement with ICLEI and committed to the campaign's *five milestones*. The process requires that the city engage in assessing its GHG emissions by developing a baseline inventory, which will lead to defining targets and developing a Local Action Plan based on the GHG inventory findings. The city should then implement and monitor the Action Plan, usually targeting quick wins such as improving public transport and energy efficiency of public buildings, retrofitting water pumping and public lighting systems, using renewable energy, and capturing methane from landfills to generate electricity for local communities.

The city also had a leadership role vis-à-vis the international community of Local Governments through its active participation in ICLEI and the foundation in 2005 of what became the C40 Leadership Group. During COP15 in Copenhagen in 2009, São Paulo participated in several side events and activities for local governments, most of which were led by ICLEI. São Paulo's former mayor, and at the time the São Paulo State Governor, José Serra, participated in the Copenhagen Climate Summit for Mayors, held in partnership by the city of Copenhagen, C40 and ICLEI. The Summit of Mayors was an emblematic event, especially in the face of the poor results of international negotiations during COP15. This is particularly relevant considering that Mr. Serra would later be a presidential candidate who included climate change as a priority in his campaign.

São Paulo's participation in ICLEI and C40 encouraged the city to undertake commitments including the development of a GHG inventory and a climate action plan, setting reduction targets and a monitoring procedure. By adhering to these commitments, even if rhetorically, the city's administration was motivated to take action (Back 2012). The partnership between the city and ICLEI was particularly important. The methodology developed by the CCP campaign was used in the city's GHG inventory, and ICLEI was deeply involved in drafting the Municipal Climate Law, pushing forward the inclusion of reduction targets into the bill (Bider-

man 2011). The city's participation in the C40 further contributed towards the mayor's decision to take on a leadership role in addressing climate change.

Other projects led by ICLEI between 2005 and 2012 addressed implementation of climate related policies and measures, such as sustainable public procurement, renewable energy, green building and land-use policies (ICLEI 2009a). As the host city of ICLEI's Secretariat for Latin American, São Paulo was actively engaged in these projects and implemented action within their framework.

Another important milestone in the city's paradiplomatic engagement was the C40 summit on sustainable cities, held in São Paulo in 2011, in preparation for the Rio+20 conference in 2012 (São Paulo 2011b).

In sum, the case study suggests that the municipality's engagement in transnational networks of local governments addressing climate change played an important role in driving the development and adoption of a climate policy. Moreover, assuming a leadership role in climate policy development further propelled the city into transnational grounds. This was further reinforced when the city's master plan was reviewed in 2014–2015 and climate concerns were included in the plan approved by the city council. However, actions mostly resulted in developing the legal and institutional framework, rather than actually promoting GHG emissions reduction in the city.

3.2 Implementing the municipal climate change policy

Despite having adopted comprehensive climate legislation and a mandatory GHG emissions reduction target, five years after the enactment of the Municipal Climate Law, the city of São Paulo failed to keep up with its commitments. There are some policies in place promoting mitigation and adaptation measures, but many had already been established prior to the enactment of the Climate Law. A transnational interface is observable in some of these policies, particularly in the case of the city's landfill gas recovery facilities and in promoting energy efficiency in the city. Yet, according to the 2012 GHG inventory, the climate-oriented measures implemented so far have not promoted sufficient reductions.

3.3 São Paulo's mitigation and adaptation measures

The city of São Paulo endeavored to match policies that reduce GHG emissions, control local pollution and generate revenue (Puppim de Oliveira 2009). The most successful example is the capture and flare of methane gas from landfill sites. The city has two of the world's largest biogas power plants in its landfills. This first methane-to-energy project began operating in 2004 to collect and process biogas from the Bandeirantes landfill and generate electricity at an on-site power plant. The project was developed as a public-private partnership between the city of São Paulo and Grupo Biogás. It was the first landfill gas-to-energy project implemented in Brazil to obtain certified emissions reductions under the CDM. In the first auction, held in September 2007, the transaction totalled about USD 16 million. The other two auctions held in September 2008 and in June 2012, resulted in approximately USD 17.5 million and USD 2.3 million respectively (BMF-BOVESPA 2012). The initiative therefore created a triple win situation: GHG emissions reduction, cheap clean energy generation, and financial gain from selling carbon credits.

The paradiplomatic component of this municipal policy is clear. The landfill gas recovery project was replicated in other South American cities (Brasil 2013) and São Paulo shared its technical knowledge with other cities through transnational networks. ICLEI published a special "Case Study Series" about São Paulo's experience (ICLEI 2009b, 2012), the C40 included the case of São Paulo's gas recovery project in its reports (C40 2011) and the city shared its technical knowledge with other C40 cities, including Mexico City and Lagos. The project is also part of the United Nations Sustainable Development Knowledge Platform (UN 2014) and is cited as a benchmark in World Bank (2011, 2012) and OECD (2010) publications dedicated to the study of cities and climate change.

