

## ENVIRONMENTAL PROTECTION SUSTAINABILITY STRATEGIC FACTOR IN THE ENERGY INDUSTRY

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### Abstract

We propose to conceive an environmental strategy intended to integrate harmoniously Gorj energy industry with principles of sustainable development. The sustainable development complies trinomial: ecological-economic-social.

In our view, sustainable development, requires clean water and unpolluted air, land consolidated rejuvenated forests, biodiversity and protected nature reserves, churches and monasteries secular admired by visitors, welcoming places entered in the natural and cultural harmony.

It is also necessary to reduce the pressure generated by socio-economic factors on the environment and the principles of sustainable development. The quality of life in urban and rural areas show extreme differences compared to European standards.

For efficiency, we addressed the modeling method by designing a model valid for all thermoelectric power plants based on fossil fuels, allowing simultaneously, so adding value and environmental protection.

The general objective that we propose for the environment, natural resources and patrimony, is related to the prevention of climate change by limiting the emission of toxic gases and their adverse effects on the environment

The achievement of strategic objectives and implementation of proposals submitted, we consider that would have a double impact, on the one side, to protect the environment and the quality of life and, on the other side a positive influence on economic and social level.

**Keywords:** resources, energy, sustainability, efficiency, development

**JEL Classification:** O11, O25, O44

### 1. Introduction

In our research, we aim to design an environmental strategy ment to harmoniously integrate Gorj energy industry with sustainable development principles[1] and sustainability of this tradionally generating polution industry.

The basic principle of this strategy, the sustainable development complies with the triad : ecological-economic-social, in order to reach European environmental performance, provided by the național sustainable development strategy, în order to accelerate economic progress for the transition to the developlment pattern that generates added value, customer oriented so as to achieve continuous improvement of the quality of life în harmony with the environment [2] .

The general mission for environment, resources and natural heritagefor the County of Gorj is to have a clean and attractive environment favored by natural and cultural heritage that could generate a large part of Romania's tourism potențial.

In our view, sustainable development of Gorj County, requires clean water and unpolluted air, consolidated land, rejuvenated forests, biodiversity and protected natural reservations, secular churches and monasteries admired by visitors, welcoming localities harmoniously entered in the natural and cultural environment.

Also, it is necessary to reduce the pressure generated by socio-economic factors[1] on the environment and sustainable development principle. For example, most cities in the county face degradation of green areas, meaning that the ratio between green areas and constructed areas is becoming smaller. The tendency will be to favor green spaces[6], in order to reach a goalthat allows in every locality to be a ratio of 2/1 between the area occupied by green spaces and the one occupied by constructions. Also, the quality of life in urban and rural areas

shows extreme differences compared to European standards. Generally strategies should be designed to target city beautification.

For efficiency, in this study we addressed the modeling method by designing a model valid for all thermo-electric plants based on fossil fuels, allowing the growth of both added value and environmental protection. In our study we used methods and tools such as: SWOT analysis, case study, modeling and economic experiment.

## 2. Objectives

The overall objective [3] that we propose for the environment, natural resources and heritage, is related to the prevention of climate change by limiting the emission of toxic gases and their adverse effects on the environment [1].

Improvement of living standards of the population by protecting and improving the environment quality are favored by the improvement of integrated water treatment systems, waste management, reduction of pollution and preserving biodiversity, reducing negative environmental effects caused by urban heating systems and climate changes, use of modern technologies in business and the adoption of measures to prevent natural disasters in vulnerable areas.

The strategic objectives [3] for environment and natural resources that are drawn from the general objective are:

### 2.1 Growth of residents life quality [6]

Is made: By the increase of population training level regarding the modernization, expansion and maintenance of green areas and by raising the quality of social services. This is achieved in stages, through the following steps [1]:

1. Regeneration of public spaces and improving living conditions. The revitalization of cities is an increased priority: an attractive city must be a space with a varied and quality offer for leisure.

2. Improving the quality of services for families to stop population decline and population exodus overseas. In this category a major impact might have the implementation of projects in the field of modern medical services to the public and ones dedicated to children: kindergartens, schools and suitable playgrounds.

### 2.2 Reducing industry negative effects to the environment.

The predominant industries in Gorj County economy, the energy and mining, have left a deep imprint on the environment through a lengthy process requiring for remedy at least as much time as was used for environmental damage.

As strands [3] to annihilate environmental vulnerabilities are:

- actions to improve air quality, water and soil,
- actions to address landslides and flooding.

Staging in order to achieve this objective consists in achieving the following steps[3] :

1. Reducing the negative effects of industrial activities on air, water and soil.
2. To reduce the risks from landslides and floods, will need to strengthen the affected lands. Land degradation is caused both by natural factors but especially the industrial factors and is the main vulnerability of the region. Almost 65% of soils are affected by erosion, landslides and floods. Combating this vulnerability is made through reforestation programs in the medium and long term, drainage and reclamation works and furnishing of riverbeds and streams.

