Legal Aspects of Protection against Air Pollution in Poland

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Abstract

Air pollution is a major cause of global threats to the environment and the population. It causes numerous diseases, especially respiratory and cardiovascular, contributing to premature mortality and tumors, among other. European provisions in the area of air protection include solutions for the elimination of various types of pollution from stationary, industrial and mobile sources. They provide an extensive legal system which is adapted to the differences in the generation of pollutants, the extent of their toxicity, the impact range, persistence in the environment, and bioaccumulation. Poland has adapted its legislation to the EU framework in this regard. In the article, we have presented the applicable legislation protecting against air pollution and its practical implementation by the Polish authorities. The performed analysis showed that the current, binding legislation is not fully able to protect the environment from the harmful effects of pollution.

Key words:

air pollution, legal aspects, healthcare, air pollution monitoring

Introduction

Air pollution is a major cause of global threats to the environment and the population [1]. This is the greatest public health problem, not only in Poland, but also in Europe and in the world. Poland, alongside Bulgaria, is one of the countries where air pollution is highest in the European Union [2]. Organization for Economic Cooperation and Development (OECD) warned recently that by 2050 air pollution in the cities will be a major environmental cause of death worldwide, surpassing the cause of death through inadequate quality of drinking water and lack of sanitation [3]. WHO report REVIHAAP of 2013 provides an overview of research proving the correlation between air pollution and the incidence ratio [4].

In Poland, air pollution contributes to about 45 000 premature deaths per year, and 97% of Poles is breathing air recognized by the World Health Organization (WHO) as harmful to health [2,5]. In addition, six of the ten most polluted cities in Europe are located in Poland [2]. The problems of pollution and the deterioration of health are upward trends. In Poland, the number of the prematurely-dead due to air pollution has already reached 51 000 [2].

Air Pollution Origins

Air pollution occurs when gases, liquids and solids occur in the composition of air that are not its natural components, or are present in concentrations not corresponding to the natural composition of Earth's atmosphere [6]. They are also the most dangerous kind of contamination, since it is impossible to reduce their operation to a specific area. The International Labor Organization defines it as air contaminated by all substances that are harmful to health or otherwise dangerous, regardless of their physical form [7].

Currently, most of air pollution, more than a half, is produced by fuel and energy, metallurgical and chemical industries [8]. Substantial amounts of air pollutants are produced by the combustion of fossil fuels (coal, lignite, petroleum, natural gas, etc.) [9]. Transportation, mainly the wheeled vehicles, also has a considerable share in air pollution. Coupled with the emitted car exhaust, it comprises a third of the total carbon dioxide emissions into the atmosphere. Furthermore, vehicle exhaust include, among other, nitrogen oxides, sulfur compounds and lead compounds. Refineries and petrochemical plants emit by-products of oil refining into the air. [10]. The mining industry, on the other hand, involves the emissions of methane, a gas which is the main component of natural gas. Moreover, air is adversely affected by the storage and disposal of sewage and waste. Decomposition of organic substances through microorganisms leads to emissions of methane (one of the greenhouse gases) and fragrant gases, which are a burden to the environment [11]. Households are another significant source of air pollution. They emit gases into the atmosphere caused by the combustion of coal used for heating of residential buildings [12].

Excessive air pollution is currently stretched over more than 20% of the Polish territory, mainly in the area of industrial districts and large urban centers. Air pollution, however, can also come from countries neighboring with Poland. Poor air quality in Poland is caused mainly by emissions from the municipal and the road transport sectors. The result is a spin-off of huge amounts of exhaust gases into the atmosphere, which include carbon oxides (CO, CO_2), sulfur oxides (SO_2, SO_3), nitrogen oxides (NOx) along with dust, ashes and soot. Airborne particulates PM10 and PM 2.5 are particularly dangerous to human health. They comprise sulfur, mercury, nitrogen compounds, lead and other heavy metals [10,13,14].

