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## INNOVATIVE ECO-MANAGEMENT BY CEMENT INDUSTRY OF POLAND

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Instantly changing environment and surrounding drive all polish cement plants to change its production engineering and whole technology, which is also defined as innovative management process. Target of innovation is to find the way to improve the efficiency of mixed production and profitability of the enterprise. Our paper considers the very actual and important problem of environmental management (known as Eco-Management 1).

Protection of our natural environment has recently become one of the most urgent cases not only for nations, states and local societies but also for every single person and because for that also for individual enterprises. The changes in perception of global problems, taking more responsibility for all our actions, consciousness of irreversibility of environment destruction somehow forced companies and their authorities to estimate also their impact on these processes.

Eco-Management gives the instruments to operate to developing the environmental protection especially by great plants and factories. Most known option of environment-friendly-management is EMAS - Eco-Management and Audit Scheme, which is very complex and efficient tool for adopting enterprise to environmental demands.

With this instrument polish cement plants can easily realize the whole production proceeding and commercial management and reach the required level of economical performance, which won't collide with natural environment.

Our paper presents the meaning of implementation of these systems for greatest cement plant of Poland and present two most important aspects off his process: the costs and the benefits of Eco-Management.

### 1. The cement plant and the environment

In a market ruled by the principle of *free initiative*, it is important to have mechanisms to protect the cement industry against unfounded attacks, as well as mechanisms of social and environmental protection against the enterprises actions.

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<sup>1</sup> Garcia J. C., Enterprise Environmental Management – Umweltfreundliches Management, TBN, Tübingen 2002, pp. 45 – 48; Miebach H. H., Umweltfreundliche Produktionsverfahren bei der Bau- und Zementindustrie, Hekel Verlag, Düsseldorf 2001, pp. 23 – 26.

That's why the economical activities are submitted to several limitations, one of them, the sustainable development. The cement plants have been especially forced to become *green* for many reasons, in which we emphasize:

- a) The law attempts
- b) Punitive costs (fines, penalties, indemnities, etc)
- c) Penal guilty (to the managers, besides the penal responsibility off he company)
- d) Pressure from the environmental organization (Ecology-Clubs, Greenpeace etc.)
- e) Awaken citizenship (local initiatives)
- f) International Codes pro-environment
- g) Requirements of Eco-Building and Housing

## **2. Environmental Management Models in Poland**

One of more popular models of environmental management is EMAS - the Eco-Management and Audit Scheme, is a voluntary initiative designed to improve cement plant's environmental performance.

It was initially established by European Regulation 1836/93, although this has been replaced by Council Regulation 761/01 <sup>1</sup>.

Environmental management has become a core business issue for many organizations. Minimizing the amount of waste that is produced, reducing energy consumption and making more efficient use of natural resources can all lead to financial cost savings, in addition to helping to protect and enhance the environment.

EMAS is not strongly backed by Polish Government and the environmental regulators - organizations that participate are recognized as making commitments to the environment and to improving their economic competitiveness <sup>2</sup>.

The EMS provides the organization's management with a structured framework for identifying, evaluating, managing and improving its environmental performance. It helps to ensure that the organization's overall environmental goals, as set out in its environmental policy, are implemented throughout the organization and that employees, contractors and suppliers know their roles and responsibilities in helping the organization to achieve them.

Regular monitoring and auditing of the organization's environmental performance and the system that is put in place to improve it provide management with a basis for evaluating the effectiveness of the EMS. The EMS also provides a system for collecting and managing data on environmental performance, which is used in the environmental statement and can be used to make validated product claims.

Up to now, environmental protection issues have mostly been a matter of concern for the responsible authorities. An increase of environmental awareness among the management level and employees in enterprises, organizations etc, will gradually relieve the local and regional authorities of some of their tasks regarding supervision of environmentally hazardous activities. One of the main objectives for nowadays is namely to introduce the European Union Eco-

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<sup>1</sup> s. [www.emas.org.uk](http://www.emas.org.uk) and [www.emas.com.de](http://www.emas.com.de).

<sup>2</sup> Tomasz Nitkiewicz, op. cit., pp. 12 - 14.

Management and Audit Scheme (EMAS) to cement plant and buildings materials factories in Poland.

