ECONOMIC ACTIVITY DEVELOPMENT AND IMPACT ON THE ENVIRONEMENT –THE INTEGRATED MANAGEMENT OF INDUSTRIAL POLLUTION IN DÂMBOVIȚA COUNTY

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Abstract. Environmental degradation, effect of the irrational relations between man and nature, which have been maintained along time, has determined, on the basis of certain urgent environmental warnings given by different pluri- and multidisciplinary research works carried out in time, the change of attitude of national and international public opinion towards the quality of environmental factors. Pollution, with its multiple components (water, air, soil, habitat), knows no frontiers, which makes it absolutely necessary to unite our efforts and energies in order to assure the maintenance within normal limits of the ecological balance, both for the present and for future generations. Environmental protection is a relatively recent notion, the bad consequences on certain factors considered "destructive agents" (acid rains, carbon dioxide, sulphur dioxide, escape gases, chemical fertilizers based on nitrogen, sulphur) used in agriculture, pesticides, insecticides, insecto-fungicides, industrial waste, non-recyclable wrappers have led to major environmental misbalances, which triggered the prompt reaction of most of the world's states. The complexity of environmental factors that influence and determine environmental balance justifies the need and opportunity of a environmental management system, organized as a component of the global system of public and private.

The achievement of an integrated system for the prevention and control of the pollution coming from the activities mentioned in Annex I of the Norm 96/61/CE (Norm concerning the Integrated Pollution Prevention and Control/ IPPC), has the purpose of implementing prevention or reduction measures concerning the emissions in the atmosphere, water and soil, including measures

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concerning waste management, in order to attain a high protection level for the environment as a whole.

The specific demands concerning the integrated approach, according to the provisions of the Norm 96/61/CE, have been adopted in Romania through the governmental emergency decision O.U.G. no. 34/2002 concerning pollution prevention, reduction and integrated control, approved through the Law 645/2002. The series of standards ISO 14000 concerning environmental management system has been completely adopted by the Romanian Association of Standardization under the name of the series SR ISO 14000, with a view to promote the implementation of environmental management systems.

Industry, the most important economic branch of Dâmbovița County, has a high diversification degree and a special impact on the environment. The processing industry is dominant (over 80%), and the most representative activity domains are metallurgy (Dâmbovița County occupies the third place in the country concerning the production in this sector), extractive industry with an ancient tradition in this county; the machine-building industry, represented by traditional enterprises; the industry of electrical home appliances; textile industry, relatively well represented; chemical industry, etc.

The environment is a sustainable system that needs to maintain a stable resource basis, avoiding the overexploitation of recyclable resources or the functions of environmental drilling and using up non-renewable resources only inasmuch as there is an investment in adequate substitutes, which includes maintaining of biodiversity, atmospheric stability and other functions of the ecosystem that are not part of the ordinary classification of economic resources.

Industrial activities exert an impact on all environmental factors, by affecting the air, water, soil quality, by generating different types of waste and by using natural resources and energy. In this sense, it is necessary to regulate and control these activities, so as to assure the respect of legislation in environmental protection domain and of sustainable development principles. The impact on air quality is due, in some cases, to the way how IPPC installations function or to the fact that the limit or threshold values established for specific pollutants are not respected, as is the case for instance of: powders, sulphur oxides, nitrogen oxides, heavy metals (ex.: zinc), volatile organic compounds.

The impact on air and soil quality is due to the length of service of the installations, to the inadequate functioning of (pre) treatment stations/installations for water used in technology and to the inefficiency of air depollution installations.

Man's effects on environment are more obvious as intensity and dissemination during the last few years, because of the industrial development. This is the main environmental pollution source, through its ample technological

processes that generate large quantities of pollutants, which get into the air, the water or remain on the soil.

In Dâmbovița County, in the areas affected by pollution from industrial sources, in order to prevent, improve and reduce industrial pollution, by means of normative programs, measures and actions have been established as annexes to the integrated environmental authorizations emitted for polluting economic operators, measures of reduction of the impact of industrial activities on environmental quality, measures that can be found as well in the Local Action Plan for the Environment of Dâmbovița County, revised in 2007.

The 18 Integrated Environmental authorizations of the economic operators from Dâmbovița County contain, in the Action Plan, measures meant to reduce the effects of industrial activity on the environment. During 2007, the economic operators that had not obtained the transitional period (13) took integrally the measures included in the Action Plans of the authorizations they hold. For the period 2008-2014, the 5 economic operators benefiting of a transitional period are to gradually reduce their air, water or soil emissions, according to the case.

