



Buenos Aires Climate Change Action Plan English Summary



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Buenos Aires Ciudad



EN TODO ESTÁS VOS

Buenos Aires Climate Change Action Plan English Summary

Agencia de Protección Ambiental
Buenos Aires Environmental Protection Agency



Buenos Aires Ciudad



EN TODO ESTÁS VOS

Bike lane extension	160 km
MSW	1.279.338 tons/year
	1.15 kg/person/day

Biodiversity

Buenos Aires city have grown rapidly and without any planning, resulting in an intense and unequal urbanization with an enormous population density. Because of these processes the natural biodiversity of the city have been severely reduced, causing a decrease in the life quality of Buenos Aires citizens due to the many health and environmental benefits that green spaces can bring to people.

Nowadays Buenos Aires City has 2 Natural Reserves: “Reserva Ecológica Costanera Sur” and “Reserva Ecológica Costanera Norte”, moreover the EPA is fostering a project of the “Reserva Ecológica Lago Lugano”, which will be located in the south of the city, in a highly urbanized area, with the purpose of preserving the local biodiversity of the area and developing education and research activities.

Towards a Climate Change Strategy

On December 2009, the City launched the Climate Change Action Plan Buenos Aires 2010-2030 in order to embark on a long-term effort to reduce its contribution to global warming assuming the responsibility for the Greenhouse Gases (GHG) emissions generated within and even beyond the city boundaries. For that purpose a GHG Inventory was compiled as the baseline to set mitigation actions. Besides, taking into consideration past events and future forecasts, the Government considered flood risk prevention and emergency response as the main priorities in terms of adaptation.

So as to establish the Climate Change Action Plan as a State Policy, the Adaptation and Mitigation Climate Change Law was approved in the City Legislature in September 2011, with the objective of establishing actions, tools and strategies to reduce human vulnerability and natural systems, protect its effects and strengthen its benefits; confirming the decision of the Government to grant Climate Change the importance its deserves, thus transforming it into a real and cross disciplinary state policy. The Act defines the dissemination and communication strategies with the aim of ensuring access to information for all stakeholders. Likewise, it states to be the duty of the Enforcement Authority (Buenos Aires EPA) to create and coordinate an External Advisory Council, composed of experts in the field, to assist and advise the implementing authority, as well as an Interministerial Team, to develop the Climate Change strategy in a needed trans -disciplinary interaction. Since the Adaptation and Mitigation Climate Change Law was enacted Buenos Aires Climate Change Action Plan is checked, adjusted and updated every 5 years, being 2015 the first review version, including progress in the period between 2010 and 2015.

Buenos Aires` s international interaction

Besides and in order to make the most of city - to - city interaction, Buenos Aires joined since 2009, the main international networks working with the firm objective of installing local issues and promoting regional and sub-national governments inclusion in international negotiations.



In this framework, on March 2015, the first Latin American C40 Forum took place in Buenos Aires City, in which many Latin American cities, such as Buenos Aires, Sao Paulo, Mexico DF, Lima and Rio de Janeiro – among others- , subscribed to the Compact of Mayors and compromised to become fully compliant before the end of 2015.

Through this agreement the City pledges to undertake the following actions:

1. Develop and publicly report a greenhouse gas (GHG) emissions inventory that is consistent with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC)
2. Identify and publicly report on climate hazards
3. Set and publicly report a target to reduce GHG emissions
4. Assess and publicly report on climate vulnerabilities
5. Publishing plans to address climate change mitigation and adaptation

Buenos Aires reached the compact compliance milestone on September 2015, becoming part of the group of cities achieving the goal, together with Rio de Janeiro, Cape Town, Copenhagen, Melbourne, New York, Oslo, San Francisco, Stockholm, Sydney and Washington DC.

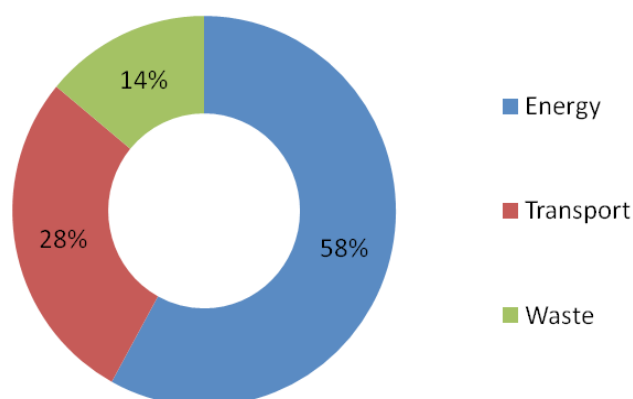


GHG Inventory

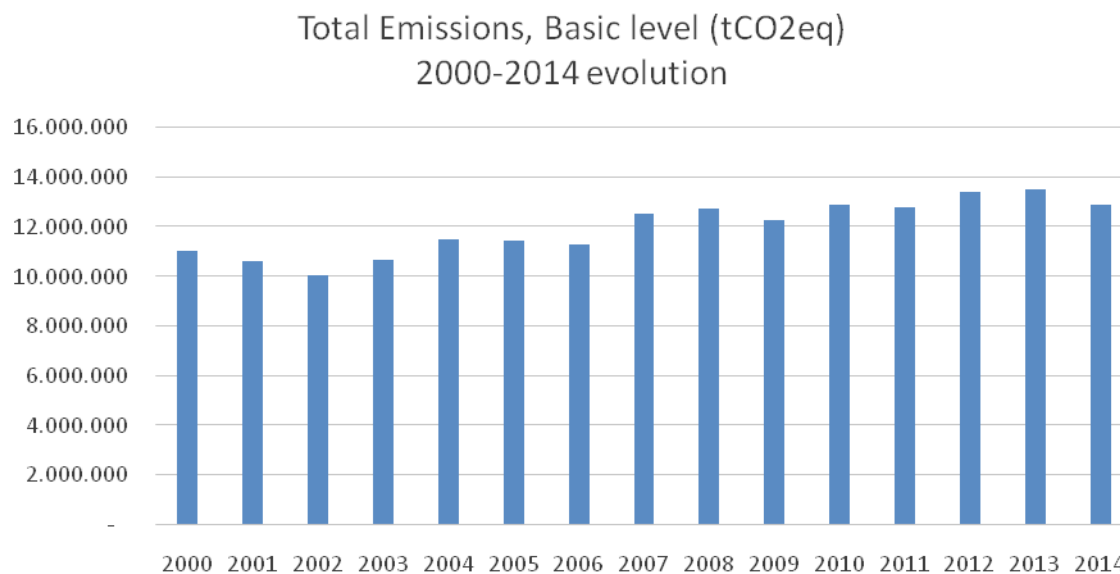
So as to achieve this commitment Buenos Aires reviewed the GHG Inventory in terms of the requirements included in the Global Protocol for Communities – GPC-, for the period between 2000 and 2014. From this inventory it was possible to identify the major emission sources. Thus, it stands as the baseline in order to set an emission reduction strategy. In 2014 emissions were estimated in 12, 9 million tons of CO_{2eq}.

In the figures below, total 2014 emissions by sector, and GHG emissions evolution between 2000 and 2014.

Total GHG emissions per sector (tCO_{2eq}) – 2014



GHG emissions evolution 2000-2014



To highlight some important points:

The energy sector has been steady throughout the whole series the main source of emissions, slightly increasing its share in the last 10 years, which on average was 58%. In second place, the transport sector with a relatively constant participation, 31% on average. Finally, the waste sector contributed 14% of the emissions during the period.

Regarding the evolution of total GHG emissions in the period 2000 - 2014, an increase of 17% is observed. However, in the last 10 years (2005-2014), the increase was 13%.

Moreover, considering that the City Government began to implement mitigation measures, embodied in the first Climate Change Action Plan in 2009, is relevant to compare the current level of emissions with those prior to the Plan. Considering the reference year, it's important to highlight that the emissions in 2014 increased only 1.5% compared to 2008.

Mitigation Actions

Within the first implementation period mentioned above, 2010-2015, the government carried out various actions and mitigation projects in different sectors of the City, which have reduced an estimated amount of 450.000 tons of CO_{2eq} in 2015.

