

5.Tackling Climate Change and Urban Resilience in the City of Athens

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Abstract

The City of Athens, a venerable yet intricate city of near 700.000 residents, part of a 3.75 million people urban area, is for several years now facing severe challenges. Those include an ongoing socio-economic crisis, large refugee flows, as well as rising temperatures and recurring heat waves, resulting from climate change. Through concerted efforts, the city has managed to survive, to adapt and to transform into a more creative and collaborative city. The struggle is by no means over. From 2016 to 2017, during a period of 14 months, calling on the insights and expertise of hundreds of stakeholders, the city drafted its Resilience Strategy. This is a set of practicable actions, which first of all strengthens what has made Athens stronger: formal and informal networks and alliances. Athens Resilience Strategy offers a set of new integrated ways to prepare and protect our most vulnerable from future shocks and stresses that the city is facing and will face. The Resilience Strategy, voted by the Athens City Council in June 2017, includes city's Adaptation and Mitigation Climate Action Plans. By consolidating power and expertise, by forming strong and diverse synergies and by opening itself to international networks and fora, Athens has managed to create an integrated framework of actions that make our City more resilient to social, economic and the significant environmental challenges that lie ahead.

*Athens'
resilience
framework*

Like many cities around the world, Athens is adjusting to the challenges of the 21st century. Hyper-connected economies are radically changing patterns in world markets and employment; the effects of climate change are increasingly apparent; social, ethnic and health inequalities are deepening; resources are becoming scarcer while consumption is growing; authoritarianism and/or ethnonational movements are on the rise. Urban communities and economies, now more than ever, as the world population is increasingly living in cities, will have to develop tools and skills to help them survive, adapt and thrive in the face of multiple and unpredictable disruptions .

Athens has experienced significant shocks during the recent past, that exposed the weaknesses of the city and the long-term stresses underlying them. The socioeconomic crisis laid bare the failings and limitations within the city. It also revealed the city's essential strengths, hidden resources and talents. The question is – how can Athens reflect, learn and proactively put in place resourceful, robust and inclusive systems that not only deal with current difficulties and shortcomings but also transform the city and make it strong and successful for a future that will bring new challenges?

The declining income, growing personal debt, and high real estate taxes, coupled with austerity measures that drove cuts in social services, hit our most vulnerable populations the hardest. Unprecedented levels of unemployment, poverty and homelessness grew in our city, exposing our lack of preparedness, together with the pressing need to have systems in place able to provide for the basic needs of the most exposed. The City of Athens rose to the challenge: through partnerships with NGOs and the private sector we built and are still building a robust system for critical relief and social services as well as a rationalized system of data collection and logistics. Moving forward, such partnerships, no less than such data collection and development systems, are being scaled up and replicated horizontally in city government, aiming towards an open and vibrant city where data-based decision making, transparency and accountability.

¹ See, the annual World Economic Forum's insight report on Global Risks – for 2017 here: <https://www.weforum.org/reports/the-global-risks-report-2017>

In order to further address challenges that undermine both the physical environment as well as the citizens' quality of life, the City of Athens also turned to partnerships and collaborations with international city networks, such as *100 Resilient Cities* and *C40 Cities Climate Leadership Group*, consolidating methods and resources, developing capacities and knowledge. As a result, in June 2017 the City of Athens Office of Resilience and Sustainability launched an up-to-date, comprehensive and integrated action plan, under the title *Redefining the City: Resilience Strategy for Athens 2030*², which is also aligned with the city's operational and strategic plans. Through its Resilience Strategy for 2030 the city has already been able to attract international investments.

***Partnerships
for resilience
and adaptation
to climate
change***

All collaborations enhanced the city's diversity; they thus build the city's resilience reducing its disaster risk. How does collaboration enhance diversity?

It brings a variety of players together to work on problem solving and change. Working collectively they bring variation in resources, including financial, social and natural capital. Business can provide managerial expertise and financing streams, while civil society can mobilize communities quickly with grassroots knowledge. From collaboration, a wider range of options and ideas may emerge for responding to stresses and disruptions, including options that work at local level, closer to impacts, that may be alternatives to or coordinated with actions at higher scales (SMITH 2014, 74).

