THE IMPLEMENTATION OF THE EUROPEAN UNION DIRECTIVES REGARDING THE AIR QUALITY AT A NATIONAL LEVEL AND ALSO IN SUCEAVA COUNTY

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Abstract

The paper wants to make a general presentation about the history of European Union actions and legislation regarding the air protection and also the national legislations transposed from this field. As case study it is presented the air quality monitoring network and also the dynamic of air quality in Suceava County. The respective evaluation has been elaborated through the data processing gathered from the systematic measurements taken by the laboratory of the Agency for Environment Protection Suceava, for a series of gas insults and powders as: sulphur dioxide, nitric oxide, tropospheric ozone, alkyl hydrosulphide and PM 10 powders.
Keywords: *limit value(VL), target value (VT), tolerance margin (MT), alert threshold (PA), upper assessment threshold (PSE), information threshold (PI), lower assessment threshold (PIE)*

Introduction

On a short and medium term, the atmosphere pollution has negative effects that will endanger the human comfort and health, and will affect the biologic resources and ecosystems and will cause economic damages.

On a long term, the atmosphere pollution produces some effects on a regional and global scale, as the greenhouse effect and significant climatic changes, the destruction of ozone layer from the stratosphere and acid rains.

1. History of European Union actions and legislation in the field of air quality protection

In 1972 took place the Conference of the state chiefs and member governments of EU, where it had been instituted a common policy in the field of environment protection.

Since 1987, the European Community (EC), by the ratification of the Single European Act, disposes of a legal base for the environment protection.

The principles formulated in this act are:

- the principle "polluter pays" (PP), which has two interpretations: " the polluter pays the measures taken for satisfying the standards" or "the polluter pays the damages caused to the environment";
- "the prevention principle", is in fact the prevention of pollution by minimizing it at the source;
- the principle "of high level of protection" means that all the Community states have the obligation to use the most scientific methods of environment protection, taking into account the ecological conditions, the cost-benefit analysis of the economical and social growth of the Community;
- "the subsidiary principle" – the subsidiary being an instrument for defining the optimal level of action at a national and European level, meaning that the member states will have the liberty to introduce more strict ecological standards or which are resembling with those from the EU level;
- "the integration" consists in the obligation of member states to report to the Community over the impact of different sectors and policies on the environment.

The Sixth Environment Action Programme of the European Union. represents an important source in which regards the planning of general environmental actions and especially the air protection.

The First and Second Environment Action Programme had been based on the limits of the level of gas emissions in the atmosphere. This approach could not insure the realization of quality objectives because of the wide spreading of toxic substances (as sulphur dioxide, nitric oxides, etc)

The Third Environment Action Programme reflects the passing to a more focused approach on the imissions towards emissions. The plan has proposed a formulation of the value limits of the emissions especially in what regards the stationary sources, but also the mobile one.

The Forth Environment Action Programme proposes the integrated approach of the environment protection. For the first time, the environment protection isn't an additional activity, but an integrated one in the production process. It is proposed the reduction of quantities of raw materials and energy in the economy (inputs) and the minimization of emissions (outputs). It is also proposed the possibility of action in the photochemical pollution and especially of air pollution with ozone.

The Fifth Environment Action Programme tries to promote structural changes in economy towards a "durable development". This programme is based more on the indirect and procedural instruments: the public participation to taking decisions, the introducing of ecological taxes, the

public information regarding the environment quality, the establishing of some qualitative norms of environment and of the afferent instruments necessary to implementing them, the establishing of some long term objectives for the air quality, the use of regenerative energy sources.

The Sixth Environment Action Programme, having the call "Our future, our choice", the programme proposes the approach of some priority action fields for atmosphere protection: the study of some climatic changes, in order to establish the greenhouse gas concentrations at a level that shouldn't cause abnormal variations to the Terra climate; environment and health, the elimination of those pollutants, generated by the human activity, that represent a risk for the population health and also the improvement of the existent environmental legislation.

