STRATEGIES OF IMPROVING THE AIR QUALITY IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT IN TIMISOARA MUNICIPALITY

ADINA HORABLAGA, NICOLAE MARINEL HORABLAGA
"TIBISCUS" UNIVERSITY OF TIMIŞOARA, FACULTY OF ECONOMICS
1/A DALIEI STREET, TIMIŞOARA. 300558
USAMVB TIMISOARA
119 CALEA ARADULUI STREET, TIMISOARA, ROMANIA
ahorablaga@yahoo.com, hnm75@yahoo.com

Abstract:
Based on implementing the legislation regarding the air quality in Romania, it has been noticed that there are big issues in urban agglomerations, in what regards high values at some indexes of air quality due to traffic and economic activity. Therefore, it is necessary to establish some palpable measures for decreasing the values of these indicators (as for example, suspension dust, sediment dust). The work represents a study case regarding the traffic influence and economic activities on the air quality in Timisoara Municipality and strategies of improving the air quality.

Key words: *measures, air quality, sustainable development*

JEL classification: *Q56*

Through the transposition of European legislation on ambient air quality assessment and management, in the crowded city of Timisoara five automatic monitoring stations of air quality were placed. Stations were put into operation during November-December 2007.

The automatic stations are located in five representative areas to assess the effects of traffic and industrial activity in the city.

Air quality monitoring stations are classified as follows:

• Traffic Stations - located in two areas of heavy traffic, respectively, Calea Sagului and Calea Aradului. The pollutants monitored are the specific transport activity, namely SO2, NO, NO2, NOx, CO, Pb, PM10, volatile organic compounds.

• Industrial Station - located near the industrial area of south-eastern city of Timisoara, I. Street I. Bulbuca. The pollutants monitored are: SO2, NO, NO2, NOx, CO, O3, PM10, volatile organic compounds. The station is equipped with systems for measuring meteorological parameters.

• Urban background station - located in downtown, in Piata Libertatii, away from local emission sources, to highlight the exposure of population to urban pollution levels. The pollutants monitored are: SO2, NO, NO2, NOx, CO, O3, PM10, VOCs and meteorological parameters.

• Suburban background station - located in the city Caran, Sanandrei com. The pollutants monitored are: SO2, NO, NO2, NOx, CO, O3, PM10, VOCs and meteorological parameters.

In this paper data recorded in 2009 are presented, from automatic monitoring stations for air quality.

In accordance with MAPM Order no. 592/2002 on the approval of the standard setting limit values, threshold values and criteria and methods of evaluation of sulphur dioxide, particulate matter (PM10 and PM2, 5), in ambient air, the following conclusions can be drawn on air quality in Timisoara's congestion:

 sulphur dioxide - all hourly and daily values recorded were below the limit value

 PM10 particulate matter - the values recorded have frequently exceeded in the automated determination

 Particulate matter determined in the industrial area of south - east of Timisoara, had a 25.24% frequency of overflows

The particulate matter is a complex mixture of small particles and liquid droplets from natural sources (volcanic eruptions, erosion of rocks, sand storms and pollen dispersal) and anthropogenic (industrial activity, the heating system of population-tab thermal power plants. No . 1). Particle size is directly related to the potential to cause effects.

An important issue is that the particles with aerodynamic diameter less than 10 micrometers (PM10 and PM2, 5), which pass through the nose and throat and penetrate the alveoli can cause inflammation and intoxication.

People with cardiovascular diseases and respiratory diseases, children, elderly and asthmatics are mainly affected.

Table1. Sources of particulate emissions in 2009

Group	Name of the group	PM10 (µg)
01	Combustion in energy and transforming industries	33.46
02	Non-industrial combustion plants	6.17
03	Combustion in manufacturing industry	434.11
09	Treatment and waste disposal	0.02
10	Agriculture	279.94
	Total	**753.70**

In terms of recorded values from automated stations of air quality monitoring PM10 and PM 2.5, these are found in the table. 2. With these indicators study shows the exceeding of the limit values.

Table 2.

Recorded values at the stations in 2009, automated determination PM10/PM2, 5

No. crt.	Station /type	*PM10*			
		Max.daily val. µg/m3	% from VL/day*	Annual average value µg/m3	% from VL/year**
	PM10				
1.	TM-1/traffic	93,11	186,22	32,05	64,10
2.	TM-3/suburban	118,64	237,28	29,52	59,04
3.	TM-4/industrial	114,21	228,42	31,66	63,32
4.	TM-5/traffic	115,43	230,86	33,24	66,48
	PM2, 5				
5.	TM-2/urban	103,33	206,66	24,09	-

* VL / day = daily limit value for human health protection, 50 µg/m3

** VL / year = annual limit value for human health protection, 40 µg/m3

Note: TM1-station there were 25 exceedances of the daily VL
TM3-station there were 25 exceedances of the daily VL
TM4-station there were 56 exceedances of the daily VL

TM5-station there were 41 exceedances of the daily VL

In parallel with automatic determination of particulate matter PM10/PM2,5, gravimetric determinations were made according to international standards SR EN 12341/2002 (PM10) and SR EN 14907:2005 (for PM2, 5).