The energetic sector, a major component of the economic infrastructure, represents the basis of the county's development, in the actual energetic context. Sustainable development implies the satisfaction of energy demands, not by increasing production (except for renewable energies), but by reducing consumption, by improving technologies, by restructuring economy and by changing the mentality concerning the efficient use of energy.

The energetic sector is represented by the activity of S.C. Termoelectrica SA Bucharest - Electrocentrale Doiceşti Branch, an electric power producer (electrothermal power plant) and by the complex of micro electric power plants on Ialomița River (Dobreşti, Scropoasa, Moroieni, Pietroşița, Fieni, Pucioasa), their main environmental impact being recorded as atmospheric pollution and land degradation via the transport and depositing of slag and dust deposits resulted from the economic operator into the sterile dump of Şotânga.

The inventory of the pollutant emissions in the atmosphere, according to the CORINAIR methodology shows the following aspects:

- the NOx emissions from S.C. Termoelectrica SA Bucharest - Electrocentrale Doiceşti Branch result from the burning of the fuels used in order to generate electric power (coal, black oil and natural gases);

-among the sources inventoried in the county, a large part of the global atmospheric emission of sulphur dioxide is caused by S.C. Termoelectrica SA Bucharest - Electrocentrale Doiceşti Branch , this major contribution deriving from the use mainly of fossil solid and liquid fuels (coal and black oil), with a high sulphur content, compared to the gaseous fuel.

The economic operator has no other depollution systems installed at the

funnels except those for preventing powder emissions (electrofilters). Though the sulphur dioxide emissions are significant, the height of the evacuation funnels and the activity of atmospheric currents assures a good dispersion of pollutants, so that in the areas in which this pollutant is monitored, no overpassing of the maximum admissible quantity in 24 hours has been recorded. In Doiceşti area, the average annual concentrations of sulphur dioxide are lower than in the municipality of Târgovişte (after the dispersion of the pollutants), situated 10 km away (Table 1).

Tab. 1 - Atmospheric emissions from S.C. Termoelectrica SA Bucharest - Electrocentrale Doiceşti Branch and their contribution to the total emissions in 2008

Pollutant	**Quantities (tons/year)**		
	Emitted by UE Doiceşti	**Total emitted in the county**	**Contribution of the emissions of UE Doicesti (%)**
Sulphur dioxide	1778.17	2341.25	75.95
Nitrogen oxides	191.99	2400.74	7.99
Carbon dioxide	95463	2534162	3.76
Dusts	360.40	6647.37	5.42

The production of electric power is an economic branch with an accentuated impact on the environment. Especially because most of the electric power generated in the county comes from burning fuels, a significant impact of this anthropic activity concerns the atmosphere, following the emissions of combustion gases.

The estimations made based on departmental emission inventory shows the following aspects, concerning the generation of atmospheric pollutants on activity groups:

- emissions resulting from the generation of power – 1177609.746 t/year of the total emissions;

- emissions resulting from different sectors: electric power production – 460039.4233 tons/year (39.06%), combustion in commercial or institutional installations– 38512.1123 tons/year (3.27%), steam-generating station providing heat for an area of a quarter – 49666.5388 tons/year (4.22%), combustion in the extractive sector (crude oil transport) – 124985.825 tons/year (10.61%), home combustion installations (chimneys, stoves, thermal stations) – 123670.4177 tons/year (10.50%), burnings in the processing industry (boilers) – 49804.8978 tons/year (4.22%), burnings in industry (processing ovens without contact) – 1789.5673 tons/year (0.15%), burnings in the industry (processing ovens with contact) – 329140.9643 tons/year (27.97%).

The impact on the atmosphere is less relevant, the main atmospheric emissions resulting from leaks from installations and volatilizations from the oil and natural gas extraction installations (in the county, most of the deposits present an association of oil and natural gas). The emissions are estimated at about 862.856 tons/year (0.068% of the total emissions in the county), of which 57.89% methane, 31.58% NMVOC, 10.53% carbon dioxide, to which we can add the burning gas emissions from the boilers that heat the crude oil before pumping (124985.825 tons/year).

Accidental pollution can be considered an environmental accident, produced by the discharge, for very complex reasons, of a polluting agent in quantities that can affect a part of the environmental factors and requires immediate intervention measures to isolate the affected area and to depollute the environment, being more often than not of high intensity and of short duration.

