

# **Climate change policy implementation in Buenos Aires (2015-2020)**

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## **Implementación de políticas de cambio climático en Buenos Aires (2015-2020)**

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### Abstract

In a world where climate change has been one of the main challenges in the last decades, cities and local governments are key players to mitigate greenhouse gas emissions and adapt to new climate conditions. This article focuses on climate change policy implementation at local level. Using the city of Buenos Aires as a case study, in this research it is aimed to identify which micro- and macro-level factors and the context enable the local government to implement its climate change action plan launched in 2015. To do so, Ryan's framework is used. The main findings of this paper support the hypothesis tested: Buenos Aires local government had sufficient resources and support from political and social coalitions, as well as the ability to link climate action with local issues to implement the Climate Change Action Plan (2015-2020).

**Keywords:** climate change, policy implementation, local government, Buenos Aires.

### Resumen

En un mundo donde el cambio climático representa uno de los principales desafíos en las últimas décadas, las ciudades y los gobiernos locales devienen actores clave a la hora de mitigar las emisiones de gases de efecto invernadero y adaptarse a las nuevas condiciones climáticas. Este artículo se centra en la implementación de políticas de cambio climático a nivel local. Utilizando la ciudad de Buenos Aires como caso de estudio, con esta investigación se pretende identificar qué factores a nivel micro y macro, además del contexto, permiten al gobierno local desarrollar su plan de acción de cambio climático presentado en 2015. Para ello, se usa el marco de Ryan. Los principales hallazgos de este artículo respaldan la hipótesis probada: el Gobierno local de Buenos Aires contó con los recursos suficientes y el apoyo de las coaliciones políticas y sociales, así como con la capacidad de vincular la acción climática a los problemas locales para implementar el Plan de Acción de Cambio Climático (2015-2020).

**Palabras clave:** cambio climático, implementación de políticas, gobierno local, Buenos Aires.

# 1 Introduction

Although climate change has been recognised as one of the main challenges worldwide in the last decades, greenhouse gas (GHG) emissions continue to increase. As a result, higher temperatures in the atmosphere and the oceans are observed, as well as increased sea level, extreme weather conditions, and loss of biodiversity, among other negative effects (United Nations 2015). Still, mitigation pledges made under the Paris Agreement are not enough to limit global warming to 1,5°C (Climate Action Tracker 2021), which would lead to severe consequences (IPCC 2021). Thus, the need to adapt to new climate conditions and mitigate emissions is urgent and poses a challenge to pursue a new sustainable development path (United Nations 2015).

One of the main characteristics of climate change is the asymmetrical distribution of its consequences across the globe. While Latin America had roughly an 8% contribution to the total GHG worldwide in 2018, one of the biggest polluters accounted for about 12% of the total during the same year (Climate Watch 2022). Latin America is one of the most vulnerable regions to the negative effects of climate change, as it is in the hurricane belt and has low-lying coastal areas, as well as being exposed to floods, droughts, and forestry fires, among others (Samaniego 2009). Also, with more than 80% of the population of Latin America living in urban areas (World Bank 2022), the development policies implemented at a local level and their effectiveness are crucial for mitigation and adaptation of climate change.

Considering the high concentration of population and economic activities, cities became the largest sources of GHG emissions (Corfee-Morlot *et al.* 2010). Therefore, the way urban areas are developing determines the possibility of a low-carbon, climate-resilient future, and the pursuit of sustainable economic development (Corfee-Morlot *et al.* 2010). In this context, Corfee-Morlot *et al.* (2010) state that local governments have a unique position to engage local stakeholders, as well as design and implement locally tailored responses to climate change.

With this article, it is aimed to understand how climate change policies are put into practice at local level and identify the micro and macro-level factors shaping policy implementation. To do so, one of the four megacities in Latin America is used: Buenos Aires (Argentina). The city was chosen for being the third largest in the region and having a climate action plan under implementation. The research question guiding this analysis is the following: what are the main micro and macro-level factors and what is the context in general that enable the local government to implement their Climate Change Action Plan 2020?

The current state of knowledge in the literature faces a challenge on how to evaluate climate action. Still, two approaches can be identified: the first is focused on factors which influence the implementation of climate change policy and strategies (Ryan 2015, Carmin *et al.* 2011, Corfee-Morlot *et al.* 2010, Sanchez Rodriguez 2011, Markkanen & Anger-Kraavi 2019); the second, on the contrary, gives priority to the results of such policies after they are implemented (Adam & Tsaristalidou 2019, McCarthy *et al.* 2012). This research aims to contribute to the first strand of the scholarship. This approach is driven by two main reasons. First, the analysis and comparison of mitigation and adaptation results require considering a significant number of indicators, including global and domestic events. Additionally, climate-friendly policies have a slow long-term effect which interacts with constantly changing socio-economic factors. This type of analysis is not only quite complex but also goes beyond the resources available for this research. Second, an evaluation of current results would be partial as most policy results are not yet fully updated. Consequently, this article will identify key factors that shape the implementation of local climate policies for the period 2015-2020.<sup>1</sup>

Throughout this research, the following hypothesis is tested: Buenos Aires local government had sufficient resources and support from political and social coalitions, as well as the ability to link climate action with local issues to implement the Climate Change Action Plan (2015-2020).