In what concerns the legislative activity of the European Community, have been emitted some *Frame Directives* for the insurance of air protection. The frame directives are the basis of directives that establish the standards: the limit values of the dangerous substances emissions, of the air quality, the prohibition or the limitation of using certain toxic substances or safety standards regarding the risky industries. The directives had been transformed in regulations at a national level for the member states, because the legislative tradition of these states is different. There are also some regulations of EU which are directly applicable in the member states (for example the gradual elimination of the substances that damage the ozone layer). In this context, Romania had dimensioned the environment policies and strategies in order to follow the rhythm of the European countries in this field. The UE Directives and the Romanian legislation transposed regarding the air quality management are mentioned below:

The European Union Directives regarding air quality are:

- the Council Directive no.96/62/EC regarding the air quality monitoring and management and the related Directives
- the Council Directive no. 1999/30/EC regarding the limit values for sulphur dioxide, nitrogen dioxide and nitric oxide, suspension particles and lead in the atmospheric air
- the Council Directive no. 2000/69/CE regarding the limit values for benzene and carbon monoxide in the surrounding air,
- the Council Directive no. 2002/3/EC regarding the air pollution with ozone) and Directive 2004/107/EC – limit values for As, Cd, Hg, Ni, PAH from the air.

2. The obligations of the member states for transposing the European Union Directives regarding the air quality

The obligations of the member states regarding the air quality:

- the preliminary evaluation of the air quality in the regions and the projection of local and regional networks for monitoring the air quality;
- the identification of all air polluting sources;
- the transposition into the national legislation of the normative regarding: the limit values, the alert threshold, the target values, the evaluation points ;
- the creation of the Air Quality National Integrated Management and Evaluation System by giving the local and regional environment protection authorities some monitoring equipments of the air quality and some laboratory equipments;
- the integrated evaluation of the air quality; the public information about the important values; some short-term actions when the limit values are exceeded: making some action plans on long terms in order to frame the limit values.

The main objectives of the strategy concerning the atmosphere protection are:

- the evaluation of the air quality in the areas situated in the limits foreseen by the existing norms for the quality indicators;
- the improvement of the air quality in the areas that aren't situated in the limits foreseen by the existing norms for the quality indicators; adopting necessary measures for limiting until the elimination of the negative effects over the environment, even in the trans border context; fulfilling the assumed obligations by the agreements and international treaties and participating to the international cooperation in the field.

The transposition by Romania of the European Union Directives regarding air quality is given below:

- OUG no. 243/2000 regarding the atmosphere protection, modified and approved by Law no.655/2001, Gov. Decision no. 586/2004 regarding the establishment and organization of the Air Quality National Integrated Management and Evaluation System;
- Gov. Decision no.543/2004 regarding the elaboration and application of the air quality management plans and programmes in order to reach the limit values or the target values in a certain period of time.
- Gov. Decision no.731/2004 regarding the approval of the National Strategy for Atmosphere Protection;

- Gov. Decision no. 738/2004 regarding the approval of the National Action Plan for the Atmosphere Protection, the Water and Environment Protection Ministry's Order no. 745/2002 regarding the establishment of agglomerations and the classification of agglomerations and also the areas for air quality evaluation in Romania, the Water and Environment Protection Ministry's Order no. 592/2002 for approving the Normative regarding the establishing of limit values, of threshold values and the criteria and evaluation methods of sulphur dioxide, nitrogen dioxide, nitric oxide, suspension powders (PM_{10}, $PM_{2,5}$), the lead, benzene, carbon monoxide and the ozone from the air.

The terms used in the EU Directives regarding the air quality that had been transposed also in the national legislation are the following: limit value(VL), target value (VT), tolerance margin (MT), alert threshold (PA), upper assessment threshold (PSE), information threshold (PI), lower assessment threshold (PIE), pregnant substances of ozone.

3. The organization of the air quality monitoring network from Suceava County

a. In the period 1993-2007, the monitoring network had had the following components (fig. 1):

- 1 urban background station – APM Head Office, placed on the exit from the Suceava City towards Falticeni City, far from local emission sources composed of: 1 station of automatic ozone measuring, 1 station of automatic NOx measuring and 1 measuring station of PM10 and Pb from PM10; 1 urban background station – the Centre of Suceava City, composed from : 1 station for monitoring NO_2, SO_2, CH_3-SH and NH_3 for sampling and spectrophotometric analysis; 1 industrial station Cuza Voda, placed in the Burdujeni neighbourhood, at approx. 1 km from the industrial area of Suceava Valley, composed from: station for monitoring NO_2, SO_2, CH_3-SH and NH_3 for sampling and spectrophotometric analysis;
- 1 mobile automatic station with meteorological station (wind speed and direction, the intensity of incident radiation, the relative humidity, air temperature) and automatic analyzers for powders (PM10 and PM 2,5), NOx, O_3, CO, TDC, SO_2.

b. The completion of the air quality monitoring network starting with 2007, according to the Order 592/2002 and European Union Directives.

