Aspects of the quality - Environmental management system and cleaner production

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Abstract

Management is a significant factor in any business activity. It may be enhanced by the application of various management systems. These will help to obtain, organize, administrate, evaluate and control particulars: information, quality, environmental protection, health and safety and various resources (human, finance etc). Environmental management should embrace recent changes in the area of environmental protection, and be tailored to recent regulations in this field – entirely legal and economic, as well as take into use management systems that meet the requirements of the contemporary model for economic development. These changes are aimed at abandoning the conventional approach of environmental protection and replace it with sustainable development. The keys and the aims of Cleaner Productions are at present being implemented in various companies as a non-formalised environmental management system. This concept is suggested here as a proper model for practice where geothermal energy is used. Formalized environmental management system is also discussed. By showing the features and the power of CP this paper is a signal oriented to involve the awareness of top management of diverse Romanian companies.

Keywords*: environmental management, management system, cleaner production, sustainable development*

1 Introduction

The effects of modern development forced us to think 'integrated'. Sustainable development principles require that environment management policies and practices are not good by themselves but sould also integrate with all other environmental objectives, and with social and economic development objectives.

Environmental management comprising both the latest improvements in the sphere of environmental protection and implemented management systems should meet the requirements of the new model for economic development. This can be attained leaving the conventional approach to environmental protection using instead its sustainable development (Adamczyk, J., 2001). Shortly, we will recall what Sustainable Development means. It consists of continuous economic growth whilst at same time keeping the integrity of the triad: economy-society-environment. Sustainable Development is significant mainly at macroeconomic level (e.g. national or regional). This paper deals with enterprises as a Sustainable Development addressee. To implement Sustainable Development at a company level, it is necessary to understand the enterprise as a system and to integrate it as a unit whilst also developing environmental management.

Wind, geothermal water, solar energy etc. are some of the alternative energetic sources of energy, and at the same time considered to be renewable, economical and ecologic – and can imply the concept "sustainable". But unfortunately still only exploited to a small degree in Romania (Mihai, A., 2003).

The following chart (Figure 1) shows the direct use of geothermal energy in Romania (Popovski, K. et al., 2000).

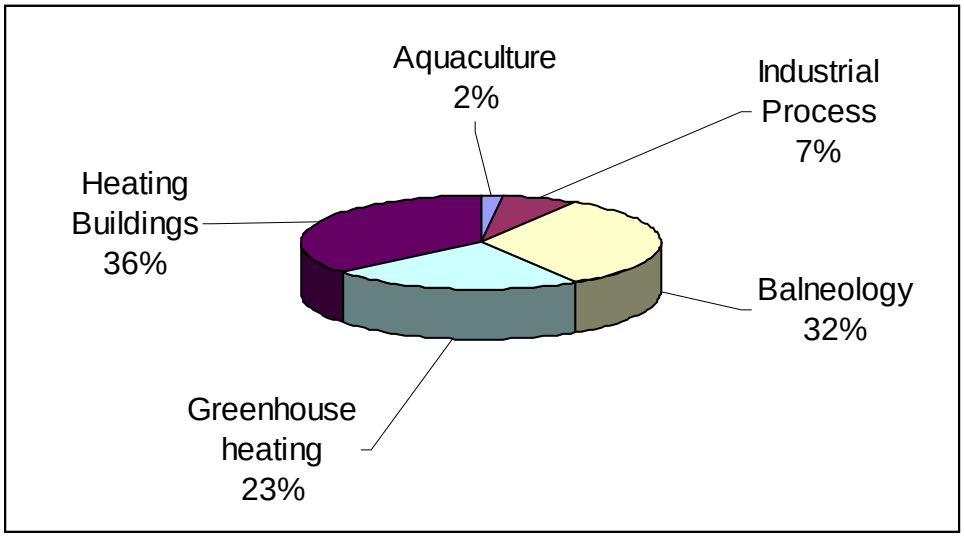

Figure 1: Direct use of geothermal energy in Romania.

