



**Biological observation**

**KEEPING THE ATMOSPHERE FROM POLLUTION – ONE OF THE BASIC PROBLEMS OF ENGINEER ECOLOGY**

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**SYNOPSIS**

**Key words:**  
pollution,  
atmosphere.

Engineer ecology researches the structure and functioning of territorial natural and industrial systems at local and regional level. On this basis, the authors analyze the current situation of air pollutants and to prognosticate the air pollutants until 2010.

Until man appeared on Earth, harmony ruled the nature and the processes and phenomena regulated each other. Nature followed the laws of its development, it regulates the links among its components, i.e. ecological harmony reigns (Stoyanov, 2009). But when the human appeared and especially from the moment when he learns how to make tools and to use them, in his impetuous development by means of his hands and brain, he changes the environment to serve his existence purposes (Stoyanov et al., 2008). In his pursuit and ambition of a wealthier and calmer life, the human starts to destroy his own environment, destroying the ecological equilibrium. In fact, we call this rough interference anthropogenic pollution and it is as a result of the human modifying activities in the nature and the natural processes. The anthropogenic pollution is a combination of factors, subject to the life and activities of the people or of a single human being which directly or indirectly influence the components of the natural environment. These factors can be: demographic collapse, urbanization, imperfect technologies, inadequate utilization of the natural resources, chemicalization of the agriculture, exploitation of the biological resources, etc (Mardirossian, 2003).

Today, thanks to the human activities and the poor ecological awareness of the global society we can't speak about ecological harmony anymore but all we can say is the fatal effects from the global ecological pollution in the nature and about the irreversible changes in the ecosystems (Getzov, 2000).

Ecology (from Greek "oikos" – habitat, home and "logos" – science) is a scientific study about the relations between the living organisms and the environment, having in mind all the existence conditions, often including the organic and inorganic nature (Getzov & Mardirossian, 1999).

Some of the major tasks of ecology are:

- Research of the regularities for the organization of life, including the anthropogenic influence on the natural systems and the biosphere;
- Creation of scientific basis for a reasonable exploitation of the biological resources, prognosis of the nature under the human influence and management of the processes in the biosphere, as well as preserving the environment, inhabited by the humans.

Engineer ecology is a scientific subject which studies the structure and functioning of the territorial units – natural-industrial systems on a local and regional level. Engineer ecology is based on the knowledge about the production technologies. Some of the most important aspects are the estimation and decreasing of the industrial influence on the environment.

The basic tasks of engineer ecology are:

- Optimization of the technological, engineer and draft constructional solutions for minimum pollution of the environment and the protection of the human health, flora and fauna, etc.
- Timely finding and correction of the specific technological processes which have a negative effect on the environment, threaten the human health or influence in a negative way the natural and anthropogenic systems.

Consequently, the human race faces a serious problem – to guarantee healthy living environment for the current and future generations. The solving of this problem is a priority of the civilization, a matter of optimal scientific development, of knowledge and human relationships. It's not a one-way road to development and to become a successful one, it is necessary to perfect the relationship between society and nature, to optimize the management and improvement of the environment and by doing this, to achieve harmony with nature.

Bulgaria is known by a lot of emissions of air polluters. Sulphur oxides are three times higher than the average for the EU countries per capita and they are two times higher than the average in Poland and Hungary. Nitric oxides emissions are almost the same and the emissions of carbon dioxide are a little lower.

As a result of the economic crisis after 1990, the emissions of key polluters in the country decreased – by 32% for the sulphur oxides, by 20% for the nitric and methane and by 18% for the carbon dioxide. The decrease is less with the carbon

oxide and the volatile organic compounds, and the industrial emissions of these polluter have a considerable decrease but this is not the case with the other major source – land transportation.

The average yearly concentrations of suspended particles and of sulphur dioxide is still a problem in the big cities and it exceeds the maximum permissible concentrations.

The basic sector influences over the air in Bulgaria are:

Production of energy – 80% of the sulphur oxides are emitted by the power stations which burn low-quality lignite and brown Bulgarian coal which contain a big quantity of sulphur. At the moment, the power production is the biggest source of sulphur dioxide – 81% of the total quantity. The heating and electric power stations from 100 to 300 MW emit 477,546 thousands t, which is 49% of the total quantity for the country. The industrial emissions (burning processes) have increased more than two times and from 5% from the previous year, they became 12% from the total emitted quantity for the country.

The policy of the government during the last few years ensured a considerable decrease of air pollution emissions. The development of the country was put on a totally market principle, without preferences or limitations. All subsidies for fuel and energy were eliminated and the energetics, the energy efficiency and the renewable energy resources developed on the basis of economic efficiency.