But let's start from the beginning. Three years ago, in 2014, through a competitive process, the City of Athens was selected to join the 100 Resilient Cities (100RC – pioneered by the Rockefeller Foundation) network. The city engaged in an intense and participatory process in order to draft and implement a holistic, robust and realistic strategy that supports and enhances the resilience of the city for the upcoming decades. The Rockefeller Foundation created the 100RC initiative in response to growing challenges that cities around the world are facing: urbanization, globalization and climate change.

² http://www.100resilientcities.org/wp-content/uploads/2017/06/Athens_Resilience_Strategy_-_Reduced_PDF.compressed.pdf

The 100RC network defines urban resilience as “the capacity of individuals, institutions, businesses and systems within a city to adapt, survive and thrive no matter what kind of chronic stresses and acute shocks they experience.” By approaching cities in a systemic way and by focusing on both shocks and stresses, the resilience approach can prepare our urban centers for a wide range of challenges both known and unknown, as well as become better in both good times and bad.

Meanwhile, also in 2014, the City of Athens (an active member of the C40 cities network since 2008) requested from C40 a technical on-the-ground support to help the city develop a Climate Action Plan for reducing greenhouse gas emissions and adapt to climate change. The first step of the process concerned the development of a GPC-compliant greenhouse gas inventory. This inventory, apart from setting a baseline for Athens, permits the monitoring of activities planned or already under implementation and the evaluation of their outcomes, while allowing for corrective actions, when necessary. At the same time, equal importance has been given to adaptation; the climate adaptation action plan is used for increasing the city’s resilience to climate risks, improving the quality of life and ensuring a sustainable future for the next generations.

The City of Athens is one of the very first cities that successfully combined and consolidated the methods, guidance and resources of the two international networks/policy organizations, integrating its Climate Change Adaptation and Mitigation Action plan within a robust, horizontal and forward-looking Resilience Strategy that addresses all city systems in ways that confer multiple benefits. As mentioned before, an essential part of this whole process involved engaging effectively a wide range of stakeholders from the public and private to the third sector and the academic community. The whole process began from the bottom up.

Participation is at the core of the resilience. The Resilience Strategy for Athens 2030 was created in collaboration with city staff and elected officials, central government authorities, academics, nonprofits, entrepreneurs, and a large variety of citizens and community groups. Over a period of 18 months, more than 140 organizations and 900 citizens participated in many workshops, conferences or public events.

Athens initiated and co-hosted international meetings with fellow cities; international and local experts worked together trying to get a better grasp of the challenges the city faces.

Within the context of the 100 Resilient Cities methodology, each of the cities' resilience journey begins with a diagnostic assessment that delineates its own significant challenges: its shocks and stresses. After several months of interviewing and engaging people from different Athenian communities, including academic and administrative experts on natural and man-made hazards, it became clear that the climate change related increase of heat is one of the most important acute shocks the city is and will be facing.³ The City of Athens is already dealing with significant Urban Heat Island effects, exacerbated by heat waves and long periods of very hot days, as well as flash floods and bad air quality. These events affect every Athenian on multiple levels including their health, economic wellbeing and quality of life. As the city's climate changes, such phenomena will become more frequent and intense. The implementation of climate change mitigation and adaptation policies should and can produce high resilience dividends⁴ for a wide range of Athenians, from entrepreneurs to marginalized populations dealing with energy poverty.

According to the 2011 seminal study (ZEREFOS et al. 2011) carried out by the Climate Change Impact Assessment Study Committee for the Bank of Greece, „Athens has undergone particularly acute climatic changes over the past decades, due to the combined influence of various —mostly anthropogenic— factors, including:

- intensified urbanization, leading to a greater 'urban heat island' effect;
- global climate change, due to the greenhouse effect;
- loss of peri-urban green areas to forest fires; and
- natural climate variability.“⁵

³ The other shocks that were prioritized for the city are: earthquakes, civil unrest, and cyber-crime, while the stresses that our residents highlighted are: the depressed macroeconomic conditions, migration flows, aging infrastructures, and mistrust.

