

## **INFLUENCE OF MOTOR VEHICLE IN POLLUTANT EMISSION IN URBAN ENVIRONMENTS**

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### **ABSTRACT**

*Together with development of the industry, there is present continuous increase of motor vehicles that contribute to the growth of the emission of pollutants. This is the main reason that during '80th of the last century, a special attentions has started to pay on pollution emissions from vehicles. It is important to note that most of the current emissions are formed directly present in urban areas and aim of this research was to determine the emission of pollutants in Prishtine area, when circulates more than 100,000 motor vehicles. Taking into consideration the daily traffic jam, and the fact that gasoline engines are responsible for most emissions of CO, while diesel engines for NO<sub>x</sub> emission, the conclusion arises that there is necessary a special dedication to the emission of pollutants and to define measures to reduce or control them.*

*Based on the performed tests and realistic assessment of the overall situation in Prishtine region, we can have a real situation on the amount of pollution in Prishtine, compared with development countries in the region we have used in our research. The results obtained, suggest us to the most important causes that increase pollutant emission from motor vehicles and offer actions to keep the same level or to reduce them.*

**Keywords:** ecology, urban environment, vehicle, etc.

### **1. INTRODUCTION**

The first link between motor vehicles and pollution of human environment in urban areas is set at 50 years of last century when researchers come to the conclusion that transport was the main culprit for the sky filled with clouds of smoke over Los Angeles, California, USA. This conclusion is supported enough fact that industrial development after World War II has increased the total number of characteristic motor vehicles. The second factor, and probably most important in establishing the connection of motor vehicles and human environmental pollution is the source of energy for driven motor vehicles, respectively fuel. With continued growth in the number of motor vehicles, amounts of fuel consummation and number of passed kilometers emitted significant pollutants which are my most important: carbon monoxide CO, non burned hydrocarbons C<sub>x</sub>H<sub>y</sub>, volatile organic compounds not metal NMVOC, nitrogen oxides NO<sub>x</sub>, particle and carbon dioxide CO<sub>2</sub>. In Prishtina the situation has changed after the last war in Kosova, except Kosovo's power plants have not the industries that will participate in environmental pollution in the Prishtina region. Recently, pollution can be defined as motor vehicles, the city's heating system and power plants in Kosova. Bypassing power plants and heating system in this paper are presented results of ecological review that defined the region of Prishtina in 2009, and the possibility of reducing pollution in urban environments.

## 2. ECOLOGICAL REVIEW IN THE PRISHTINA REGION

To determine the successful ecological review in urban environment as the region of Prishtina, have known enough relevant information to enable the acquisition of view as quality the real situation, such as the structure of the park vehicle, the amount of fuel consumption the number of passed kilometers, the average speed of movement, climatic conditions, etc.

Total number of registered motor vehicles in the Prishtina region after the war had a significant increase which can be explained by park vehicles destroyed during the war and relief during to the import of vehicles. According to data from the source [3] recently observed there stabilization of the overall increase in the number of vehicles registered in the Prishtina region that appears in Figure 1. From figure 1 is shown, for characteristic time period, average growth of approximately 13% to 21% which is much above average projected growth of motor vehicles in the world of 2.5 to 3% [1]. Certainly be noted that in the Prishtina region circulating around 125,000 vehicles, which account for 30% of the total number of vehicles registered in the Republic of Kosova.

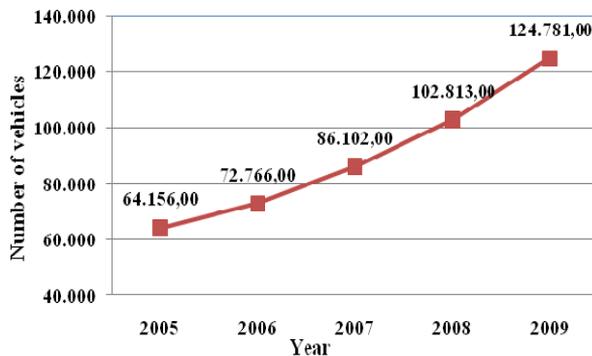


Figure 1. The total number of vehicles registered in the Prishtina region in the period 2005 - 2009