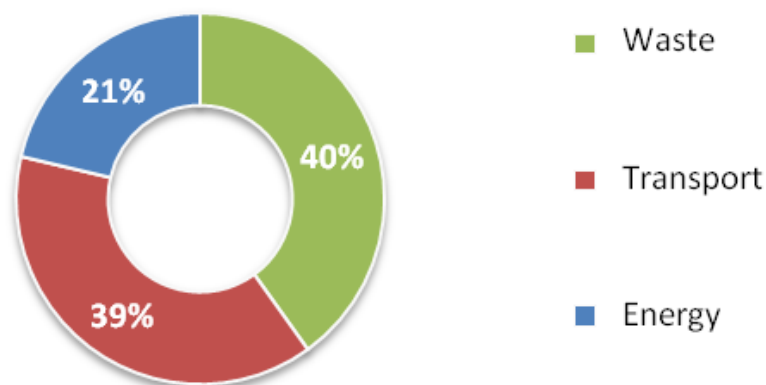
These measures are organized under the three core pillars of the first version of the Action Plan:

1. Waste management,
2. Energy efficiency and promotion of renewable energy initiatives, and
3. Sustainable Mobility Plan.



Disclosed by the more relevant sectors according to the inventory results, the emission reduction achieved in 2015 results as follow: approximately 96.000 tons of CO_{2eq} in the Energy Sector, 174.000 tons of CO_{2eq} in the Transport sector and 181.000 tons of CO_{2eq} in the Waste area. The figure below shows the reduction achieved in 2015, disclosed by sector.

Emission reduction in 2015



Waste Management

Reductions in this sector were achieved by reducing final disposition of waste in landfills, decrease transportation to the landfill location and increase of domestic recycling. Between 2013 and 2015 a reduction of 52% was made through various actions:

- Recycling promotion campaigns for neighbours and schools
- New green containers in order to facilitate source separation and Green Reception Points in public squares that received recycled domestic materials and small informatics devices
- North Mechanical Biological Treatment Plant (MBT) launched in 2013 that recovers 600 tons of the daily 1100 tons of waste treated
- Nearly 2400 tons of debris recovered per day for recycling
- PET Treatment Plant recovering 16 tons per day of plastic
- Organic Waste Treatment Plant with capacity for 10 tons per day
- Pruning and Forestry Waste Treatment Plant where 24 tons per day are reduced to sawdust

Transport

The main objective for the actions implemented in this sector was focused on reducing fossil fuel consumption, given the increase of private cars use, bearing in mind the interaction with the metropolitan area. The City has carried out actions in the framework of a Sustainable Mobility Plan:

- Preferential lanes for public passenger transport: 10.7 km extension
- Extension of BRT corridors reaching almost 54km
- Expansion of subway system with 12 new stations. In 2015: 58 km subway path extension
- More protected bicycle lanes (160 km in 2015), and the extension of the free public system which by 2015, counts with 200 automatic stations and 4000 bicycles



- Promotion of pedestrian priority areas
- Increase of parking restrictions

Energy

Since this sector has the highest impact in terms of GHG emissions – especially because of residential consumption- the core of the measures implemented in this sector were mainly oriented to promote energy efficiency, incorporate new technologies and encourage the use of renewable energy sources.

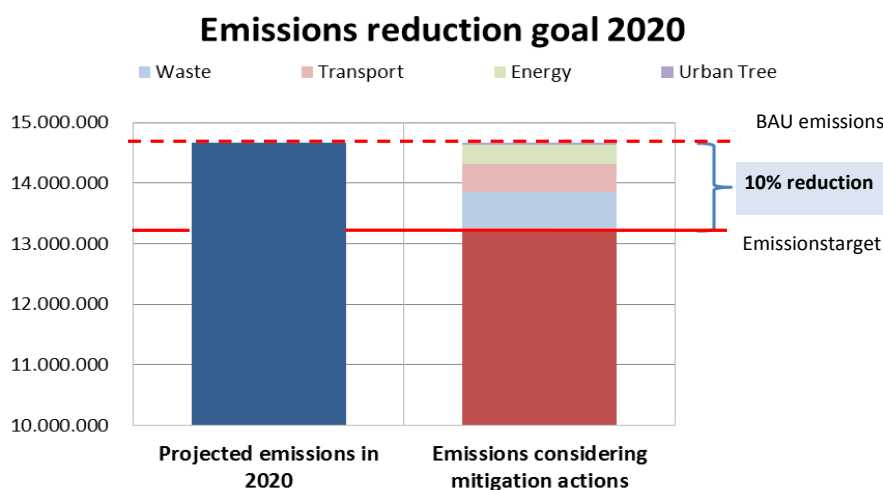
- Energy Efficiency Program in public buildings
- Installation of LED technology in public lighting: replacement of 75.000 street lights by 2015, nearly 60% of the system.
- Economic incentives for improving technology in commercial and industrial sector
- Promoting energy efficiency in residential sector with educational actions.
- Renewable energy promotion in public buildings
- Application of sustainable criteria in public purchases

Short and medium term goal

Continuing with the path of action started in 2010, Buenos Aires City Government plans to reduce 30% emission in 2030, achieving a 10% by 2020 with the following actions:

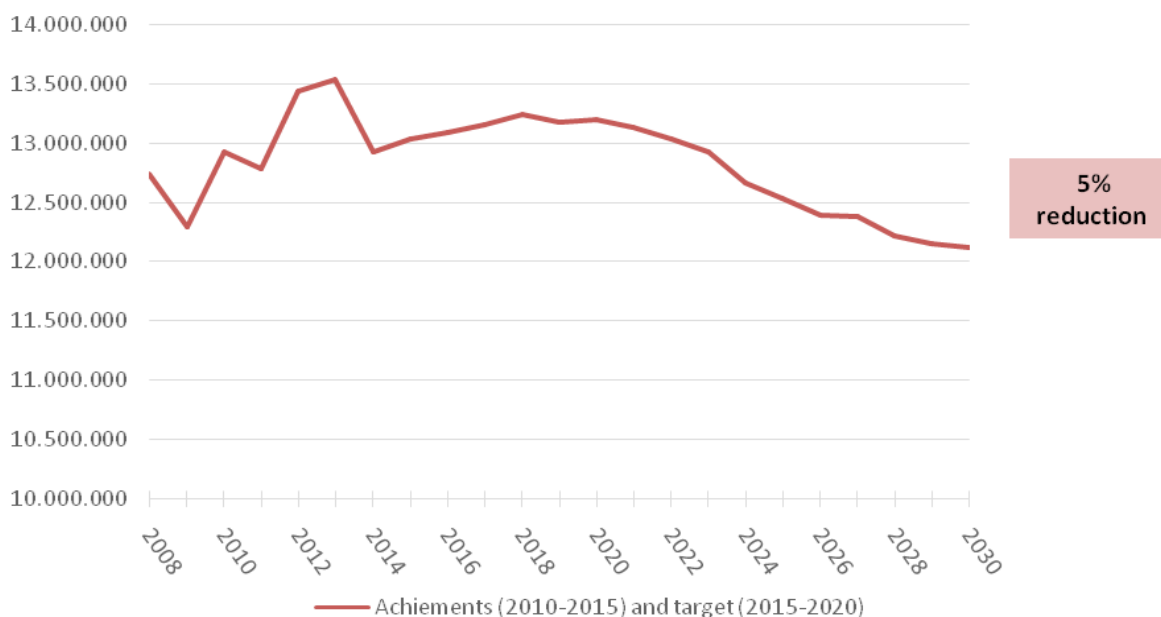
As a result of the adaptation of the inventories to the GPC standard, the update of the baseline scenario (BAU), the concrete progress of the measures implemented in the 2010-2015 period, and the analysis of the emissions potential reduction of the measures to be implemented in the upcoming period, the city defines a new goal for 2020. In addition to the three core pillars of the initial Action Plan –waste, transport and energy– a fourth pillar related to tree plantation in urban areas is proposed. An important part of all these actions will be a continuity of those initiated in the previous period, whilst new ones will be initiated in the period 2016-2020.