The main method of the research is qualitative in nature, using case study analysis. The research question is answered using Ryan's (2015) analytical framework for climate action at city level in developing countries. Such framework provides three sets of indicators regarding local capacity, local framing, and political and social factors to analyse climate change policy implementation. The primary sources used to test the hypothesis are policy papers and strategies such as laws, reports, and local plans from national and local governments retrieved from official websites. Secondary sources include international organisations and local governments international organisations' websites, which include climate change policies, strategies, and articles on Buenos Aires, as well as local newspapers, local organisations' websites and, to some extent, academic articles. Documents in English and Spanish are used for this research.

The study of climate-friendly policies in developing countries is relevant, as climate change is one of the main challenges to ensure sustainable development. In that sense, given that environmental quality affects and is affected by economic development (Todaro & Smith 2015), it is reasonable to assume that, unless managed, climate change will damage the development progress made and will put at risk the well-being of present and future generations (World Bank 2010). The interaction between poverty and environmental degradation can end in a vicious cycle where the population dimin-

1 Buenos Aires Climate Change Action Plan was launched in 2015 and set targets to 2020.

ishes or completely destroys the resources on which they depend on to keep existing (Todaro & Smith 2015). Thus, public policies toward climate change mitigation and adaptation must be embedded in a climate-smart development strategy to increase resilience, reduce further higher temperatures, and improve development outcomes (World Bank 2010). The successful implementation of climate change policies and strategies in Buenos Aires will determine its economic development and living conditions of its population and there relies on the importance of analysing which factors influence policy implementation.

The article is organised as follows. After the introduction, section 2 briefly focuses on the existing literature and main academic debates related to the research question. In Section 3, it is presented the theoretical framework and the main methods used to test the hypothesis. In Section 4, it is explained the general features of the city, main climate change threats, and contribution to this global phenomenon. In the following section, it is described local climate action, with an emphasis on the climate change action plan 2015-2020. In Section 5, it is analysed the local capacity, local framing, political actors, and social factors between 2015 and 2020 to test the hypothesis. Finally, in the last section, it is introduced the conclusions of this research.

## 2 How to evaluate climate change policies?

A key question concerning the scholarship is how to analyse and evaluate climate-related policies and strategies. Although many studies were conducted on this topic, the scholarship lacks a general agreement on how to evaluate such policies, most probably due to the variety of initiatives, purposes, targets, contexts, and perspective of the evaluator. Still, the current literature on this topic can be divided into two groups, which outlines the structure of this section. The first is focused on factors which shape the implementation of climate change policy and strategies (Ryan 2015, Carmin *et al.* 2011, Corfee-Morlot *et al.* 2010, Sanchez Rodriguez 2011, Markkanen & Anger-Kraavi 2019). The second, on the contrary, gives priority to the results of such policies after they are implemented (Adam & Tsarsitalidou 2019, McCarthy *et al.* 2012).

As Ryan (2015) emphasises, when it comes to analysing the execution of climate change policies at a local level, it is important to avoid the «everything matters»<sup>2</sup> trap. In fact, the author affirms that there are three sets of critical conditions that determine the implementation of climate change action: local capacity, local framing, and political factors and actors. First, local government capacity

2 Ryan (2015) refers to the «everything matters» trap for those studies which include a great number of factors that are relevant for policy implementation but are not able to specify a causal link between those factors and the effectiveness of an implemented policy.

includes financial incomes, legal competence, generation, and management of data, as well as human and technical resources (Ryan 2015). Similarly, Carmin *et al.* (2011) affirm that local capacity, which includes funding, technology, human, political, social resources, and leadership, becomes a key factor, as it allows the local government to implement and maintain local initiatives. As such, local capacity is an enabling condition and, when there is a lack of it, the local government will not be able to fully execute such policies.

However, government capacity is not a sufficient condition as climate policies and strategies can be opposed by different actors. Thus, the second factor is local-framing, meaning the ability to link climate-friendly policies to other local issues which could generate additional socio-economic and environmental benefits and increase the probability of policy implementation (Ryan 2015). In other words, how local communities and stakeholders perceive costs and benefits from those policies and strategies affects the likelihood of implementation. Additionally, previous experiences of early adapters indicate that general strategy combined with sector-based plans are a must to achieve key climate change adaptation initiatives (Carmin *et al.* 2011). The last set of conditions is political factors and actors which can be better explained as political leadership, membership in international municipal networks, and presence of interest groups that can support or block the implementation of climate policies at a local level (Ryan 2015). Political factors could also be linked to the top-down approach proposed by Corfee-Morlot *et al.* (2010), when political leadership or interest groups at a national level influence local governments to pursue climate action.