Sustainable Development promotes protective strategies dealing with pollution prevention, aiming to maintain environmental quality (Riccio, V. A., 2001) and to diminish unrestrained use of resources (in particular the non-renewable resources). As a result this strategy is a balance with a broad-spectrum linking economic growth and the use of natural resources. It provides a new approach to a long-term development, as well as taking into account the environmental requirements, in contrast to a restrictive view of economic growth at any price.

Within this framework Cleaner Production (CP) assigns the same goals and settles on the measures indispensable for sustainable development. It shows the importance of reducing raw materials, energy consumption, and production of waste and pollution emissions (Adamczyk, J., 2001). The possibility is quite wide and cleaner production has been acclaimed to be one of those topics today that accommodates a significant spectrum of disciplines pull out from engineering, designing, sociologists, economists, politicians, and the civil society.

The conclusions of the Earth Summit have been incorporated in Agenda 21 at Rio de Janeiro, and imposed upon us to think 'integrated'. That is part and parcel of the concept of sustainable development (SD).

The principles of sustainable development involve activating environmental management policies and practices. These are not sound by themselves but only if integrate with all other environmental objectives, and with social and economic development objectives. Those objectives were realized, and followed by development of strategies to make effective the objective of sustainable development.

The United Nations Environmental Programme (UNEP) adopted the concept of "Cleaner Production" (CP), while in industry it was modifed as Eco-efficiency. As defined, Cleaner Production constitutes the continuous application of an integrated preventive environmental strategy to processes, products, and services seeking to increase efficiency and reduce risks to humans and the environment.

When applied in a restricted manner, focusing on the processes in the existing establishments and facilities, CP is similar to other strategies such as pollution prevention, waste minimization, or cleaner technologies. They all contribute to emphasise elimination or reduction of waste and pollution at source. The validation of the outcome of processes in: the reduction of inputs, reduction of waste disposal costs

and in a better product quality, bringing benefits (good image, as well as financial) to the company.

CP as one of the strategies for planning environmentally sustainable development has realised the development and growing importance of other strategies as part and parcel of itself, for instance:

- Focus on product design and development based on the life-cycle analysis (LCA);
- Focus on safer production (management of hazardous materials);
- Recognition of the role of management systems in introducing environmentally-sound technological change (EMS);
- Focus on creating an environment conducive to CP rather than interventions at the enterprise level.

The sphere of the Cleaner Production concept found a good niche in economic development. CP is considered as a means to achieve supplementary dialogue between policy-makers and industry. This movement is comprehensive across global boundaries in addressing global environmental issues. The CP concepts have significant implications in areas such as climate change and global warming because of its links to efficiency improvement in energy utilization.

In many countries conscientious companies have discovered that some benefits are obtainable through "going green". This can be achieved by enhancing the efficiency in production, by new efforts in adapting ecological, and finally improving company image.

Nowadays it is very common for the people in charge to see the advantages of following "green" goals. Actually, the companies must understand the competitive advantage to adopt more than minimum conformity with regulations. If we analyse the issues that influence companies to improve their environmental performance and adopt the environmental strategies we observe that these differ by level as: product, firm or even sector.

Notice the following groups of issues that are interrelated:

1) Official policies and regulations;
2) Financial matters;
3) Performance and competitiveness related issues;
4) Company's code of conduct;
5) Company's image in the community (social accountability).

Business activity can be established using various **management systems**. These will help to obtain, organise, administrate, evaluate and control particulars: information, quality, environmental protection, health and safety, various resources (human, finance etc.) (Riccio, V. A., 2001).

Operating within such concepts can be considered as an incentive to apply high quality management. Such procedures are also highly recommend for the Romanian geothermal sector! Because the geothermal sector is linked to the concept sustainable development and simultaneously to environment protection, we consider this type of energy resource a chance to develop a non-formalized system that is in fact Cleaner Production. Its benefits are very suitable to Romanian`s organisational culture.

2 Environmental management systems

Geothermal energy has been increasingly utilized in the last three decades all over the world and there was an increasing interest in exploiting this resource in various ways (direct use, electricity generation etc.)

