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Abstract: Environmental Performance Indicator Systems for Industries – Experiences and Applications in ASEAN[1] Countries

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Efficient Environmental Management needs Tools

For many companies, the transparent representation as well as the continuous improvement of operational environmental performance has evolved into a key factor for acting successfully on the market. In many cases, compliance with international standards is the prerequisite for efficiently building up regional, national or global business relationships. Today, numerous companies from the most widely differing industries have already recognized the economic benefit of environmental management systems. This thesis is confirmed by the constantly increasing number of companies worldwide certified in accordance with ISO 14000. As analyses show, not only European or American enterprises are shaping this development. Countries of the ASEAN federation (e.g. Malaysia, Singapore, Indonesia, Thailand as well as the Philippines) also have recognized the potentials and following this trend.[2]

The dynamic development of the industrial milieu, characterized by more greatly perceivable impacts of environmental pollution, rising competitive and cost pressure as well as increasing global business activity is leading to new requirements specific to environmental protection being placed on companies. However in order to be able to develop the potentials doubtlessly present (cost reduction by efficient resource management, process and system optimization) from economic points of view as well, the application of methods and tools appropriate to the problems is necessary. In the case of industrial environmental management systems, the continuous improvement process is a central objective. Simple, practicable tools, which support the process of continuously improving operative environmental protection performance, are therefore necessary to support this proposition. In this context, industrial Environmental Performance Indicator System (EPI System) have proven to be very useful and efficient.

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1 Association of Southeast Asian Nations

2 By April 2001 approximately 350 Thai companies had implemented an industrial environmental management system following ISO 14000. (For a list of ISO 14000 certified companies in Thailand see (http://www.tisi.go.th); update: April 2001).

Practical Experiences from Thailand and the Philippines

As part of the international “Green Productivity Project / GPP I” the Carl Duisberg Gesellschaft e.V. Cologne commissioned the Fraunhofer Institute for Factory Operation and Automation (FhG-IFF) Magdeburg to design a software based Environmental Performance Indicator System for small and medium-sized enterprises of the ASEAN region and to implement it in a pilot company as an example Two medium-sized companies from Thailand (electroplating industry) as well as from the Philippines (electronics) were selected here as pilot companies.

The software-based Environmental Performance Indicator system was developed following international standards such as ÍSO 14031 (Environmental Performance Evaluation / EPE). Aspects such as investment cost, training effort as well as availability already played a decisive role when designing the Environmental Performance Indicator System. Against this background, the standard software MS Access was selected as the development platform.

The project was implemented in the following phases of work:

Phase 1: Kick Off Workshop

- Definition of the project team, budget, work plan and schedule
- Definition of the target system

Phase 2: Gap Analysis / Setting of Foci

- Performance of a company analysis
- Prioritization by means of ABC analysis

Phase 3: System Design

- Definition and configuration of the substantive structure of the Environmental Performance Indicator System (focus on Operational Performance Indicators (OPIs) and Management Performance Indicators (MPIs))

Phase 4: System Programming / Adaptation

- Data modeling
- Function modeling
- Prototyping

Phase 5: Implementation / Training

- Integration in the operational IT structure
- User training
- Documentation

Results and Benefits

The systems user now has the possibility to record and assess all material and media flows and the connected costs. Various levels of detailing can be chosen here from the uppermost level of the company down through the machine and process level. This transparency makes it possible for the user to identify inefficiency and potentials for cost reduction early and commence compensation measures effectively. Apart from the easily quantifiable operational aspects, cross-sectional factors such as employee qualification or legal conformity are also recorded, evaluated graphically and documented in the system.

The systems users of the pilot companies were able to take advantage of the following benefits:

- **Ecological / economic gaps** in the operational process of producing goods and rendering services can be **localized** and their causes identified (basis for process and/or product optimization, cost reduction);
- **Continuous assessment** of the operational **environmental performance** (supporting function as part of ISO 14000; basis for continuous improvement) as well as purposeful generation of efficient improvement measures with corresponding **performance review**;
- **Improvement** of the **quality** of operational **decision-making** by taking into account the ecological dimension on different technical levels (process innovation, investment decisions, basis for sustainable development);
- **Increase of security** vis-à-vis questions of environmental liability by reason of archived and **documented pollution values**;
- **Efficient communication with the particular groups of demands** inside one's own company (employee, management levels) as well as outside (e.g. waste balance, environmental reports for relevant authorities, suppliers, customers).

The thesis that the use of Environmental Performance Indicator Systems makes it possible to identify gaps in a company and lower costs was also confirmed in the project carried out. Thus, for example, in the project, the fresh water consumption of the Thai company's electroplating line could be reduced by approximately 46 % and nearly halved as a result.

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