The C40, in partnership with the Clinton Foundation, has also been involved in initiatives to develop urban transportation systems and energy efficiency technologies in São Paulo. The projects address route optimisation, operational planning, cleaner fuel options, rapid transit systems, and pave the way for replication in other cities around the world (C40-CCI 2014). As a result of a Memorandum of Understanding entered with the Clinton Foundation, the city substituted 30 512 incandescent lamps for LEDs in traffic lights, of a total 142 846 op-

erational units, reducing energy consumption by over 70%. An economy of 1.5 million KWh per month in energy consumption is expected. Other energy efficiency projects are in place to substitute old lighting systems with LEDs in tunnels, schools, hospitals and other municipal buildings.

Policies in the transport sector resulted in further reductions in GHG emissions in the city. Data from the Second Municipal GHG Inventory estimates that transport-related measures implemented between 2003 and 2011 resulted in a 6.3% reduction in local air pollutants, as well as a CO₂e emissions reduction of 6.7% – equivalent to avoiding 7835 tons of CO₂e/month. These measures began in 2005 and included fossil fuel substitution, improvements in public transport and urban mobility, as well as air quality control. The *Ecofrotas* programme, for instance, expanded the bus fleet using vehicles powered by cleaner fuels: 1200 new buses using biodiesel, 60 buses using ethanol and 319 buses using sugar cane diesel. Furthermore, the city invested in retrofitting and recovering the tram system of 190 vehicles, 92 of which are new, and reopened an old tram factory in the city. Hybrid, biofuel, electric and hydrogen fuel cell buses are expected to be introduced into the public transport system in the near future. Implementing bus corridors became a top priority for the new administration, which after eight months surpassed its goal of 150 km (93 miles). In addition to the focus on public transport, the municipality boosted investments in cycle lanes, which added 79.8 km by August 2014 to the existing 63 km, as of 2012. The traffic department CET established the delivery of 400 km of cycle lanes by the end of 2015 as a priority. However, accounting and attributing the GHG reductions from these measures will be difficult due to methodological problems. Discussing this is not within the scope of the article, but should be considered in future research.

The Municipal Climate Law also mandates the adoption of adaptation measures. As part of the strategy to reduce climate vulnerability in São Paulo, the city is expanding linear parks through tree planting, revitalizing 100 existing parks, and establishing a 1 320 000 ha park in partnership with the private sector. Other initiatives required by the municipal housing plan establish the urbanization of shanty towns (*favelas*), removal of houses in risk areas, and restructuring slums (PMSP 2012a). With regard to the public health impacts of climate, the municipality focused on addressing the prolif-

eration of tropical diseases, particularly leptospirosis and dengue (PMSP 2012b). Adaptation policies in the city so far have received less attention from transnational networks and international organisations. Nonetheless, the topic is subject of increasing interest in the scientific community, and concern about urban vulnerability is on the rise, particularly in developing countries.

3.4 Challenges

Measures implemented by the city addressing waste, transport, energy efficiency, and public health indicate that there are prospects for São Paulo to reduce its urban carbon footprint and vulnerability to climate change. However, the target established by the Municipal Climate Law proved too ambitious. The modest scale and impact of the policies in place reflect the challenges of cutting emissions in the city, particularly given the limited jurisdiction of the municipal instance to address issues that depend on national and state decision-making. Two challenges are considered here: implementation of the Municipal Climate Law, and giving continuity to the paradiplomatic action that was paramount for the adoption of the Law.

The first challenge concerns the implementation of the Municipal Climate Law. In Brazil and in many other contexts, environmental regulation fails to be implemented because of a mismatch between interests opposing and favouring it. Moreover, laws are often symbolic, passed to satisfy some political interest, but not to be implemented (McAllister 2009). Nevertheless, even a law that is not completely enforced has its merits. For one, the relevance of city initiatives and networks is not completely dependent on the amount of GHG reduced. Rather, “the ultimate goal of climate action is redirection of the economy and society onto a low-carbon pathway” (Hoffmann 2011: 107).

Furthermore, once there is a law, its content can be enforced. Brazilian public prosecutors have become significant actors in the enforcement of environmental laws and regulations. Under the 1988 Constitution, public prosecutors have a constitutional duty to protect the environment. While developing this role, public prosecutors can monitor the administrative functions of the public administration, promote environmental protection, and call for the enforcement of existing legislation which is not being implemented. The administrative control exercised by public prosecutors in defence of the environment plays an important role in pro-

moting environmental protection in Brazil. In the case of São Paulo’s Municipal Climate Law, the prosecutor’s office has led the municipality to re-establish the Climate Change Committee activities that had been suspended for over a year after the new administration took office in 2013.