In Table. 3 are shown the values recorded in 2009 from dust, gravimetric determinations.

Tab.no.3

PM10/PM2.5 values recorded in 2009, gravimetric determinations

No. crt.	**Station /type**	***PM10***			
		Max.daily val. µg/m^3	**% from VL/day***	**Annual average value µg/m^3**	**% from VL/year****
	PM10				
1.	TM-1/traffic	110,87	221,74	46,02	115,05
2.	TM-3/suburban	69,94	139,88	28,14	70,35
3.	TM-5/traffic	171,72	343,44	46,69	116,73
	PM2, 5				
4.	TM-2/urban	132,62	-	23,5	-

* VL / day = daily limit value for the protection of human health, 50 µg /m3

** VL / year = annual limit value for human health protection, 40 µg/m3

Note: TM1-station there were 94 exceedances of the daily VL

TM3-station there were 19 exceedances of the daily VL

TM5-station there were 110 exceedances of the daily VL

In Table 4 the number validated values at air quality monitoring stations in 2009 is presented in summary

Tab. no. 4 Results PM10 in 2009 at the air quality monitoring stations

Station	**Station type**	**Polluting type**	**Number validated measurements**	**Concentration**			**Frequency VL% exceeded**
				Daily max.	**Annual average**	**UM**	
TM-1	Traffic	PM10 gravimetric	248	110,87	**46,02**	µg/m3	**37,9**
TM-3	Suburban Fund	PM10 gravimetric	261	69,94	**28,18**	µg/m3	**7,2**
TM-5	Traffic	PM10 gravimetric	311	171,72	**46,72**	µg/m3	**35,3**

In conclusion, the main problem in the city of Timisoara is frequent overstepping limits for particulates. In this context, the main objectives and measures for reducing emissions of pollutants and thus improving air quality are:

- Modernization
- Traffic management (flow of traffic through the city)

• Integrated transport (including achievement of an attractive public transport leading to a reduction in the use of the own means of transport).

• Install vapour recovery systems at oil deposits and fuel distribution stations.

• Implementing an integrated system for monitoring, evaluating and managing air quality in the City needed for:

- concrete foundation and accurate environmental policies and local strategies, identifying and assessing clear objectives and the best ways and means of action, based on reliable data and quantitative information on air quality levels and development;

-enabling the correct application of the principle of "polluter pays"

-creation of appropriate infrastructure acquisition tasks and responsibilities arising from the transposition and implementation of EU air quality Directives into national legislation (ongoing process);

-development of National Environmental Quality Monitoring;

-realization of the requirements of the Aarhus Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters;

-alert the public in cases of accidental pollution, implementing immediate intervention measures to reduce emissions;

-improving institutional and administrative capacity of local authorities in air quality management;

- increasing the intervention capacity of the local authorities to protect people and the environment, including in the case of special situations;

-monitoring the effectiveness of measures to reduce emissions.

• Developing and implementing public awareness programs (including the leaderships polluting units), in conjunction with air pollution problems to attract support for the programs in the improvement of air quality.

• Initiate community programs for collecting and processing data and information to quantify the relationship air pollution - effects on human health in the natural and built environment.

• Establishing partnerships between local communities (local government, environment, public health, etc.) and non-governmental organizations, private sector, academic, financial environment in order to identify and implement concrete actions to address air pollution problems.

In areas and agglomerations where the air quality assessment results show that the concentrations in ambient air for one or more pollutants exceed the limit and / or target values,the territorial government initiates the development of environmental management program and respectively, for the integrated management of air quality where air pollution is due to several pollutants.

The air quality management are all measures / actions that carry a maximum of five years, the zones and agglomerations where one or more of pollutants are found exceeding the limit values and / or target values in order to decrease below this level.

Among the measures included in the program, aimed at limiting emissions from road traffic are:

• Restriction of heavy traffic in the City.

• Extend bike trails

• Traffic flow by creating unique ways

• Restricting access of heavy vehicles

• Restriction of speed

• Traffic management and video surveillance (integrated management, monitoring and traffic control)

• Increasing the use of public transport by extending public passenger transport networks

• Expansion and street design

• Ensuring gutters wash, a landscaped parking along public thoroughfares and road spray, according to a predetermined schedule and sent sanitation operator

• Controlling building sites and urban household works in the application of sanctions

• Organising joint RAR - Police - Environmental Protection Agency to identify vehicles with emissions exceeding the maximum limits and retention of registration certificates up to troubleshooting. Checkpoints will be proposed by the Environmental Protection Agency in areas where there were exceeding of the maximum allowed for the gases emitted by motor vehicles

• Planting trees and expanding the green areas, upgrading of parks

Air quality management plan is developed by the Environmental Protection Agency in cooperation with responsible institutions in charge of environmental protection. This includes the costs necessary for the implementation of measures that are found in this plan.

If there are exceedings in the limit values or target values for other pollutants, the air quality management program will be reviewed.

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