In 2014 the city emissions were 12.9 million tCO_{2eq}. Continuing on the same trend scenario in 2020, the level of emissions would increase to 14.7 million tCO, reaching 17.3 million tCO_{2eq} in 2030. In comparison with the baseline year considered in the Action Plan – 2008- emissions without mitigation actions will be 36% higher in 2030.



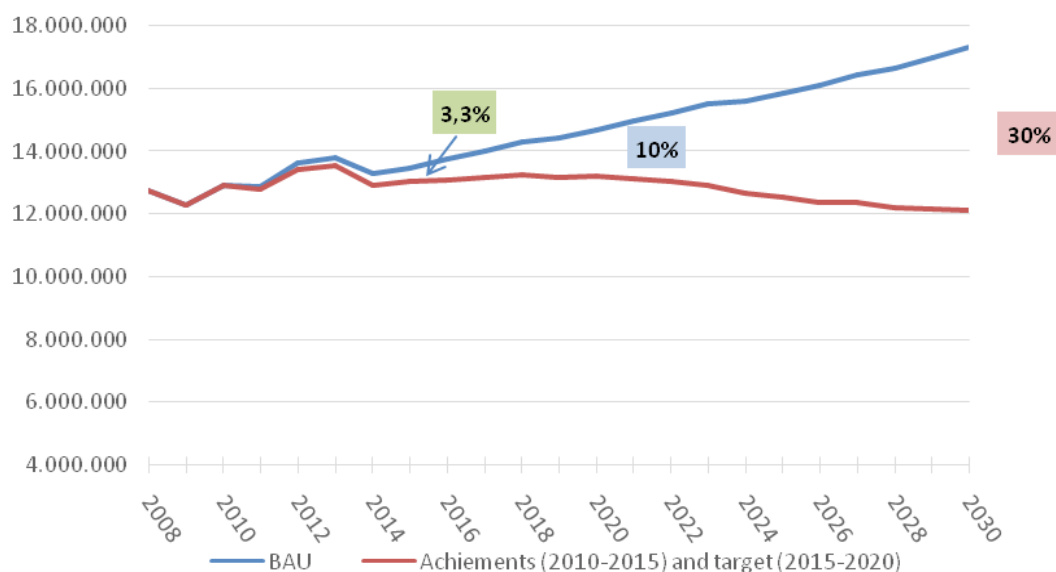
The updated target establishes a 10% reduction below the level of emissions projected in the BAU scenario in 2020 and 30% in 2030 -bearing in mind external factors beyond the city government scope of influence-. This will represent a reduction of the total emissions amount by 5% below the emissions generated in 2008, reference year of the previous Action Plan, as shown in the figure below.

**Expected GHG emissions evolution
(tCO₂eq/year) 2008 vs. 2030**



The figure below presents the reduction targets proposed in the Action Plan in comparison to BAU scenario, for 2020 and 2030. To achieve the 2020 target, emissions in terms of BAU scenario should decrease 1.46 million tCO_{2eq}.

**Buenos Aires GHG emissions (tCO₂eq/year)
BAU vs Achievement&Target**



2016-2020 Mitigation Actions

In the same line with the previous period 2010-2015, the actions are presented by sector.

Waste Management

The actions promoted by the city government in the waste sector -in order to reduce the total amount of waste disposed in landfills- for the period 2016-2020 will reduce 472,000 tCO₂eq in 2020. Combined with reductions in emissions from the measures initiated in the previous period 2010-2015, a total reduction of approximately 650.000 tCO₂eq/year will be achieved.

- Launching of South Mechanical Biological Treatment Plant (MBT)
- Bulky Waste Treatment Plant
- Recycling Centre with educational proposes
- Capacity expansion of the Organic Waste Treatment Plant
- Capacity expansion of the Pruning and Forestry Waste Treatment Plant
- New technology for waste classification in Recycling Centre
- 2 new Recycling Centres

Transport

The actions promoted by the city government in this sector in the period 2016-2020 in order to improve sustainable mobility in the city, will reduce 290.000 tCO₂eq /year as a result of annual savings in fossil fuels consumption. Combined with emissions reductions in the previous period 2010-2015, the total reduction amount will increase to 464.000 tCO₂eq /year in 2020.

- Extension of BRT corridors across the city: 38 new km
- Expansion and improvement of the Subway system: 10.8 km in 3 new stations and a new line with 16 stations (which will start in this period and will be finished in the following period), increasing approximately the number of passengers from 1.3 million per business day in 2015 to 1.8 million in 2020
- Enlargement of protected bicycle lanes, reaching in 2020, an extension of 300 km
- Infrastructure works such as low level tunnels and viaducts

Energy

The actions promoted by the city government in this sector in the period 2016-2020 in order to improve energy efficiency in the city, will reduce 330.000 tCO₂eq /year as a result of energy savings in fossil fuels consumption, both natural gas and electricity, due to measures implemented in the previous period and over the next action plan.

In the next five years, the city government will focus its efforts in achieving a lower energy consumption by improving energy efficiency and increasing the use of renewable sources.



- 100% of LED technology in street lighting
- Campaigns to promote reduction of electricity and natural gas consumption in residential and commercial use
- Promotion of Energy Efficiency in Public Buildings
- Renewable energy potential analysis, by source - Development of core information for further analysis, such as: Insolation Map, Wind Map and a Biomass Inventory

Besides the 3 core pillars mentioned for the Mitigation Strategy in the first implementation period, the City is working on an **Urban Tree Master Plan**, which will imply concrete benefits as carbon sinks, in a long term.

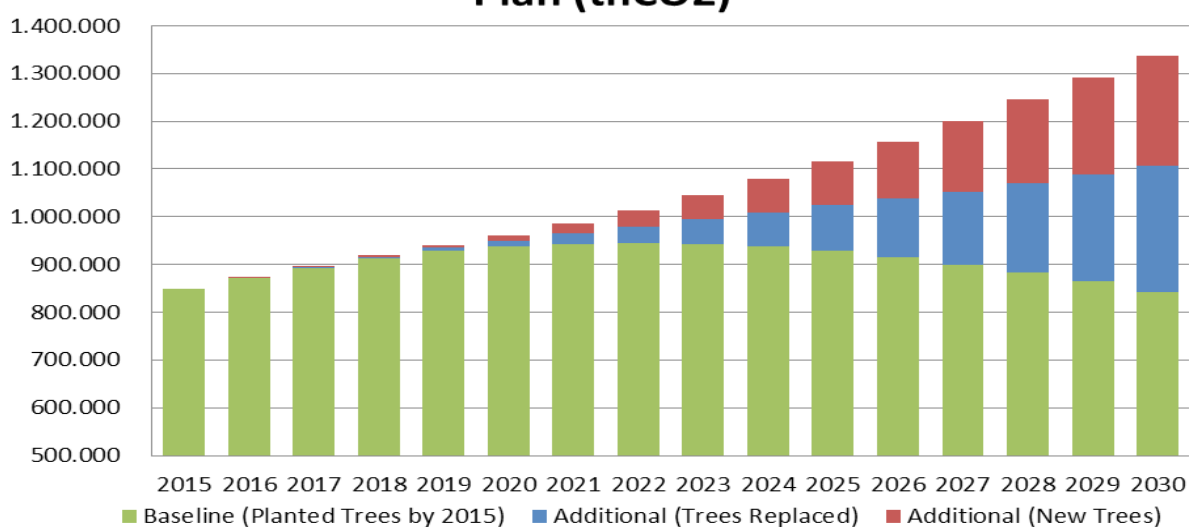
Buenos Aires is a city well known for its beautiful street trees. In order to maintain them, the first phytosanitary census has been performed in 2011. It provided the needed knowledge regarding the diversity, species quantity, general state, distribution, and georeference of the different varieties. From this study the City defined the Urban Trees Master Plan basis.

Regarding the Master Plan, the City completed the census on trees alignment and those in green spaces, resulting in 2011 in a total of 372.000 trees and allowing the government to have quantitative and qualitative information broken down into neighbourhoods.