The Municipal Legislative Council (*Camara dos Vereadores*) is also entitled to conduct an operational surveillance of the acts of the executive branch. Although in practice the councillors avoid taking this type of measure, the Parliamentary Front for Sustainability, formed by councillors from different parties, committed to implementing a sustainable agenda in the city.

The second challenge involves maintaining and improving paradiplomatic action in the implementation of municipal climate policies. Since the adoption of the Climate Law, and especially after a new municipal administration took office, in 2013, the environmental and climate paradiplomatic activity of the city has been reduced. Participation in environmental and climate transnational networks and transnational forums decreased to a virtual halt. At the same time, the city’s previous engagement in these forums has not been enough to spur lasting agreements and programmes with other cities in the networks. By limiting its transnational participation, the city withdrew from its role in global climate governance. This suggests that participating in such paradiplomatic activities is indicative of, if not a driver of local climate action.

Perhaps this is another challenge that the prosecutor’s office can help to address. The Municipal Climate Law contemplates the use of international cooperation mechanisms to provide the city with access to funds for mitigation and adaptation. The city’s guidelines for the Climate Action Plan further calls for an international interface in the implementation mechanisms for the municipal policy (Sao Paulo 2011). The document requires the municipality to identify opportunities to work with national and international institutions. It is yet to be seen whether a strong paradiplomatic climate action in the city will contribute to effectiveness in the implementation of local policies and measures. Liaising with initiatives such as the NAZCA platform and the registry being developed by local government networks in the wake of COP20 could inspire the city of São Paulo to frame its transport and adaptation measures as climate action. However, the opportunity to discuss participation in Brazil’s mitigation strategies such

as the Nationally Adequate Mitigation Actions (NAMAs) has not been open to local governments so far. Given that subordination to the federal level has been endorsed by the decisions adopted at COP20 and COP21, if the city of São Paulo's alignment with national government on the climate agenda continues to underestimate the role of subnational governments in addressing climate change, it is difficult to expect a shift from this path.

Conclusion

This paper explored São Paulo's climate policy through an examination of the interactions between transnational and local initiatives that took place during the adoption and implementation of the Municipal Climate Law. Paradiplomatic activity was paramount in promoting the debate about climate change at the local level. It also contributed to the adoption of the Municipal Climate Law, which established an ambitious legal framework for reducing emissions. As a result, the city established a precedent for other subnational governments in Brazil to follow. In addition, being a city of a Non-Annex I country, São Paulo positioned itself at the forefront of international climate change policy-making and the environmental paradiplomatic agenda.

However, the city's reduction target is still far from being achieved. The paradiplomatic action that helped the city to establish a legal framework and strengthen its international standing has been less relevant in the implementation of the Climate Law. Structural factors further contribute to the discrepancy between the adoption and implementation of São Paulo's Climate Law. For instance, in Brazil a change in government can dramatically alter policy implementation. In the case of São Paulo's climate action, the Municipal Climate Law was adopted within a government that prioritised this agenda, but the new coalition in power opted to focus on improving transport in the city, without explicitly linking it to climate concerns. It could also be that the contribution given by transnational networks to the adoption of São Paulo's Climate Law furthered a Northern agenda which the city could not implement. Alignment of the city's political agenda with that of the federal government – given that both are led by the same Workers' Party – could also explain the shift, since climate change and energy policies are not a political priority to be addressed. Yet, such a discrepancy is not exclusive to the city of São Paulo, nor to cities in develop-

ing countries. Similarly, many local authorities in rich countries are not making substantial progress in implementing local climate policies, and the importance of subnational after COP20 in Lima was diminished (ICLEI 2015).

Despite these challenges, the case suggests that urban climate change policies in São Paulo might well be irreversible. Indeed, facing the weak diligence of the Municipality in implementing the Law, the municipal legislature and the state public prosecutors took measures to call upon its enforcement. Answering a request from a Municipal Councillor, the prosecutor's office began investigating the non-compliance of the Climate Law by the local authority, which led to re-establishing activities of the Municipal Climate Committee in August 2014. Furthermore, with the adoption of the Paris agreement in 2015, global acknowledgement of local action to protect the climate might encourage the city's leadership to implement the measures that already have a robust legal framework to support them.

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Notes

- 1 <http://newsroom.unfccc.int/lima/lima-call-for-climate-action-puts-world-on-track-to-paris-2015/>
- 2 By March 2016, the platform registered over 11300 commitments by cities, regions, businesses and other stakeholders. Available online at: <http://climateaction.unfccc.int/> (accessed on: 10 March 2016).
- 3 Plano Decenal de Expansão Energética, 2010.
- 4 In the following year, Brazil communicated to the UNFCCC secretariat its position on nationally appropriate mitigation actions (NAMAs).

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