In Dâmbovița County, the significant impact of oil and natural gas extraction on the environment is the fact that surface and underground waters, and soils have turned salty and have been polluted with oil. Such areas can be found there where the transport pipes were deteriorated, and the responsibility to restore these agricultural and forest lands to their former uses goes to S.C. OMV/Petrom S.A, according to the conformation programs. This kind of pollution has decreased continually during the last years, but the phenomenon persists especially in the area of Târgovişte and Găeşti.

In 2008, the preventive measures taken in the county (by the Agency for Environmental Protection and the National Environmental Guard – the Commissariat of Dâmbovița County and by the economic operators), 32 situations of accidental pollution have been recorded, which took place following the activities of crude oil or oil products extraction and transport (with a tendency of decrease compared to the 114 situations of accidental pollution recorded in 2007).

At present, because of the use of certain inadequate technologies, agriculture has become a potential source of environmental pollution and degradation, the main agricultural pollutants being the chemical fertilizers and pesticides. Considered as an essential part of agriculture, agricultural products processing industries are also responsible for environmental pollution.

The nitrates coming from agricultural land, that end up in waters deteriorate water quality and produce environmental misbalances. Other situations refer to dangerous substances, such as cadmium, which ends up in coastal waters (Gâştescu P., 2000).

The agricultural sector has a negative impact as well on the atmosphere, because of the emissions of specific pollutants. Certain studies of the Institute of Pedological and Agrochemical Research have led to the identification of four

localities vulnerable to water pollution with nitrates coming from agricultural sources: Bilciureşti, Ciocăneşti, Crevedia and Răcari.

The atmospheric, water and soil emissions resulted from agriculture consist in methane and ammonia, gases resulted from the processes of enteric fermentation and from animal dejections, as the animal farms are important sources of air, soil and water pollution. The quantities of specific pollutants emitted in the atmosphere from agriculture and their contribution to the total emissions inventoried in the county are presented in table 2.

Tab. 2 - Atmospheric emissions from agriculture and their contribution to the total emissions

Pollutant	2007 (tons/year)			2008 (tons/year)		
	Emissions from agriculture	Total emissions in the county	Contribution of the emissions from agriculture (%)	Emissions from agriculture	Total emissions in the county	Contribution of the emissions from agriculture (%)
CH_4	6420.80	14034.34	45.75	6094.35	15670.43	38.89
NH_3	4927.01	5550.52	88.76	4443.74	5067.04	87.69

Among the sources inventoried in Dâmbovița County, 89.3% of the global atmospheric emission of ammonia results from agriculture, this major contribution deriving from the animal dejections and from the use of nitrogenous fertilizers.

A special impact of the agricultural activities is represented by soil degradation because of the intensive grazing, because of the irrational exploitation of the forest and land fund, and also because of the application of an inadequate technological system, especially on the land belonging to small and middle households. At the same time, the tilling on slopes, perpendicular on the contour, lead to soil degradation, to the decrease of productive potential and the transformation of external environment through gullies that appear after abundant rains. This can lead to their becoming unproductive lands.

The sustainable use of soil involves different long-term actions, which assure along with the obtaining of positive economic results, a maintaining and an improvement of soil quality. One of the most important reasons of soil degradation has been the inadequate use and management of agricultural land. In order to increase the tillable land area it is necessary to use protection, improvement and rational use methods based on principles of sustainable development of soil resources.

The EU has a sustainable development strategy and relevant is the fact that in the declaration from the World Summit for Sustainable Development from Johannesburg of September 2002, was acknowledged the need to work together to accomplish this goal. So, a development model has been reached, which aims at achieving a balance between economic growth, life quality and environmental protection on the average and long run, without the increase of natural resources consumption beyond the capacity of supportability of the Earth.

One of the best known definitions of the concept of sustainable development comes from the World Commission for Environment and Development – "Sustainable development is the one that satisfies the needs of the present without compromising the capacity of the future generations to meet their own needs."

In the sustainable development context, in order to use soil adequately, it is necessary to take certain measures:

- diversifying crops to improve and preserve the soil;
- selecting plant species to match the soil type, the climate and resilient to illnesses;
- using residual organic materials coming from the animal breeding sector, in combination with mineral fertilizers to assure the nutrients needed for cultures and to preserve soil fertility;
- using new fertilizers and protective preventive means, limiting as much as possible the use of chemical substances against weeds and insects/rodents;
- using fertilizers and pesticides according to soil's productive potential;
- carrying out the soil-related work during the optimal period.