It is clear that environmental concepts have changed from the early conventional and dogmatic meaning related to purifying the ecological sphere without regard to economic development, management topics, technological change, social needs and political arguments. There is no doubt that the new atmosphere surrounding environmental issues today is toward management, and organisation system.

The management systems can be carried out either autonomously or as an integrated management system that encompasses all the problems linked to the management of an organisation, whatever the type.

We can identify the management systems as:

- Formalised systems, based on some reference points as standards (standardised systems) or on laws; or
- Non-formalised systems (Adamczyk, J., 2001).

The former are management systems based on the standards series as ISO 9000, 14000 or 18000, and the latter point to Cleaner Production or TQM (www.iso14000.com).

Mostly used in Europe are two formalised environmental management systems (EMS):

- EMS based on BS 7750:1992 – Environmental Management and Audit Scheme-EMAS;
- EMS based on the ISO 14000 series.

The first one (EMAS), was approved by the Council of the European Union in 1993 (Council Regulation No. 1836/93). As other standards it is a deliberate scheme for industry. To join in Environmental Management and Audit Scheme a company must review its own environmental performance on a regular basis, which means to develop an environmental management system.

The goals of EMAS are:

- To initiate cleaner technologies;
- To reduce, avoid and remove all emissions prior to leaving the process;
- To diminish the use of natural resources.
- This system presumes that companies are fully responsible for their environmental impact. Consequently the company's main responsibilities include:
- To assume a favourable direction to have an environmental policy that will promote continuous improvements in its environmental performance;
- To develop an action plan of environmental area.
- To acquire efficient training programme to enhance employees' environmental awareness;
- To do Eco-audits;
- To put together available, relevant information to the community;
- This management system – EMAS, is approachable mainly to the companies that operate in industrial sectors. The method can, however, be adopted into other economic sectors such as distribution or public services.

The standards regarding EMAS were published in the years 1996-97. (ISO 14000), but a valuable experience had been gained by setting up earlier environmental

management standards (BS 7750 and EMAS) and the quality management standard (ISO 9000).

ISO 14000 is a set of standards that deals with activities for environmental protection and pollution prevention. The most important standards of environmental management system, are based on the previous ISO 14000 series, namely:

- ISO 14001 – Environmental management systems. Specification and application guidelines. ISO 14001:1996 establish basis for procedures of environmental management system.
- ISO 14004 – Environmental management systems. General principles, systems and supporting techniques.

As a result these standards have been developed to be:

- Used by companies of any size and type;
- Adoptable for a range of geographic, cultural and social conditions.

Environmental Management System (EMS) is defined as:

"An element of a general management system that involves organisation chart, planning, responsibilities, codes of practice, procedures, processes and necessary means for developing, implementing, managing, reviewing and maintaining of environmental policy"(Beltramo, R. and Pandolfi, E., 2001).

For instance a management system promotes a continuous improvement in environmental performance by repeating the following activities in an iterative manner:

- To design and implement an environmental policy (environmental planning);
- To achieve the environmental objectives;
- To validate and to prevent (measurements and assessment of effects);
- To scan (permanent evaluation and control);
- To review management activity (continuous improvement of a system).

The experience shows clearly that the system requires on-going improvement in compliance with environmental performance, thus leading to improvement in an environmental management system.

Implementation of environmental management system by a company is valueable for their positive and truthful environmental approach, as well as for local communities. This is the reason why we strive to develop this approach in Romanian enterprises.

3 Non-formalised environmental management system

The Industry and Environment Programme Activity Centre at the United Nations Environmental Programme (UNEP) published the *Cleaner Production Programme* in Paris 1989. Cleaner Production is in fact a preventive environmental strategy based on this program.

UNEP defines Cleaner Production as: "The continuous application of integrated preventive environmental strategy to processes, products and services, to increase efficiency of production and services and reduce risks to humans and the environment".