### 2.3 Sustainable management of natural resources and protected spaces

The central component of sustainable development, closely related to the regeneration of communities and improvement of environmental factors quality [7], is related to the sustainable management [8] of natural resources and protected areas [9], accompanied by educational activity in the service environment, with long term impact.

1. Improve management and cooperation on natural resources and protected areas. The natural heritage of the county of Gorj is important in all respects. To stop the degradation of biodiversity and natural resources and minimize risks to the environment and sustainable development, it is necessary to achieve effective management of protected areas, management that is governed by the following regulations:

- Law no. 5/2000 approving the plan for national land,
- GD. 2151/2004, the creation of the protected area,
- GD. 1284/200, the Special Protection Areas for Birds as part of the European Ecological Network Natura 2000,

- GD. 971/2011, amending and supplementing Government Decision no. 1284/2007, declaring Special Protection Areas for Birds as part of the Natura 2000 ecological network in Romania,
  - GEO no. 57/2007 on the regime of protected natural areas.
2. Development of media programs and population awareness [3]. A necessary but not sufficient condition is public involvement, especially through educational and awareness activities.

Given the principle: "Attitude determines ability" - promoting environmental actions such as "let's do ..." or integrate environmental issues into everyday life by NGOs such as:

- "Hai Hui" Foundation, Târgu-Jiu,
- Centrul Ecologic Zonal Jiul Foundation, Târgu-Jiu,
- Administrația Ariei Naturale Protejate Nordul Gorjului de Vest, Târgu-Jiu,

could produce lasting changes in the general attitude of the population and therefore a responsible attitude in the sense of preserving the environment.

## 2.4 Protection and improvement of the environment

This is achieved through the following steps [3]:

1. Extension and modernization of wastewater treatment.
2. Extension of integrated waste management systems.
3. Protecting biodiversity, natural areas and protected areas.
4. Development of an integrated monitoring and early intervention in emergency situations system.
5. Reduce the negative environmental impacts generated by economic activities and outdated technologies, including ecological restoration of the sites affected.

Actual achievement of the objective is measured by the following indicators [6]:

- length of modular system sewer networks made (km)
- number of drinking water treatment plants and wastewater treatment,
- number of events for environmental education and awareness campaigns,
- the number of economic agents who impementat anti-pollution technologies,
- the amount of solid waste treated before disposal (t),
- the amount of recycled waste in the production process for use (t),
- arranged land area for waste disposal (ha)
- reforested areas (ha)
- number of environmental monitoring systems,
- number of rapid response systems in case of disaster environmental pollution.

## 3. SWOT Analysis on Environment and Natural Resources [3]

In order to outline approach options and methods which can implement the results of this strategy, we analyzed the strengths, weaknesses, opportunities and risks in the perspective

### Strengths

- over 2/3 of the county is covered by forests, waters, rivers and caves,
- Submediterranean climate influence
- the mountain area is almost unpolluted, with clean air and rich in negative ions,
- funding of grants have created a resource for organic food by establishing and maintaining a rich hunting and ecological folds on the alpine domain
- mountain and foothill villages have sufficient natural potential and guesthouses,
- sufficient mineral resources consist of rich deposits of limestone, lignite, oil, natural gas, copper, magnesium and titanium,
- there are well-trained specialists on environmental issues,
- there are resources for building renewable and clean energy facilities,
- the County has a diverse tourist potential: mountain, spelunking, spas, ecotourism, nature, religious.

### Weaknesses

- insufficiently developed transport infrastructure,
- lack of a highway,
- lack of an airport,
- tourism and leisure infrastructure insufficiently developed,
- poor protection of protected areas, natural parks and natural monuments,

- localities affected by industrial pollution and landslides in mining areas,
- integrated monitoring of environmental factors underdeveloped especially on radioactive pollution monitoring,
- poor management of waste of any kind, especially the household,
- weak capitalization of nature potential,
- local authorities are insufficiently involved in environmental protection activities,
- insufficient protection works in protected natural areas,
- low level of education of citizens in environmental matters.

#### **Opportunities**

- an integrated project on water / sewer component is being developed in cities and towns,
- existence of landfills,
- existence of a Local Environmental Action Plan,
- the existence of a master plan for water and wastewater
- existence of regional operators for water and sewerage,
- existence of selective waste collection projects,
- European funding opportunities for development and infrastructure improvements.