A major risk for environment and the population's health is represented by depositing the waste directly on soil, disrespecting some minimum requirements, evacuating waste in the water and its uncontrolled burning.

The production wastes generated in the county come mainly from mine and quarry exploitation, agriculture and agricultural products processing, wood processing, textile industry, inorganic chemical processes, organic chemical processes, thermo-electric processes, chemical and mechanical treatment of surfaces and metal coverage, water treatment, oil extraction. According to the data of a statistic survey (AS-GD-PRODDES) carried out in 2008 concerning 2007, the quantity of production wastes generated by economic operators was of 223911 tons.

The economic activities that produced the largest waste quantities, except oil extractive industry, were electrical power industry, quarry exploitation and metallurgical industry (Table 3). So, 35.48% of the quantity generated is represented by the dust generated by S.C. Termoelectrica SA Bucureşti-Electrocentrale Doiceşti Branch, 9.06% of the sterile is generated by SC

Carpatcement Holding SA –Fieni Branch, and 18.71% of the wastes come from the metallurgical industry. The ferrous metallic wastes generated by the other economic operators represent about 11.25% of the total.

Tab. 3 - Structure of the non-dangerous waste on activity branches

Economic activity	Quantity generated (tons)	Proportion (%)
Mine and quarry exploitation	20140	9.06%
Processing industry	48236	21.71 %
Power production	78821	35.48 %
Metallurgic industry	41579	18.71%
Constructions	15199	6.84%
Others	18186	8.2%
Total	222161	100%

There is a functional deposit of non-dangerous waste, built in 2007, belonging to SC Erdemir România SRL Târgovişte, meant for mineral waste coming from the production process. It became functional on 01.01.2008, the mineral waste generated by the economic operator being deposited after being dehydrated and pressed.

SC Termoelectrica SA Bucharest– Electrocentrale Doiceşti Branch, ceased the depositing of ashes by means of hydraulic transport in the deposit of Şotânga, on 31.12.2008. The quantity of ashes generated in 2008 was of 42379 tons, of which:

- 21167 tons were valorized through authorized firms that manufacture construction materials (bca);
- 21212 tons were transported in the company's deposit.

Concerning the management of dangerous waste, in 2008 the quantity of dangerous medical waste generated by medical units was of 154.186 tons, 295.96 tons used oils, 32.08 tons electrical and electronic equipments (in 2007 were gathered 11.577 tons), 130 tons dry mud substance coming from industrial used water treatment and 615.88 tons dry substance, mud coming from the towns' water treatment stations.

A major source of environmental pollution is the road transport, where the main problems highlighted are:

- atmospheric pollution, generated by the long length of service of the private auto park, by common transport and by industrial transport, because the exhaust gases are not according to the emission norms;

- environmental pollution generated by the excessive use of privately owned cars, because of the unsatisfactory offer of the common transport system;

- atmospheric, sonorous pollution and pollution generated by vibration in the rural areas, generated by the length of service of the rural roads;

- generation of discomfort for the population and wear of the roads, following the heavy traffic that serves the sand and gravel extraction units and other units of the extractive industry (oil derricks, mining exploitations);

- sonorous pollution generated by the traffic;

- adoption of a non-ecologic management for specific wastes and pollutants (suspension emissions, presence of oils and detergents in used waters).

Environmental quality is affected by atmospheric pollution, by the fact that the vegetation is exposed to NOx, by the evacuation of used waters with an inadequate content of specific pollutants (oils, suspensions, detergents), however the impact being low.

The significant wear of certain roads (national, departmental and communal roads, access roads to industrial units) and their continual exploitation not balanced by periodical maintenance and reparation works affects life quality through the increase of the car repairs costs, as they favor and accentuate the rhythm of their deterioration.

