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**Battle for Cleaner Air:
Skopje and Sarajevo**

Article 1
Article 2
Article 3
Article 4

**“It is a shame for such
a beautiful city to be so
polluted.” (Sarajevo)**

– Personal Interview. 1 August 2021

August 2021, Sarajevo

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Introduction

Being a capital in the Western Balkans is not an easy job. Skopje, Sarajevo and Belgrade, have all been on top of the lists as some of the cities in Europe, and the world, with the most polluted air. In particular, Skopje and Sarajevo have been switching positions in the last decade, as if they were competing for the notorious title of the most polluted Western Balkans capital¹. However, according to experts and the available data, Skopje and Sarajevo have made some improvements. Nevertheless, they are still considered as “work in progress” since the pollution is still present, especially during winter months while the heating season is at its peak. The administration of the City of Skopje, having within its administration all of the urban Skopje municipalities, has been busy working on improving its air quality². The Canton of Sarajevo, which consists of urban Sarajevo in its borders, has also been implementing measures aimed at improving the air quality.

As the previous comparative article between North Macedonia and BiH elaborates on the national efforts in both countries, the conclusion is that Skopje and North Macedonia would definitely get a higher score if the battle for cleaner air were an actual competition. Having in mind the mentality in the region, maybe a competition would be a way to go, if that is what it takes to motivate the people and the policy-makers to fight more vigorously for cleaner air. The common enemy is the same – air pollution – and the fight against it should motivate both countries and the region to join forces and collaborate more in their efforts against air pollution. In the end of the day, polluted air knows no borders. After discussions with environmental activists³ from Skopje and Sarajevo, but also from Tuzla, Zenica, Bitola, Tetovo, and other cities in North Macedonia and BiH, the notion remains that the battles they engage in is still not resulting in absolute victory. They say⁴ that even though they are protesting every winter when the air becomes unbearably polluted, both in Sarajevo and Skopje, local authorities lack behind in implementing measures.

On the other hand, local authorities from both Skopje and Sarajevo have been adopting concrete measures and plans that are already in motion, and some of them show good progress. The discussion in this article revolves around these measures, without tackling the energy efficiency aspects, which require a focus on its own. Few consulted academics⁵ say the situation with the air pollution and the view on the measures is never one-sided and criticism falls towards the lack of action on the side of the citizens as well. Media are another key factor that plays a role, in a sense that some of the

1 Sužanj, A., 2021. *Sarajevo – svjetska prijestolnica zagađenosti*. [online] Balkans.aljazeera.net. Available at: <https://balkans.aljazeera.net/> [4 August 2021].

2 Град Скопје - Заштита на животната средина. 2021. *Проекти - Град Скопје - Заштита на животната средина*. [online] Available at: <https://zivotnasredina.skopje.gov.mk/aktivnosti/> [Accessed 29 July 2021].

3 Danova, Elena. *Personal Interview*. August 2021.

4 *Personal Interview*. 02 August 2021.

5 Tešanović, Majda. *Personal Interview*. September 2021

organized protests for instance, or awareness for the available measures, perhaps have not been correctly covered and targeted in order to reach wider visibility and support. All that being said, the fact is that there is no doubt that the local authorities are making a progress in adopting measures to improve the air quality, yet they are not sufficient to make more drastic improvements. Factors are various and we can understand them better upon looking into the following comparison between the two capitals.

Moreover, the local authorities in both cities say that it would take at least few years for the current measures to show results⁶. This would especially be true when comparing local implementation introduced anywhere throughout the Western Balkans, considering the high pollution levels in some regions. Additionally, the slower policy-making processes and political complexities are another factor. The two countries have been characterized by this sentiment for decades already. However, the air quality should not be seen just as a political tool, even though it has its political nature. Finally, good air quality is a part of what constitutes decent standard of life, and forms an integral part of human right to health and well-being⁷. Some of the approaches on the local implementation of measures will show both the similarities and differences between Skopje and Sarajevo, and what the two cities can potentially learn from each other. A good indicator of the national and local level in improving the air quality and energy efficiency in both countries is the progress of the two capitals, as the most densely populated areas in BiH and North Macedonia.