However, the local authorities are also responsible for different kinds of services, e.g. collection of municipal waste, treatment of sewage water and supply of energy for heating and electricity. The demands on the local authorities to perform these services in an ecologically sustainable way will increase as more and more plants and factories implement some form of environmental management system.

Therefore, the project also includes actions for developing and adjusting the EMAS scheme to the different activities in a local authority. The EMAS project will also serve as a starting-point for a deeper cooperation between the partners, resulting in follow-up and development of further projects in the field of environmental protection. In the end, the results from the project will be spread among participating regions and also to other interested parties in the East and Baltic regions.

The most important Environment Management System profits are: performance, reduced liability, competitive advantage, improved compliance, reduced costs, fewer accidents, employee involvement, improved public image, enhanced customer trust, better access to capital <sup>1</sup>.

### **3. A Benefit of Environmental Management - Practical View**

These practical examples below show how to achieve not only environmental benefits but also economic success. Professor Gege presents six typical examples that are easy to transfer to other contexts. The examples are categorized into six areas: raw materials and supplies; water and waste water; energy; waste management; and packaging <sup>2</sup>. This model we have applied to analyze the profits of EMS by polish cement plants:

#### **a) Raw materials and supplies**

The following are the most frequently used measures with the greatest cost cutting effect in the materials and auxiliary materials sector:

- Environmental optimization of products and changing in production processes to reduce material input (limestone, clinker, sand), in particular for materials, which are hazardous for the environment.
- Recovery of production residues and return of used products, recycling them directly for new products (recycled gypsum and furnace additives).

An example from Cement Plant "Odra" in Opole -using of recycled gypsum and reduction of clinker (by its partial changing to furnace additives) brought the savings of ca. 250.000 USD per annum.

#### **b) Water and wastewater**

The following are the most frequently used measures with the greatest cost cutting effect in the water/waste water sector:

- Establishment of water recycling circuits, mostly in connection with cleaning operations, to allow process water to be used several times in the production process.

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<sup>1</sup> s. Gege M., *Reducing Costs Through Environmental Management*, B.A.U.M., Stuttgart 1999, pp. 67 – 69.

<sup>2</sup> Idem, pp. 80 – 84.

- Replacement of water-intensive processes by new technologies, which require only small quantities of water or do not use water at all.

Example from Cement Plan "Ożarów" in Ożarów:

Water recycling circuit in clinker cooling installation brought the cost effectiveness of 315,000 USD per annum.

A closed-cycle rinsing water system was established in clinker cooling installation. The system includes mechanical filters and an ion exchanger for contaminant removal before the water is reused for cooling.

Related to total water consumption, about 70% of the water is retained in the cyclical system, which means savings of some 80,000 m<sup>3</sup> of water per annum.

The investment in the closed-cycle system and the ion exchanger was about 3000,000 USD giving a payback period of about 7 or 8 years.

#### c) Energy

The following are the most frequently used measures with the greatest cost cutting effect in the power sector:

- Use of combined heat and power systems (CPH) especially by cement plants, having a high demand for electricity and process heat.

- Energy management system, i. e. including all energy flows and individual solutions based on this.

- Use of waste heat from machines, cooling water, etc., for space heating or process pre-heating (recuperation systems).

- Control of machines, heating, lighting, air-conditioning, etc., closely matched to needs. This avoids time wasting and saves energy.

Example from Cement Plan "Góradzde" by Opole:

Energy Supervisor by the Environment Protection Administration of the Province Opole has identified saving the energy potentials assessed to 2 millions Zloty in 2000.

The earlier appointment of Energy Supervisor enabled this cement plant to achieve economies of about 9% on power in the 2000 to 2001 period, with consequent savings of some 2,000,000 PLN. Individual measures included:

- \* Replacement of the central compressed air system by additional (supporting) compressors, thus permitting shutdown wherever compressed air is not required.

- Identification and elimination of leaks in the compressed air system.

- Separation of power supplies to the individual production areas, thus making it possible to disconnect each area individually.

#### d) Waste management

The following are the most frequently used measures with the greatest cost cutting effect in the waste management area:

- Waste stream separation, i.e., development of a comprehensive separation concept, ideally with color coding, to ensure separation of recycling materials from residual materials throughout the process.

- Recycling of materials directly in the production process, wherever possible. This eliminates charges for waste disposal and at the same time reduces the cost of purchasing raw materials and supplies.

