Environmental Management System and Corporate Studying in the Function of Energy Efficiency

Nikolić Vesna, Danković Sanja and Galjak Mirjana*

1. University of Nis, Faculty of Occupational Safety in Nis, Čarnojevića 10a, 18000 Niš, SERBIA
2. "HIP-Petrohemija" a.d. Pancevo, Spoljnostarcevacka 82, 13000 Pancevo, SERBIA
3. Ministry of Health, Nemanjina 22-26, 11000 Belgrade, SERBIA

* marta7@ptt.rs

Abstract

Corporate learning for ecological efficiency and environmental protection is becoming a standard practice in many big and small companies although there is no unique model which would be suitable for every organization. Unlike the corporate learning, which is a process, "learning organization" presents a necessary structure - in fact, cause and consequence of corporate learning for environmental protection. Any organisation, being manufacture, service or else, which promotes the learning of its employees and by this learning continually changes itself can become a learning organisation.

New organisational models are based more on communication and information systems than on the description how people interact. Based on the current needs of energy systems to improve ecological efficiency and implement green business, the paper examines corporate learning in energy systems and relations of learning and environmental management and consider green manufacturing as a concept and strategy of sustainable energy systems of the business.

Keywords: Ecological efficiency, energy systems, green business, learning organization.

Introduction

The introduction of green production concept as the business strategy directed towards profitability by operating processes with no adverse effects on the environment[3] in energy systems can support the transformation of corporative systems, offer lots of chances to present generation and keeps the planet safe for future generations to survive and develop. Green production is not related only to the changes in the use of resources, production processes or products but also to the changes of corporative culture and attitudes of people. Companies already know that corporate education for environmental protection is very important because educated employees can increase productivity which results in profit increase. In today's economic situation the actions aimed at the concept of sustainable development as the development that satisfies the needs of present-day generation without endangering the ability of future generations to satisfy their needs[4] save money and minimize adverse effects on the environment.

The implementation of any vision of sustainable development in corporate systems asks for the directing education for environmental protection towards more effective problem solving and acting. During the last decade, as a result of global demands of sustainable development, many companies are becoming aware of the need for their own transformation first into learning companies and then into organisations within which education for environmental protection transcends education and permanent training of experts by including all employees, enabling them for designing such processes, programs and organisation of all elements of corporative systems that have no adverse effects on the environment.

The environmental management system is the "part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy."[8] This system presents a useful tool for helping corporative systems to define their own responsebilities in accordance with sustainable development. By implementing general requirements of environmental management system into the top corporate management system, it is possible to improve the changes concerning law, public and principles of sustainable development. It is also possible to direct corporate learning to increase the awareness of each employee. Recognising his own part and clearly defined responsibility in the management system each employee can take actions which contribute to the elimination of effects on environment.

Organizational learning in energy systems

At its early beginning, the industrial development was mainly directed to the increase of capital by encouraging productivity of employees causing the improvement of the standards of living. It was stimulated by the policy of the society and economic mechanisms and controlled by the prices of production, goods and services. During the industrial development, the aspects of environmental protection and sustainability were not taken into account and knowledge was the capital used for creating new production

processes and new products. This is the reason why traditional learning is being given a new dimension which would enable society to reach sustainable development but all this requires the transformation of the existing system of learning.

The realization of corporate learning for environmental protection asks for vision, imagination, planning and acting of all employees in order to achieve healthy, ecologically sustainable society and beside the regular educational system, it has its important role in transformation of classic business organizations into "learning organizations".

In present day academic and business environment there is increasing interest in the concept of corporate learning. The problems of corporate learning are closely related to the paradigm of "learning organization" and the concurrent advantage of an organisation based on knowledge. In the situation of rapid and extremely dynamic changes, a company gains its concurrent advantage on the market not because it has something that others do not have, but because it knows how to do something better than others which presents the core competence of the company. The core competence is, as a matter of fact, the source of concurrent advantage on the market and this can be achieved only by corporate learning.[6]

Due to mentioned changes in the development of society, the concept of learning organisation has been widely accepted by a lot of modern organisations. Learning organization promotes education among employees and at the same time learns from them. Key characteristics that define a learning organisation are:

- Establishing education of both individual and organisation as the basic condition for achieving objectives;
- Including all members in the process of continual re-examining and improvement;
- Organisational structures consider operational tasks the opportunity for continual learning.

