

## AIR POLLUTION IN TIRANA CONCERN OR A PROBLEM.

Dr. Valentina Sinaj  
Mba Glediana Foto

### Abstract

Tirana has recognized during the last 20 years' development of comprehensive demographic. . This is reflected in the increasing number of citizens, businesses, buildings, etc.. This development has had positive impacts on the economy as well as standard of living of the citizens of Tirana. However, besides the positive consequences of this development in economy, this growth has also caused negative effects, which is reflected especially in the growth of pollution. The number of vehicles circulating in the city is increasing, buildings have a very up, these and other factors are important as affecting air pollution This paper will focus on the causes of air pollution in Tirana. For their study used data from the Municipality of Tirana, the Ministry Environment, Forests and Water Administration, Institute of Health Public transportation ministry.

### 1. Introduction

Tirana has recognized during the last 20 years' a development of comprehensive demographic. This is reflected in the increasing number of citizens, businesses, buildings, etc. This development has had positive impacts on the economy as well as standard of living of the citizens of Tirana. However, besides the positive consequences of this development in economy, this growth has also caused negative effects, which is reflected especially in the growth of pollution. There are activities in Tirana which start from family level, and of course they also include small and large businesses which represent some of the major causes of pollution. On the other hand, the number of cars circulating in the city is large (about 30% of the total number of vehicles nationwide are registered in Tirana, in addition to the large number of vehicles entering and leaving every day in the capital city). As a result from above, the demographic development of Tirana causes the following effects:

1. Air Pollution
2. Studies by the Institute of Public Health, tell that the pollution in Tirana is the highest in the country. The main cause are vehicles.
3. Noise pollution
4. Studies by the Institute of Public Health, tell that the pollution in Tirana is the highest in the country. Vehicles are among the main causes, but also buildings, night clubs affect, etc..
5. Energy consumption
6. Albania from oil exporting country prior in 1990, has become in an importing country. The main cause: road transport.
7. Contamination of soil and water
8. Accidents

Environmental Agency of the United Nations has called Albania, the shelter of some of the biggest problems of the environment in the Balkan. Current economic development in Albania, has priority over the environmental issues, while the need to understand that this development can not be sustained unless it provides space for environment protection and preservation. Although the government has met many of the "legal duties" on environmental issues, the problem is in implementing of these laws. For example, Albania has ratified the Aarhus Convention in 2000, which entitles citizens to receive information about the environment and to participate in environmental decision-making, but this Convention may not apply when the Regional Environmental Agencies, have no

numbers landline phone where citizens can take to seek information. Shares of the government to protect the environment, should not be sporadic and isolated, but part of a proper policy and professional.

Environmental pollution in the capital city is the cause that 57 percent of children living in Tirana suffer from respiratory infections. From a study conducted by the Regional Directorate of Hygiene has shown that pupils aged 6 to 17 years, where a good part of their exhibit various health problems like respiratory infections, breathing difficulties and allergies to various pollution environment. But the statistics consist that 26 percent of pupils suffer from respiratory infections of the upper road and lower, while about 11 percent of pupils have difficulty in breathing, and about 20 percent of them are affected by these allergies.

From the study and other statistics for the level of noise through has result, about 88 percent of the classes is over the OBSH standard value (standard value is 35dB).

### 1.2 Pollution factors

Factors that contribute in air pollution are numerous; First we have the pollution from toxic gases coming from cars and industry.

Secondly there are no efforts to prevent environmental pollution from cars. There is no custom policy to favor new cars. By binding that with TVSH. Because duty is too small to block cars that have at least over 7 years who entered in Albania.

Third, environmental pollution by powders with large particles that come from construction inappropriate. Companies that build have not any obligation to create a job with the smallest pollution of the environment, rather clays and powders are everywhere. There is no interest in the ministry to force companies to implement all the regulations needed for the protection of the environment. The works carried out in terms of traffic on the road.

