



# BOOK OF PROCEEDINGS

**INTERNATIONAL CONFERENCE**  
**13<sup>th</sup> - 14<sup>th</sup> October 2023**

ISSUES OF HOUSING,  
PLANNING, AND  
RESILIENT DEVELOPMENT OF  
THE TERRITORY

**Towards Euro-Mediterranean  
Perspectives**

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# **Issues of Housing, Planning, and Resilient Development of the Territory Towards Euro-Mediterranean Perspectives**

## **Conference Theme and Rationale**

Albania, along with other Western Balkan countries, has undergone significant economic, social, and political changes in recent years. As a result, housing, planning, and the resilient management of territorial development have emerged as critical issues. This is because these regions face significant challenges in providing affordable housing, addressing the impact of urbanization on the environment, fostering evidence-based decision-making on the territory, and bringing forth the commitments towards climate neutrality.

The organizers use the term “multi-modality” to define complex situations (in matters of territorial planning, management, architecture, housing, public space, technology, etc.) that have historically encompassed Western Balkans and Mediterranean cities in a logic of coexistence and value co-creation. A combination of knowledge and heritage that throughout time and history have given life to civilization in this region of Europe. The active involvement of Albania in the existing network of the Mediterranean Basin and the EU, through a joint action plan with UN / UNECE, and the Albanian and regional authorities, including reputable scientific bodies such as the Academy of Sciences of Albania, makes this conference even more intriguing to explore fascinating areas of research. The conclusions, to be considered as a stage for open innovation, will include recommendations for further scientific and applied research, projects, and events.

The geographical focus of the conference covers three dimensions: i) Albania; ii) the Western Balkans; iii) Euro-Mediterranean countries. POLIS University aims to focus on the above-mentioned research areas that are of common interest to both Western Balkans and Mediterranean cities, including, but not limited to: housing policies, urban history and architecture typology, innovation and digitalization in urbanism, energy efficiency, resilience and environmental sustainability, governance and smart technologies for city management, education and gender aspects in urban planning research.

In this regard the main aim of this international conference is to bring together scholars, policy-makers, and practitioners to examine the pressing issues of housing, planning, and land development in these regions, in a context of transition fatigue, climate challenges and post-pandemic realities.

# **Issues of Housing, Planning, and Resilient Development of the Territory Towards Euro-Mediterranean Perspectives**

## **Conference Aim**

The main aim of this international conference is to bring together researchers, policy makers and practitioners to examine the urgent issues of housing, planning and land development in these regions, in a context of transition, climate challenges and post-pandemic realities.

## **Objective**

- Consolidation of the cooperation network between Albanian and non-Albanian researchers, lecturers, managers, with the aim of participating in joint research projects at the regional and international level;
- Support of local authorities with contemporary data, on the state of housing issues, planning and sustainable urban and environmental management, as well as representatives of public and private institutions operating in this field.

The conference is organized by POLIS University (U\_POLIS) in cooperation with the Academy of Science of Albania, and supported by other local and international partners.

In the framework of resilience, the main conference theme is devoted to Issues of Housing, Planning, and Resilient Development of the Territory from a Euro-Mediterranean Perspective, including Albania, Western Balkans and the Mediterranean Basin. This event aims to bring together academics, policymakers, researchers, experts, practitioners, and stakeholders from diverse backgrounds to discuss and address critical challenges related to housing, urban planning, and the development of resilient territories.

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# **Air Quality Status of Tirana. Temporal effects of COVID-19 restrictions on the decrease of urban air pollution.**

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## **Abstract**

This research paper builds on the analytical work conducted by Co-PLAN, Institute for Habitat Development under the “Green Lungs for Our Cities” project, supported by the EU Delegation in Albania. This specific publication consists of the analysis of data from a dedicated ground-based monitoring process conducted from March 11th to May 11th, 2020 in 4 different locations of Tirana on PM2.5, PM10 and NO2, based on the protocol and practice established by the Alternative Monitoring Methodology of the Green Lungs project ([link](#)). This in the perspective of the effect that quarantine had on specific pollutants in comparison with before and after the period of restrictions. Other sources, such as publications from the World Bank “Regional Note on Air Quality Management in Western Balkans”, +IQAir “2019 World Air Quality Report”, European Environmental Agency “Air Quality in Europe – 2019 Report” and “Assessing Air Quality through citizens science”, were also consulted during the analysis of data from this 62-days monitoring practice. The data provide an overview of how concentration levels of the selected air pollutants changed during the lockdown phase and after the removal of measures. The purpose of the monitoring process and the report was threefold

- (i) to verify the direct linkages between air pollutants and sources of pollution,
- (ii) raise awareness of air pollution among state and non-state actors,
- (iii) propose relevant measures to reduce urban air pollution for the near to mid-term future.