6 Krvavac, Zijada. *Personal Interview*. August 2021.

7 Nations, U., 2021. *Universal Declaration of Human Rights | United Nations*. [online] United Nations. Available at: <https://www.un.org/en/about-us/universal-declaration-of-human-rights> [Accessed 20 August 2021].

Similar battle fields

The winter months have been critical for both Sarajevo and Skopje, and this has been the period with the worst air quality detected each year. The European Environment Agency⁸, in addition to the opinions of regional experts, confirms that the pollution specific to the Western Balkans is mostly a result of two combined factors: old industrial facilities still in operation and the domestic heating in households, which in many populated areas is not properly organized. In order to address the issue of heating, the capital of BiH, Sarajevo, started providing subsidies for furnace replacement aimed for households⁹. Skopje started a similar action, adding another one for replacing and cleaning old chimneys and offering financial assistance for purchasing bicycles and electric scooters¹⁰. Representatives from both cities working on this issue claim that improvements have been noticed in the air quality, but more time is needed for the air quality to show further improvements. Nonetheless, North Macedonia seems to have made a more visible progress when compared to BiH, mostly due to the more specific plans and action strategies for improving the air quality that have been adopted on local level in several cities, including Skopje, whereas the BiH actions plans and strategies are not always straightforward and specific.

By looking into the administrative organization and the bodies responsible for the air quality in the two cities, we can also see some similarities – having in mind the important difference that Sarajevo is administratively much more decentralized in comparison to Skopje. The City of Skopje is made of all the municipalities of the wider metropolitan Skopje area¹¹. The City's administration adopts and coordinates plans and measures against air pollution and environmental protection, which are then further implemented by the municipalities in Skopje. The Section for protection of the environment is the administrative body that deals with the air pollution issues in Skopje, more specifically the Air Quality, Climate Change and Noise Protection Department¹². In recent years, more efforts have been made in improving the air quality and concrete measures and plans have been put in place, most notably favoring the already mentioned financial subsidies for households and companies as incentives, as well as traffic regulation during critically polluted days. An achievement that has been praised in the media in North Macedonia has been made in 2019, when Skopje became the first

8 EEA, 2021. *EEA Western Balkan Countries*. [online] eea.europa.eu. Available at: <https://www.eea.europa.eu/publications/western-balkan-countries> [Accessed 21 August 2021].

9 World Bank, 2019. *Air Quality Management in Bosnia and Herzegovina*. [online] Open Knowledge World Bank. Available at: <https://openknowledge.worldbank.org> [Accessed 9 August 2021].

10 City of Skopje, 2021. *Јавен повик за субвенции на велосипеди - Град Скопје* [Public Call for Vouchers for Bicycles - City of Skopje]. [online] Град Скопје. Available at: <https://aplikacii.skopjelab.mk/velosipedi/> [Accessed 3 September 2021].

11 Град Скопје - Заштита на животната средина. 2021. *Проекти - Град Скопје - Заштита на животната средина*. [online] Available at: <https://zivotnasredina.skopje.gov.mk/aktivnosti/> [Accessed 29 July 2021].

12 Ibid.

Macedonian city to join the EBRD Green Cities network¹³, reaffirming its dedication to a greener future. Sarajevo is also a member of the Green Cities network. However, the activities in Skopje focused on making the city greener have been more active. Several green agenda projects have been started¹⁴ and measures for cleaner air have been doubled in comparison to 5-6 years ago¹⁵.

The administrative organization of BiH is much more decentralized and complex compared to North Macedonia, which brings its own advantages and disadvantages. The wider metropolitan area of Sarajevo is incorporated into the Canton Sarajevo, which is part of the Federation of Bosnia and Herzegovina, one of entities that constitute BiH. Having multiple layers of governance that often overlap in jurisdiction over same territories and issues could be a disadvantage, however the advantage of Sarajevo over Skopje is that the Canton has its own Government¹⁶ and designated Ministry for Environmental Protection¹⁷. This should, at least in theory, make the process of adopting measures more direct and customized. Similar to Skopje, Canton Sarajevo and the City of Sarajevo have adopted measures against air pollution in the past couple of years, which include financial subsidies for households aimed at the replacement of old furnaces. However, looking into the measures, Skopje definitely offers more compared to Sarajevo - by extending the subsidies to vouchers for bicycles and electric scooters¹⁸, as well as providing financial assistance for cleaning of old chimneys.