The transformation of an organisation into a learning one is not a simple process and it requires changes in culture and the awareness of people. A lot of organisations have already placed a great accent on employee training and offer them opportunities to develop their skills. They themselves define and design and then perform designed education and trainings realizing "corporate learning" in that way.

Corporate (organisational) learning is organization-wide continuous process that enhances its collective ability to accept, make sense of and respond to internal and external change[1]. The purpose of organisational learning is to enable an organisation (company, small business) to develop competences that it has not had up to that moment, especially those that help achieve concurrent advantage on the market in accordance with the principles of environmental protection and sustainable development. However, the learning of new ways of behaviour often asks for abandoning the common behaviour, in fact, replacing the existing ways of behaviour in a company and forming environmentally acceptable and desirable behaviour of the organization (cognitive and behavioural component of corporate learning).

In literature there are some critics about the concept of corporate learning stating that organisations cannot learn; that only employees of organisations can. Some authors claim that only individuals can learn and that there is no knowledge except in individuals and in their brains. Others, on the other hand, claim that corporate learning is a social process which, by interactions, creates the knowledge which exists in an organisation independently from being present in the brains of members of the organisation[6]. These are specific experiences and knowledge contained in the routines, structures, systems, work technology which do not disappear if an individual leaves the organisation. The knowledge which represents the source of key competences of an organisation is the one that exists at organizational not individual level.

Starting from the principles of sustainable development and the assumption that an energy system is facing external and internal changes, (external changes include achieving concurrent advantage on the market together with establishing sustainable interaction of economic, social and natural systems and internal include the transformation into the learning organisation aiming at making higher ecological efficiency), corporate learning for environmental protection can be defined as the process of acquiring and accumulating useful knowledge and information by employees in energy systems.

Environmental management system (EMS) from the discourse of corporate learning

Standard ISO 14001, as environmental management system, has become a widely used administrative tool as a response of corporate systems to the requirements of sustainable development. By bringing requirements of ISO 14001 and a complex set of tools for sustainable development into accordance and embedding these requirements in processes, a complex organisation will be able to form a strategic plan for sustainable development initiative.

Environmental management system (EMS) presents overall approach to implementation and development management and makes it possible to greatly improve the corporate awareness of the significance of environmental protection and its systematic management. The application of EMS improves the effects on the environment not only by investments and benefits but also by the improvement of

operational practical measures in everyday activities. This leads to risk minimisation, cost savings and improvement of an organization entire management system. The environmental management system is also directed to the management strengthening for the sustainable development, raising the employee awareness as well as to educational programs for environmental protection. The active participations of employees at all levels in the application of EMS will obtain the path to the flexible and sustainable system.

The work and progress of each of energy organisation depends on successful management so the management of an organisation tends to produce sustainable products, services and solutions and to ensure the accordance with nature. It carries out and controls the sustainability performances, evaluates and analyses the performance indicators, provides feedback and continually improves the work of an organisation. In modern times the management has to focus its activities in several directions, changes of behaviour being the most important.

The raising of ecological awareness of each employee is of great significance for achieving sustainable development and environmental protection so a lot of organisations have started the implementation of corporate learning according to standard ISO 14001 "Qualifications, training and awareness" in order to transform traditional production into a green one.

It is also very important for successful implementation of the policy for environmental protection that employees improve their knowledge about the interactions of energy system and environment voluntarily, so appropriate guidelines and procedures must be made. Organisations have been implementing different educational programs: from those offering basic knowledge of environmental protection, through special courses (designed for particular jobs) to learning how to manage environmental protection according to standards and law regulations.

Green production as a strategy for sustainable business of energy systems

In the past, the problems related to the environmental protection were often ignored during the planning of industrial processes, production and disposal of used materials and products. The problems of hazardous and toxic waste are generally handled in the most appropriate and most effective way for organisation, without consideration of direct and/or future effects on health and the environment. Poorly planned and inefficient energy consumption leads to high operational costs and increasing emissions. Adverse impact of production, distribution, use and disposal of used products on the environment was and still is, an integral part of the life cycle. During the first half of 1970, the fact is that the need for including environmental protection in the development of the manufacturing process, as well as the impact of these processes on the environment had not been recognized.