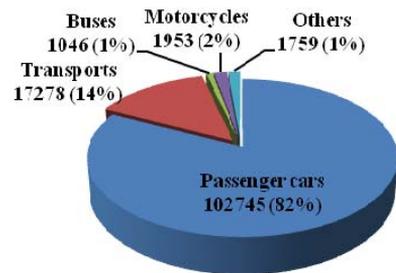


Figure 2. Participation of vehicles by categories in the Prishtina region in 2009

With further analysis of the park vehicles in the Prishtina region, while according to data [3], it is noted that the passenger cars represent the largest total number of registered motor vehicles in the Prishtina region, which seen in Figure 2. Besides the percentage participation, in Figure 2 are presented values of motor vehicles registered under the categories of vehicles. It should be noted that truck and others pose significant participation, while participation of motorcycles and buses (most belonging to the city public transport) can almost be not consider.

When talking about the park of vehicles, then also must be noted his ages seniority structure, which for the period 2007 - 2009 is shown in figure 3. According to data taken from [3], one can conclude that about 80,000 vehicles are older than 15 years, which represents more than 65 % of the total number of registered vehicles.

Analyzing the same data can be observed that the trend of buying new cars in Prishtina region is stored during the period of the review. At the same time due to actual low for the import of old vehicles coming to the growth of registered vehicles in the age structure of two to five years and that from 5 to 10 years.

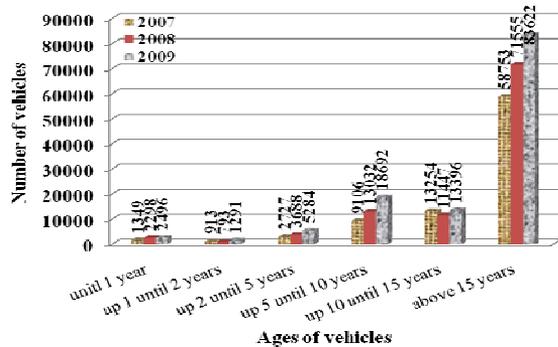


Figure 3. The age structure of the park vehicle in the Prishtina cities for period 2007 - 2009

Taking into consideration that these vehicles satisfy the regulation of European for output gases (EURO 2, EURO 3 and EURO 4 but almost) and provide the number of vehicles with engines without

technology “advanced” of fuel injection with catalyst in feature, and can conclude with right politics guidance can be realized some improvement in ecological terms, which will presented in follows of this paper.

To perform the analysis of the emission of pollutants in the Prishtina region must be known the quantities of fuel consumption for those purposes, which according to data obtained from [3] have been evaluated.

### 3. IMPROVING ENVIRONMENTAL STATEMENT

The planned reduction of pollutant emissions in OECD countries - Europe in the first prior are thinking by using new technologies which applied in modern motor vehicles. One of the important causes of current environmental statement in Prishtina region is described the ages of park vehicles. With the goal of reducing the emission of pollutants from motor vehicles in the Prishtina region have analyzed two variants of "renewal" of the park vehicles (Figure 4) and:

First version, which means the replacement of vehicles older than 15 years, with 18,000 vehicles whose engines meet standards for EURO 2, EURO 3 and EURO 4 and second version in which in addition to a first version also replaced of 10,000 vehicles on the older than 15 years with vehicles whose engines to meet standards for EURO 2, EURO 3 and EURO 4. In this way it will reduce the average age of park of vehicles in the Prishtina region juo

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which in first version will reduce in 15.45 years while in second version at 14.22 years.

With using computer program [4] are performed calculations of pollutant emission in 2009 in the Prishtina region, as well as for first and second version of the renewal par of vehicles at the Pristina region, which seen in Figure 5 for emission of CO, NO<sub>x</sub> and NMVOC.