Moreover, the City of Skopje, has been adopting for several years a strategy and an action plan for branding the city as “Green Skopje”, including support to numerous research studies on the air quality that are available on the official website¹⁹ of the City of Skopje. The capital of North Macedonia even entered a competition for becoming “European Green Capital”²⁰ for 2023. Even though it did not manage to win the race, this move again clearly shows the ambition Skopje has for achieving a more widely recognized status as a green city and resolving its pollution problems, aside from the self-branding and promotional values this brings. On the other hand, Canton Sarajevo, being one of the cantons in the Federation of Bosnia and Herzegovina with the most resources available, has also made a number of studies on the pollution and the air quality. However, Sarajevo did not put forward a clear ambition to brand itself as a “green city” more widely, which again gives more points to Skopje, even though both cities are part of the EBRD Green Cities network²¹. However, when comparing the two cities, it is important to keep in mind that the overall legal and political framework surrounding the two capital cities plays a role in how they handle environmental issues and how “green” they aim to become in reality. The mechanisms available to the two cities give different prospects and perspectives on handling the air pollution and improving the air quality.

13 Ebrdgreencities.com. 2021. *Skopje*. [online] Available at: <https://ebrdgreencities.com/our-cities/skopje/> [Accessed 2 August 2021].

14 Град Скопје - Заштита на животната средина. 2021. *Проекти - Град Скопје - Заштита на животната средина*. [online] Available at: <https://zivotnasredina.skopje.gov.mk/aktivnosti/> [Accessed 29 July 2021].

15 Peneva, Julijana. *Personal Interview*. July 2021.

16 Vlada.ks.gov.ba. 2021. *Vlada Kantona Sarajevo*. [online] Available at: <https://vlada.ks.gov.ba/> [Accessed 4 August 2021].

17 Mkipgo.ks.gov.ba. 2021. *Početna | KANTON SARAJEVO*. [online] Available at: <http://mkipgo.ks.gov.ba/> [Accessed 10 August 2021].

18 City of Skopje, 2021. *Јавен повик за субвенции на велосипеди - Град Скопје [Public Call for Vouchers for Bicycles - City of Skopje]*. [online] Град Скопје. Available at: <https://aplikacii.skopjelab.mk/velosipedi/> [Accessed 3 September 2021].

19 Град Скопје - Заштита на животната средина. 2021. *Проекти - Град Скопје - Заштита на животната средина*. [online] Available at: <https://zivotnasredina.skopje.gov.mk/aktivnosti/> [Accessed 29 July 2021].

20 Balkan Green News, 2021. *Belgrade, Zagreb, Skopje out of race for European Green Capital 2023*. [online] Balkan Green Energy News. Available at: <https://balkangreenenergynews.com/> [Accessed 23 August 2021].

21 EBRD, 2021. *Home*. [online] EBRD green Cities. Available at: <https://www.ebrdgreencities.com/> [Accessed 7 August 2021].

What kind of measures the cities bring forward?

Looking into what the cities have actually put forward as actions and measures to prevent air pollution and improve the air quality more deeply, one can indeed notice some similarities. As brought up before, one of the more popular measures in the last few years both in Skopje and Sarajevo have been the financial subsidies to replace old furnaces. Nevertheless, other measures and actions have also been implemented, and the cities vary in the level of success they experience. The basis for the way the various measures are implemented are the studies that have been and are conducted in Skopje and Sarajevo, and that help shape the policies for fighting the air pollution, especially in the critical winter months.

Another reliable source of data the cities rely upon are the measuring stations for air quality that shows the levels of PM10 and PM2.5 present in the air. In Skopje and North Macedonia, the levels of air pollution can be followed on the official website of the Ministry for Environment and Planning²² through weekly reports based on the data from 18 air quality measurement stations placed around the country, 3 of which are in Skopje. For Sarajevo and other BiH cities, the air quality data can be sourced through the Federal Hydrometeorology Institute²³, which presents the information on the air pollution levels with tables and maps. The air pollution in the two cities during winter months extends much further beyond the WHO's guidelines²⁴ and thresholds that should not be exceeded – which for instance is 50 for PM10 per square meter in a 24-hour period, but in Skopje and Sarajevo this number has reached several hundreds, many times over.