The implementation of new legislation has resulted in reactive strategies of environmental protection related to the dilution and dispersion of pollution in the manufacturing processes. Reactive efforts of an organisation in preserving the environment are those which the organisation undertakes in order to make their business comply with legislation. On the other hand, proactive actions toward the environment are the ones that are being implemented but are not prescribed by law and contribute to the quality of the environment. Green production is the activity of this kind.

Green production is a business strategy that focuses on profitability through environmentally friendly operating processes.[4] Directing the organization toward this type of production and action is inevitable not only because it contributes to environmental protection but also because of its fundamental strategic soundness.

Stuart Hart, Director of the University of Michigan's Corporate Environmental Management Program (CEMP), indicated that green business strategies based on the principle of environmental sustainability may constitute a key basis for competitive advantage in the coming decades[3]. Green production strategy tends to minimize or eliminate all adverse impacts of the production process to the environment at all stages - from the entry of raw materials to final disposal of products through a closed production process thus requiring the transformation of production processes and transformation of environmental management as well[6].

Taking into account these factors the objectives of green production focus upon three fundamental goals:

- minimize emissions, effluents and accidents;
- minimize the use of virgin materials and non-renewable forms of energy; and
- minimize the life-cycle cost (cradle to grave) of products or services.

Green industry is the industry that can be defined as manufacture or service that directly contributes to maintaining or improving environmental quality as well as to improving the use of resources. Green activity or service is the one that can[3]:

- generate renewable energy (including alternative energy sources such as wind, solar and water energy, bio fuels etc.);
- recycle existing materials;
- produce, build, install or maintain the product with the least possible energy consumption;
- perform the appropriate training and raise awareness and
- produce a natural, sustainable product.

Now a days more and more organisations are trying to implement this business concept relying on the research of scientific institutions and associations for the environmental protection as well as on the results of internal marketing. With the development of green technologies they produce a product based on sustainable elements and materials, saving energy and reducing waste. The organization conducts surveillance of its products within the organisation and follows its whole life cycle, from planning, development, material procurement, manufacturing, distribution and use to disposal or recycling. Many of them begin their transformation by introducing "green" use of raw materials, "green" manufacturing processes, renewable energy and green information technology equipment.

Review of good practices-Results and Discussion

The current trend of many energy systems in the world is to focus the managing of the organisation on better environmental management, so it becomes an integral part of business. For many pro-active companies, environmental management is the management strategy, not just the initiative.

The role of environmental management system ISO 14001 is to facilitate the transition of an organisation to green production. It can help start the process of continuous improvement and the establishment of voluntary restrictions by the adoption of the concept of green production and directing the business of the company toward elimination of adverse impact on the environment. The environmental management system ISO 14001, which is implemented on the basis of this concept allows the systematic development of management and tools for the elimination of adverse environmental impact in the complete life cycle of a product, while at the same time saves energy and raw materials and supports the organisation through raising awareness of environmental protection throughout the organization.

With the recent explosion of "green" things energy companies such as ETSA Utilities from Australia, Saras SpA from Italy, Tohoku Electric Power Co. from Japan and others have recognized the vital role that their employees have in the daily operations of common importance involving the environment and sustainability. Corporate learning for environmental protection is becoming a standard practice in many large and small companies, although there is no single model to fit each organisation.

Many organisations ask from newly employed staff to have some knowledge in this area and expect employees to improve their existing knowledge. They adjust activities to corporate values of sustainability and environmental protection so that knowledge of the environment is not isolated within the top management but is expanding. In this way green jobs are being created.

Green jobs are those jobs in primary industries of green economy that promote environmental protection and energy efficiency. Green jobs are the opportunity for people to work in the industries which follow the policy of environmental protection and include jobs that require lower and more trained staff[2].

In order to realize the pursuit for this type of work and to improve understanding and awareness of employees about the activities in environmental protection a lot of organisations in various ways encourage learning and participation of employees in activities referring to environmental protection and the improviement of ecological efficiency.

ETSA Utilities[5], one of South Australia's largest corporations established in 1946, has provided services that include: delivering electricity from the high voltage network; installing, maintaining and reading meters; and providing an emergency response in the event of blackouts. ETSA Utilities plays a leadership role in the community and takes environmental responsibility very seriously so environmental management is a core business for them. To ensure the environmental management objectives are met, they maintain an EMS in line with ISO 14001 and established a department which is responsible for coordinating the application of the EMS. It also provides environmental training and conducts asset audits/risk assessments to determine environmental risk in conjunction with each department.

