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PENGANTAR REDAKSI

Redaksi mengucapkan Selamat Hari Raya Idul Fitri 1424 H, mohon maaf lahir dan batin atas segala kesalahan yang kami lakukan baik yang sengaja maupun yang tidak sengaja. Pada kesempatan ini pula, kami mengucapkan Selamat Hari Natal dan Tahun Baru 2004. Semoga pada tahun baru nanti, seluruh sivitas akademika Universitas Diponegoro pada umumnya mampu meningkatkan prestasinya dan tidak perlu mengulangi kesalahan yang pernah dilakukan sebelumnya.

Pada edisi ke-3 tahun 2003 ini, Redaksi menerima artikel, antara lain dari Jurusan Teknik Sipil, Arsitektur, Kimia, Elektro, Lingkungan dan Program Diploma III Fakultas Teknik UNDIP.

Redaksi menyampaikan terima kasih atas partisipasi para pembaca dengan mengirimkan artikel-artikelnya, semoga di kemudian hari minat menulis terus meningkat

Kritik dan saran pembaca selalu kami tunggu. Akhir kata, Redaksi mengucapkan selamat membaca.

Redaksi

DAFTAR ISI

IMPLEMENTING CLEANER PRODUCTION *(AN INDONESIAN PRACTICE)*

Ika Bagus Priyambada[*)]

Abstract

Cleaner production (pollution prevention) has become a significant component of environmental management programmes which is distinct from end-of-pipe treatment in that it minimize wastes and emissions by reducing them at the source. Cleaner production is a cost effective complement to pollution abatement in meeting environmental standards. The systematic avoidance of wastes and pollutants reduces process losses and increases process efficiency and product quality. It also reduces the cost of waste treatment and disposal.

Indonesia is developing countries has the opportunities to implement cleaner production programmes in all of its industrial life. Like other country cleaner production programmes are required to increase their performance facing the environmental problem which increasing rapidly. Implementing this program is not a simple way , due to limited technology available in each country and other aspects that have to be considered, such as government, public, and industrial interest, and the most important thing is finance.

Important steps which involved in establishing the necessary pre-conditions for a cleaner production programme are establish a shared vision of how to promote cleaner production, build a consensus that the best way forward is through cleaner production programme, asses the existing system, establish cleaner production programmes and to provide long-term finance and technical assistance

Introduction

Over the past few years, cleaner production (pollution prevention) has become a significant component of environmental menage programmes in several developed countries. Cleaner production is distinct from end-of-pipe treatment in that it minimize wastes and emissions by reducing them at the source. End-of-pipe technologies, by contrast act on wastes and emissions that have already been generated, reducing them considerably.

Cleaner production systems can be defi-ned as approaches to industrial processes and product design that allow progress towards the goals of waste reduction in material and energy inputs, maximisation of energy efficiency, and minimization of overall environmental impact not just within a production plant but at all stages of design, production, distribution, consumption and disposal.[1]

Cleaner production is now recognized as a cost effective complement to pollution abatement in meeting environmental standards. The systematic avoidance of wastes and pollutants

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reduces process losses and increases process efficiency and product quality. It also reduces the cost of waste treatment and disposal.

Indonesia as the one of developing countries has the same opportunities as other developed countries to implement cleaner production programmes in all of its industrial life. Like many other developing countries through out the worlds cleaner production programmes are likely being required to increase their performance facing the environmental problem which increasing rapidly. Implementing this program in a developing country is not a simple way , due to limited technology available in each country and other aspects that have to be considered, such as goverment, public, and industrial interest, and the most important thing is finance.

The overall strategy to implrmrnt cleaner prduction programe

Five important steps are involved in establishing the necessary pre-conditions for a cleaner production programme.[2]

- Establish a shared vision of how to promote cleaner production. In this case Indonesian government has to collaborate with industrial sectors and public representative to shared the vision of cleaner production beneficent, such as improve the profitability, improve their performance for facing environmental problems and also discuss how to implement this programme in industrial life.
- Build a consensus that the best way forward is through cleaner production programme. Many industries, especially under medium size industries in Indonesia still do not understand what cleaner production is. In this case government has to joined together with some industrial which have already implemented this programme to encourage other industries to set up this programme and make them understand that cleaner production programme is the best way to increase their profitability with a cleaner processes.
- Asses the existing system of environmental and industrial policy with techniques and procedures for identifying areas and sectors requiring change.
- Establish cleaner production programmes such as demonstration projects and similar small-scale activities. Indonesia has already has a pilot project for cleaner production practice. Cement manufacturing in Cibinong is one of big industry that has already implemented this programme successfully.
- Provide longterm finance and technical assistance. Indonesian government has become aware the importance of cleaner environment start to encourage industrial sectors to set up cleaner programmes. The consequences are that Indonesian government has to provide more technical guidance and financial support to its industries, Hence, the industries are not hesitate to bring this programme in their entire processes.