A study done by UNDP²⁵ back in 2017 concluded that both in urban Skopje and the rural areas of the wider Skopje region firewood and hard fuels are widely used as heating solutions, a main source of the PM10 and PM2.5. Figure 1 below shows the results on the usage of heating solutions from the field study done with 5044 households, selected through statistical sampling. The first column represents the urban individual households and the second is for the rural households. The blue color represents the usage of firewood and other hard fuels that are being used for heating, with around 33% present in urban households and almost 90% in rural areas.

22 Moepp.gov.mk. 2021. *Инсталирани нови мерни инструменти за мерење на PM10 во автоматските мониторинг станици за квалитет на амбиентен воздух Лисиче, Гостивар, Кичево, Велес 2 и Кавадарци | МЖСПП.* [online] Available at: <https://www.moepp.gov.mk/> [Accessed 10 August 2021].

23 Fhmzbih.gov.ba. 2021. *Federalni hidrometeorološki zavod.* [online] Available at: <http://www.fhmzbih.gov.ba/latina/ZRAK/AQI-satne.php> [Accessed 10 August 2021].

24 Who.int. 2021. *WHO global air quality guidelines: particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide.* [online] Available at: <https://www.who.int/publications/i/item/9789240034228> [Accessed 27 July 2021].

25 Dimitrovski, D., 2017. *Како се загреваат домаќинствата во Скопската Котлина?.* [online] Skopjesezagreva.mk. Available at: <https://www.skopjesezagreva.mk/> [Accessed 2 August 2021].

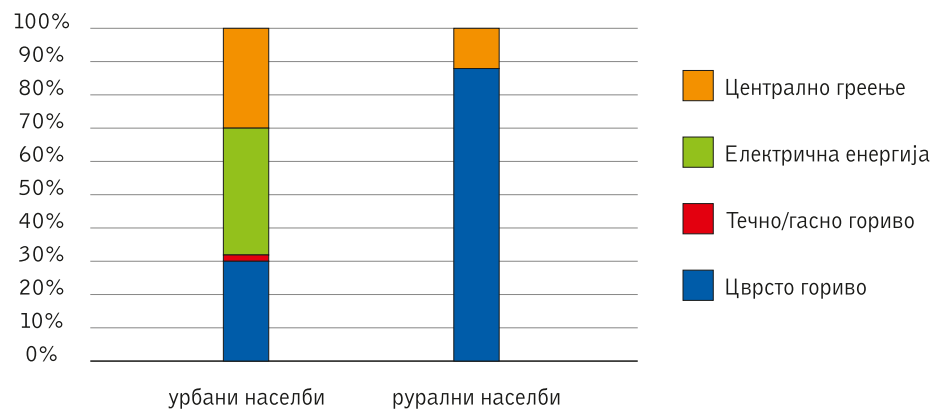


Figure 1: Heating solutions in Skopje. 1st column – urban areas; 2nd column – rural areas. Blue – firewood; Green – electricity; Purple – central heating; Red – gas

Aside from the heating, there have also been other reasons for the increased concentrations of the harmful particles in the air of Skopje from 2000 on, according to the study. Similar results have been shown in later versions of the study. The most important reasons apart from the household heating are the following, as summarized by the specialists that have been working on the detailed overview²⁶:

- Atmospheric conditions
- Urban factors
- Traffic
- Maintenance of public hygiene

In Sarajevo, the air pollution has been present for several decades already, and it has been a topic of political debates and public discussions since the 1970s. Similar to Skopje, the main reasons for the air pollution in Sarajevo are primarily the domestic heating solutions, with the traffic and the industrial facilities contributing to a lesser extent as well²⁷. Same as in Skopje, the most critical months are December, January and February, when the air quality is extremely poor. Measurements of the air quality done in Canton Sarajevo in 2015 during the winter months show extreme air pollution, but not much nitrogen dioxide was detected, which is a confirmation for the cantonal authorities that the biggest contributor to air pollution in Sarajevo is domestic heating using solid fuels and old furnaces²⁸. The main causes of air pollution resulting from individual heating are summarized as follows²⁹:

- Usage of furnaces and low-power boilers that do not allow efficient and low-polluting combustion of the solid fuels used
- Improper or inadequate consumption of coal and its poor quality
- Lack of coal processing for the needs of small furnaces on the market
- Poor maintenance of domestic and industrial furnaces and plants
- Geographic conditions of the city of Sarajevo, located in a valley with poor ventilation conditions, making the usage of inefficient and old furnaces that much more polluting.

26 Martinez, G., Spadaro, J., Chapizanis, D., Kendrovski, V., Kochubovski, M. and Mudu, P., 2018. Health Impacts and Economic Costs of Air Pollution in the Metropolitan Area of Skopje. *International Journal of Environmental Research and Public Health*, 15(4), p.626.

27 Podić, A., 2019. ZAGAĐENJE ZRAKA I MALA KUĆNA LOŽIŠTA - PROBLEM KOJI IMA RJEŠENJE [Air Pollution and Small Domestic Furnaces – Problem That Has a Solution]. [online.] Ekoakcija.org. Available at: <https://www.ekoakcija.org/> [Accessed 9 August 2021].

28 Mpz.ks.gov.ba. 2015. Upravljanje kvalitetom zraka u Kantonu Sarajevo. [online.] Available at: <https://mpz.ks.gov.ba/> [Accessed 26 July 2021].

29 Ibid.

Several studies show that, both in Sarajevo and Skopje, the natural ventilation corridors are in jeopardy and efforts must be made to preserve them in order to maintain any prospects for good air quality in future³⁰. This is particularly crucial for Sarajevo³¹, where the rise of numerous tall buildings are already showing signs of interrupting and modifying the air circulation in the city. Traffic is another prevailing problem in Sarajevo and Skopje, and experts agree that pollution comes from the traffic year-round³². For instance, Skopje and other bigger cities in North Macedonia are crowded with old vehicles. The Government of North Macedonia³³ and some municipalities have adopted plans for gradual replacement and removal of old vehicles through regulation of the market and a string of limitations for those who wish to purchase old vehicles, both for commercial and business use. Results of these types of indirect measures are yet to be seen and materialized in the upcoming years³⁴. However, it is uncertain how local and national authorities will be determined in imposing stricter vehicle regulations as the citizens keep on complaining of the rising price of cars and petrol. For Skopje though, a better-organized public transportation is in the making as a good alternative, and the City of Skopje plans to offer it in the upcoming years with its latest project for rapid bus transit³⁵ tracks that should better connect the city and its suburbs.

However, North Macedonia's deputy minister for environment, Mr. Jani Makraduli³⁶ stated that one of the main reasons of air pollution is that many citizens use firewood, solid fuels and old furnaces for heating during winter months, mostly due to their financial situation and old habits. As much as the domestic experts would agree to some extent, the impact of the industrial facilities should not be underestimated either. Moreover, most residents cannot afford heating from clean energy sources, and therefore as many as almost half of the city's residents turn to firewood to heat their homes. A lot of it is purchased on the black market, which is cheaper but more toxic to the environment³⁷. Even though reactions on social media to the Deputy Minister's statements have been divisive and deemed as borderline accusatory towards the ordinary people, the studies and the data following air quality measurements support it to a certain extent. Moreover, it has been medically proven that emissions from burning wood and coal in households cause health problems, such as diseases of the cardiovascular and respiratory systems. They are emitted by burning coal and wood, which in combination with old and infective furnaces can produce carcinogenic substances.

In both Skopje and Sarajevo, the solid fuels used for heating are mainly wood and coal, followed by waste generated in agriculture and forestry, and sometimes even ordinary household waste. Solid fuels are mainly used for what scientists call "small plants for combustion", or in translation regular household stoves, furnaces and small boiler rooms for central heating of dwellings. The high emissions of pollutants from these small combustion plants are a consequence of incomplete combustion caused by the low combustion temperature of solid fuels. This results in relatively high emissions of fuel per unit, produces the particulate matters PM2.5 and the carbon monoxide, which are the two major air pollutants in both Skopje and Sarajevo. The combustion of solid fuels in small household plants is also a significant source of emission of black carbon (soot), a contributing factor to the climate change.