Keywords: Air Pollution, Monitoring, Pandemic, Urban Mobility and Form



## Introduction

Air pollution in Albania constitutes one of the most pressing environmental and urban health risks with regard to public health quality. Ambient air pollution (AAP) is a serious local health problem that accounts for an estimated 5350 premature deaths per year and an average of 184 days of life loss country-wide [1] (European Environmental Agency, 2019). The most common health implications related to high concentrations of pollutants in the air are; acute lower respiratory infections, increased risk for lung cancer, strokes, ischemic heart disease, chronic obstructive pulmonary disease, and increased stress level. Polluted air damages vegetation and habitats whereas most commonly it leads to a severe decrease of ecosystem services especially those close to urban and industrial areas. In Albania air pollutants originate from a range of sources that can be ranked by their impact:

- Combustion from vehicle engines combined with low fuel quality.
- Construction sector and heavy industry.
- SME that operates Medium and/or Low Combustion Plants.
- Illegal burning of waste and agriculture corps.

It is mandatory that for most pollutants (Sulphur Dioxide SO<sub>2</sub>, Nitrogen Dioxide NO<sub>2</sub>, Ozone O<sub>3</sub>, and Particulate Matter PM, Carbon Monoxide, and Dioxide CO & CO<sub>2</sub>) monitoring practice have to report more than 75% of the time during a year (6570 hrs. per year) so that it meets the requirements of the Ambient Air Quality Directive (European Union, 2008). From 2015 there was no accredited station in Albania that monitors and reports statistically accepted data on air pollution. Therefore, most of the citations on Albania's air pollution in any status reports from EU agencies, the World Bank, and WHO refer to information more than 5 years old. In the meantime, it is exactly the period between 2015 and 2020 when uncontrolled emissions have increased significantly and pollution concentration is considered to be the most important environmental risk to human health especially in Tirana and Elbasan. Given the contexts where the Albanian public has not been informed in specific regarding the status of urban air quality and regarding urban and environmental health for years now, citizen science and initiatives to fill this gap have contributed to a level in factorizing Air Pollution as a main concern in Tirana. Nowadays there are main sources of information and fully accessible to the public at large, namely:

i. Green Lungs for Our Cities. A project funded by the EU Delegation in Albania and implemented by Co-PLAN Institute for Habitat Development and Milieukontakt Albania. Indicatively monitoring the concentration of 8 different types of pollutants in Tirana, Durres, Elbasan, and Shkoder Municipalities. Providing information via the dedicated Online Platform link regarding 2340 monitoring practices and results.

ii. Air Quality monitoring also on 8 components, conducted by cooperation between Vodafone Albania and Tirana Municipality for a total of 3 stations in Tirana. Providing real-time information via the dedicated app Tirana Ime.

As for the state institutions, there have been very few to no publications of any monitoring practice nor a status report on air quality. During the last years, the national and social media was fed by civil society initiatives whilst only in 2019 this issue was highlighted through more than 45 articles and broadcasts dedicated to this topic. On the other hand, communities are now fully aware of the unhealthy status of the urban air in Tirana and other main cities. Immediate effects in the decrease of pollution concentration were seen and sensed by all, due to the restrictions imposed in March 2020 amid the global pandemic caused by COVID-19.