In a similar line of thought, Corfee-Morlot *et al.* (2010) highlight that several obstacles can be identified in climate change policy implementation. The first is the institutional blockage in governmental administration, due to different priorities and interests. The second is the lack of proper capacity and technical expertise, which is found in emerging economies, as well as in developed ones. The lack of appropriate financial resources happens not only because of different financial structures but also due to climate change action plans where the need for funding is not mentioned. Also, in some cases, local governments do not have enough jurisdictional power over certain sectors or activities which greatly contribute to climate change. Finally, the absence of national or central governments support is a challenge mainly in proper regulation. Sanchez Rodriguez (2011) adds that adaptation initiatives can also be limited, due to disagreements over legal rights on resources, level of resource out-take, availability of resources, limited enforcement of regulations, and national and international regulations.

Markkanen and Anger-Kraavi (2019) specify that to avoid inequality outcomes, which deteriorate even further the living conditions of the most vulnerable, three key elements are needed for the

successfulness of climate change policies: inclusive design and implementation, strategic thinking and support, and a pro-poor approach.<sup>3</sup>

When it comes to evaluating the results of climate-friendly policies, the Inter-American Development Bank (IDB) proposes a different set of indicators for mitigation and adaptation projects. Adaptation indicators include data availability, institutional capacity, existence of laws and regulations, and information dissemination, among others, while mitigation is measured according to greenhouse gas or carbon dioxide equivalent emissions (McCarthy *et al.* 2012).

On the other hand, Adam and Tsarsitalidou (2019) suggest an index of environmental policies efficiency (EPE), through data envelopment analysis,<sup>4</sup> to evaluate policies implemented by national governments. The emphasis is on the extent of output maximisation by countries through a set of environmental policy instruments. The methodology used is based on the assumption that environmental degradation is influenced by pollution generated by economic activity but can be manipulated by public policies (Adam & Tsarsitalidou 2019). The authors state that urbanisation rate, GDP per capita, democracy level, and bureaucratic strength are the factors which have a relevant impact on environmental policy efficiency and that population density and low corruption levels do not have an impact on efficiency. Moreover, inefficiency can be linked to poor democratic countries as there are inadequate high environmental taxes and accountability levels are low while in high-income democracies, where environmental issues are an important topic, environmental policies are more efficient (Adam & Tsarsitalidou 2019). Yet, this study appears to be more useful to evaluate climate change mitigation policies as it is based on the total amount of pollution due to economic activities. Thus, it lacks variables to evaluate adaptation policies.

Also, it is pertinent to consider that several indexes of climate change were developed over the years. Yet, to the best of our knowledge, these indexes pay greater attention to the current state of a country or local area, rather than evaluate the results of climate change policies; namely, it has not been found a singular index or set of indicators, for both mitigation and adaptation climate policies, and even less to evaluate local governments' action.

3 «A pro-poor approach entails systematically considering how a policy can be used to benefit the poorest and taking active measures to address any regressive outcomes» (Markkanen & Anger-Kraavi 2019).

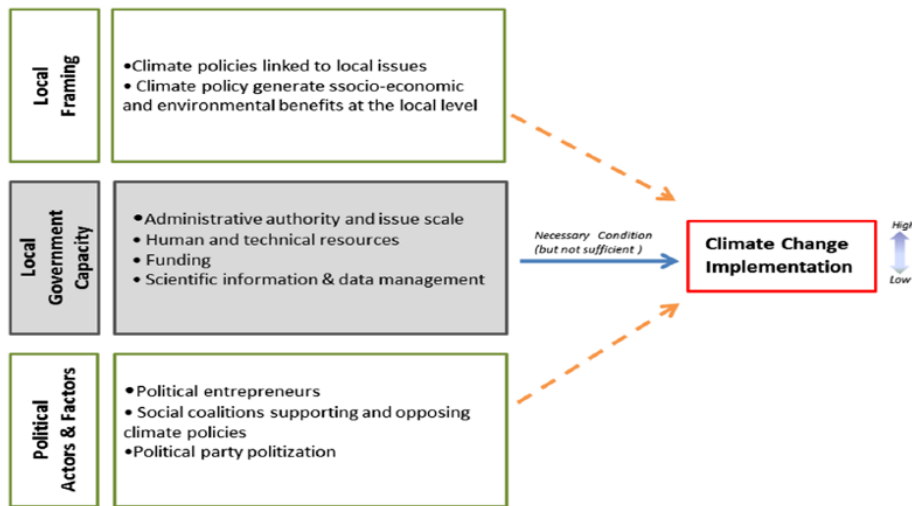
4 Data envelopment analysis is «nonparametric method that measures relative efficiency by comparing it with the possible production frontiers of decision-making units with multiple inputs and outputs using linear programming».