According to the Master Plan, the city government will plant 130.000 new trees during the period 2013-2023, which among many other benefits, will improve the city's carbon capture capacity.

While in 2020 the level of CO₂ captured by the trees planted in 2015 won't be significant, it will be by 2030, reaching 500.000 tCO_{2eq}, that together with the 850.000 tCO₂ accumulated by 2015, will reach a total CO₂ concentration of approximately 1.3 million tCO_{2eq} sequestered in 2030.

Additional CO₂ accumulation due to Master Plan (tnCO₂)



The extent of the Action Plan and the impacts in terms of the mitigation strategy

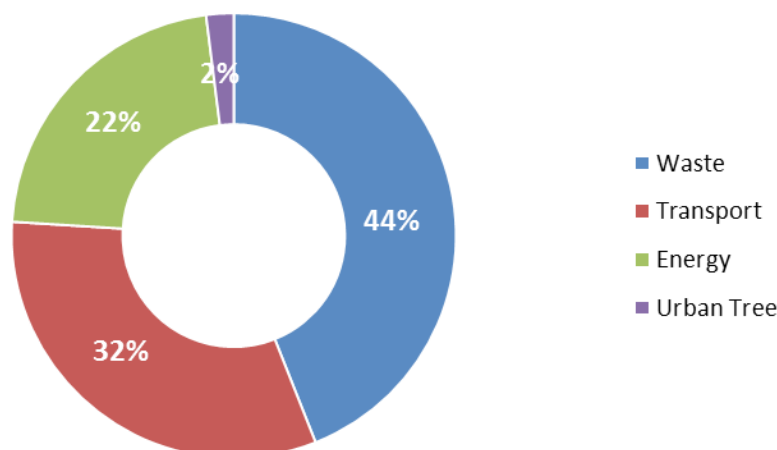
The figure below shows the impact of the actions planned by sectors of the Buenos Aires Climate Change Action Plan 2016-2020. The Waste sector has the biggest impact in terms of GHG reduction, followed by the Transport sector, achieving as a whole nearly 75% of the reduction; showing the City's effort to work on the main priorities regarding GHG emissions generation.

The Energy sector, also extremely relevant on mitigation strategies, will have a less impact in term of GHG reduction in a short and medium term, because of the still direct dependency on national policies. At a national level, the sector potential can even increase with policies that foster the use of renewable sources of energy, for example.

Finally, regarding the Urban Tree actions, these have a low capacity of reduction in the period 2016 - 2020, due to the little growth of the new trees, but the potential by 2030 will be rather significant.

The mitigation strategy for the period 2016-2020 will reduce GHG emissions generation in almost 1.000.000 tCO₂eq. Moreover, considering the achievements from the previous period (2010-2015), in 2020 the avoided emissions will reach a total amount of 1.46 million tCO₂eq, which represents a 10% reduction in a baseline scenario target.

Emissions reduction in 2020, by sector



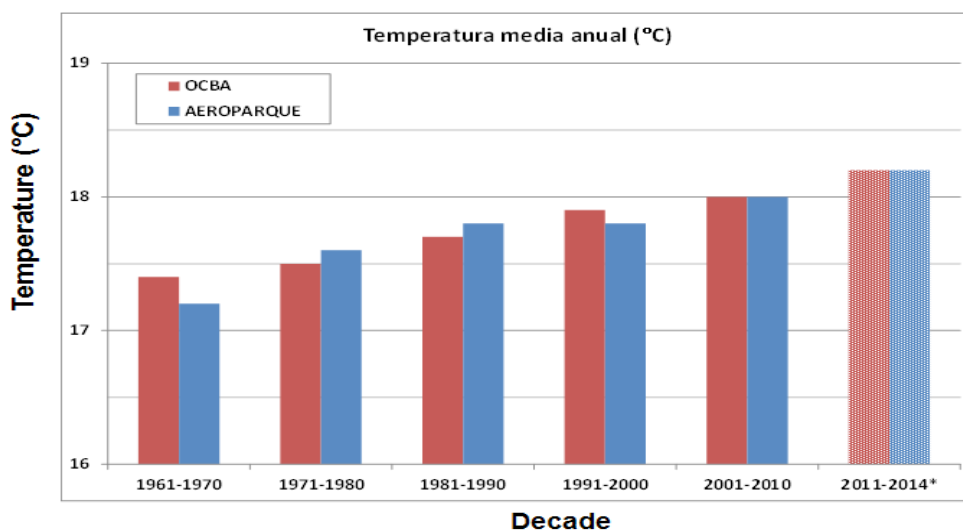
Current and expected climate changes in Buenos Aires

Temperature in Buenos Aires City

In order to make of the most of the impact analysis and allow comparison, the information used include the decades 1961-2010 and the first years of the current decade -2011-2014-. The first variable presented in the figure below is average annual temperature in two measurement

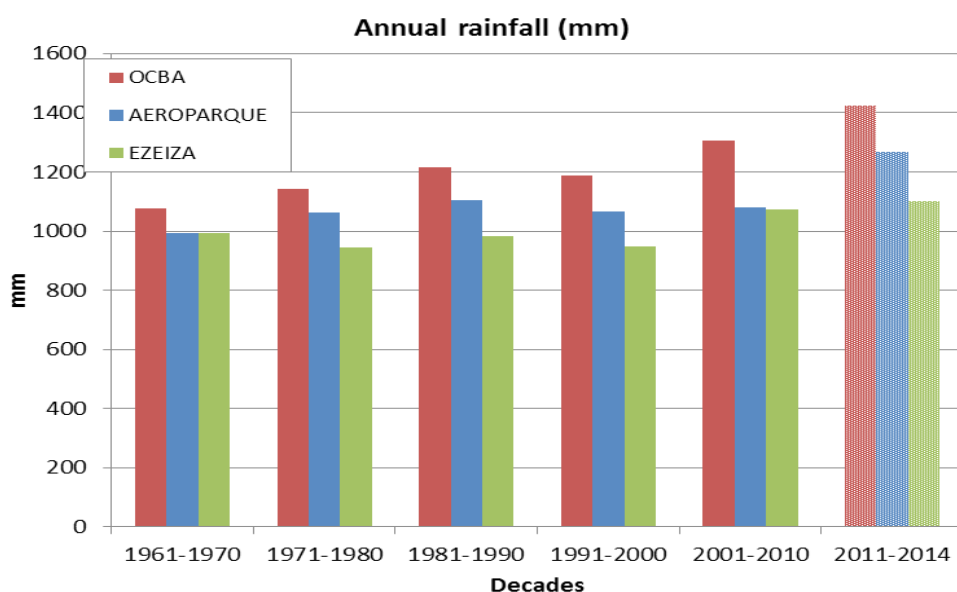


sites within the city boundaries, and shows an increase of approximately 1°celsius when comparing 1961-1970 to 2011-2014. In average temperature scaled up in 0.13°/10 years between 1961 and 2014, showing that local changes are similar to global tendency when analyzing the same period of time.