The impact on life quality caused by traffic influence can be appreciated as being considerable, taking into account the following values of road traffic emissions: carbon dioxide (22328.417 t), sulphur dioxide (7.637 t), nitrogen oxides (269.329 t), volatile organic non-methanic compounds (70.576 t), methane (1.951 t), carbon monoxide (350.992 t), nitrogen protoxide (0.956 t), total dusts in suspension (19.339 t), cadmium (0.0797 kg), chrome (0.3546 kg), copper(12.055 kg), nickel (0.469 kg), lead (56.730 kg), selenium (0.0711 kg), zinc (6.9577 kg); other mobile sources and equipments - carbon dioxide (5915.763 t, sulphur dioxide (1.970 t), nitrogen oxides (88.569 t), volatile organic non-methanic compounds (16.763 t), nitrogen protoxide (2.343 t), total dusts in suspension (10.300 t), cadmium (0.188 kg), chrome (0.094 kg), copper (3.202 kg), nickel (0.1318 kg), lead (6.911 kg), selenium (0.0188 kg), zinc (1.884 kg).

The pressures exerted by tourism can be felt especially in the area of upper Ialomița Valley, in Bucegi massif –Padina basinet, because the tourist routes coming from Buşteni, Bran - Moeciu converge towards these zones. In general, people practice a tourism that is not controlled from the viewpoint of the environmental protection, the pressures being generated by improper waste and used water treatment. The Administration of the Natural Park Bucegi endeavors (logistically and financially) to improve waste management in the area it administrates, by installing recipients for the collection of waste and warning panels.

The process of elaboration of the governmental economic strategies and policies must start from the premise that the environmental protection represents a necessary component for the transformation of the economic system and for society's sustainable development, an important instrument in the implementation of the ecological preventive policies being represented by environmental investments.

The environmental protection expenses represent the economic measure of the answer given by society to approach the environment-related problems during a certain stage; they include the expenses for environmental monitoring and protection and the expenses to prevent or eliminate the deterioration of the environmental factors.

The characteristic environmental protection activities can be grouped in: pollution prevention and reduction, air and water quality protection, dangerous and non-dangerous waste management, soil quality and underground water protection, noise and vibration reduction.

The financial resources allotted for investments in the domain of environmental protection come from the private sector, and also form the budget sector, the budget providing money especially for domains as waste transport and depositing, clean water and sewerage infrastructure development, sustainable territorial organization.

Financial instruments with special destination have been developed, allowing the support of the private sector in the effort to invest in environmental protection, such a financial instrument meant for the support and carrying out of high priority objectives of major interest for the environmental protection being The environmental fund, a special extra-budgetary fund made up in 2000 of:

- contribution of 3% of the revenues coming from the sales of ferrous and non-ferrous metallic wastes, of the goods to be dismantled, obtained by the waste holder or by the goods holder, natural or juridical person;
- taxes for atmospheric pollutant emissions, due by economic operators holding stationary sources which affect the environmental factors;
- taxes cashed from the economic operators that use new lands in order to deposit wastes that can be valorized;
- contribution of 2 lei/kg, due by the responsible economic operators, for the difference between the annual valorization objectives or incineration in burning installations with recovery of energy for the wrapper wastes mentioned by the legislation in force and the actual quantities valorized or incinerated with recovery of energy;
- contribution of 2% of the value of the substances classified as being dangerous for the environment, except for those used to produce medicines;

- a proportion of 1% of the sales value of the wood mass, paid by the economic operator that introduces the wood mass into a processing process;

- tax of 1 leu/kg envelope, paid by the producers and importers who introduce new and/or used envelopes for reuse on the market;

- contribution of 3% of the sum cashed annually for hunting funds management;

- pollution tax for cars;

- donations, sponsorships, financial assistance from romanian or foreign, natural or juridical people and international organizations or organisms;

- sums coming from the reimbursement of the financing provided, interests, delay penalties and other financial operations carried out from the financial sources of the Environmental fund;

- sums coming from events organized for the benefit of the Environmental fund;

- taxes for the delivery of notifications, agreements and authorizations related to the environment;

- any kind of interest or penalty due by the debtors of the Environmental fund.

Beneficiaries of financial support from the Environmental fund, for the projects proposed, can be: economic operators, non-governmental organizations, local authorities and educational units. The Environmental fund is created according to the European principles "Polluter pays" and "Producer responsibility", in order to implement the legislation concerning the environmental protection, harmonized with the provisions of the EC acquis.

Dâmbovița County had, in the year 2008 a contribution of 3,426,808.61 lei to the Environmental Fund and a number of 569 contributors registered at the Administration of the Environmental Fund.

During the post-adhesion period, in the environmental protection domain, Romania benefits of support by means of the European funds for environmental projects (Structural and Cohesion Funds), projects that are to be carried out as part of the Sectorial Environmental Operational Program and of the Regional Operational Program.

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