### 3 Theoretical framework and research method

#### 3.1. Theoretical framework

To answer the research question and the hypothesis guiding this paper, the framework described by Ryan (2015) is used. This theoretical framework provides three sets of indicators to analyse





**Figure 1**

Ryan's analytical framework: key factors affecting climate policy implementation

Source: Ryan (2015).

the implementation of climate change policies at the local level. First, indicators are grouped as local capacity, which refers to resources, information management, and legal competence that the local government must implement or maintain climate change action. Although this is an enabling condition, without which climate action would not be achievable, it is not sufficient. Thus, the second and third sets of indicators are local framing and political factors and actors. Local framing is the observable link between climate change policies and other current issues, which can provide additional socio-economic and environmental benefits to the population (Ryan 2015). This becomes significant for policy implementation as the perception of local stakeholders and communities on costs and benefits generated can result in support or opposition to climate action. Political factors and actors refer not only to the political leadership of the local government in climate change issues but also the action of interest groups, due to the consequences of climate-friendly policies implementation, especially those who are dependent on carbon-intensive economic activities. In the scheme of Figure 1, it is presented Ryan's analytical framework.

This framework was chosen based on three reasons. First, it provides a set of factors and conditions that shape the development and implementation of climate-friendly policies by local governments (city-level), with a greater emphasis on developing countries (Ryan 2015). The focus on developing countries gives a greater relevance to analysing the impact of human, technical, and financial resources at a local level as well as the challenge, faced by local governments to combine climate policies with issues such as poverty, security, and inequalities. Additionally, as local climate agendas will determine the existence of low-carbon economies, the last set of indicators proposed by Ryan (2015) requires the consider-



ation of economic actors that are more dependent on high carbon emissions activities.

Second, Ryan’s framework starts with the assumption that the combination of these sets of factors can lead to different outcomes. As a result, the comparison of these factors in Buenos Aires is used to explain the challenges faced by local governments in the implementation. Moreover, by using well-defined indicators, this research avoids falling into the «everything matters» trap described previously. In Table 1, it is presented the indicators which are divided into three groups, outlining the three sets of factors proposed by Ryan (2015).

Factors	Indicators
Local capacity	Legal competence Human and technical resources Funding
Local framing	Climate strategy linked to local issues Cost and benefits of climate action for the population
Political actors and social factors	Political leadership Influence of economic sectors and social actors

**Table 1**

Indicators that are used to answer the second research question based on Ryan’s analytical framework

Source: author’s own elaboration.

Finally, this framework allows an analysis of not only the implementation of climate-friendly policies but also the design. In other words, the link between climate action and local issues faced by the population, such as strengthening water drain capacity to avoid flooding, and the consideration of social and economic actors that will face the costs and benefits of the strategy provide a basis from which the priorities, the structure, and the principles of the action plans can be compared. Most importantly, it highlights whether these factors have been considered in the policy design.

### 3.2. Research method

The method of this research is qualitative in nature, using case study analysis. The primary sources managed to test the hypothesis are policy papers and strategies such as laws, reports, and local plans from national and local governments retrieved from official websites. Secondary sources consist of international organisations’ websites, which include climate change policies, strategies, and articles on Buenos Aires, as well as local newspapers, local organisations’ websites and, to some extent, academic articles. Documents in English and Spanish are used for this research.

For clarification, in this research it is only analysed the city of Buenos Aires, without including the metropolitan areas. Additionally, the term «climate change policies» is understood as public policies on mitigation and adaptation<sup>5</sup> to climate change. This term is used as a synonym for «climate-friendly policies» and «climate action».

In this research, it is analysed climate change action, based on factors shaping the implementation, and not the results, of climate policies. This approach is mainly driven by the fact that the analysis and comparison of mitigation and adaptation results require considering a significant number of indicators. Additionally, climate-friendly policies have a long-term effect and interact with changing socioeconomic factors, including domestic and external events. An example of such factors is the ongoing global pandemic COVID-19 (coronavirus disease 2019), which reduced the economic activities worldwide and, therefore, the CO<sub>2</sub>eq emissions, although the precise impact of the pandemic is not yet fully determined. Therefore, evaluating the results achieved would not only be challenging but also demand resources that go beyond this research. Last but not least, data availability regarding mitigation and adaptation results is limited. For instance, in Buenos Aires, the data regarding carbon dioxide equivalent (CO<sub>2</sub>eq) emissions is available until 2018. Thus, the impact of the action plan updated in 2015 is not observable yet.

## 4 Buenos Aires, an overview

The Autonomous City of Buenos Aires (Ciudad Autónoma de Buenos Aires, CABA) is the third-largest megacity in Latin America, after Mexico City and São Paulo, by population size (Mauad 2018). Buenos Aires is the capital of Argentina and, according to the last official national census, has a total population of 14.8 million people, including the metropolitan area, which equalled roughly 37% of the total population in Argentina (Gobierno de la Ciudad de Buenos Aires 2015). However, without considering the metropolitan areas, Buenos Aires has 3.05 million (Gobierno de la Ciudad de Buenos Aires 2015). Although this research is based on the city without their metropolitan area, it becomes relevant to consider people commuting daily due to education and jobs, which significantly increases the population.<sup>6</sup>

The climate change action plan here under analysis identifies three main future risks for the city: temperature rise, increased rainfall, and water-level ascent. In Buenos Aires, the average temperature increased by 0.13°C every ten years between 1960 and 2014 (Gobierno de la Ciudad de Buenos Aires 2015), and it is estimated it will continue to rise. This is a significant risk, as it implies

5 «Climate change mitigation» refers to actions towards the reduction of greenhouse gas emissions, while «adaptation measures» are those that aim to adapt to the inevitable consequences of climate change, such as hurricanes, increased temperatures, or sea-level rise.