Changes in Rainfall in Buenos Aires City

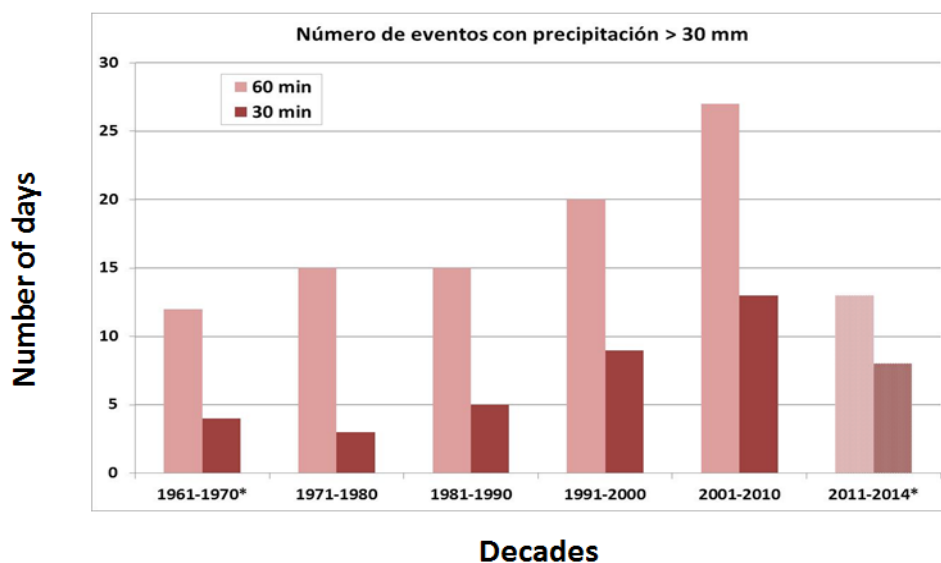
Rainfalls have increased over the past decades within Buenos Aires City. This is shown in the figure below: when comparing 1961-1970 to 2011-2014 the increment was a 29% in average. In the graph, each color represents a measuring station; two are located in the city and one outside. While comparing the rains occurring within the city to the ones happening outside (Ezeiza), the result obtained is that in Ezeiza have rained 8% more than in the city (1961-1970), and this difference has increased up to 29% during 2011-2014 due to the urban environment. Rainfall is a climatic variable that is more influenced by urban environment than temperature, resulting in an increase of 5% to 10% in urban areas than suburban sectors.



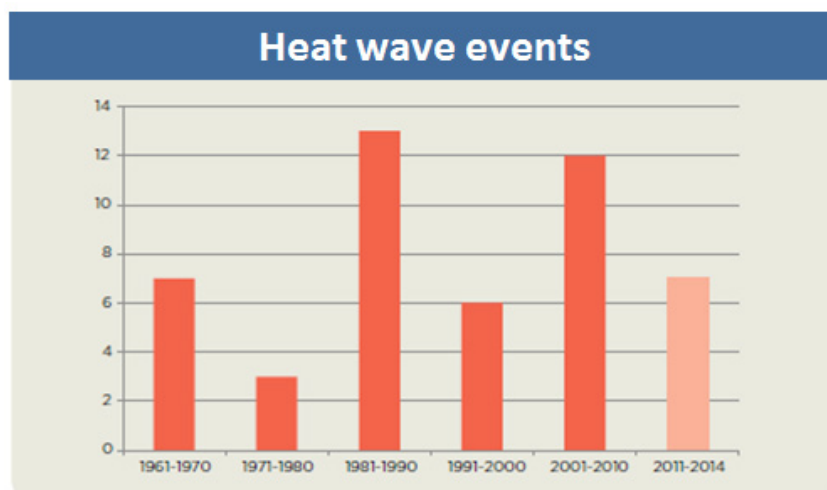
Furthermore, out of the two figures presented it can be concluded that the main change of rainfalls was the increase in the intensity of rains. The amount of water poured has been increasing over time but this phenomenon has occurred in the same amount of days as before. In conclusion, more rain is distributed in less time.

Lastly, the figure below shows the number of days with the extreme event of a rainfall with more than 30mm. From its analysis, it can be concluded that these events have increase its occurrence over the last decades, even duplicating if the comparison is between 1961-1970 and 2001-2010.

Intense rain fall events



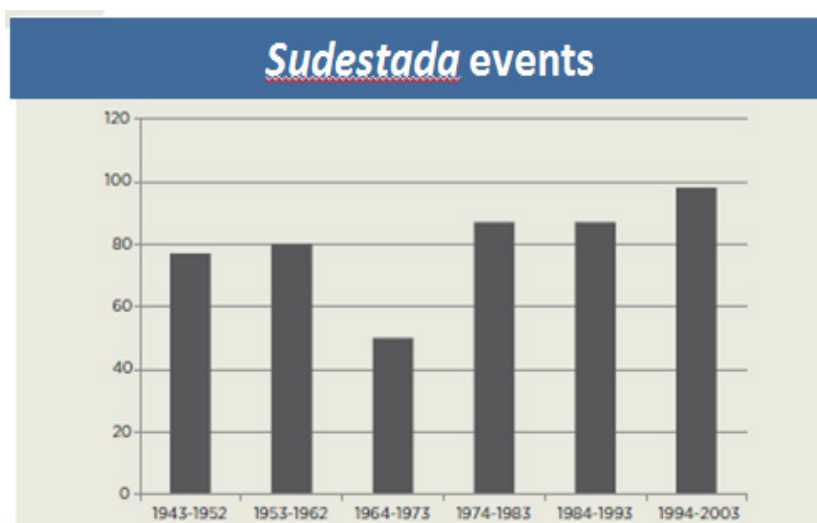
Extreme Events Heat wave events



The figure above shows the evolution of the number of heat waves for different decades between 1961-2010 and 2011-2014. Even though the increase in the number of events, the trend is not so clear, in the period 1981-2000 the same amount of heat waves occurred than those during the recent and shorter period 2001-2014.



Sudestada events

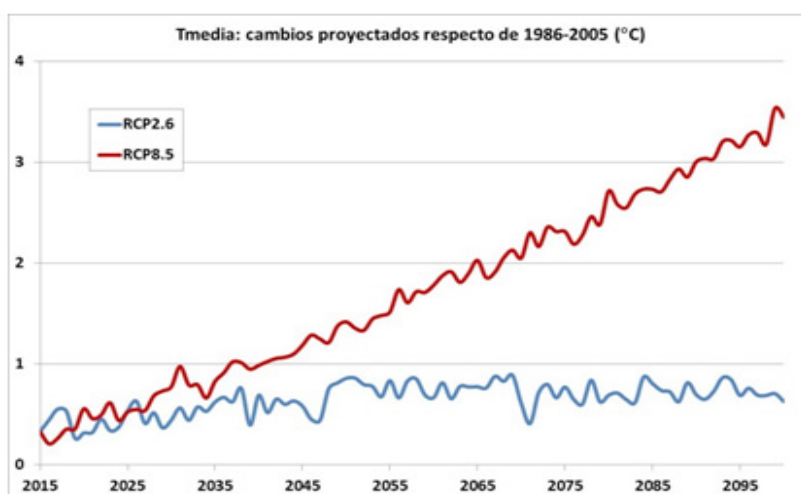


The figure above shows the evolution of the number of Sudestadas in different decades. The "sudestada" is a meteorological phenomenon characterized by the occurrence of persistent strong winds from the S-SE sector - accompanied by precipitation. Between 1994-2003 and 1943-1952 the occurrence increased 27%.

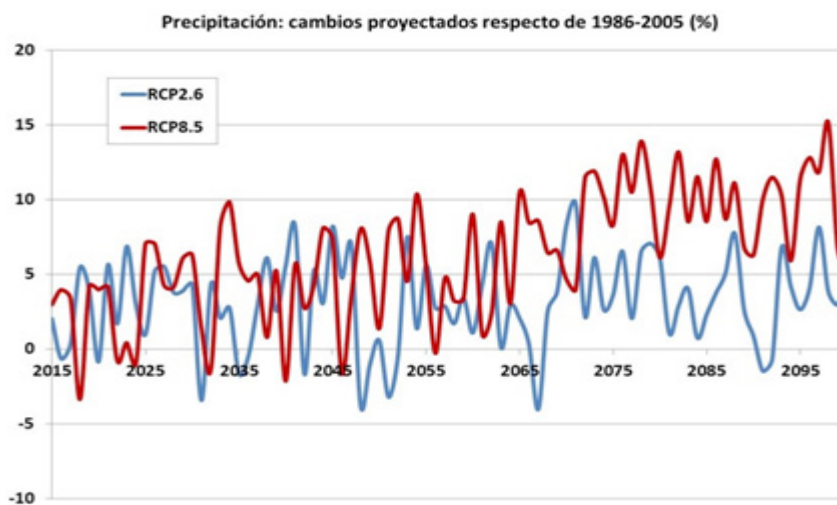
Future Scenarios

In this section the figures presented show the forecast of maximum and minimum IPCC scenarios (RCP2.6 and RCP8.5) in temperature and annual rainfall in Buenos Aires City for the remaining years until the end of the century compared to the averages from the reference period (1986-2005).