Fourth, environmental pollution comes from waste plastic and there is no stabilizing measure to the public opinion. Fifth, the pollution comes from material that have covered the rivers and forests in Albania. There has been taken no restrict to collect and plant creation.

Motor vehicles are one of main factors that play the greatest role in pollution. If we stop and analyze motor vehicles, as major polluters of the environment, we see that the number of cars is increasing with a frighten progression recently. Having a traffic charge and slow movements often

associated with stoppings, it is possible that in the environment is created more pollution that would be expected if the car will move in a constant speed. On the other hand, maintenance of vehicles are often not performed in accordance with the recommendations of the manufacturer, which causes a considerable discharge of gases in the environment and good burning substances. These discharges depend very much on the quality of fuel used for consumption. Gases emitted from vehicles, petrol or diesel, are several times more dangerous than those of dust, as these gases enter in the body easily and cause severe illness.

### 1.3 Effects

There is a serious concern that the threat of human health from environmental pollution in cities is greater than the risk of releasing gas from cars. The main toxic substances that pollute the air and threaten the people lives entering into the lung include carbon monoxide, plumbum, benzene, nitrogen dioxide and toxic air way transportable. Unfortunately, there is a growth of evidence in the body that show the damage done to our health from toxic substances that pollute the air. Also, it appears that the negative repercussions of environmental pollution are serious enough not only for adults but also children. To be mentioned is the fact that the effect of toxic substances seriously affects children yet unborn that shows damage caused to the embryo stage. Carbon monoxide is the result of products burning and is released mainly from cars and factories. It is odorless and colorless and therefore people can not smell it. Ozone found in the air level that we breathe, is produced by photo-chemical reactions, other toxic substances and ultraviolet rays of the sun. Increased concentration of these two gases is usually associated with increased concentration of other toxic substances that may have negative effects on children. The main types of observed cardiac diseases are anatomical abnormalities that are enough serious to the interior part of the heart, valve, pulmonary artery and aorta. Most children with such anomalies should submit surgical intervention since the beginning of their lives. An especial concern is that pregnant women have not checked or how to avoid toxic substances found in the air they breathe.

The environmental pollution by various factors is made due to the addition of the tumors. Specialists say that in recent years there has been growth of tumors, which has succeeded in frighten numbers, where each year are affected 3 to 4 thousand people. A considerable portion of these cases are caused by excessive air pollution. Tumors caused by air pollution, in its content has benzene and nitrogen dioxide.

Air pollution has been identified in all major cities of the country where the movements of cars or industrial activities are greatest. Therefore, the addition of disease is greater in these cities, which wake up with polluted air. Tumors are not the only disease of which suffer a large part of the population, but air pollution causes a number of diseases that spread in various forms. Because the contaminated particles circulating in the atmosphere has increased morbidity in young children. Specialists express the

necessity of state structures to the immediate intervention and avoiding the issue of air pollution.

Tirana is the main problem for the content of particles in the air and particularly NO<sub>2</sub>. Noted that nitrogen dioxide (NO<sub>2</sub>) and other harmful particles, have considerable value in most of the points of Tirana and other main cities of the country. The content of solid particles (LNP of PM 10) in the air of Tirana city, consistently exceed the extent of 2-4.5 times the permitted levels of EU countries. Nitrogen dioxide (NO<sub>2</sub>) is a continuous increasing within the last five years. Likewise, benzene (C<sub>6</sub>H<sub>6</sub>) expected to be a major problem in the future. These gases released mainly by the national traffic that constitute an environmental health problem. The high level of pollution affects to the reduction of Albanians' durability. These elements are taken through the air and are harmful to the human health, because contain carcinogenic elements. The Albanians' life has risk to reduce from 1.5 to two years less.

Analysis of environmental situation in the complex includes all the constituent elements of the environment and factors related to the environment, such as economic development, its pressure on the environment, the physical condition of the environment components, the impact of economic development on the environment, measures to improving the environment, the degree of their effectiveness, priorities identify, etc..