⁴ As Judith Rodin claims in her 2014 book *The Resilience Dividend: Being Strong in a World where Things Go Wrong*, catastrophe is not always preventable, but the degree of destruction and devastation can be mitigated, and cities are increasingly recognizing the need to invest in foresight and innovation no less than in diverse and redundant systems that will allow them to better “bounce back.” Building resilience is also a key economic development strategy: the benefits can be seen in the city's budget lines, its economy and in greater opportunity for the residents.

Athens and Climate Change

The same study asserts that the average annual temperature in Athens has been steadily increasing since the 1970s. From 1970 to 2011 there has been a 1.3 ° C increase, while climate models show that for the Athens area an average peak summer temperature increase of 2 ° C is projected for the period 2021-2050 and 4 ° C for the period 2071-2100 (ZEREFOS et al. 2011).

Another major study on the “The Impact of Climate Change on the Greek Economy” (KARTALIS et al. 2017) indicates that by the middle of the 21st century the temperature is expected to rise by 2.5 degrees Celsius on average in relation to the period 1961-1990. Regionally, during the summer months, the increase may reach up to 3.8 degrees, with dramatic consequences for the urban areas. Heat wave days (with temperatures above 35 degrees Celsius) are expected to increase by 15-20 annually by 2050. By the end of the century, „tropic days“ (more than 35 degrees Celsius during the day and more than 20 degrees Celsius during the night) are expected to number more than 50 annually in most areas of the country (KARTALIS et al. 2017, 86-95).

The primary effects of the above on a city like Athens will be: depletion of groundwater and water scarcity, drought and intensification of heat waves. The secondary effects will be: intensified Urban Heat Island effects, increased energy demand for cooling, increase of energy prices, and serious impact on public health⁶. The impact will be severe in the tourism sector, also increasing the vulnerability of archaeological sites, forests and peri-urban agriculture. Extreme weather events will be much more frequent, thus the occurrence of flooding, fires and of material damage will be mounting (KARTALIS et al. 2017, 182-205).

All climate change scenarios indicate that extreme heat events are expected to typify the city’s future. Since 2010 we have already observed a sharp increase in the length

⁵ See section I.14 Climatic Trends in the Athens Region, pp 50-58

http://www.bankofgreece.gr/BogDocumentEn/chapter_1.pdf

⁶ During hot summer days, the temperature in the center of Athens is usually 6-10 degrees Celsius higher than the temperature in the northern suburbs – the Urban Heat Island phenomenon (Santamouris, 2007; Santamouris M., et al. 2015). As close to 80% of the buildings in Athens are vulnerable to heat stress (constructed before 1980), the cost of the energy consumed for cooling in the center of Athens during the summer months is already double the corresponding cost in its most remote suburbs. And it is expected to increase rapidly affecting predominately the most economically vulnerable neighborhoods of the center of Athens ((Santamouris M and Kolokotsa D, 2015; Santamouris M. et al, 2013).

and level of high temperatures, the frequency and intensity of heat waves, the UHI effects, as well as forest fires and flash floods. The density, anarchy and bad quality of our built urban fabric, as well as the lack of green open spaces, are supporting and exacerbating the problem.

The risk of extreme events, undermine many of the assumptions we've used to plan and develop our city. There is insufficient climate protection of existing buildings, while, in the vast majority, public works and new building construction disregard local climate conditions. In addition, the lack of updated legislation on energy and environmental protection for buildings and other urban infrastructure, have contributed to an increase in the urban heat island effect, the social and economic decline and desolation of the city center, the socio-economic squeeze of the lower income brackets, as well as pushing 24% of the population into energy poverty (VATAVALI and CHATZIKONSTANTINOY 2016; SANTAMOURIS et al. 2013 and 2015).