### Unique evidence-based research.

Methodologically this research is based on the interpretation of evidence-based data which were collected through site-monitoring practices following the Alternative Air-Monitoring Methodology used by the Green Lungs Project which is available at the platform as referend by the link in the Abstract section. By conducting regular daily monitoring practices from March 11th to May 11th, 2020 for a total of 62 days, to identify the changes in Air Pollution in Tirana for NO<sub>2</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub> and address indicatively the correlation between measures and pollution level. Four locations were selected for this monitoring campaign, following the project findings from 2019 whereas these areas were all exceeding the allowed standards both in terms of concentration and days exposed. These locations are situated on the western part of Tirana's ring, namely Vasil Shanto crossroad, 21 Dhjetori crossroad, Architecture and Civil Engineering crossroad, and Zogu Zi roundabout. A total of 681 monitoring practices were conducted for an overall coverage of 10% of the total day-night time.



Figure 1: Photos from the monitoring locations / Source: Author, March 17th 2020

To fully interpret the findings, a detailed correlation with imposed restrictions by the central government was kept. Chronologically on March 11th public transport, construction sector, and public gatherings were halted until a second notice. Two days later the full quarantine was imposed and there was no activity happening anywhere in the city. The very first finding can be addressed to the decrease of pollution level by 12.7% two days after public transport and heavy vehicles were not circulating in the city. Following the second finding, it took just one week without vehicles and construction for the pollutants (NO<sub>2</sub>, PM<sub>2.5</sub>, and PM<sub>10</sub>) concentration to drop below the EU standards in the Albanian Capital. On March 14th a high concentration of smog was inexplicably present in the city during the afternoon and evening. None of the sensors used during this

campaign indicated any increase, as it was for the odor of Sulphur that oriented us to measure and control in various resources the real-time concentration of the Sulphur Dioxide. The result was that from 18.00 to 23.00 the SO<sub>2</sub> concentration reached a peak of 166 µg/m<sup>3</sup>. Even though few media were reporting the unprecedented situation, none of them explicitly identified the source causing this pollution. Nevertheless, it can be addressed to the waste being burned either in Tirana or Durres Municipality due to the increased amount of waste generated from over-consumption that characterized the first days of quarantine in our country. This research results indicate a difference of 14% from day to day in terms of pollution concentration decreasing in the monitored areas. From April 5th to 7th it was registered a record low pollution level in all the locations. The results are as follows:

- a. PM<sub>10</sub> = 6µg/m<sup>3</sup> (6 times lower than the EU standard and 3 times lower than the WHO standard)
- b. PM<sub>2.5</sub> = 1.5µg/m<sup>3</sup> (13 times lower than the EU standard and 7 times lower than the WHO standard)
- c. NO<sub>2</sub> = 7µg/m<sup>3</sup> (6 times lower than the EU and the WHO standard)

From the second week of April, when the construction sector restarted their work at full capacity and private vehicles were more and more present on the streets, until the end of my monitoring campaign it can be noted that slight increase in pollutant concentration daily with a moderate factor of 9% difference from day to day. It can also be noted the impact that strict measures on closing activities and movement during weekends had regarding the significant and rapid decrease of pollution concentration in the city. To conclude with the fact that it was unprecedented for Tirana citizens to experience healthy air quality for a consecutive 52 days in a row. It is also important to note that from the last week of April activities and circulation were moderately open without time restriction, besides public transport (urban-interurban and schools) that is foreseen to reopen on the 15th of June. Nevertheless, the increase in concentration during the second week of May is not only attributed to the mass opening of all activities and transport in the city rather than to the meteorological conditions that characterized the whole Balkan Peninsula with the Sahara Sandstorm. Which for the sake of the citation were present for 10 days and more aggressive in terms of fine dust particles present in the air and later covering urban and natural surfaces after the rainfall.

## **Findings.**

A more specific interpretation for each of the monitored pollutants:

- a. PM<sub>10</sub> average from March 11th to May 11th was 25.76µg/m<sup>3</sup> and the lowest registered value was 6µg/m<sup>3</sup> (6 times lower than the EU standard and 3 times lower than the WHO standard)

Therefore, indicating a substantial decrease of 41% compared to the 2019 yearly average and standing at least 36% below the EU standard while it didn't meet the WHO standard whereas even during COVID-19 in Tirana we were at least 6% above their exposure standard. Tirana was reported to have a yearly average concentration of PM<sub>10</sub> = 50.6µg/m<sup>3</sup> in 2016 (RGJM, 2017). While the same source reported an increased concentration during 2017 PM<sub>10</sub> = 62.4µg/m<sup>3</sup> which is also the last report on Air from the state authorities. On the other hand, from the Green Lungs project the same component, we registered an average yearly concentration of 43.8µg/m<sup>3</sup> during 2019.