6 For instance, Buenos Aires has over 3.2 million people commuting daily to the city (Gobierno de la Ciudad de Buenos Aires 2015). Its metropolitan area is comprised of 40 municipalities, with close economic and social links to the city.

consequences for health, such as new diseases, besides droughts and bush fires risk in green areas. Increased rainfall, in quantity and frequency, and water-level rise, from the sea and river, are strongly linked to flood risk. In Buenos Aires, rainfall increased by 32% between 1961-1970 and 2011-2014 (Gobierno de la Ciudad de Buenos Aires 2015). Moreover, studies show that the number of rainy days remained relatively stable, which means that the intensity also increased. As Buenos Aires is located on La Plata River coast and has multiple smaller rivers surrounding the city, fluctuations in river level must be added to sea-level rise. In fact, 25% of the city is vulnerable to a one-hundred-year flood and, if the water level rises by five metres, approximately 1.5 million inhabitants would be affected (Himschoot & Areco n. d.). Therefore, in case of flooding, the living conditions of the population might deteriorate greatly, as well as the infrastructure and the economic activity. Additionally, a significant part of the high-risk areas of the city is the territory occupied by *villas* or *asentamientos*,<sup>7</sup> which are even more vulnerable to deteriorating conditions.

## 5 Buenos Aires Climate Action Plan (2015-2020)

The Climate Change Action Plan, first elaborated in 2009, was updated in 2015, following the requirements of the Law n. 3,871/11. The update was not only continuing with the original Action Plan measures but also established clear and separated mitigation and adaptation goals for the period 2016-2020 (Gobierno de la Ciudad de Buenos Aires 2015). Although the climate action plan was recently updated in 2021, this research does not focus on it, due to the short period of time since its implementation. Contrary to the previous version, the Action Plan 2016-2020 does not disclose the funding needed nor the funding sources for achieving its targets.

Adaptation goals, some of which were planned to be achieved in 2019, can be grouped into training on extreme events, those linked to water level rise and flood risk, homes relocation, and health. Regarding the first, training was planned to focus on increasing prevention and crisis management know-how. The target population for these trainings are not only the internal agencies of the local government but also the inhabitants in general, as it includes besides awareness campaigns.

As one of the main risks for the city is flooding, the expansion of the hydro-meteorological network is a central target of the action plan. The expansion includes a Doppler radar, numerical modelling system for weather forecast and floods, data management, and a video alert system. For 2020, the local government planned to build

7 *Villa* is the Spanish term used in Argentina for unplanned population settlements, of irregular layout, usually as a result of illegal land occupation, which has been in the past years incorporating basic services such as drinkable water, sewage, and waste management, while an *asentamiento* is a group of people settled irregularly in a territory that cannot be urbanized, such as under a bridge, side of railroad tracks, public square, and floodplains, among others, and the living conditions are extremely precarious, without basic services (Gobierno de la Ciudad de Buenos Aires 2020).

62.4 kilometres of sewage pipes, a part of which would be financed through a World Bank loan, to improve draining rainwater. Additionally, the city will have a vulnerability map in which hospitals, schools, geriatric homes, *villas*, and poor neighbourhoods located in risky areas are identified.

People living in *asentamientos* or within the limits, established by law, to the Riachuelo river<sup>8</sup> shall be relocated, as they are in an environmental risky area. The local government aims to build homes, which would be available through easy access lines of credit.

Finally, the adaptation action plan contains health programs coordinated, with different agencies, to create awareness and aid more people. Hospital maintenance work is also included. However, this section lacks quantifiable targets.

The mitigation targets for the period 2016-2020 have four axes: changing transportation means, waste management, energy efficiency, use of renewable energies, and urban woodland master plan. The main contributors are expected to be waste management (44% of total CO<sub>2</sub>eq emissions reduced) and the transport sector (32%), while energy and urban woodland would reduce by 22% and 2%, respectively, by 2020 (Gobierno de la Ciudad de Buenos Aires 2015).

The transport sector is expected to contribute to a reduction of 290,000 TnCO<sub>2</sub>eq emissions by 2020. To achieve such a contribution, the focus is on promoting public transport use and the healthy mobility program, which includes public bikes and walking mobility. Among the quantifiable targets, are 38.5 kilometres of expansion of exclusive lanes for buses, an increase from 1.3 to 1.8 million passengers using the metro lines, one full new metro line, three additional stations for an existing line, 140 kilometres constructed for bicycle lanes, and 400 new bike stations with 6,000 bikes in total, reaching 13.7 kilometres of walking streets or with pedestrian priority.