An analysis like this becomes easy and interpretable using measurable, understanding and clear indexes for each factor or element of its. State of the environment analyzed for each of its integral component such as air, water resources and related ecosystems, land and its ecosystems, forests and forest ecosystems, biodiversity. State of the environment is not the arithmetic average of the state of its integral parts.

Each component of the environment analyzed separately but not so detached from each other.

## 2. Data

This paper will focus on the causes of air pollution in Tirana. For this study is used data from the Municipality of Tirana, the Ministry of Environment, Forestry and Water Management, Institute of Public Health, Ministry of Transportation.

The variable that is chosen for studying is PM<sub>10</sub> - one of the main air pollutant components. Problems that can cause PM<sub>10</sub> are increasing asthmatics attack, bronchiteve deterioration and other respiratory diseases. It also reduces body's ability to respond to infections. Especially children, elderly, and those who suffer from asthma or bronchitis are the most vulnerable groups of the population to PM<sub>10</sub>. For these reasons, it is important that measures be taken to reduce this pollutant. These measures will be based on the discovery of the causes of the increase of this indicator, especially in urban areas.

Table 2.1 Data on pollution

Year	PM10 (in mg/m <sup>3</sup> )	Waste (in ton)	Population	Car
1997	125	83066	351,520	19,850
1998	133	92354	386,672	25,498
1999	137	121890	425,339	29,043
2000	141	153257	436,016	32,740
2001	145	171552	478,424	38,633
2002	152	155388	494,409	45,587
2003	160	197275	518,143	53,793
2004	167	235797	552,016	63,476
2005	172	235660	585,756	75,844
2006	163	289475	600,339	80,395
2007	159	359862	607,467	85,218
2008	173	578888	616,396	92,455
2009	148	227371	626,426	100,450

Source:

PM10: INSTAT - Social Indicators – Environment

Waste - The Municipality of Tirana

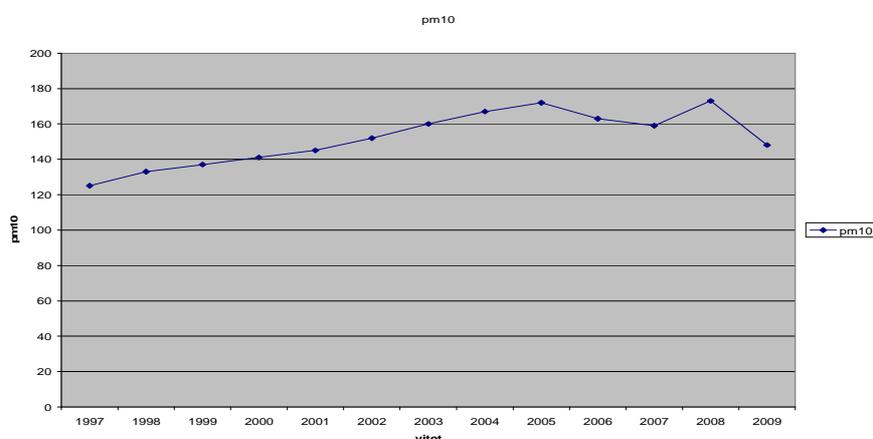
Population - The Municipality of Tirana

Car - The Municipality of Tirana

Below is a graph of measure (in µg/m<sup>3</sup>) of this component in Tirana during the period 1997-2009 (according to INSTAT).

### 2.1 Trend

Linear trend over the studies time shows that the series was a growing trend. Regarding the trend of moving averages that can be seen as a tightly with many series, the main trend is increasing but there is a break in 2005 and beyond there is a downward trend. Although the trend of PM10 in recent years seem to decline, its values are still much higher than the permitted values. Graph 2.1 Trend of the PM10



### 3. Empirical Analysis

Explanatory variables taken in the study are: the population of Tirana, the waste discharged into the Sharra' area (measured in ton), the number of vehicles circulating in Tirana, and building area of apartments for the period 1997 to 2009 (measured in m<sup>2</sup>). It will also estimate how some of the campaigns to plant trees have affected that local government has taken during the study.