Given the context where numerous researchers have cited a direct link of PM (particular matter) to the aggravated effects of COVID-19, such pollutant in my case indicates a substantial decrease by 31% compared to the 2019 yearly average and standing at least 25% below the EU standard but it didn't reach to meet the WHO standard whereas even during COVID-19 in Tirana we were at

least 91% above their exposure standard. Tirana has not reported a yearly average concentration since 2015 therefore we can refer only to the data provided by the Green Lungs platform. During 2019 we registered an average yearly concentration of 27.8 $\mu\text{g}/\text{m}^3$ . It is important to note that the second week of May was characterized by meteorological conditions caused by the Sahara Sandstorm that was present in the whole region.

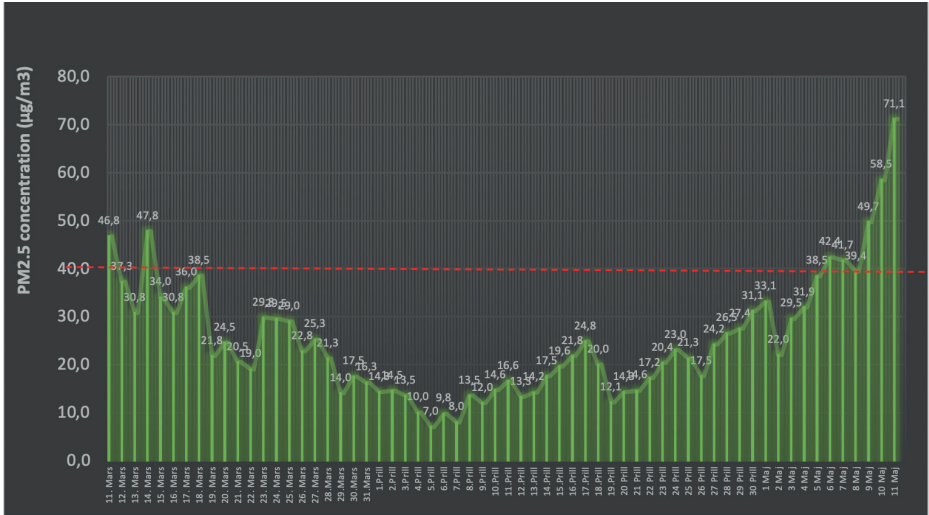


Figure 2: Daily concentration of PM10 during the lock-down period in Tirana (11. March.2020 – 11. May.2020) / Source: Author chart of the daily monitoring results.

b. PM2.5 average from March 11th to May 11th was 19.1 $\mu\text{g}/\text{m}^3$  and the lowest registered value was 1.5 $\mu\text{g}/\text{m}^3$  (13 times lower than EU standard and 7 times lower than WHO standard)

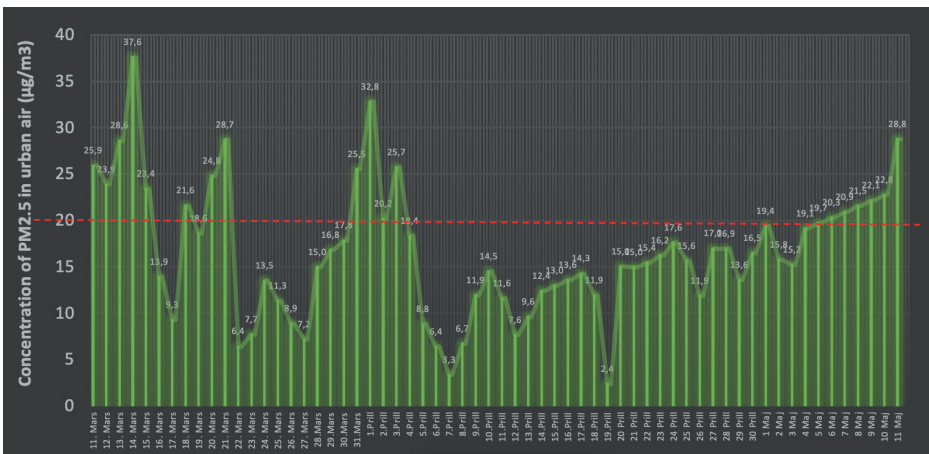


Figure 3: Daily concentration of PM2.5 during the lock-down period in Tirana (11. March.2020 – 11. May.2020) / Source: Author chart of the daily monitoring results.