Average temperature change (°C)



Change in annual rainfall (%)



Conclusion

Buenos Aires weather has been changing in the last 50 years specially related to higher temperatures and increasing intensity in rainfall. The changes also include more frequent heat waves, “sudestadas” and extreme events of rainfall. Furthermore, the projected scenarios for the rest of the century show that the actual tendency of changes in Buenos Aires climate will deepen more or less depending on the evolution of global GHG emissions. Consequently, mitigation and adaptation actions must be implemented in order to reduce the impacts of climate change and the threats that presents to human health, infrastructure and human development.



Buenos Aires City Climate Hazard Taxonomy

(Self-made compilation based on the Climate Taxonomy, C40's, ARUP and Bloomberg Philanthropies classification of city-specific climate hazards, with specific information for the city based on the impact assessment).

Hazard Group	Hazard (Main Type)	City Climate Hazard (Type)	City Climate Hazard (Sub Type)	Climate Hazards Expected	Effects
Meteorological	Precipitation	Rain Storm The last decade shows the higher number of rain storms registered (and the period between 2011 and 2014 of this last decade).	Heavy Rain Storms (locally known as 'Sudestada'). The number of cases in which cumulative rainfall during 24 hours was greater than 100 mm (extreme event in Buenos Aires), has duplicated its occurrence, comparing for example the period 2001-2010 with 1961-1970. During this decade, the events in the period 2011-2014 have already reached the total amount of the decade 1961-1970.	High frequency and intensity of heavy rain storms	Increase in pressure to the hydraulic system Increase risk in vulnerable population Material losses
		Increased Average Annual Rainfall.	Local studies show a 29% rise in average annual rainfall for Buenos Aires City.	Moderate Increase in rainfall	
	Wind	Increased Frequency in East-Norwest Wind	Heavy Rain Storms (locally known as 'Sudestada')	Switch of wind direction Eastward due to the Atlantic South Anticyclone shifting	
		Increased wind speeds	Severe wind	Increase of wind intensity	Strong winds might cause tree falling and material losses
	Lightning				
	Fog				
Extreme temperature - Cold					



	Extreme temperature-Hot	More Hot days	Hot days	Increase Average Annual Temperature in 0.13° compared to 1961	Increase in risk for vulnerable groups. Increase Power shortage. Increase pressure in health system
	Hotter Summers	Heat wave			
	More frequent and longer heat waves events.	Heat wave The phenomenon of heat wave shows a high occurrence in the past 3 decades.	More frequent heat waves events		
Climatological	Water Scarcity				
	Wild Fire				
Hydrological	Flood	Flash/surface flood	Rain storm	High frequency of flooding	Material losses. Movement of affected population. Human lives losses.
	Coastal flood. Registered data shows an average river level rise of 1,7 mm per year	Heavy Rain Storms (locally known as 'Sudestada')	Estimated increase in sea level of 0,6m		
	Wave Action				
	Chemical Change				
Geophysical Biological	Mass Movement				
	Insects and microorganisms	Water-borne disease	E.g. Diarrhea, hepatitis, gastroenteritis		Increase in pressure to the Public Healthcare System, because of the expansion of the mentioned diseases. Mortality and morbidity increase.
	Vector-borne disease	E.g. Dengue			
	Air-borne disease	E.g. bronchitis, asthma, pneumonias.			

Adaptation - Action Lines

As previously mentioned, the Adaptation and Mitigation Climate Change Law was approved in the City Legislature in September 2011 (and regulated in 2014), with the objective of establishing actions, tools and strategies in order to reduce human and natural systems vulnerability, protect its effects and strengthen its benefits; confirming the decision of the Government to grant Climate Change the importance it deserves, thus transforming it into a real and cross disciplinary state policy. Currently, Buenos Aires articulates within the Climate Change Interministerial Team, with inputs provided by the Climate Change Advisory Board,



the public policies and defines adaptation targets so as to increase the city's resilience. From the rapid and unplanned urbanization that has been occurring in the city since the 1950's, some frequent flood-prone areas were occupied mainly by low-income social sectors looking for better opportunities.

Despite the remarkable increase in population density in the City, the lack of planning and infrastructure investment in recent decades has failed to address, even natural increase in urban populations themselves. This has resulted in growth disorders of all kinds: lack or inefficiency of services and infrastructure, housing shortage and occupation of unsuitable areas, which are more vulnerable to the effects of environmental degradation.

The City has been working to address climate change adaptation by identifying vulnerable areas, facilities at risk and hazards; and it is taking action in order to reduce floods and the impacts of heat waves, increasing the response to emergencies and improving green areas, among other. The Integral Risk Management formulation responds to an analysis of possible scenarios, the determination of the levels of risk, and identification of the related government areas, as well as their mission and functions. These last, in order to determine specific areas of action, to ensure effective responses during emergencies.

The City is working to increase its Adaptation capacity in preparation for the extreme events expected in the region as a consequence of climate change.

The biggest challenge for the city lies in the increase of temperature levels resulting in an increase in frequency and intensity of heat wave events, as well as the increase in frequency and intensity of extreme storms and rain events. To reduce vulnerability and risk of its inhabitants, the strategy includes the addition of a permanent meteorological monitoring network, the maintenance of the rainfall drainage system, the increase of green space, the use of lakes as flood buffers, the relocation of settlements in vulnerable areas, and an important Hydraulic Plan in order to prevent floods on the largest basin of the city; as well as the creation of an Emergency Response Centre, designed with the latest technology allowing the city to coordinate a rapid and integrated response in case of a disaster situation.

For the next period, based on the scientific evidence that shows a tendency in the increase of these phenomena, the City Government intends to continue and deepen the on-going work, gathered under the following lines of action:

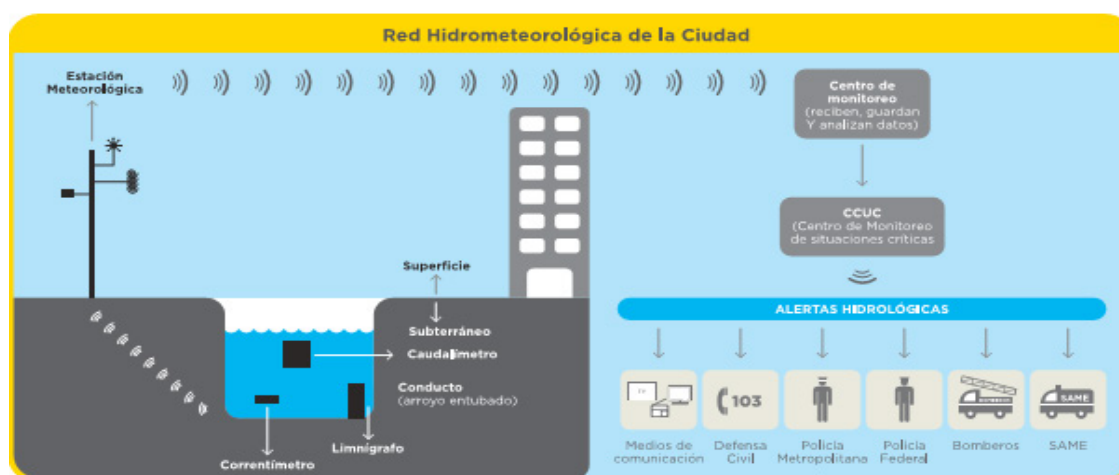
1. Information Service and Emergency Assistance

- **Director Plan of Emergency:** It identifies 21 threats likely to occur in the city and structures the response to these events. The objective is to bring a rapid response optimizing time and resources. Each threat identified has an action protocol which is monitored and continuously updated. One of the main threats for the City is heat waves becoming one of the top adaptation priorities to be address by the Civil Defence department with an Action Plan that includes strategies to improve the emergency response as well as the capacity of the health system to address the increase in the frequency and intensity of extreme events.
- **Prevention Actions:** It includes training courses for the personal involved in the emergency response but also training for community institutions such as schools and senior centres. By 2015, 6000 municipal agents have been trained to be able to respond efficiently in emergency situations. In the next years, the city government will improve the needed equipment to act during and after an emergency. Besides, through the First Responders Program, the government trains people living in low income settlements in first



aids, to act in an emergency situation.