For transposing the European Union Directives the air quality monitoring network had been modernized and extended this way:

- 1 fixed automatic urban station – Mihai Eminescu High School, placed in the central area of the city, orientated towards the human health protection, for monitoring, O_3, NO_2, NOx, COV, SO_2, CO, PM10, Pb;

- 1 fixed automatic industrial station, Cuza Vodă, placed at approx. 1 km from the industrial area of Suceava Valley, composed from: station for monitoring NO_2, SO_2, CH_3-SH and NH_3;

- 1 regional station, Poiana Stampei, placed in the rural area, at an altitude of 1000 m, at great distance of polluting sources for monitoring the same gases.

All 3 automatic stations are foreseen with meteorological stations for the automatic registration of climatic parameters.

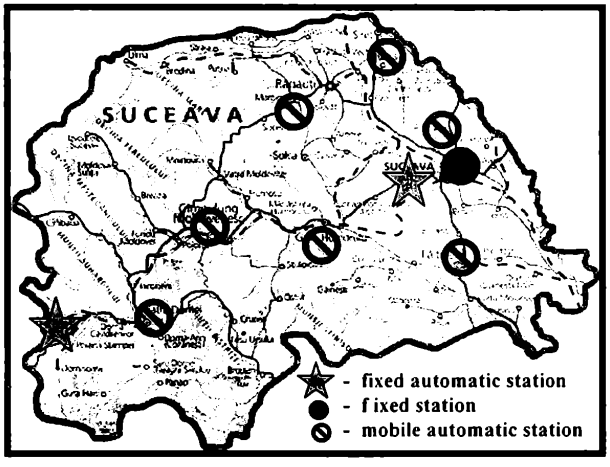


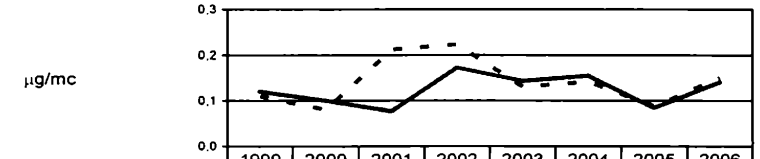
Fig. 1: The organization of the air quality monitoring network from Suceava County

4. The dynamic of air quality in Suceava County

In the paper are presented the conclusions regarding the air quality dynamic in Suceava City by the information processing gathered from continuous measurements from inside the local monitoring network in the period 1999/2006. The evaluation of results had been done accordingly to the above-mentioned European Union norms, which had been transposed in the national legislation.

For the SO_2 indicator – from the data analysis it can be observed that in the 2 stations (Cuza Voda and Suceava – centre) this indicator is a lot

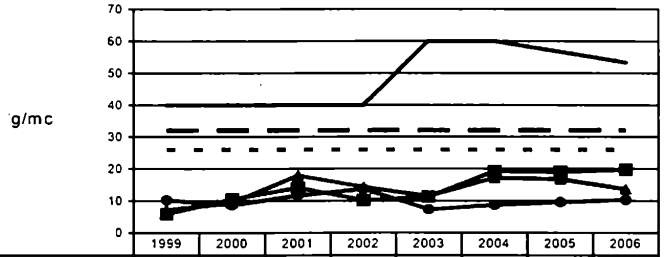
below the daily limit for the protection of human health (125 mg/mc) and also below PIE of air quality for the protection of human health (50 μg/mc) according to the Order 592/2002. The average annual values in this 2 control points are between 0,08 -0,22 μg/mc in this period, the maximum values don't exceed 9,4 μg/mc in the analyzed period towards the 60 mg/mc maximum admitted concentration (figure 2).



	1999	2000	2001	2002	2003	2004	2005	2006
Cuza Vodă	0,12	0,10	0,08	0,17	0,14	0,16	0,084	0,14
Suceava centru	0,11	0,08	0,21	0,22	0,13	0,14	0,088	0,15

Fig. 2: The evolution of average annual concentrations at the SO_2 indicator in Suceava city in the period 1999-2006

For the **nitrogen dioxide**, the average annual concentrations registered in 2006 (figure 3) in comparison with the annual limit value for the protection of human health of 26 μg/mc and the lower assessment threshold of 40 μg/mc – established by the Order 592/2002, are under these limits, in this way: the annual average values in the 3 control points are between 11.71-19.73 mg/mc in this period.