Legal Bases of Air Protection in Poland

The main piece of legislation governing the air quality in Poland is the Act of 27 April 2001 – the Environment Protection Act [15]. Solutions in this area adopted and applicable in the European Union have the greatest influence on the shaping of legislation on air protection. The source of the obligation to adapt Polish law with the Community law is the Europe Agreement of 16 December 1991 [16], which came into force on 1 February 1994. Under articles 68 and 69, Poland has undertaken to harmonize its

laws, including the ecological ones, with Community law. Adjustment of Polish law to EU law was of a unilateral commitment, and its execution was set for a period of 10 years from the moment of the Association Agreement coming into force. Legislation adopted after 1989 was adapted to Community law in a greater or lesser extent.

European legislation on air protection includes solutions for the elimination of various types of pollution from stationary, industrial and mobile sources. They provide an extensive legal system which is adapted to the differences in the generation of pollutants, the extent of their toxicity, the impact range, holding time in the environment, and bioaccumulation. [17] The EU model of air protection is based on the following principles of conduct:

- determining national annual emission limits (ceilings) for certain types of pollution;
- being responsible for the introduction of measures to ensure the maintenance of a designated ceiling lies with national authorities;
- determining the minimum standards of air quality and the obligation to take remedial action when these standards are exceeded;
- determining acceptable emission limits for individual installations and industrial processes, as well as the duty of monitoring selected pollutants at the source of emissions;
- introducing emission limit standards for mobile sources and fuel quality standards;
- seeking to harmonize methods of measuring the concentration of pollutants and air quality monitoring strategies of the Member States;
- the public and all interested parties should have access to information on air quality.

The main legislation is the 2008/50/EC directive on air quality [18]. Its provisions are designed to limit air pollution to levels which minimize harmful effects on human health or the environment. It sets out, among other, the concentration limits for major air pollutants (sulfur dioxide, nitrogen dioxide, nitrogen oxides, airborne particulates PM10 and PM2.5, lead, benzene, carbon monoxide and ozone), which cannot be exceeded within EU. Member States are obliged to designate zones and agglomerations for air quality assessment and management, monitoring long-term trends and allowing this information for public view. In places where air quality is good – such a state should be maintained; in areas where the limit is exceeded – appropriate action must be undertaken. Provisions of a binding nature are complemented by thematic strategies and other measures to address the environmental objectives in the transport and energy sectors.

Past efforts to improve the situation have been insufficient. Long-term violation of air quality standards in our country led to the European Commission initiating proceedings against Poland for the infringement of the 2008/50/EC directive in December 2015 [19]. This procedure is in progress, with a possible result in the imposition of high fines by the European Court of Justice.

The scale of neglect in these activities has been confirmed by the Supreme Audit Office [20], which indicated that surveyed cities conducted corrective actions in a limited manner for the protection of air. Their scale and pace were insufficient in view of persistent poor air quality. The same cities have been dominated by investments in transport and public transportation, and actions associated with warming of the buildings, i.e. those which have only an indirect impact on reducing emissions and concentrations of harmful substances in the air. Some cities even misinvested, e.g. Nowy Sacz, where the primary concern for the purity of air in winter is the burning of coal at homes, financed only the installation of 82 solar collectors, instead of implementing a program for the elimination of low emissions. The tasks set out in programs to protect air should be controlled by the Inspectorate for Environmental Protection. However, the regional inspectorates for environmental protection have carried out such an inspection only once.

An important step on the way to improving air quality in Poland may be the amendment to the Environmental Protection Law of September 2015, commonly referred to as the Antismog Law. It introduced additional regulations aimed at reducing emissions. On its basis and by resolution, the local authorities may determine which fuel and what types of boilers can be used in a given area. Earlier rules in this case were not precise enough, which prevented their practical application.

So far, new permissions have been used only in the Lesser Poland province. The so-called Smog Act, adopted in January 2016, provides that from 1 January 2019 Krakow will introduce a complete ban on the use of solid fuels [21]. The allowed fuels will only be gas, light fuel oil, heat system, electricity and renewable energy sources. The resolution gives a three-year adjustment period in conjunction with the funding of heat sources and mechanism for equalizing the difference in costs of their use. The Antismog Act is a necessary step, but not enough to improve air quality in Polish cities. It gives local governments the ability to determine fuel quality standards and technical parameters of the boilers, but does not force to take appropriate action, which would be a much more effective solution. In addition, for the new rules to bring expected results, it is necessary to increase the efficiency of control measures and increase awareness among the residents and local authorities of the existing causes of air pollution and associated risks.