- **Emergency response** – The Coordination and Control Centre: The City of Buenos Aires has developed an integrated response system that is coordinated from the Unified Coordination and Control Centre (CUCC), which centralizes emergency quick response with every city department involved. It has been designed and developed with innovative technology to coordinate a fast and integrated response for all agencies in case of accidents, eventual disasters or other health emergencies. For the next period, the CUCC would be able to identify, monitor and control in real time the status of the sewers with the information provided by the Hydraulic-Meteorological System.
- **Meteorological network extension:** It provides information in real time on rainfall and storm effects. The sensor system seeks to have a better understanding of the status of sewers and channel relievers, allowing the building of an early alert to possible flooding. This system is connected to the TETRA (for the Spanish acronyms) Network which allows the Emergency Areas to be updated on the meteorological situation and be prepared in case of possible flooding. For the next period, the City government aims to cover the whole city extension with the mentioned network and with new infrastructure such as a Doppler radar and remote stations of water intake.



- **Emergency Resilience Promotion:** the Civil Defence department promotes training courses in informal settlements (identified as most-at-risk population) with the purpose of providing them with the knowledge for being "First Responders"; this is how they can bring a basic assistance and orientate the help in case of critical events. During 2015, 200 neighbours turned into First Responders and more than 5000 people got the knowledge to give basic assistance in critical events. Bearing in mind, its importance and big success, the program will be extended in the next period.

2. Analysis and Vulnerability Reduction

- **Strategies for the hydrological vulnerability:** The Buenos Aires' Territorial Model (a development plan for the period 2010-2060) includes studies about hydraulic vulnerability with the purpose of establishing strategies to mitigate the effects of increasing average annual rainfall and the resulting floods. So as to increase drainage capacity, in the next period, the city will continue incorporating green areas; and reservoirs in specific green areas to contain the excess water in cases of heavy rainfall.



- **Geo-referenced information and risk mapping:** this strategy is orientated to the systematization of the information in maps. This is a very helpful tool to evaluate the risk associated to each territory. The inputs are given by past experience events, projections and scientific research. By 2019 the city will develop a Vulnerability Map considering a three pillar assessment based on: impact, institutional and socio-economic analysis.
- **Relocation of vulnerable population:** In general, low-income population settles in precarious and highly crowded housing, in flood plains. Rainwater floods occur in different areas of the City of Buenos Aires, it is a recurrent problem that affects more than 350,000 people, 90,000 of which are located in precarious riverside settlements on the bank of the Riachuelo River, a highly contaminated water body.

To reduce the threat to the most-at-risk population, the City finished a census of the informal settlements at this riverbank and has relocated by 2015, more than 500 families which were settled on the riverside. As part of the Comprehensive Recovery Plan to clean up the Matanza-Riachuelo basin, the current work include renovating the road and increasing its value, in order to transform this riverside into a cobbled, landscaped, and re-forested street. Relocation will continue for the next period: vulnerable areas have already been identified, as well as potential lands. Moreover for 2020, the city government plans to restore 16 km of green space in the shores of the Riachuelo.

3. Inclusiveness and Habitat Sustainable Management

In order to foster inclusion and improve risk management, the city government strongly believes in the importance of social inclusion and sustainable management of habitat:

- **Inclusive Portals:** There are 11 City's offices working for inclusion and habitat improvement, located in vulnerable areas, so as to allow direct communication with the community, helping to identify the real needs and to execute a better response. The city government strongly believes the importance of encouraging networking with the community and will continue during the next period, increasing participation in debates and workshops.
- **Urbanization of informal settlements:** Within Buenos Aires city there are approximately 13 informal settlements. In order to improve the quality of life of those who are located in the slums areas, the city government has planned for the next period to work on infrastructure, such as the construction of a sewer of 1500 meters in the informal settlement 1.11.14, that will double the capacity of the system benefiting many families. Also this work will include sidewalks, more green spaces, an Integral Waste Management Program and an Animal Control Program.
- **Environmental Dimension Inclusion:** This strategy seeks to make public places, buildings and city's equipment more sustainable, including sustainable criteria when planning and designing the City. Some examples are "Parque Donado- Holmberg" neighbourhood where a Plan of Development and Urban Restoration has been implemented in order to prioritize public green spaces, an educational centre and a community centre, including a sustainable and more efficient dimension such as green roof and water recovery systems. Another example of this type of planning is the "Comuna Olímpica" (which stands for Olympic village). An area that is being developed to house more than 50.000 participants of the 2018 Youth Olympic Games that will take place in Buenos Aires City. After the end of the Games the houses constructed will be available to buy with accessible loans.



4. Structural Interventions

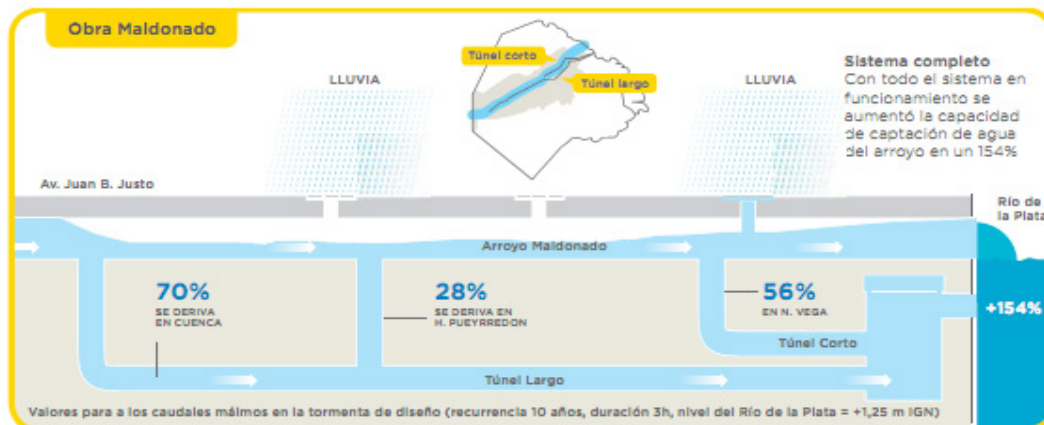
The city's drainage system is from 1941 and the continuing increase of the population (together with the migration process) and construction have resulted in a system that is not enough to handle rain water collection. That is why, considering the expected increase in extreme rain events and severe storms, and taking into consideration that in the City of Buenos Aires paving intensifies runoffs, the city government is working on a Hydraulic Plan, in terms of structural interventions.

- **Hydraulic Plan:** The strategy includes the maintenance of the rainfall drainage systems, the management of water reservoirs and the expansion of new piped relief channels to control the main underground creeks. The lack of these structures has produced significant flooding in several areas of the City in the past years.

Buenos Aires has series of protection stations against local south-eastern storms as well as pumping stations at several level crossings. Remote-controlled robots and other technologies are used to clean and maintain drains, chambers, and ducts of the rainfall drainage system.

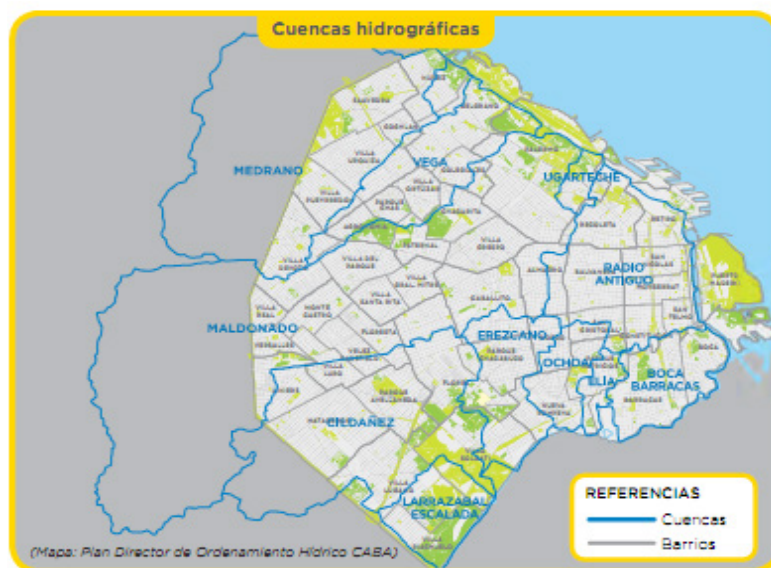
The following creeks have been recently modified:

- *Maldonado:* two tunnels built to increase drainage capacity and thereby reduce the risk of flooding in the basin of the stream. Moreover the storm drain system was restored and enlarged to increase its capacity, benefiting 500.000 people. In the next period, the city government will build more tunnels reaching a total extension of 33Km.