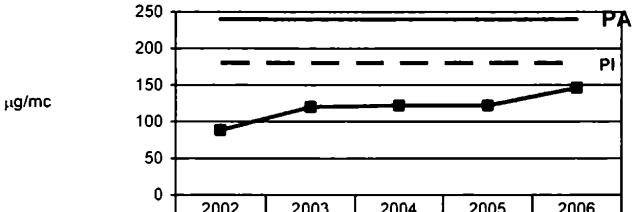
	1999	2000	2001	2002	2003	2004	2005	2006
CMA/VLA	40	40	40	40	60	60	56,66	53,33
PSE	32	32	32	32	32	32	32	32
PIE	26	26	26	26	26	26	26	26
Cuza Vodă	10,25	8,68	11,71	13,69	7,33	8,73	9,63	10,31
Suceava centru	7,12	9,34	17,84	14,27	11,47	17,12	16,76	13,64
Sediu APM	5,90	10,46	14,05	10,20	11,25	19,26	19,07	19,73

Fig. 3: The evolution average annual concentrations at the NO_2 indicator in Suceava city in the period 1999-2006

The maximum daily values registered don't exceed 75,94 μg/mc in the analyzed period, towards the 100 μg/mc maximum admitted concentration.

The indicator **powders PM 10**, in the realized period, the limit value plus the annual tolerance margin (VL+MT) has been exceeded only for 2006. We must notice the fact that the available annual VL from 2007 (4. μg/mc) has been exceeded in all the monitored years. It is observed an ascending evolution of the annual average concentrations of PM 10 powders in the analyzed period and also the exceeding of the daily frequency VL+MT.

The analysis the results from the monitoring of the **tropospheric ozone** in the period april 2002 – december 2006, indicates (figure 4) that none of the timed average concentrations hadn't registered the informing or alert threshold, the maximum timed concentrations registered annually in this period being represented in the graphic from below, in comparison with PI and PA.

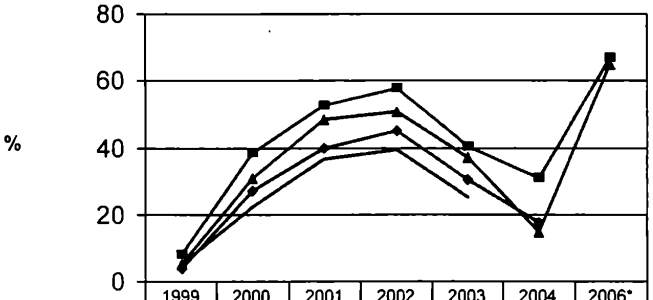


	2002	2003	2004	2005	2006
PA	240	240	240	240	240
PI	180	180	180	180	180
Val. Maximă orară O3	88	120	122	122	146

Fig.4: Maximum timed concentrations of O3 measured in Suceava city in the period april 2002-december 2006

For the alkyl **CH_3-SH** indicator is observed a significant growth of the average concentration in the period from the 2006 when has operated the wood cellulose processing installation of the paper and cellulose factory from the city, in comparison with the anterior period in 2004. From figure 5 it is observed a similar evolution regarding the frequency of VL exceeding (of 0,00001 mg/mc) for the alkyl hydrosulphide indicator. In this way, we can observe a growth of the daily frequency VL exceeding starting from

2000 until 2002, in all the monitoring points with their reduction in 2003-2005 and in the period September-December 2006, there had been registered the highest levels of the VL frequency exceeding from all the analyzed period. The very high annual maximum concentrations registered in the last years were due to some damages of some technological installations at SC AMBRO SA that had lead to some uncontrolled emissions of residual gases with high concentrations of alkyl hydrosulphide in the air, often favoured by the climatic conditions.



	1999	2000	2001	2002	2003	2004	2006*
Cuza Vodă	7,9	38,4	52,6	57,7	40,1	30,7	66,67
Suceava centru	5.1	30,9	48,4	50,8	36,9	14,8	65,06
Itcani	3,9	26,9	39,6	44,9	30,1	17,6	
Sediu APM	5,2	22,2	36,4	39,4	25,2		

Fig.5: The evolution of frequency daily CMA exceeding for alkyl hydrosulphide in the period 1999/2006

Conclusions regarding air quality in Suceava city

The information resulted from the air quality monitoring in Suceava County indicates Suceava City as a critical area under the aspect of air pollution with alkyl hydrosulphide and suspension powders of PM10. Taking into consideration the concentration of industrial emission sources, the road traffic, including the national and European one, that transits Suceava city, the deficiency of green spaces, we can generally consider Suceava City as a critical area under the aspect of PM 10 powders pollution.

References

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*** The Annuals reports EPA Suceava