Actions within the waste management sector are expected to reduce emissions by approximately 472,000 TnCO<sub>2</sub>eq. Such actions consist of increasing the annual capacity to 14,500 tonnes of an organic waste treatment plant and 90,000 tonnes of a pruning waste treatment plant, as well as improving the waste separation capacity of existing waste treatment plants and the building of other two new in different locations.

Energy savings in gas and electricity are targeted to reduce 330,000 TnCO<sub>2</sub>eq emissions by 2020. However, this target is based on actions already implemented in the previous action plan and those to be implemented in the following action plan (2020-2025). Besides public buildings evaluation, awareness campaigns, promotion of renewable energy use, inventories of biomass energy capacity, and wind map for wind energy purposes, the only quantifiable target is the replacement of 56,000 public lightnings with LED lights.

8 The Riachuelo river or Matanza river is a 64 kilometres river, which originates in Buenos Aires Province and defines the southern boundary of the city of Buenos Aires.

Although the urban woodland master program does not have a clear contribution to reducing CO<sub>2</sub>eq emissions by 2020, in the action plan it is estimated more than 1.3 million TnCO<sub>2</sub> concentrations by 2030. Until 2023, the target is set to 130,000 trees planted.

## **6**

### **Local capacity, local framework, political actors, and social factors**

The purpose of this section is to examine the Climate Change Action Plan Buenos Aires 2030 (updated and launched in 2015), under the framework proposed by Ryan (2015) on climate change policy implementation, for the period 2015-2019. As stated before, with this framework, it is evaluated local policies, based on three sets of indicators: local capacity, local framing, and political actors and social factors. Thus, the section is structured as follows: first, the local government is analysed regarding legal competence, human and technological resources, and funding needed to implement the action plan; second, this research explores the link between the strategies and other local issues or socio-economic and environmental benefits they can generate; third, political leaders and local economic sectors that can determine the implementation or not of such strategies are identified.

#### **6.1. Local capacity**

One of the key features of Buenos Aires is that its local government has a level of autonomy which includes a legislative power; that is to say, the city can sanction and implement local laws. Although they must comply with national laws, the implementation of local climate-friendly policies is not an issue, as the local government sanctioned such laws since 2002. Nevertheless, their legal competence is limited when it comes to local issues, such as inter-urban transportation, that involve the metropolitan areas which are comprised of several municipalities with their own local governments.

Human resources are evaluated in this section based on personnel training and the local government structure, meaning personnel dedicated to climate change or environmental issues. In that sense, two important factors must be considered in this case study: first, this action plan was not the first (nor last) to be implemented by the local government, which suggests that the Environmental Protection Agency had previous know-how and capacity to develop such a strategy; second, in 2009, the External Advisory Board was created, providing knowledge from the Academia and local NGOs. Also, the action plan received external technical assistance and the collaboration of the Inter-Ministerial Team when elaborated. Addi-

tionally, in 2018, Buenos Aires joined 100 Resilient Cities, launched its Resilient Strategy, and was provided with technical assistance from the international organisation, which adds more experience to the local government's human resources. Therefore, it is safe to say the city had the technical and human resources needed to design and implement climate change strategies.

Regarding the government structure, there is a department responsible for environmental issues, being climate change one of them. In 2008, Buenos Aires' local government created the Environmental Protection Agency (APrA, in its Spanish acronym), under the Ministry of Environment and Public Space. The Agency's main purpose is to plan policies and projects that will improve the environmental quality of the city. APrA is responsible for greenhouse gas emissions inventories and formulates, develops, and coordinates the implementation of climate-friendly policies at the local level. The agency also coordinates the Inter-Ministerial Team, which influences the development of climate action. As Mauad (2018) states, APrA is a key player, due to its autonomy and the possibility of hiring personnel specialised in climate change action, which increases human resources capacity.

The third factor to consider when analysing local capacity is funding. This is a key weakness of Buenos Aires' strategy, as it does not state the funding required for achieving its targets or the sources of potential financial resources. Moreover, the annual budget dedicated to the environmental agency is almost insignificant. In 2016, APrA received 0.2% of the total budget (Gobierno de la Ciudad de Buenos Aires 2016). The budgets include fixed costs, as personnel expenses, which reduces the financial resources available for climate change action, and denotes the priority level environmental issues have at a local level. Despite the limited budget, Buenos Aires has other funding sources, as it received financial support from the Clinton Foundation when developing the bus rapid transit system, and from the World Bank to assess climate risks, improve infrastructure and housing conditions of one *villa*, and enhance the risk flood management capacities (Mauad 2018, World Bank 2020).

## 6.2. Local framing

In Buenos Aires, one of the main pillars of mitigation goals is the local transport system. The city does not only provide transport services to its inhabitants but also to those commuting daily to work or study, which in total account for 195,000 passengers monthly (bus, metro, and train) (Gobierno de la Ciudad de Buenos Aires 2019). The new lines and improvements planned in busses, trains, and metro have been promoted, not only linked to the quality of transport (new vehicles) but also in its better frequency, speed, and better infrastructure of stations (Gobierno de la Ciudad



de Buenos Aires 2015). The infrastructure, such as exclusive bus lanes, was also avoiding traffic congestion. Moreover, the bike program was linked to improving the health conditions of the population, in addition, to being available all the time free of charge, which becomes a key feature in the country, with increasing inflation and poverty levels.