- *Vega:* the first stage is concluded, seeking to triple the capacity of storm water discharge. A second stage will consist in the construction of a main reliever tunnel, incorporating additional sinks, and 10 kilometres of new branches to increase the capacity of the secondary ducts, benefiting more than 300.000 neighbours.
- *Medrano:* Sarmiento Park has been adapted to become a reservoir that will receive the water excess (up to 300 million litres) from the stream so as to reduce the impacts of flooding.

- *Cildañez*: Lake Soldati and Indoamericano Park will be restored and cleaned to function as a rainwater regulator basin, benefiting 50,000 residents of the area. By 2020, the works on flooding control will be finished, including 2000 mts in tunnels and water reservoir areas that also work as public green spaces.



Map of Buenos Aires Creeks

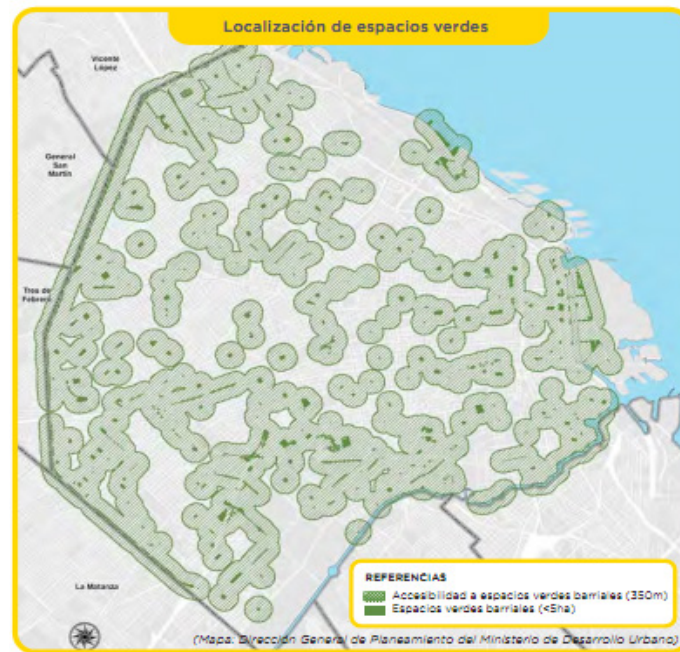
5. City's Natural Environment

- **Recovery Plan to clean up the Matanza- Riachuelo basin:** This basin is one of the most polluted natural areas due to an historical wrong management and lack of control of the industries installed by the riverside. Buenos Aires government together with Buenos Aires Province and National authorities have developed a restoration plan that includes renovating the riverside road and increasing its value, in order to transform it into a cobbled, landscaped, and re-forested street.
- **-Green Buenos Aires Plan:** It was launched in 2014; it is a 20-year plan to adapt Buenos Aires to the challenges of climate change. The project will develop more than 1.100.000 m² of new green spaces, and 32 integrated hydric squares; 10 large parks and many green terraces will be also built. By enhancing green spaces and planting trees (up to 50.000), the city expects to reduce the heat island effect. Green motorways and 4 sustainable basic units are also contemplated in the plan, with the aim of reducing car use in the city, so as to reduce noise pollution and CO₂ emissions.

Green roofs and walls, consisting of rooftops and walls covered with vegetation, fulfil an important function improving thermal insulation and generating a rain absorbing area. The first green roof was inaugurated in 2011 and, because it was constructed on a public school building, a low maintenance design was chosen and a path was built across the green area for student use. Currently, more schools count with green roofs and other sustainable technologies; at the same time, other public buildings have also installed a green roof like the Legislative Palace, where a green roof consisting of removable trays of grass on the rooftops has been installed. They also help reduce emissions and noise levels; therefore the local Government has started the installation of green walls in urban highways. The Buenos Aires Green Plan also aims to increase



green spaces in the city by increasing the area of green roofs in public buildings while fostering the private sector to join the initiative.



Buenos Aires Green Areas

6. Health and Climate Change

- Environmental Health inside the Public System:** The city government carries out different actions to identify early impacts on human health and therefore be able to respond rapidly and efficiently. According to future scenario and impact assessment, the city will suffer a temperature and heavy rain fall events rise, increasing the pressure in the public health system, which besides currently assists people from the metropolitan area. This strategy includes the reinforcement of the Health Centres Network and the Communitarian Action Network and the implementation of the “Healthy Stations” in parks and strategic points of the City, which are increasing in number year after year, seeking to respond to emerging challenges.
- Heat waves prevention and actions:** as mentioned, the future scenarios assessments foresees an increase in temperature related extreme events and heat waves, that together with existent socio economic conditions, increases risk and vulnerability for the citizens, especially children and the elder population. To reduce impact magnitude and consequences of the events, the city government communicates heat waves alert, according to different magnitude categories (according to data from the National Meteorological Service) through the Early Warning System. Moreover Civil Defence area has a response Plan where it is stated how to act in this emergency situations.
- Plague risk reduction (dengue):** As global temperature rises, Buenos Aires is more and more exposed to diseases exclusive of tropical areas. The dengue is a viral disease transmitted by the “Tiger” mosquito and is in expansion since global warming creates favourable conditions for its habitat. The city works to prevent the spread of the disease and eradicates those mosquitoes that transmit not only dengue but other diseases as well. In the same line, the city offers training courses related to Health



and Climate Change. The Environmental Epidemiological Surveillance Program aims at providing continuous, useful, and timely information about adverse environmental factors, to facilitate decision-making processes related to solution, control, and prevention.

Raising Awareness and Environmental Education

Environmental education is one of the main strategies to develop social awareness about the consequences of Climate Change and sustainable ways to deal with it. Buenos Aires city is ruled in this aspect by the Environmental Education Law (N°1687/05) which promotes the incorporation of environmental education in all school levels. This law is implemented by Buenos Aires Environmental Protection Agency together with Education Ministry's Green School Program.

- **Buenos Aires EPA:** the main purpose of the actions of the EPA is to create a new environmental ethic and to promote changes in social values allowing people to identify not only the problems but also possible solutions. In order to achieve this objective the EPA has developed many different training programs, actions for reevaluation of local biodiversity as natural heritage of the city and encouragement of community involvement in the Matanza- Riachuelo Basin restoration projects. For the next period, among other actions, the city government intends to increase preparation of environmental trainers and the administration of the Natural Reserve in the south of the city in order to promote local biodiversity.
- **Green School Programs:** The objective of this program is to promote sustainable development through Environmental Education in schools, in 4 core pillars: Waste Management Plan, Energy Efficiency and Renewable Energies, Environmental Health, and Climate Change. Just to mention a few examples of achievements in schools during the period 2010-2015:
 - 12.000 tons of recycled material recovered
 - 432 orchards in schools
 - 6 schools with green roof and 6 more with photovoltaic panels.
 - For the next stage, it is projected that 100% of the schools will implement waste separation, 700 schools will have their own orchards, 30 schools will incorporate renewable energies and more trainings in rational use of energy will take place.

Furthermore, other areas of Buenos Aires Government have programs that help awareness raising about the environment issues of the city.

- Breakfast cycles and talks of different related subjects.
- Permanent training for governmental agents who have contact with neighbours.
- Promotion of different green programs oriented for young people.
- "Concientizadores Ambientales Program" which consist in door to door talks with neighbours and doormen in order to increase the source separation of the waste and recycling.
- Trainings in Soldati's Green Centre about recycling.
- Compost classes by Buenos Aires EPA.





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