The Athens Resilience Strategy and more specifically the Climate Change Adaptation Action Plan outline concrete steps for improving the urban quality of life in the face of increasing temperatures, flash floods and bad air quality. The Climate Change Mitigation Action Plan, being compatible with the objectives of the Global Covenant of Mayors for Climate and Energy, sets the target for cutting GHG emissions by 40% until 2030, which is translated into approx. 2,000,000 t of CO₂eq. The main activities concern the energy upgrade of the city's very old building stock, public lighting and promotion of sustainable mobility options.

Climate Change Adaptation is fundamental to our city's resilience. The use of green and blue infrastructures in the city and the adoption of nature-based solutions for cooling the city are crucial measures, with multiple co-benefits and a potentially very high resilience dividend.

Addressing climate change requires an "unprecedented level of cooperation, not only between countries, but also between different levels of Governments and the private sector" (DE BOER, 2009, p. 1). The participation of the Municipality's core administration is considered of high importance during

Why a Resilience Strategy

the process of drafting and implementing the plans. Almost all municipal departments and agencies participated in meetings and discussions as well as workshops and conferences and provided key input regarding the everyday management of the city and the current legislative and regulatory framework of Greek local authorities. Moreover, municipal officials with relevant expertise and authorities participate in internal monitoring teams which overseeing the implementation of the Athens Climate Action Plan and Resilience Strategy.

By including and activating municipal directorates and employees, the Office for Resilience and Sustainability is working towards the integration of resilient goals and performance indicators to the Municipality's annual technical plans and budgets. Thus, the City can effectively address climate change as well as other resilient challenges in a horizontal and sustainable way.

The Athens Resilience Strategy aims towards a city that is open, green, proactive and vibrant, setting forth concrete actions that address issues of maintenance, safety, efficiency and accountability, crisis preparedness and management. It presents a series of distinct yet connected actions with a clear vision of how the city can best cope with the increasing interdependence of shocks and stresses. This can be reached through eco social policies that elevate the role of local government and give it its rightful place as an important player in economic development, social welfare, environmental adaptation and technological innovation.

***Athens Resilience Strategy
Implementation:
the First Year***

If we take into consideration the plethora of research evidence regarding the rising temperatures and the recurrence of flash floods, it is puzzling how low a priority Climate Change Adaptation is for most political leaders in Greece. In such an adverse political environment the Office for Resilience and Sustainability in Athens has prioritized crucial actions from its Resilience Strategy addressing this challenge that can be implemented within the year. Those actions include the measures for awareness raising and the protection of the most vulnerable populations, the creation of a master plan for the resilient management of a landmark large green area (Lycabettus Hill) in the city, the implementation of a pilot project regarding food waste and circular economy, as well as the establishment of

renewable energy production in roofs of our public buildings.

In 2016, within the framework of the European project TREASURE, the National Observatory in partnership with the Athens Municipality developed and launched a mobile phone application with personalized information regarding real time heat related health risks for Athenian residents, including a map with cool spots for their protection during heat waves. Athens is developing an integrated communication, awareness raising and capacity building campaign targeted directly to vulnerable populations as well as the city administration staff.

Moreover, together with the Deputy Mayor for Children the Office of Resilience and Sustainability implementing a program funded by the German government to Inform, educate and raise awareness in school communities regarding energy saving. The main aim of the project is to change the culture of energy consumption initially in 80 participating schools and raise awareness regarding climate change issues.

Finally, already established successful municipal initiatives such as the *synAthena* network of civil society initiatives and *Schools Open to Society and the Neighborhood* are part of our resilience building in Athens as they are supporting citizens' participation and engagement in several municipal and other climate change related projects and initiatives. Adaptation to climate change and urban resilience in Athens are now addressed through horizontal, multi-stakeholder and dynamic resilience-building projects. New ones as well as modified or adjusted existing efforts, are going forward, producing data, new procedures, new ways of thinking with the active participation of our urban communities and our municipal staff, who've proved to be effective and resilient during times of crisis. Slowly but steadily the culture regarding data-driven, forward looking, resilient policies is changing in the City of Athens.

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In conclusion

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