Other initiatives of the action plan were also linked to local issues in Buenos Aires; for instance, the woodland plan was promoted as beneficial to air and water quality, decreasing pollution and mitigating high temperatures, which are a significant issue for the population, especially during summer, causing health problems and power cuts, due to increased demand (Gobierno de la Ciudad de Buenos Aires 2015). Also, among the adaptation measures, the construction of sewage and drain infrastructure to face the increased rainfall is described as meant to improve the living conditions of the population as the city has had flooding in the past, causing important economic losses.

The vulnerability of *villas* and *asentamientos* is mentioned in several initiatives of the action plan of Buenos Aires, mainly concerning flooding areas and living conditions of the population. Although the strategy does not include a specific goal for this population, in the present research, it is noted that the urbanisation plan carried out by the local government included new and better infrastructure, which increases the climate change adaptation capability. However, a weakness can be seen in the fact that a common work or previous consultation with the population living in the *villas* is not included in the action plan to improve engagement and ownership of the initiative. One of the main concerns of inhabitants is related to land regularisation, as the great majority do not have property titles of their homes and are afraid of a possible eviction (Giambartolomei 2019b). Also, local organisations stated that the house improvement process requires the owners to leave the property and become a «virtual» owner of another house, which is accessed with debt commitments. Two additional issues are part of this process: as the residents leave their property, they lose the possibility of having a business or work from their homes, and services fees become more expensive, even out of budget for most households, due to the improvement (Cavallero & Gago 2019). As a result, the link between the initiative and other local issues of the population is considered limited, even though benefits will be significant in the long term.

### **6.3. Political actors and social factors**

Among this set of factors, it is relevant to include political entrepreneurs who promote climate change policies or initiatives at a local level, participation in international organisations which can facilitate the access to technical assistance or improve the reputation



of political leaders, and interest group or economic actors who may be highly dependent on carbon-intensive activities (Ryan 2015). In this line of thought, Corfee-Morlot *et al.* (2010) claim that political leadership and interest groups influencing local governments to implement climate change policies are also observed from a national perspective. More importantly, political leaders, as well as the private sector and the general public, are significant actors, when establishing climate change issues in the local agenda and developing action plans (Corfee-Morlot *et al.* 2010). Nevertheless, in some cases, the political discourse to set a local government as a climate leader does not match the reality (Mauad 2018).

Political leaders, especially mayors, are in most cases key players when the first steps toward climate legislation and action plans are taken (Ryan 2015). In Buenos Aires, although climate change policies started previously, Mauricio Macri (2009-2015) can be considered a political entrepreneur, with the support of the local legislative power (Mauad 2018) as the first climate action plan with long term goals, as well as the mitigation law and the action plan updated were done during his term. Additionally, Macri's successor, Horacio Rodríguez Larreta, came from the same political party which had a significant influence on the continuity of climate-friendly policies. Notably, in Buenos Aires, the development of climate change policies was accepted among different political parties, despite climate issues not being present in the political debate (Ryan 2015).

This political leadership can also be linked to international organisations participation. Mauad (2018) claims that the Action Plan formulated in 2009 was built, due to Buenos Aires' international projection: Macri needed an action plan to present in COP15. During his first year in government, the city joined C40 and later gained great international exposure, when promoting its climate initiatives during C40 Latin America Forum. In 2015, C40 recognised Buenos Aires as one of the 10 cities that were leading the fight against climate change (*La Nación* 2015). Rodríguez Larreta increased further Buenos Aires' international projection, as the city joined 100 Resilient Cities in 2016, which led to the development of the local resilient strategy two years later —and committed the city to reach carbon neutrality by 2050.

In Buenos Aires, the implementation of the Climate Change Action Plan launched in 2015 has been influenced by economic and social actors who were dependent on carbon-intensity activities or affected in their line of job or living conditions. As one of the main pillars of the action plan is to promote and extend the bike lanes, strong support from bike makers was noted, while taxi owners and drivers showed their discontent (Ryan 2012), as the number of passengers was expected to decrease, due to a program that offers free and always available bikes all over the city. The opposition also came from people using cars as main transportation means, as the

bike lanes reduced the space in the street for other vehicles and there was less parking available (Giambartolomei 2019a). Still, the opposition was not strong enough to force the government to modify its original plan. Another important pillar of the action plan is waste management in which new waste treatment and recycling plants were planned. In this case, the opposition came from two fronts. First, people living in the neighbourhood where one of the waste treatment plants was built opposed to the location, not only because the place was meant to be a green area (*i.e.*, public square) but also because it implied adding cement to a floodable area which could exacerbate the area's problems to naturally absorb rainwater (Clarín 2018, Musse 2019). Due to a majority in the local legislative power, the local government was able to implement the project.