The paper will conclude with some recommendations for sensibilization starting from families level for contributing to the reduction of this pollutant in the city where we live.

Equation	Intersept	Population	Car	Waste	Building	Fv	R <sup>2</sup>
1	79447,3 (5.942)	0.141 (5.494)					0.733
2	127238 (18.9)		0.430 (4.041)				0.59
3	132242.665 (22.437)			0.088 (3.820)			0.57
4	133285.794 (17.529)				133285.794 (2.731)		0.404
5	49434.53 (2.302)	0.214 (3.118)	-0.476 (-2.075)	0.043 (2.950)	0.048 (3.762)	39.162	0.951
6	90608.762 (9.439)	0.120 (6.4)		0.037 (2.222)	0.059 (4.513)	37.134	0.925

Note: Values in parentheses show the values of student statistics.

First, has studied the relationship that this variable has with each of the above indicators.

If we analyze the models that we have built realise that: In first equation is studied the dependence of PM10

variable by the number of population in years in Tirana's city and has seen that there is an important connection and for more the growth of population affects growth of pollution in the city of Tirana.

In the second equation, is studied the dependence of pollution from vehicle variable. This connection is significant and the increasing number of vehicles in the city leads to increased pollution.

In the third equation, is studied the dependence of PM10 from urabane waste which has a significant positive relationship.

In the fourth equation, is studied the dependence of PM 10 from construction variable and for this relation has been seen that the increasing of buildings in Tirana, leading to increasing environmental pollution.

In the initial model, we evaluated the impact that qualitative factors have in the importance of the model. During the period 1997 - 2009 Albania has signed several international multilateral environmental conventions and agreements. To fulfill their obligations of immediate measures should be taken. In fact, for this reason is adopted a set of rules, which have been created by the time a new environmental legal framework, but its applicability is questioned.

In our model, to reflect these factors, it is chosen as qualitative independent variable the years since Albania has signed the environmental conventions on air. These conventions are presented in the following table and the years when are signed has coded 1, while other years with 0.

Covenant	Year of accession	Coding
Convention on transboundary air pollution Long-range and protocols for heavy metals, persistent organic pollutants and the Protocol to Abate acidification, eutrophication and ground-level ozone	Acceded in 2005	1
Stockholm Convention on persistent organic pollutants	Ratified in 2004	1
Basel Convention on Control of Transboundary transport of hazardous wastes	Acceded in 1999	1

Also, as another qualitative variable is considered planting trees. For the coverage of this variable in the model, are marked with the code 1 years where have been campaign for planted massive trees. In fact, after the reconstruction of several quarters of Tirana in the period 2001-2008, the process of their rehabilitation is associated with tree planting. This has occurred in the Rinia Park area, on the street from Dinamo Stadium till 21 Dhjetori Square, the Elbasan street, in the interior environments of some quarters as 1 May block, Bus Park area etc., and in some other areas of the city. According to some information from city hall employees, the years when there have been extensive campaigns planting trees are: 2001, 2004, 2006, 2009. The values of sig for the qualitative variables are  $0.954 > 0.05$  to environmental conventions and  $0.191 > 0.05$  to plant trees. This shows that these variables in the model are not significant, although the model is globally significant. Interpretation: Relevant equations, depending on the values of qualitative variables will be like the following matrix:

Year	Have been no planting trees = 0	Have been planting trees = 1
Have been no signature convention = 0	$PM10 = 81148.439 + 0.112*Pop. + 0.05*Constr.$	$PM10 = 84664.61 + 0.112*Pop. + 0.05*Constr.$
Have been a signature convention = 1	$PM10 = 84754.139 + 0.112*Pop. + 0.05*Constr.$	$PM10 = 88270.31 + 0.112*Pop. + 0.05*Constr.$