The longterm goal may be to introduce cleaner production to every industry in the country through the

establishment of key advisory and information centres on cleaner production and technology, and thus effect a nation-wide transformation of industrial practice and philosophy.[2]

The shortterm goal may be simply to set up one effective cleaner production de-monstration project that will launch a snowball effect throughout a specific region or industry sectors, which will eventually spread to other regions and other industries.[2]

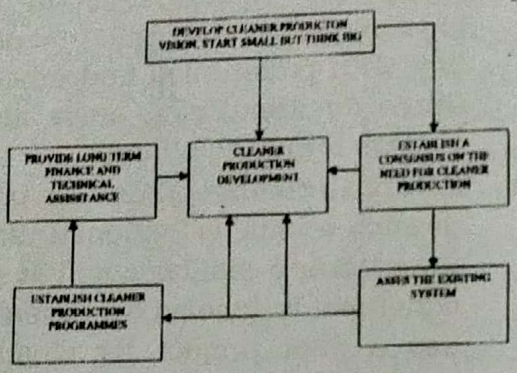

Figure 1. The overall strategy for cleaner production development.

Establish a sha

The initial task in the development of a shared vision and consensus is to identify key people and key institutions that will form the backbone of the cleaner production initiative. It may be that the people and one of the key institutions can be combine to form the nucleus of a Cleaner Production Centre.[2] This has been done in a number of industrialized countries. In Indonesia the Cleaner Production Centre may be consist of government, scientist and industrial itself.

One of the first jobs of such a centre is to publicize, in a join effort with government - in this case the Indonesian government can be represented by Trade and Industrial Department - the need for cleaner production and the importance of the vision that it entails. It is never sufficient simply to approach key leaders in business and government because many, quite unexpected organizations are likely to become involved in cleaner production programme. Information dissemination is a media that will help promoting cleaner production program by presentations, seminar, lectures, writing articles and preparing training programmes.

Assess the existing system

Before cleaner production policies and programmes can be formulated and implemented, governments need to gain a clear understanding of how their existing system works. This will reveal a number of obstacles that are likely to hinder adoption of cleaner production, and which will have to be promoted. In the process the opportunity can be taken to introduced cleaner production appro-aches to industrial and environmental legislation, and to develop specific cleaner production initiatives. A bias towards pollution control might be found, for example in:[2]

- innovation policy
- industrial policy
- raw material pricing
- trade policies
- tax systems
- educational curricula
- environmental regulations
- technology development

Government has to understand what is the meaning of cleaner production at the industrial level. This is often

misunderstood, which leads to inadequate policies to promote cleaner production or to the idea that cleaner production does not warrant separate attention at the policy level.

Establish cleaner production programmes

A cleaner production programme incorporates with demonstration projects, education, training, capacity building, outreach and institution building. For implementation this programme in industry, the first job which has to be set up is to carry out the same kind of as-sessment as governments do, but in this case, has to be done at the manufacturing level. A specific tool, the cleaner production opportunities audit, has to be available for this purpose, and has been successfully used in many demonstration project in several developed countries. This tool is used to examine an industry's production process, evaluate the changes that could be made and estimate their costs.

Another management practice that have to be made is that the country has to formulate such regulation and consen-sus to develop the economy and preserve the natural environment. This regulation is proposed to introduce the principles of preventive environmental management into the production and development programme of companies in order to achieve sustainable industrial development. These principle aim at minimizing solid, liquid and gaseous wastes in the production process, while simultane ously providing economic benefits. For implementation this regulation :[2]

The Enterprise

- will prepare and implement a cleaner production consensus according to the agreed methodology
- will introduce the consensus into short and longterm production and development plans and arrange for periodical reporting
- will designate a supervisor for the consensus

Government (Department of Trade and Industry, Department of Environment, Department of Natural Reso-urces)

- will organize training courses in the methodology of Cleaner Production design
- will facilitate access to information about world solutions in this practice
- will support enterprises seeking finance for the most effective undertakings resulting from cleaner production consensus.

In practice, manuals for industry have to be set up to control and assess the cle-aner production programme. This practice has been successfully carried out by several developed country. This assessment is not a one-off, start to finish procedure.[2] If the assessment has been made, and the country has already adopted cleaner production programme, the result must be evaluated and monitored. This evaluation will provide feed-back to improve the innovations intro-duced, it will also suggest new areas for application of cleaner production concepts. At this point the assessment cycle should be repeated.