Example from Cement Plant "Odra" in Opole:



A BRAM- System (in German: Brennstoff Aus dem Müll) was set up to mark the to sort and use recyclable furnace fuel from refuse and sweepings. This reduced the amount of household waste of City Opole by 30%, thus cutting the costs of waste disposal by 250,000 USD and furnace operating costs of cement plant by 50,000 PLN per annum. The payback period for the purchase of BRAM-Installation was less than five years.

#### f) Packaging

The following are the most frequently used measures with the greatest cost cutting effect in the packaging sector:

- The use of disposable packaging materials of all kinds, e.g. re-use of duplex or multiwall sacks, and use of reusable plastic sacks and cement containers (refuellers) and railway tank cars (by bulks cement).
- Reduction of packaging material quantities by using less packaging, different packaging, and changing unit sizes; changing from high-cost, environmentally harmful materials to more environmentally acceptable materials.

Example from Cement Plant "Nowiny" in Kielce :

This factory developed a re-usable packaging system using untreated jute and paper, for all cement assortments, and reduced the prices for bulk cement (transported with own cars or railways wagons of buyers) also for all buyers they return the package (bags, sacks).

The return rate is more than 70%. This means each packaging set can be re-used more than two times. The reduction in jute and paper consumption is more than 60%. There are further reductions in the waste and energy sectors. The cost saving with this re-usable packaging system is about 1.3 million Zloty per annum.

The cost reduction examples given here, and the others cited in the Gege's book '*Reducing Costs through Environmental Management*' are characterized by some common points among the companies involved:

- High priority is given to environmental protection.
- Environmental protection is firmly established in company organization, with clearly defined responsibilities and contact persons.
- Environmental guidelines and goals are clearly defined.
- Almost all cement plants are validated in accordance with the EMAS to obtain these qualifications in the near future.
- This exchange of experience is very important, especially to enable whole polish cement industry to achieve savings.

#### Further Reading

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## PREZENTACJE REKLAMY PLACÓWEK EDUKACYJNYCH ORAZ UCZELNI NA CD-ROMACH

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Placówki edukacyjne, w tym szkoły wyższe często tworzą różnego rodzaju materiały mające na celu promowanie ich działalności w kraju i na świecie. Materiały te z reguły mają formę drukowaną i przyjmują postać informatorów, folderów, biuletynów, ulotek reklamowych. Zawierają informacje dotyczące kierunków studiów, zaplecza naukowo- dydaktycznego, rodzaju świadczonych usług dla podmiotów gospodarczych oraz wiele innych danych mających na celu zapoznanie społeczeństwa z ofertą placówki edukacyjnej. Współczesny marketing oferuje tego typu instytucjom wiele różnych form promowania swojej działalności. Niniejszy artykuł poświęcony jest najnowocześniejszej z nich - prezentacjom i reklamom zamieszczanym na **CD-romach**. Autor dokonał badania ponad 100 różnego rodzaju marketingowych prezentacji zamieszczonych na powyższych nośnikach informacji. Na tej podstawie przedstawia w artykule podstawowe błędy popełniane podczas ich tworzenia oraz podaje wskazówki ułatwiające posługiwanie się nimi.

CD-romy, nazywane również dyskami CD to metaliczne, okrągłe płytki z jednostronnym komputerowym zapisem, utożsamiane z pamięciami o dużej pojemności. Prawie każdy użytkownik komputera posiada je oraz z nich korzysta, np. instalując nowe oprogramowanie. CD-romy nagrywa się i odtwarza przy użyciu komputerów. Można je również przegrywać (kopiować).

Z punktu widzenia form i możliwości oddziaływania na odbiorcę, CD-romy to doskonałe narzędzie promocji i reklamy. Przewyższają pod tym względem telewizję, będącą nośnikiem technicznie wyrafinowanych filmowych przekazów reklamowych.

Potęga CD-romu jako narzędzia marketingowej prezentacji wynika z następujących, ważniejszych możliwości jego wykorzystania:

- a) prezentacja filmów – każdego rodzaju, począwszy od tradycyjnie nagrywanych i montowanych, skończywszy na najnowocześniejszych trikach filmowo-komputerowych,
- b) udźwiękawianie przekazów wizualnych – może to być muzyka, narracja, specjalne efekty dźwiękowe,