#### 4. Conclusions

This paper focused on the discovery of the connection that exists between air pollution and some of its main causes that primarily associated with increasing of urbanization. By the simple regression analysis was discovered that there is an important relation between each of the variables included in the study and the level of pollution in the air. Multiply regression analysis has shown that the highest rate of explication of air pollution is by the increasing number of population and the growth construction surfaces. However, it is thought that there is a strong relation between population growth and increasing the number of vehicles circulating in Tirana over the years, hence the inclusion of population explains among other the influences that cause vehicles and especially the old vehicles into the air pollution in Tirana.

The model was tested in several ways. The main tests include the detection of multikolinearitet, heteroskedasticitet, and autocorrelation. Also there are processed other several non-linear models to appreciate the rate of explication and alternative interpretations of data. In the model taken in consideration some qualitative variables which are thought to have had an impact on the extraction of regulations and the prohibition of the collection of atmospheric pollutant, especially in relation to vehicles. However the inclusion of these variables in the model have not rised up the explanation of the model, although they are expected to have a lasting impact on this problem. In conclusion, the analysis performed, as well as a range of academic studies about this problem, it is necessary to:

1. Improve the city's urban system including:
  - o Raising the standards of public and private transport;
  - o Regulation of traffic and increasing road safety;
  - o Promote alternative transportation;
  - o Design and implementation of traffic operational scheme that takes into consideration the reduction of air pollution (bicycles, electric trains and other)
- 2 Harmonization of the fiscal system for environmental protection with European standards. Urban analysts in Tirana suggest that the increase of transportation tax is an unacceptable politically step for now. However, it is valuable to review international experience with different market mechanisms.
- 3 Strengthening environmental education to the general public with basic concepts related to environmental protection of air quality and the negative effect of the transport sector and human activity.

#### Literature

- Alexander, J., Divin-Cosgrove, C., Faner, M.L., O'Connell, M. (2005 July). Increasing the knowledge base of asthmatics and their families through asthma clubs along the southwest border. *Journal of American Academy of Nurse Practitioners*, 12(7).
- Bäcklund, A., Perzanowski, M., Platts-Mills, T., Sandström, T., Lundbäck, B., Rönmark, E. (2006). Asthma during the primary school ages –prevalence, remission and the impact of allergic sensitization. *Allergy*, 61(5), 549-555.
- Barraza-Villarreal, A., Sanin-Aguirre, L.H., Téllez-Rojo, M.M., Lacasaña-Navarro, M., Romieu, I. (2001). Prevalencia de asma y otras enfermedades alérgicas en niños escolares de Ciudad Juárez, Chihuahua. *Salud Pública de México*, 43(5), 433-443.
- Brown, S.A., Hanis, C.L. (1999). Culturally Competent Diabetes Education for Mexican Americans: The Starr County Study. *The Diabetes Educator*, 25(2), 226-236.
- Burke, W., Fesinmeyer, M., Reed, K., Hampson, L., Carlsten, C. Family history as a predictor of asthma risk. *American Journal of Preventive Medicine*, 24(2), 160-169
- Zhu J. 1999. Principles of microbiology and biochemistry in manure odor production. In: Treatment processes for reducing gas and odor emissions from livestock and poultry facilitiesShakopee, MN. p 51-4
- Zhu J, Jacobson LD, Nicolai RE, Schmidt DR. (Department of Biosystems and Agricultural Engineering, University of Minnesota, St. Paul, MN). 1998. Development of an odor rating system and emission/separation curves. Progress Report III.
- Zhu J, Jacobson LD, Schmidt D, Nicolai R. unpubl. Daily variations in odor and gas emissions from animal facilities.
- Buletine periodike te Instat.
- Buletine periodike te Ministrise se mjedisit
- Buletine periodike te Ministrise se Transportit.