The assessment must be carried out in the country which implementing cleaner production programme. Such project can be made to assess cleaner production improvement. This project is design in order to pay particular attention to the need for information by policy makers and to different dissemination strategies for cleaner production. The project may begin with a series of wide ranging assessment in five major areas:[2]

- innovation and industrial policies
- environmental policies at nationnal level
- environmental policies at local level, with some emphasis on the permit system
- cleaner production policy abroad
- the introduction and implementation of cleaner production in companies

These evaluations must be made with the help of interviews with important individuals and collective brainstorming ses-sions in workshops involving representatives from industry and government. The successful implementation of cleaner production programme is likely depending on the establishment of a number of cleaner production demonstration projects in individual companies, where the emphasis is on training and education of experts people and other related individuals.

Demonstration projects for cleaner production programme are made in order to reveal constraint to progress both within companies and in the relationship of companies to the outside world, notably with local nationnal government agencies. The constraints are different in every country. However, some develo-ped country are experienced with several constraints which often occur in cleaner production practice. These constraint are:[2]

- conceptual
- organizational
- knowledge-based
- technical
- economic

Conceptual constraints [2] relate to issues which companies regard as important. Conceptual constraints can include a lack of importance given to the environment, resistance to change, and poor environmental standards in both companies and governments.

Organizational constraint [2] can be traced back to the way a company is organized, to the ways in which companies work together and the ways in which government's environmental and innovations policies are organized.

Knowledge-based constraints [2] usually relate to lack of knowledge about cleaner production programme. Many professionals in companies and governments do not know how to obtain information about cleaner production, often because it cuts across the conventional, social psychological, environmental and managerial divisions.

Technical constraints [2] are common because technical changes are often involved in cleaner production. The need to master techniques of cleaner production assessment and change installations, tools, input materials,

processes and products often reveals technical constraint, sometimes at the stage of technology development, sometimes during demonstration and sometimes during dissemination.

Economic constraints [2] are also common, despite the fact that cleaner pro-duction usually result in savings for both industries and governments. Common economic constraints include vested interests, shortage of investment funds and incomplete or incorrect allocations of costs during the economic analysis of cleaner production possibilities. One of the most common economic constraint is a pricing policy that in effect subsidizes the use of resources such as energy and, particularly, water.

Prvide longterm finance and technical assistance

The objectives is to assess cleaner production programme, provide cleaner production training and establish demonstration project. Long-term and on going support also require appropriate institutions, in this case it may be represented by governments and individual representatives.

Longterm finance is the most important aspects of implementing a cleaner production programme, and it may be provided in several ways. First, government may take an initiative to finance cleaner production programme. It will show that government is concerned and put cleaner production in a first priority. Secondly, technical support can be financed by governments and industry organizations on a pragmatic basis which likely will has greater impact than the relatively isolated financing of individual cleaner production events. Thirdly, revolving funds may be carried out for small and medium industries. The money from such funds can be used to finance cleaner production programme. Companies will repay the fund from the economies that they achieved.

Case study

PT. Semen Cibinong (Cement company in Indonesia)

Cement is made by burning a fuel toge-ther with limestone and clay, shale or slate, yielding a clinker which is then ground with gypsum to produce cement. The process which is carried out in large rotating kilns, is a complex one, and it is easy to lose control and make substandard product.

The quality of the cement is determined largely by the firing temperature. However, both the NO_x and SO_x levels increase with higher temperatures. The process, must therefore, be operated within a certain bond of temperature with the optimum at the lower end. If the process is operated too far below this optimum, off specification product is produced. If the temperature is too high the fuel is wasted, cement quality is reduced and air pollution is increased.

The LINKman system is designed to mimic best operating practice and maintain optimum process conditions. The objectives were to stabilize the running of the kiln, reduce fuel con-sumption and increase output, and produce a consistent quality of clinker with optimum free lime levels. This final objective also reduces the energy required to grind the clinker.

Note that the temperature is not uniform along the length of the kiln. The LINKman system monitors the NO_x, CO and O_2 levels, the temperature at the bottom of the four stage preheater and the power required to turn the kiln. The process is optimized by controlling the freed rate to the kiln, its rotational speed, the fuel supply to the main and auxiliary burners and the speed of the kiln induced draft fan.

Several advantages can be achieved by operating this system:

- The wastage of coal at high temperature is avoided
- Higher quality clinker is produced
- The lining of the kiln has a longer life
- Some reductions in NO_x and SO_x emissions.

Conclusion

Indonesia as any other developing countries has huge environmental problems. Cleaner production is an option in environmental management practice for facing the problems. Implementing this programs requires the willingness and ability of government and industry to bring about a transformation of the national economies. This transformation may involve both incremental and more radical changes, require careful targeting, staging and phasing in of different policies and initiatives, and changes in the roles of various stakeholders throug-hout the transition to a cleaner production economies.[3]

Critical to the success of a cleaner production strategy are :

- a shared vision of how to promote cleaner production programme
- a consensus that the best way for ward is through cleaner production programme
- an assessment of existing policies, followed by corrective action
- a series of cleaner production initia-tives such as demonstration projects
- long term finance and technical assistance

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