ETSA Utilities' consider environmental education and training as one of the most important objectives and thus it is included in every year's Environmental Action Plan which provides direction for managers and employees. They recognized that environmental education and training are fundamental to the demonstration of due diligence or environmental duty of care so ETSA Utilities constantly updates its environment training modules to meet the changing legislative requirements placed on the management of its assets and business activities.

As a result of active participation of employees in decision making of corporation, ETSA Utilities developed sustainability initiatives that are consistent with meeting national reporting obligations with regard to greenhouse gas emissions, as well as complementing corporate, stakeholder and environmental aspirations. Some of the actions the corporation carries out as a result of the well established EMS and participation of all employees in decision making are:

- A Climate Change Policy has been endorsed to identify the need for further action in the area of reducing the corporate greenhouse footprint;
- They secured three of the very first fully-electric, zero emission vehicles released by Mitsubishi Motors Australia Limited;
- In 2009. "Energy Efficiency Challenge" was launched to

reduce electricity consumption resulting in a consumption reduction of approximately 4% relative to 2008. Close monitoring of energy consumption continued in 2010 and 2011 with a range of new energy saving project opportunities identified;

- Staff and contractors received training in tree pruning around power lines from industry accredited professionals to preserve significant or heritage trees and areas.
- In order to restore vegetation and wildlife and re-establish original habitats through natural regeneration and on-ground works, the new environmental initiative was started – the Para Woodland Project (a 321 ha reserve) – where employees give 120 hours of their time to help plant 2,000 native trees and eradicate pest olive plants.

The Saras Group[7], established in 1962 by Angelo Moratti, operates in the energy sector and is one of the leading operators in the oil refining industry in Italy and Europe. It operates in the following areas: the sale and distribution of oil products on the national and international markets; the generation and sale of electricity; the provision of IT services and scientific research for the oil, petrochemical, energy and environmental sectors.

The Saras Group situated on the south-western coast of Sardinia includes Saras SpA which refines crude oil into petroleum products and accounts for approximately 15% of Italy's total refining capacity. In 2004 Saras SpA obtained ISO 14001 certification of the Environmental Management System and in 2008 EMAS registration which represents an inspiration for the company to voluntarily protect the environment, with the direct involvement of employees and the general public.

To achieve environmental objectives, ongoing training of employees is essential, both in terms of updating knowledge and in terms of raising awareness of the importance of the role of every person. For this reason Saras has conducted specific training courses on issues of environmental protection and safeguarding for direct employees of the refinery (based on which a multimedia course on CD-ROM has been developed, aimed at employees of contracting firms who work on the site), a number of specific courses have been held on atmospheric emissions and on the treatment, recovery and reduction of water wastage.

In 2008, several training sessions (of two hours each) were held for newly-hired employees on EMS. In 2009 over 4,200 environmental training hours were delivered, including specific training in HSE (health, safety and the environment), courses in accident scenarios and on the environmental, safety and major accident prevention policies in which the entire workforce took part in strictly technical courses.

Corporation's dedication to sustainable development and employees' inclusion into decision-making process led to important objectives achieving:

- Completion of the TGTU unit (Tail Gas Treatment Unit). The TGTU completes the sulphur recovery cycle and brings Saras into line with the BAT (Best Available Techniques) defined by the European Union.
- Environmental Integrated Authorisation (EIA) for the integrated prevention and reduction of pollution.
- Industrial efficiency and energy saving services range from the building of package plants for industry (including blowdown gas recovery systems, filtration systems and chemical additivation systems) to advanced process controls and process analysis systems. This type of service also includes engineering services (for example, feasibility studies and cost/benefits analysis, basic process), consultancy in the field of oil refining, development of training systems for operators of the OTS (Operator Training Simulator) plant, integrated services for the implementation and subsequent management of measures to improve energy efficiency.

Tohoku Electric Power Co.[9], headquartered in Sendai, Japan, supplies electricity to 7 million customers. Tohoku Electric Power has acquired certification of ISO 14001. In 2007, they started expanding and reinforced the Group's EMS. To raise the level of environment activities of the Group companies, they developed the "Sustainable Tree" of the Tohoku district and Tohoku Electric Power Group aiming their efforts at creation of a socio economic system that realizes sustainable development together with local communities through environmental management.