#### **Risks**

- not completed restoration of property rights over land and forest, which constitute a real obstacle to investing,
- increasing disparities between communities,
- lack of a county program to combat landslides,
- lucrări de îmbunătățiri funciare insuficiente și slab finanțate,
- there is an irrational exploitation of river gravel affecting river beds,
- degradation of protected areas due to irrational exploitation of natural resources,
- silting of rivers and pollution poses disastrous effects in case of floods,
- chaotic exploitation of natural resources, without a medium and long-term strategy,
- pit mine and irrational deforestation cause landslides,
- lack of a continuous afforestation,
- underinvestment in water treatment and wastewater treatment.

#### **4. Conclusions and proposals to reduce the negative effects of environmental pollution**

Based on the objective reality of the monoindustrial structure of Gorj county through categorical dominance of mining and energy industry, sectors with a major impact on the environment, we sought some solutions applicable to the most important economic entity in the county, the thermal power plant from Turceni.

Gorj County is facing severe problems in terms of environmental quality. On the one hand, soil pollution problems [6] from the thermo-electric Rovinari and Turceni plants with ashes, sulphurous gases and carbon oxides surfaces directly affecting more than 100,000 ha, and on the other hand, watercourses are polluted indirectly. Thus follows the need to implement projects [5] for improving the environment such as:

- flue evacuation of combustion of the sludge in this way, the dust is wetted, it becomes a viscous liquid and then removed by pumping in natural deposits,
- exhaust pipe by desulphurisation.

These projects, once they are put into practice, give rise to a large amount of waste, a chemical compound derived from toxic gas desulfurization, synthetic gypsum. Storing large amounts of synthetic gypsum, involves making other investments for storage and payment of fees for pollution.

To eliminate these drawbacks, the administration will contact a manufacturer of gypsum boards interested in making a precast gypsum plant in the city Turceni by the following conditions:

- the total quantity of synthetic gypsum resulted from desulfurization process is of acceptable purity according to European standards,
- to achieve the required purity of the gypsum, a filler is necessary (fine ground limestone) with a purity of about 97-98%, which can be obtained from limestone rock 95-96% purity,
- existence of limestone quarries in the Vâlcan mountains, Runcu village, Gorj county,
- plasterboard factory building, to be completed with the completion of desulphurization investment in Steam Electric Power Plant Turceni,

Following a partnership resulted from collaboration between the administration [3] and the private sector have set up legal and procedural stages prior to start building the plasterboard factory in Turceni city.

Thus, the entire amount of synthetic gypsum as a waste product resulting from flue gas desulphurisation in Turceni power plant will be purchased by the investor and is the raw material for building platerboards.

Turceni Thermal Power Plant, menus already a draft investment contracts providing for equipping four units of 330 MWh of gas desulfurization plants. In the process of desulfurization is necessary to use lime as neutralizing agent resulting from this process an important quantity of residue, waste synthetic gypsum (WSG).

Providing the entire anual quantities of limestone flue gas desulphurization process required (400,000 t / year) will be made in the limestone quarry in Runcu, which has sufficient reserves of limestone desulfurization system guaranteeing support for long term.

Taking full synthetic gypsum waste (DSG) resulting from the process of desulfurization by the investor, an investment amounting to about 100 million euros is necessary to build a factory for gypsum - cardboard, with a capacity of 50 square milioae drywall boards / year right next to Turceni thermal power plant, synthetic gypsum is used entirely as feedstock.

Following this investment, closes environmentally the whole process flue gas desulphurization of the Turceni thermal power plant, with beneficial effects on the entire Romanian economy, given the high value of the investment and that an important part of the production of gypsum - cardboard will be exported.

Very important are the positive effects to[2], on the local community of the city Turceni by creating more than 600 jobs, as follows: approx. 150 direct and approx. 450 indirect and economic revival due to the beneficial impact on the local budget.

From the analysis of economic and financial calculations [3] on local budgets [1] Turceni city or county of Gorj follows:

1. 300,000 euro/year ie approx. 1,500,000 Lei annually at a rate of 4.5 lei/euro direct and secure income to the local budget, causing an increase of approx. 15% of the budget of the City of Turceni, (from about 2,000,000 to about 2,300,000 euros per year) [12];
2. 150,000/year ie approx. 675,000 lei annually at a rate of 4.5 lei/euro, direct and safe income to the local budget of the county, resulting in an increase of approx. 1.5% of the budget Gorj (from about 10 million euros per year to about 10.15 million) [13].

Only with this money, for example, you might run an investment over three years, by which to achieve an integrated and centralized sewerage and wastewater treatment for the city Turceni and which until now yet there were no financial resources to achieve it.

Strategic objectives and implementation of proposals submitted, we think it would have a double impact, on the one hand to protect the environment and the quality of life and, on the other hand a positive influence on economic and social level. This could demonstrate that the energy industry is really a strategic factor both economic sustainability and creating a healthy environment.

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