c. NO<sub>2</sub> = average from March 11th to May 11th 42.1µg/m<sup>3</sup> and the lowest registered value 7µg/m<sup>3</sup> (6 times lower than EU and WHO standard)

Nitrogen dioxide has been considered to be the main problem in Tirana for the last 5 years. It is directly linked with two acute problems that our city faces daily. Low level of mobility within the city whereas traffic congestion constricts most of the drivers and passengers to endure 200 hours of traffic per year and an average of 244 liters of fuel being burned in traffic (GJOKA, 2020). The second problem consists of a worst-scenario combination for a city as dense as Tiana, where low-quality fuel is being burned in ICE vehicles that are part of one of the oldest fleets in the region.

As a first finding, it can be stated that even though we experienced around 35 days in a row with NO<sub>2</sub> concentration below the EU and WHO standard of 40µg/m<sup>3</sup> the overall average of these monitoring campaigns stands at 5.3% above the EU and WHO standards. In terms of comparison with the concentration of previous years. Tirana was reported to have a yearly average concentration of NO<sub>2</sub> = 24.5µg/m<sup>3</sup> in 2016 (RGJM, 2017). While the same source reported an increased concentration during 2017 NO<sub>2</sub> = 67.5µg/m<sup>3</sup> which is also the last report on Air from the state authorities. On the other hand, from the Green Lungs project. on the same component, we registered an average yearly concentration of 112µg/m<sup>3</sup> during 2019. Finally, we can state that enforced restrictions banning all transport means in Tirana contributed directly by reducing the NO<sub>2</sub> concentration in urban air by 62% from the previous year. Nevertheless, it should be mentioned that by the end of the monitoring campaign, when transport means were gradually open in full (besides public transportation) the concentration started to increase by an average of 1.47 µg/m<sup>3</sup> per day.

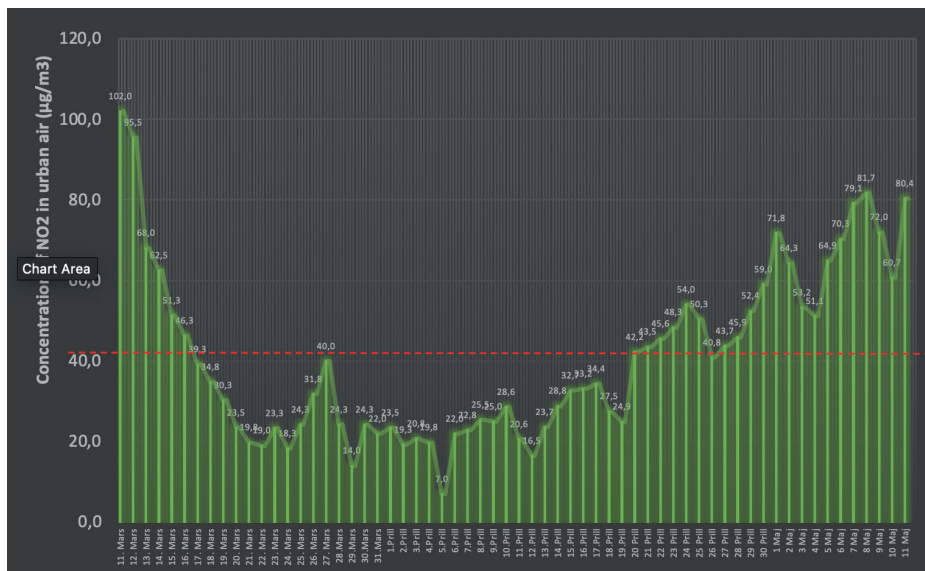


Figure 4: Daily concentration of NO<sub>2</sub> during the lock-down period in Tirana (11. March.2020 – 11. May.2020) / Source: Author chart of the daily monitoring results.