30 Krvavac, Zijada. *Personal Interview*. August 2021.

31 Bešić, V., 2019. Zagađenje zraka: U Sarajevu glavni problem kućna ložišta, saobraćaj i visoke zgrade. [online] Aa.com.tr. Available at: <https://www.aa.com.tr/> [Accessed 4 August 2021].

32 Tikveša, Rijad. *Personal Interview*. August 2021.

33 Economy.gov.mk. 2019. Закон за Возила. [online] Available at: <https://www.economy.gov.mk/> [Accessed 9 August 2021].

34 Unfccc.org.mk. 2016. Дарко Јаконов: Автомобилите-сериозни причинители за загадување на воздухот. [online] Available at: <http://unfccc.org.mk/?LCID=162&NewsID=540> [Accessed 10 August 2021].

35 Vasilevski, M., 2021. Skopje to introduce first Bus Rapid Transit system in Western Balkans - finance.gov.mk. [online] finance.gov.mk. Available at: <https://finance.gov.mk/2021/04/21/skopje-to-introduce-first-bus-rapid-transit-system-in-western-balkans/?lang=en> [Accessed 27 July 2021].

36 Press24.mk. 2020. Јани Макрадули: Чист воздух мора да има за сите, тоа е приоритет од кој нема откажување. [online] Available at: <https://press24.mk/node/409729> [Accessed 13 August 2021].

37 Lee, J. and Mickute, V., 2019. Inside Skopje, Europe's most polluted capital city. [online] Aljazeera.com. Available at: <https://www.aljazeera.com/features/> [Accessed 25 September 2021].

The amount of fuel needed for sufficient heating in one household highly depends on the efficiency of the furnace, as well as the characteristics of the dwelling and its energy efficiency level. Major part of the emissions from combustion ends up in the surrounding air. Heating the households during winter months by burning solid fuels causes far more air pollution by suspended particles than heating with electricity or gas, as the emissions from the firewood and other solid fuels stay longer in the surrounding air. This is the case both in BiH³⁸ and North Macedonia, including of course Skopje and Sarajevo. This is why financial assistance programs for the replacement of furnaces in households became the most notable subsidies in recent years³⁹, with Skopje adding a similar action for replacing and cleaning old chimneys of individual and collective housing units. Representatives from both cities working on this issue claim that improvements have been noticed in the air quality⁴⁰, the pollution periods last shorter compared to few years ago and the measures should show their long-term impact in few years.

38 Podić, A., 2019. ZAGAĐENJE ZRAKA I MALA KUĆNA LOŽIŠTA - PROBLEM KOJI IMA RJEŠENJE [Air Pollution and Small Domestic Furnaces – Problem That Has a Solution]. [online] Ekoakcija.org. Available at: <https://www.ekoakcija.org/> [Accessed 9 August 2021].

39 World Bank, 2019. *Air Quality Management in Bosnia and Herzegovina*. [online] Open Knowledge World Bank. Available at: <https://openknowledge.worldbank.org> [Accessed 9 August 2021].

40 Personal Interview. 03. July 2021.

How to win the battle?

The measures that have been introduced in Skopje and Sarajevo in recent times for the purpose of fighting air pollution can be roughly grouped in several categories that include measures aimed at traffic regulation, recommendations for the citizens and enterprises, financial assistance and urgent actions and restrictions when air pollution gets extremely severe. Even though closely connected and intertwined, the energy efficiency measures are not included in this discussion. Since the air pollution issue points at individual heating solutions as the major contributing factor, the most interesting of all measures are the financial subsidies for the residents. In Sarajevo, the pilot project for subsidies for old furnace replacement was launched at the beginning of 2021, in collaboration with the cantonal Ministry for Environmental Protection and Planning and the UNDP⁴¹. The call was successful and as a result a new one is being launched for the upcoming winter, with the support of the Swedish Embassy and a total budget of EUR1.5 million⁴². The implementation of the call and all of the activities is being handled by the UNDP and according to the initial estimates, up to 600 households will be able to replace their old furnaces.