Second, waste collection is organised to improve the city's capability to recycle. But it depends on the work of thousands of men and women that are part of 12 cooperatives. In 2016, the local government faced the opposition from the cooperatives when trying to privatise or build new waste treatment plants, as the conditions would create unemployment and additional difficulties in waste selection (Federación Argentina de Cartoneros, Carreros y Recicladores 2016). Moreover, the cooperatives constantly demanded better working conditions (*i.e.*, appropriate working clothes, or tools) and better integration into the recycling system, highlighting that without their participation waste collection, and recycling would be significantly reduced, and the Action Plans goals would be harmed (Federación Argentina de Cartoneros, Carreros y Recicladores 2016). The cooperatives also played a key role, together with NGOs, such as Greenpeace, Fundación Ambiente y Recursos Naturales, and Asociación por la Justicia Ambiental, when the local government presented a project law on waste incineration to generate energy which was expected to result in job losses and health issues. The law was approved by the legislative power, but a writ of protection was presented before a judge who ruled the suspension of the law (Frittaoni 2018).

Another important actor that shaped the implementation of the climate action plan has been the Argentine Chamber of Electronic, Electromechanical and Lighting Industries (CAIEEL, in its Spanish acronym). In 2013, the local government changed 70% of the public lighting for LED lights and, thus, 2015-2020 action plan included changing the remaining 30%. This became an important issue when the bidding process started in 2016 and CAIEEL claimed the number of days provided by the tender was only beneficial to the Philips company which won the previous bidding. As a result, CAIEEL made a public request to delay the bidding process, which was later approved, providing more time for national small and medium enterprises to be able to prepare and participate in the process as it could generate 20,000 jobs (Ensinck 2017).

## 7 Conclusions

The purpose of this research was to identify micro and macro-level factors that influence the implementation of climate change policies at local level. To do so, this paper used the Buenos Aires Climate Action Plan (2015-2020) and aimed to answer the question of which factors and context enabled the local government to implement its climate change plan. As a result, this research formulated one hypothesis: the local government has sufficient resources and support from political and social coalitions, as well as the ability to link climate action with local issues to implement its climate action plan. To test the hypothesis, Ryan's (2015) analytical framework was used.

The findings of this research endorse the hypothesis. Although local capacity is a necessary but not sufficient condition to implement climate policies (Ryan 2015), Buenos Aires appears to satisfy this requirement. The local government has the legal competence to sanction laws on the topic and no opposition from other political parties was observed. Human and technical resources appeared to be appropriate and, when not sufficient, were complemented with resources provided by international networks, such as 100 Resilient Cities. Funding was more challenging, as the local budget was limited for environmental issues. This was solved to a certain extent with funds provided by international organisations or by linking climate initiatives with other departments, such as sanitation or infrastructure.

Additionally, several actions are linked to other ongoing issues. The action plan made an emphasis on the benefits of better transportation, infrastructure, and improved living conditions for the most vulnerable population. However, certain challenges remain, for instance, the issues created in Buenos Aires, due to the urbanisation process in the *villas*.

When it comes to political actors and social factors, the influence of political leadership and participation in international organisations was observed. In fact, Mayor Macri had an evident leadership in climate issues which gained more relevance in the local agenda, a path followed by his successor. This combined with the participation in C40, 100 Resilient Cities, and international conferences, such as COP15, led to a strong commitment to tackling climate change at city level. Still, social, and economic actors that suffered or were opposed to climate initiatives were identified. In Buenos Aires such actors, in some cases, were able to stall or cancel initiatives.

The analytical framework used to answer the research question focuses on factors and context that determine the implementation of climate-friendly policies; thus, in this research it is not analysed

nor evaluated which barriers can pose a challenge. For instance, as climate action plans are based on vulnerability or diagnosis studies, the climate change threats identified by those studies determine the implementation of relevant and adequate climate policies. Although climate policies require more time to be enforced, the fact that most action plans are updated every five years poses the question of how unexpected climate events are dealt with, until a new action plan is designed. Also, as demonstrated throughout this research, political leadership is a significant factor in climate action, particularly in local governments. As a result of democratic elections, a new administration can block the implementation of climate-friendly policies or change the priorities if political views differ. Finally, in the case of developing countries, the urge to develop and solve other issues, such as poverty and education, can result in climate issues relegated or beneficial policies to carbon-intense economic activities.

Analysing the local factors and context provided valuable information about the implementation of climate change policies at city level. Yet, further research is needed to address the limitations found in the present study, such as measuring the results of the action plans implemented. This research also lacks a wide evaluation of the impact of external events (*e.g.*, global health and economic crisis, or actions of other countries) on the implementation of climate-friendly policies. A deeper result analysis focusing not only on greenhouse gas emissions but also on adaptation measures to evaluate the vulnerability to climate change of the city is also needed. Finally, the question of how the experiences of Buenos Aires can be replicated in other cities shall also be addressed.

## 8 Acknowledgments

This paper is part of a broader research carried out in 2020, which resulted in a master's thesis. In that research, the purpose was to compare Buenos Aires' climate change policy implementation to that of Rio de Janeiro's and identify a bottom-up approach in both cases.

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