## **Conclusions.**

From the very beginning of the global pandemic caused by COVID-19, two major effects have been assumed by communities situated in large and dense cities in Europe. The first consists of the rapid decrease of pollution right after the quarantine was imposed and the other was rather argumentative at the time since preliminary data of grave clinical effects of the virus was linked with populations being extensively exposed to urban air pollutants. For example, there were even figures indicating that someone who lived for decades in a county with high levels of fine particulate pollution was at least 8% more vulnerable to experiencing mild and strong effects from COVID-19 than someone who lives in a region that has just one unit (one microgram per cubic meter) less of such pollution (Harvard University, 2020). Across Europe, the EEA database with more than 4,000 monitoring stations indicated in real time how the NO<sub>2</sub> concentration decreased by 24% in Milan, 40% in Barcelona, and 56% in Madrid compared to the same period of 2019. Similar air quality information was visually provided by Copernicus Atmosphere Monitoring Service via Sentinel 5 satellite that indicated in detail the decrease of pollutants especially in highly dense urban areas. Tirana on the other hand registered a record decrease of 64% which once more indicates that the pollution load emitted from fuel burning in the transport sector and construction are the sole reason for air pollution in our city.

There is an increased risk that cities of the Western Balkans could suffer an increased pollution load being emitted to their cities where the energy systems depend on Thermal Power Plants. Quarantine during the spring of 2020 indicated a significant increase in energy demand by households. Cities such as Prishtina, Belgrade, Skopje, and Sarajevo local and central governments should be prepared if there should be a second wave of the pandemic and requiring people to quarantine during wintertime. This means that emissions from the coal/lignite power plants will increase significantly. In the case of Albania, the central government should be prepared to avoid such a situation in cities such as Korca, Pogradec, Kukes, Tropoja, Dibra, and Shkodra, where citizens are still using wood, coal, and pellets with very low calorific input also not applying any standard of emissions from these products being traded in the upper mentioned locations. The World Bank report “Regional Note on Air Quality Management in the Western Balkans” not only requires increased efforts to avoid the potential increase of pollution during winter time but also reflects on a larger scale that such emissions will affect the neighboring countries (World Bank, 2020).

This said, in specific for Albania as we do not have a coal-based energy system, we are more likely to face an increased pollution concentration since early winter 2020. Also, more emissions are expected to increase the concentration of urban air pollutants, especially during the daytime since most of the activities will be conducted during active day hours. Nevertheless, we already have to face the situation of NO<sub>2</sub> concentration being 2-times above the National, EU, and WHO standards of 40µg/m<sup>3</sup>, with toxic emissions (dioxins and furans) from waste being burned in incinerators and open dump sites, public works and private construction activities that do not invest any cent in terms of reducing their air pollution footprint.

Nevertheless, the current crisis, besides its multiple impacts on our socio-economy, offered a glimpse of what a resilient and sustainable society should look like once the Paris Agreement commitments are met and the EU Green New Deal is implemented.

Decarbonization of energy, transport, and industry sectors appears clearly to be the most resilient solution for a sound socio-economic shift toward a climate-friendly and clean future.

## **Policy Suggestions:**

- a) There is an emergent need that Albania to invest and establish an Air Quality monitoring and reporting network in line with the National Strategy for Air Quality DCM No. 594, dated 10.9.2015, and National Plan for the Management of Air Quality DCM No.412/2019.
- b) Finalize full transposition of the following directives in the Albanian Legislation:
- 2008/50/EC on Ambient Air Quality
  - 2016/2284/EC on National Emission Ceiling
  - 2016/802/EC on Sulphur Content
  - 2009/126/EC Stage II of VOCs from petrol
  - 2015/2193/EU Directive on Medium Combustion Plants
  - 2010/75/EU Directive on Industrial Emissions Directive
- c) Capacitate and enable close cooperation of NEA and IPH where from one part there is a scientific interpretation of the pollution concentration and the other evaluates economic value in terms of the welfare-based approach of pollution exposure and overall urban-environment health status.
- d) Transition toward a low-carbon economy will significantly decrease most fossil fuel combustion sources. This should be a mid-term objective, therefore investments should be oriented and defined at a central level with a climate-neutral approach. Investments cannot continue to be made without an orientated decision-making process, whereas in Albania and mostly in Tirana we are still not aware of both immediate and long-term footprints that private and public investments have in terms of Air Pollution and Ecosystem Services. There is by far not a single practice of Benefit-Cost Analysis that includes ES, Air Pollution, and Urban Health in the exercise.
- e) The local government of Tirana and its Council should immediately emphasize restricting air pollution from public and private transport, traffic congestion, construction, and industrial sector, as these appear from the last 5 years to have become very well-known stationary sources.
- f) In Tirana, the most exposed category of the population toward the exceeding concentration of pollution daily is disproportionally distributed. There should be a feasible solution so that any action taken to reduce air pollution does not burden poor and vulnerable people.
- g) Public investments should be oriented toward climate-friendly interventions therefore a National Emission Target should be set after the Air Monitoring Network is established and the National Emission Analysis is conducted.