Some of the most important objectives developed throughout "Sustainable Tree" are: to raise the awareness of each employee about the environment to promote environmental activities as a member of the local community; to actively engage employees in educational and monitoring activities, to expand these engagements through the whole corporation; to realize a low carbon society trying to reduce greenhouse gas emission; to create a recycling-oriented society etc.

Corporation's dedication to sustainable development and employees' inclusion into decision-making activities as a member of the local community leads to important objectives achieving:

- Reduction of greenhouse gas emission;
- Raise of awareness of each of employee by providing advice about the energy-saving to reduce energy use;
- Organization of seminars for personnel of thermal power plants to secure appropriate management of wastes;

Conclusion

A large part of mankind is aware of the fact that the environment has reached the critical point by the attempts of people to ensure the existence which was considered necessary. But the awareness of the dangers our Earth has been facing, made people try to find the possibilities for minimizing adverse effects on the environment. In the last several years the prospects for success of the attempts to improve the quality of life have increased due to the concepts of sustainable development, standards of green production and environmental protection, new forms of sustainable learning as well as the raising of people's awareness about the necessity for changes.

The creativity and innovations in green technologies (known as clean technologies) lead towards the implementation of green production which results in cleaner and healthier planet. The costs can be high but the savings related to the pollution and the use of energy, gaining the reputation and loyalty of consumers justify the investments.

The way to sustainable development is not easy. The changes in economic and social progress of environmental protection are huge and demand a lot of effort regarding planning, implementation and control, but they will lead to the realization of millennium objectives which represent the realization of basic human right – the right of each person on the planet for health, education, accommodation and safety.

Corporate learning for environmental protection is one of the key factors for raising awareness about the problems we are facing in the 21st. century. Modern energy organisations have established the vision to raise the employee's awareness and understanding of global problems and the ways in which the behaviour of individuals and the organisation as a whole can influence the environment on the global level. The creation and development of the collective awareness of the necessity for joint efforts and solutions required by green economy through courses and other forms of leraning at all levels lead to the transformation of a classical organisation into a learning organisation in which employees at all levels, individually and collectively, continually develop their abilities to achieve ecologically effective results and thus contribute to improving green business and environmental efficiency of the company.

Acknowledgement

Research reported here is part of the project titled ''Research and Development of Energy Efficient and Environment Friendly Polygeneration Systems based on Renewable Energy Sources Utilization'', funded by Serbian Ministry of Education and Science (project III42006).

References

1. Business Dictionary, Organizational learning, <http://www.businessdictionary.com/definition>, viewed March (**2010**)

2. District of Columbia, Green Collar Jobs, <http://planning.dc.gov/planning/frames.asp?doc=/planning/lib/planning/green_collar_jobs>. viewed April (**2010**)

3. Encyclopedia of Small Business, Green production, viewed April 2010, <http://www.enotes.com/small-business-encyclopedia>, viewed April (**2010**)

4. Encyclopedia of Informal Education, The Learning Oragnization, <http://www.infed.org>, viewed April (**2010**)

5. ETSA (Electricity Trust of South Australia), Environment menagement plan, <http://www.etsautilities.com.au/centric/home.jsp> viewed May (**2011**)

6. Nikolic V., Organizational Learning - An Integrative Approach to Learning in the Workplace, 13th Dependability and Quality Management International Conference, Proceedings ICDQM, Belgrade, 59-70 (**2010**)

7. Saras SpA (Saras Raffinerie Sarde SpA), Environmental Declaration 2011. <http://www.saras.it/saras/pages/home>, viewed May (**2011**)

8. SRPS ISO 14001 (Serbian International Organization for Standardization), Sistem upravljanja zaštitom životne sredine – zahtevi sa uputstvom za primenu, Zavod za standardizaciju, Beograd (**2005**)

9. Tohoku EPCO (Tohoku Electric Power Co.), Environmental Action Report 2007: Basic Stance to Environment, <http://www.tohoku-epco.co.jp/index-e.htm>, viewed May (**2011**).

(Received 1st June 2012, accepted 18th July 2012)

Fonte: Advances in Management ; Aug. 2012, Vol. 5 Issue 8, p28-33, 6p [Base de Dados]. Disponível em: <http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=3&hid=12&sid=213a266b-9e32-4d11-a513-8e06c62dc65c%40sessionmgr10>.Acesso em: 01 Oct. 2012