Skopje, on the other hand, started this line of subsidies with a pilot project back in 2016, and in the first year 350 household received benefits. However, the difference between these two similar lines of subsidies is that in Sarajevo there is a ranking list and stricter criteria for the application process. On the other hand, it is easier to get the subsidy in Skopje, as there is a list of documents that should be submitted with the application and all this can be done online. The subsidies are being granted until the budget is exhausted, based on the “first come-first take” principle. The solution for the subsidies in Skopje has another advantage over Sarajevo – the refund principle is based on bills or vouchers. In both cities, the interest is rising and the citizens get up to 70% coverage of their cost. In Sarajevo the limit is set at BAM5,000 which is around EUR2,500, yet in Skopje the maximum amount is lower, up to around MKD62,000 or EUR1,000 per application.

Since 2016 until today, as shown in the figure 2 below, the City of Skopje has managed to replace thousands of old furnaces. The replacement of old furnaces ended in 2019, yet other 4 new lines of subsidies have been introduced. It has been confirmed by the local authorities that the financial assistance programs intended for the residents will expand and continue in the next years. It seems that Skopje is well on the way to winning the battle and Sarajevo should be able to keep up in the fight against the air pollution too, if the successful project for furnace replacement subsidies is a clear indicator

41 Bojadžić, L., 2021. *Informacija o realizaciji Pilot projekta*. [online] Vlada.ks.gov.ba. Available at: <https://vlada.ks.gov.ba/aktuelnosti/novosti/informacija-o-realizaciji-pilot-projekta> [Accessed 3 September 2021].

42 Deković, A., 2021. *Kanton Sarajevo: Izdvojeno 2,9 miliona KM za zamjenu peći na ugalj*. [online] Aa.com.tr. Available at: <https://www.aa.com.tr/ba/> [Accessed 20 September 2021].

for this. However, a number of activists criticized the application process and the low visibility of the projects. A lesson learnt, that should be adopted by both cities, is that it is necessary to make application process as straightforward and simple as possible. Additionally, it is important to work on higher visibility of such opportunities both for the residents and the cities – and in turn for better air quality.

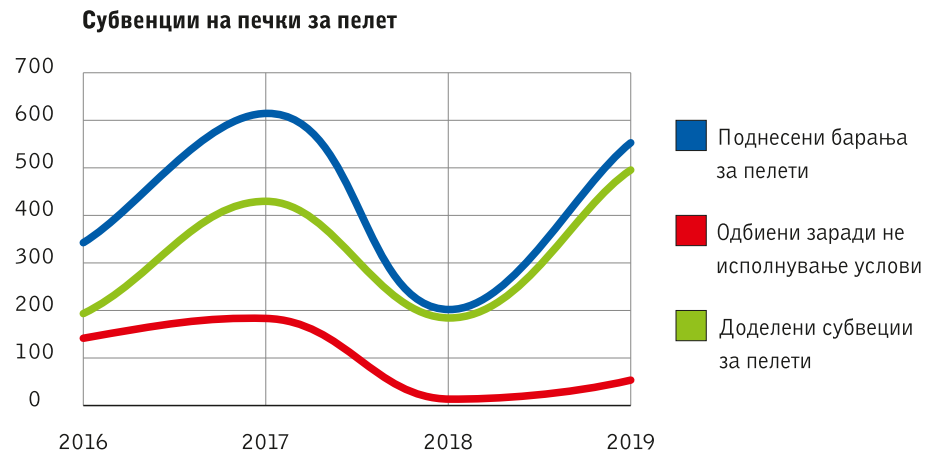


Figure 2: Subsidies for furnaces by year. Blue – total number of applicants; Red – number of rejected applications; Green – number of awarded subsidies⁴³

Furthermore, as Skopje is moving ahead of Sarajevo in the battle for cleaner air, it has introduced the new subsidies that are becoming increasingly popular. Aside from handling the household heating by replacing old and inefficient furnaces and cleaning old chimneys, Skopje has addressed the issue of air pollution caused by the traffic by offering subsidies for bicycles and electric scooters. The new lines of subsidies started in 2019 on the territory of Skopje and all of them had and still have their own budgets and separate calls for applications, resulting in massive success⁴⁴:

- 1) Call for financial assistance for inverter ACs – over 1,400 inverter AC subsidies granted to households since 2019, based on purchasing bills
- 2) Call for chimney cleaning – over 400 chimneys have been cleaned by the City of Skopje since 2019, based on the principle “first come-first served”
- 3) Call for bicycle subsidies – over 4,000 subsidies in the amount of MKD3,000 (EUR50) have been granted since 2019 as vouchers, as shown in the figure bellow.
- 4) Call for subsidies for electric scooters – over 200 subsidies up to MKD7,000 (EUR120) have been granted since 2019 as vouchers, as shown in the figure bellow.

⁴³ Град Скопје - Заштита на животната средина [City of Skopje - Environmental Protection]. 2021. [Subsidies] Субвенции - Град Скопје - Заштита на животната средина. [Online] Available at: <https://zivotnasredina.skopje.gov.mk/subventsii/> [Accessed 11 September 2021].

⁴⁴ Ibid.

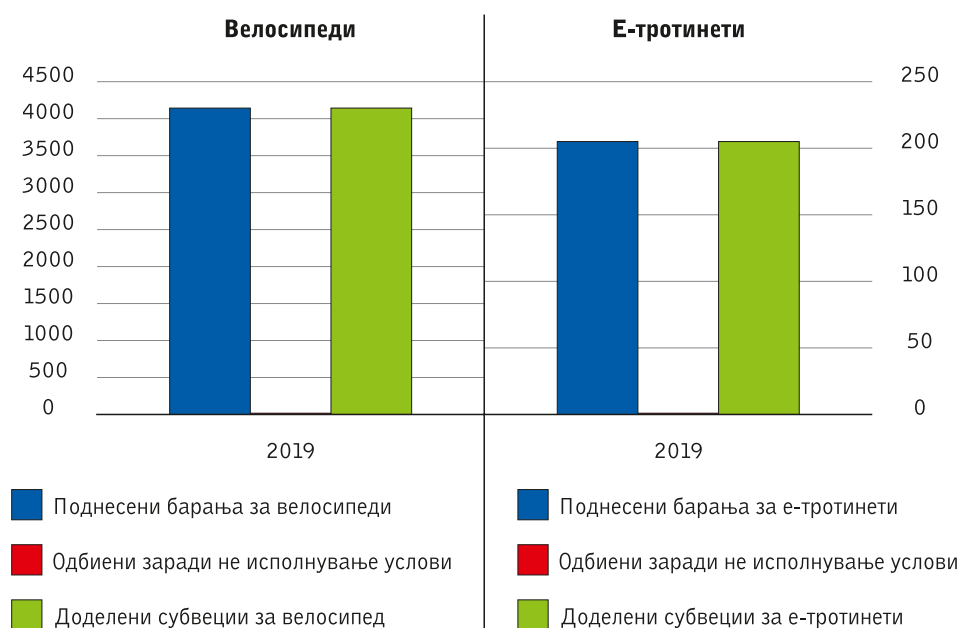


Figure 3: Subsidies for bicycles and electric scooters. Blue – total number of applicants; Red – number of rejected applications; Green – number of awarded subsidies⁴⁵

It is worth noting that the subsidies for bicycles and electric scooters have turned out to be the most popular measures. Even though the amount of money granted to the residents of Skopje does not cover the full price of bicycles or scooters, it turned out to be a good incentive. Considering that this measure seems to be very attractive, the traffic of Skopje is expected to modify more in near future. Hopefully, in a matter of several years bicycles and electric scooters will become much more visible, thus contributing to less air pollution caused by the traffic. Sarajevo would definitely benefit if similar measures, such as diversifying and expanding subsidies, were to be introduced. Cleaner air would be the best trophy, and experts are optimistic that the battle will end in a victory for both Skopje and Sarajevo, especially if they learn from each other's moves. Following the example of Skopje, other cities in North Macedonia have started implementing similar measures and financial assistance programs, which will be covered in the next articles.

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