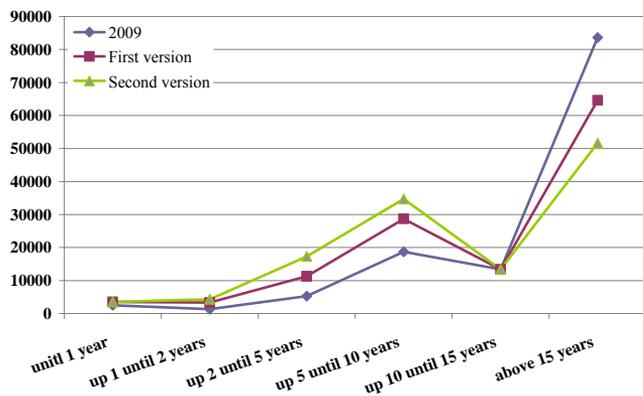


Figure 4. The possibility of renewing the park of vehicles in the Prishtina region

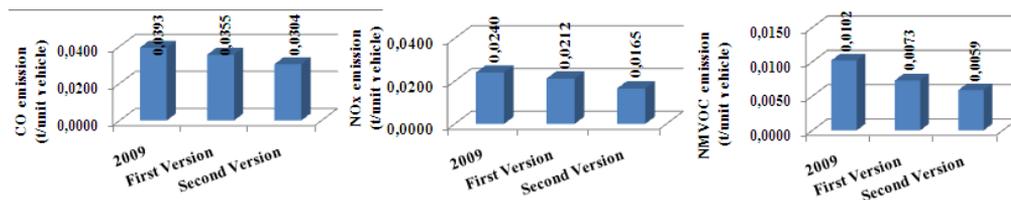


Figure 5. Characteristic emissions of pollutants obtained by "renewal" of the park of vehicles

Besides "renewal" of the park vehicles, which primarily reflected in using new technology systems of fuel injection of diesel engines but also for gasoline and gas processing output to the engine output tubes, the activities of further reduce the emission of pollutants should be directed to the use of conventional fuel with the highest quality and alternative fuel. It is certain that CNG (*Compressed Natural Gas*) today represents the most important alternative fuel which enables the realization of much smaller emission of pollutants, particularly of NO<sub>x</sub> and particles.

Given the current economic situation is certainly not "renewal" of the park of vehicles under first and second in a short time and using alternative fuels. For this issues are needed to work in more ways which will help to improve urban environmental review. These activities are:

- Regulatory measures and emission control measures,
- Improves in fuel efficiency,
- Alternative fuels for transport vehicles,
- Managing of requirements of transportation and logistics,
- Political integration and international coordination.

As an example here would be referred to the monitoring stations, which constantly need to monitor pollution in the characteristic city's points. One such station is installed in Prishtina, and the following examples are given the results of emission particles, pollutants and other components (Figure 7). This station will help global review of pollution in urban areas and regulation of transportation under the relevant directions.



Figure 7. The emission of particles in the period 1.1 - 29.3.2009

#### 4. CONCLUSION

The problem of urban pollution from motor vehicles represents one of most important problems with whom taken the contemporary world. Given the geographical position of Prishtina and set it near the Kosovo power plants, park vehicles on the average ages of 16 years, the pollution problem should be given significant attention. Analysis of pollution from motor vehicles in the Prishtina region in 2009 has shown that the current level of pollution is the pollution level of the average of OECD countries - Europe before seven years. Recognizing the above facts are analyzed "renewing" of the vehicles park is shown in this paper. Besides "renewing" of the vehicle park the measures for reduction the emission of pollutants should be directed to:

- Increasing efficiency with alternative fuels consumption,
- Use of alternative fuels for vehicles which use in public transport and for passenger cars, by providing appropriate infrastructure,
- Introduction of alternative types of transportation "more clear", primarily to transport passengers in urban areas,
- Permanent monitoring of the emission of pollutants in characteristic urban environments of countries with the goal of defining regulatory measures,
- Etc.

It is certain that only continued activities in all mentioned directions can be achieved desired results in controlling and reducing the emission of pollutants in urban environments.

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