The key of CP is to promote preventive strategy as opposed to traditional waste reduction approach. Accordingly, it involves progressive pollution prevention for manufacturing processes, as well as products to reduce environmental impacts during production and throughout the entire life cycle of the product. We stress the strategy of reduction of waste and emissions before they leave the process.

Cleaner Production facilitates the implementation of sustainable development at company level. It can also be understood as a non-formalised environmental management system. Its aims are:

- Improving of environmental quality of manufacturing processes and products;
- Employing cleaner technologies (energy and materials saving);
- Accessibility to training programmes for employees.
- Cutting off toxic raw materials and products;
- Carrying out technical solutions of high reliability;
- Encouraging efficiency by reducing the generation of waste;
- Implementing closed material cycles all through the life cycle (design, production, distribution, use and re-use of by-products);
- Supporting environmental products and technologies;
- Proximate recycling facilities for industrial waste;
- Decreasing all emissions and waste to the environment.

Cleaner Production can be included in integrated management systems (www.iso14000.com). The CP certification procedure involves a four-step procedure:

1. Application for Company's Cleaner Production Certificate (after completing the second level training on CP), along with required documentation.
2. Verification of application at the Cleaner Production Centre.
3. Evaluation of applications by the Qualification Committee.
4. Awarding to the company the Company's Cleaner Production Certificate.

This procedure is open to all companies operating in the industrial and service sectors that are prepared to implement the CP strategy as an environmental non-formalised management system. So far, in Romania there is no company reported having been awarded the Company's Cleaner Production Certificate.

The companies granted the Company's Cleaner Production Certificate are subject to on-site audit on a two years basis to check the proper function of their environmental management system based on Cleaner Production.

The case for more use of geothermal energy is a matter of energy liberalization policy, as well as ecological issues.

According to UE Romania must assume a new "Energy Policy", in fact this is already being prepared to be adopted within a few months, and this will take into consideration the geothermal potential. Accordingly, Romania expects a "boom" in this sector in the future. On this premise we try to draw attention to the application of the CP as a non-formalized management system, which in our opinion has a great potential for success.

At this stage Romania has a certain experience in the geothermal sector, but not as extensive as is its potential deserves, although it is a fact that geothermal energy is the most utilised of the renewable resource of Romania.

On the other hand, in the last two years numerous ecological accidents have been reported in Romania. These emphasise the responsibility of the companies to reflect and decide on how to avoid repetition of such accidents. It allows the communities, as well as the companies to achieve not only considerable environmental benefits but also large profits.

Generally, the programmes recommended for adoption are non-formalised environmental management systems.

An initiative must be taken to set up a Romanian Cleaner Production Centre based on an Agreement on Cleaner Production and Sustainable Development for Industry. The Romanian of Engineering Associations (AGIR) and the Technology Agency and the Romanian Centre for Environment (Testing and Certification) must be made

aware of the Company's Cleaner Production Certificates. The companies that implemented Cleaner Production as an environmental management system can benefit in financial terms (Adamczyk, J., 2001).

We must take into consideration environmental performance driven access to favourable financial funding.

4 Conclusion

Cleaner Production is a strategy for shielding of the environment. It can be used as a non-formalised environmental management system on a company level. It is in our opinion highly appropriate for Romanian environment.

The benefits of the implementation of this system are the following:

- To the environment by reducing environmental impacts;
- To the company by additional savings and reduced operating costs.

Similar to the formalised environmental system, Cleaner Production involves the improvement of company's environmental performance. Experience indicates that companies involved in the Cleaner Production programmes achieved decreased waste and emissions; lesser utilization of raw materials and consumption of energy in addition to reduced in production costs and environmental fees. All these are achieved by continuous improvement through implementing the CP projects.

The costs related to operating a Cleaner Production project are paid back within a short time (months or years – depending on the project).

Many companies in European countries are developing corporate environmental strategies to reduce negative impacts on the ecosystem. This involves adopting environmental objectives' statements, conducting audits and monitoring performances. But we are not to forget that the ecosystem is unique for us. All of us, individuals and communities, small enterprises and multinational companies are responsible for preserving it for future generations.

5 References

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