## **Recommendations:**

Emission from public transport is assessed at 22kilo-ton per year in Tirana, sourcing by a fleet of only 305 busses. An immediate renewal of these fleets should be subject to Tirana Municipality. Either any bus part of the public transport fleet meets EURO-6 standard or we attempt to electrify the fleet or the system. An alternative for public transport could consist also of developing the appropriate infrastructure that either Tram, Train, Metro, or Trolley is offered for Tirana outer Ring, Kombinat Kinostudio, Inner Rign, Train Station to Rinas Airport (along the economic area of the Highway) All these combined could reduce by half the usage of the private cars in Tirana for daily basis purposes.

Emissions from heavy vehicles mostly used for public service operations and largely nowadays by the construction sector do not meet at least the EURO-3 standard of emission. Therefore, both central gov. institutions in collaboration with local authorities should enforce that these operators either meet the emission criteria to operate within the highly dense urban area or they will be subject to a polluter pay tax for the air emissions.

Emissions from private vehicles and motors are subject to technical control by the SGS company that licenses the vehicle's technical conditions. Their practice includes a quantitative measurement of the exhaust system. Therefore, we insist that is important for each vehicle to be monitored for each of the specific pollutants causing problems with air pollution in Tirana (PM, NO<sub>2</sub>, VOC, SO<sub>2</sub>, HC, CO). Whoever does not meet the threshold of EURO-IV or above should not be provided with a renewed license.

Electric vehicles are more present in Tirana more than ever before, introduced in large by Taxi companies that immediately felt the opportunity and now are expanding as they appear to be economically benefiting and facing traditional ICE with unequal competition. Fiscal policies should be drafted so that private owners of ICE vehicles can transit toward E-Vehicles. A practice now present in all EU countries whereas in some others there are objectives to phase out all ICE by 2030. For Tirana this would be the ultimate solution in terms of removing for good the main source of Urban Air Pollution but it would require that the whole mobility and accessibility system is revised as a new charging network would be needed in Tirana but also country-wide.

Given the increasing urbanization and density of Tirana combined with the lack of urban parks at a neighbourhood level, it would be beneficiary for citizens and also Urban Air to pilot and contextualize concepts similar to Low Emission Zones. Aiming to manage emissions through taxation of motorized vehicles entering these areas that do not meet EURO-5 standard or above and Ultra Low Emission Zones that either restrict any transport means operating with Internal Combustion Engines or regulate only the presence of E-Vehicles.

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**Abbreviations:**

AAQ	Ambient Air Quality
AM	Air Monitoring
AAP	Ambient Air Pollution
AKBN	National Agency of Natural Resources
CC	Climate Change
CO <sub>2</sub>	Carbon Dioxide
CO	Carbon Monoxide
COP	Conference of Parties
EC	European Commission
EU	European Union
EV	Electric Vehicles
HC	Hydro Carbons
ICE	Ignition Combustion Engines
IPH	Institute for Public Health
LEZ	Low Emission Zone
MIE	Ministry of Infrastructure and Energy
MTE	Ministry of Tourism and Environment
NO <sub>x</sub>	Nitrogen Oxides
PA	Paris Agreement
PM <sub>10</sub>	Particular Matter 10micrometer
ppm	Part Per Million
WB	World Bank
ULEZ	Ultra Low Emission Zone



**Scientific Academy of Albania**