Considering the fact that air quality in Poland still differs from the required standards, there is a need to take additional efforts to eliminate sources of pollution, primarily including low emissions. They should be tailored to the specifics of these entities, which are the main source of the problem. These include primarily: low energy, individual fireplaces, the old municipal heat sources (boilers, heating plants), small local energy sources for commercial and industrial applications. According to experts, the problem of low emissions will not be solved without introducing additional regulations, such as to determine emission standards for solid fuel boilers and to define quality standards for solid fuels. The introduction of the new rules will not produce the desired results, if not accompanied by greater determination in the implementation of the law [22].

Air Quality Monitoring in Poland

In order to maintain safe air quality standards, a system for pollution monitoring has been established, which determines the environmental law and implementing regulations. Currently, the system is compatible with the requirements of the 2008/50/EC directive [18] on ambient air quality and cleaner air for Europe [18] and the 2004/107/EC directive on heavy metals and polycyclic aromatic hydrocarbons [23].

The functioning of the system to assess air quality on the basis of the above rules has been defined by the National Environment Monitoring Program (NEMP) 2013-2015. [24] Measurements and air quality assessment serve to provide information on the levels of substances in the air in relation to air quality standards, identification of areas for improvement of air quality and monitoring of the effectiveness of corrective programs. The collected information is used to protect the environment by systematically informing the authorities and the public about the quality of the environmental elements, abiding by environmental quality standards and the areas where these standards have been exceeded and the changes to existing quality natural elements, as well as the reasons for these changes.

As part of NEMP, the data on the state of the environment are generated and collected which the Republic of Poland is obliged to transfer under international obligations. Information generated under NEMP is used by units of local and central governments for the operational management of the environment by means of legal instruments, such as the procedure for environmental impact assessment, permits for the introduction of substances or energy into the environment, programs and plans for protection of the environment as a whole and its individual components, urban development plans. Information generated under NEMP is also used for monitoring the effectiveness of actions and strategic planning in environmental protection. Moreover, it forms the basis for strategic environmental impact assessments and is used for the planning of sustainable development at all levels of management.

The collected information is also used for purposes related to regional development and the use of structural and cohesion funds. One of the main purposes of the NEMP tasks is the generation of data and development assessments necessary to fulfill the signed and ratified international agreements by Poland in particular the constantly expanding duties of reporting the status of the individual components of

the environment to the European Commission, the European Environment Agency and the bodies of environmental conventions. The information produced by NEMP is also used in work on the formulation of negotiating positions of Polish proposals concerning the new regulations of the European Union in the field of environmental protection.

State Environmental Monitoring provides data collection subject to sharing under the provisions of the Act of 3 October 2008 on the provision of sharing information about the environment and its protection, public participation in environmental protection and environmental impact assessments, regulating issues of free access to environmental information [25]. The statutory objectives of the State Environmental Monitoring (SEM) are fulfilled through partial tasks, including studying indicators characterizing the individual components of the environment, observation of natural elements, the collection and analysis of the results of research and observation, obtaining information on the pressures on the individual elements of the environment, assessment of status and trends in the quality of individual elements of the environment based on established criteria to identify areas exceeding environmental quality standards, analysis of cause-and-effect relationships, drafting summaries, reports, messages, and making them available in print or electronic media. In order to provide easy access to current measurement data and results of the work carried out within SEM, the Inspection regularly updates thematic websites.

The activities of the State Environmental Monitoring (SEM) under art. 24 of the Act of 20 July 1991 the Inspection of Environmental Protection [26] are coordinated by the bodies of the Inspection of Environmental Protection. On the provincial level, the tasks of SEM is performed by the provincial environmental protection inspector as a body of government administration (art. 3 and art. 5 of the Act). At the national level, SEM tasks are performed by the Chief Inspector of Environmental Protection (CIEP), who is also the coordinator of the activities carried out for the needs of the State Environmental Monitoring. The implementation of SEM tasks also involves other committed units required to do so under the law, e.g. organs of government administration and local government, services, road, airports, railways and installations managers, as well as research institutes carrying out tasks under agreements with CIEP. The work of all these bodies is supervised by CIEP.