There is a possibility to choose the future development of the country – to keep the current policy, to continue following the above mentioned principles and a certain plan. The estimation of the prognosis concerning the emissions of the air polluters is presented as a “basic scenario”. This is a scenario with “taking measures”. With the admissions to this prognosis, there are no additional policies and measures to the already accepted government policy. The prognosis concerning the emissions of the air polluters for the period until 2020 is based on the hypothesis that the enforcement of the certain plan for action concerning the climate changes will continue at a level of already taken measures.

The prognosis of the emissions of polluters is based on the prognoses for development of the following indicators in the country:

- Demographic prognoses;
- Macroeconomic prognosis – total and divided into sectors and subsectors, sources of emissions;
- Changes in the energy consumption into sectors, resulting from a better energy efficiency and production technologies;
- Changes in the energy consumption by the people, resulting from the incomes and energy effective houses and electrical appliances.

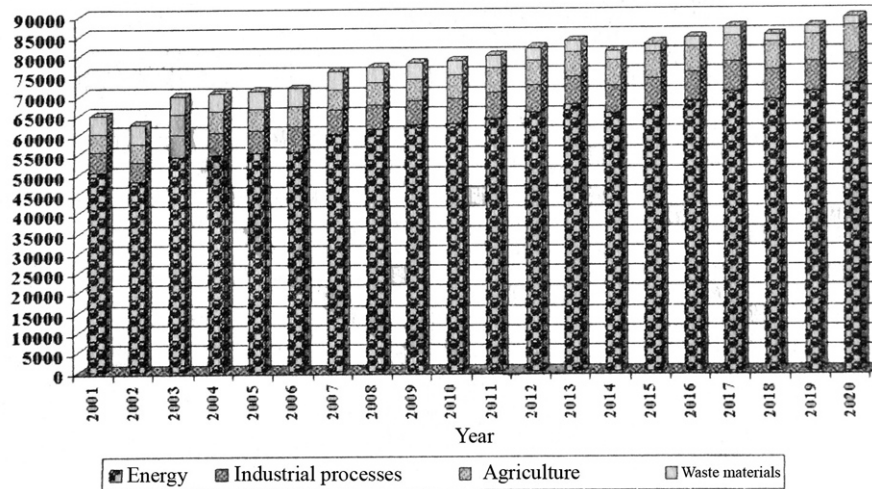


Figure 1: Prognosis for the total emissions.

Fig 2. presents the objective of Kyoto, together with the results for the period 1988-2002 and the prognosis emissions until 2020. It can be seen that the prognosticated emissions are much lower than the permissible ranges according to the Kyoto Protocol. It is enough that the market principles are observed and the country will carry out the Protocol requirements.

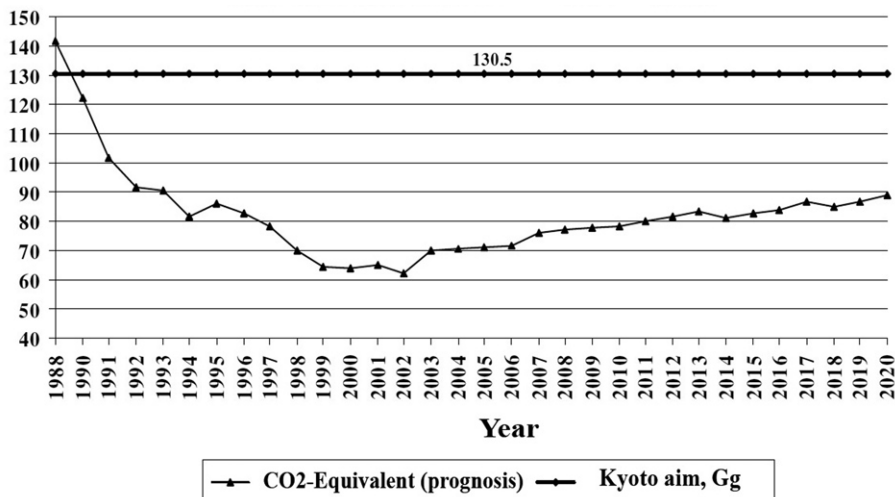


Figure 2: Prognosis for the emissions of air pollutants until 2020.

It can be concluded that although the country has emissions lower than the permissible, it has a potential for additional decrease of the emissions of air pollutants. This potential can be fulfilled in case of purposive policy of decreasing of the emissions which means of accelerated implementation of additional policies and measures. The choice of political decisions will allow avoiding the predicted increase

of the emissions of air pollutants. Meanwhile, a bigger part of the policies are already implemented in the member countries of the European Union and they are an irreversible part of the future fiscal policy of the country.

Recently, the research at an international level showed a considerable progress. This is why Bulgaria should also take measures and finance new research. The Ministry of Education and Science as well as the Bulgarian Academy of Sciences should pay special attention and to provide money for further research in this field.

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