"The State Environmental Monitoring Program for the years 2016-2020" [27] is now being implemented. Every year in Poland, air quality is assessed for the pollution with 12 substances: sulfur dioxide, nitrogen dioxide, carbon monoxide, benzene and ozone, airborne particulates PM10 and PM2.5, and pollutants found within PM10: lead, arsenic, cadmium, nickel and benzo(a)pyrene.

Monitoring systems are largely based on the networks of measuring stations deployed as needed at critical points of the province (mostly cities). Furthermore, the results from the measuring stations can be complemented by the results of mathematical modeling of pollutant dispersion. The data from the measuring stations are stored in the database systems of the Regional Inspectorate of Environment and are sent to the national base located at the Chief Inspectorate for Environmental Protection. In 2013, measurements were carried out by aspiration method at 809 automatic stations, 983 manual positions and passive methods at 1137 positions.

According to the art. 89 section 1 of the Environmental Protection Act [15], on the basis of measurements carried out at the stations of the State Environmental Monitoring, the Provincial Inspector of Environmental Protection (PIEP) shall assess the quality of air in the region for the previous calendar year until April 30 of the current year. The results of evaluations are published in the form of provincial reports available on PIEP website. PIEP forwards the results of evaluations to the Management Board of the province which, if necessary, develops and implements a program for the protection of air in the province for selected zones, in which air quality standards have been violated. The Chief Inspector of Environmental Protection performs a cumulative assessment of air quality on the basis of annual air quality assessments made by PIEP.

The monitoring system distinguishes between pollutants covered by an annual assessment of air quality and pollution covered by long-term assessment of air quality. The annual air quality assessment takes into

account the substances for which national legislation and EU directives specified standard concentration in the form of acceptable levels / target / long-term goal in the air, for the protection of human health and plant protection. The evaluations conducted under the terms of fulfillment of the criteria laid down to protect the health of people currently included: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), benzene (C_6H_6), ozone (O_3), PM10 and PM2, 5, heavy metals: lead (Pb), arsenic (As), cadmium (Cd) and nickel (Ni) in PM10 and benzo(a) pyrene (B(a)P) in PM10. Assessments made in terms of meeting the criteria referenced to plant protection includes: sulfur dioxide (SO_2), nitrogen oxides NOx and ozone (O_3).

Air quality assessment is performed with respect to the area of zone [25]. Based on the results of annual air quality assessment, each individual substance is classified for zones, in which levels:

- exceed the permissible level magnified the margin of tolerance,
- are between the acceptable level and the acceptable level magnified by the margin of tolerance,
- do not exceed the acceptable level,
- exceed the target level,
- do not exceed the target level,
- exceed the long-term level (only ozone),
- do no exceed the level of long-term goal (only ozone).

Conclusion

The World Health Organization announced that the PM2.5 and PM10 particulates can cause adverse effects in human health (in terms of cancer, respiratory and cardiovascular diseases), even at concentrations that are lower by half than those considered acceptable in the European Union [4, 5, 28]. The existing system of monitoring air pollution is working efficiently in our country, but legal measures to reduce the emission of harmful substances into the atmosphere seem to be ineffective. Recently, this has been confirmed by numerous violations of air pollution standards in Poland. Increase of this phenomenon should arouse concern and lead to the solution of this problem as soon as possible. Undoubtedly, all efforts to improve air quality, other than appropriate legislation, will require ongoing significant financial outlays. However, such investments in the long term show that, in the future, we can expect significant savings associated with the reduction of costs in the medical field resulting from a reduction in the incidence of cancer, respiratory and cardiovascular diseases. Scientific reports on the impact of air pollution on other aspects of health are numerous but inconsistent [1]. Therefore, we cannot underestimate the unresearched full impact of harmful substances in the air on human reproductive health [29]. Past research in this area alarmed about the adverse effects on semen parameters or pregnancy [30,31,32]. It has already been proven that particulates impact genetic disorders of male reproductive cells and cause some defects in the fetus [31,33,34]. Consequently, it can be expected that, other than the current risks posed by air pollution, we will perhaps acquire knowledge on epigenetic effects in the future epigenetic effects (diseases occur in later generations as a result of the modification of genetic material by some chemical compounds) [33,34].

Taking into account all aspects of health, from exposure to air pollution, we should decisively pursue to solve this problem at the central government (effective legal solutions combined with budget support), but also to build public awareness of the scale of this problem at the same time.

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