

# Challenges in cleaner production policy in Egypt

Dr. Raymo Lilja, EPAP

## Introduction

Promoting industrial pollution abatement through cleaner production (CP) in Egyptian industry is one of the key objectives of Egyptian Pollution Abatement Project EPAP. EPAP is a joint project between the Governments of Egypt and Finland, the World Bank (WB) and European Investment Bank (EIB) and has been working since 1997.

EPAP has promoted cleaner production on several fronts:

- ? Technical assistance and financing of major CP investments in medium and large scale industry
- ? Producing self-monitoring manuals for industry with a special chapter on cleaner production
- ? Training on hazardous waste (HW) management with strong emphasis on waste minimization
- ? Support to the inter-ministerial CP committee established by the Ministry of State of Environmental Affairs (MSEA) with the target of producing a national CP strategy
- ? Proposing CP related amendments to the executive regulations of the main environmental law
- ? Training in basic concepts of CP for inspectors, media staff and NGO events.

This presentation summarizes some of the lessons learned so far about means and challenges in promoting CP in a country like Egypt.

## EPAP financing packages for CP investments

The financing component of EPAP consists of a 35 MUSD soft loan investment package from World Bank (WB) including a 20% grant and a slightly subsidized 15 M€ loan from European Investment Bank (EIB).

EPAP was originally focusing on the 40 major polluters, mostly in the public sector. Pollution Abatement Action Plans or Compliance Action Plans were designed for a group of these companies to present a road map to full compliance. Unfortunately many of these companies were and are not creditworthy for the soft loan because of outstanding old debts or lack of acceptable guarantee arrangements. EPAP turned then mainly on private sector medium scale companies and has up till now assisted in financing 14 significant environmental investments and five are in the pipeline. Of these projects twelve can be considered as partly or totally as cleaner production investments. EPAP operates in the whole country and all industrial sectors are eligible. EPAP is closing down and no more newcomers are invited in the pipeline.

The EIB loan with some interest subsidy was not very attractive to industry. Some projects for substituting heavy fuel oil boilers with natural gas were financed. The EIB package was

cancelled in 2001 due to low demand and competition by more lucrative financing mechanisms.

### **Success stories of CP investments**

Examples of the cleaner production investments financed by the WB package are:

Switching into argon flushing from mercury flushing in the production of fluorescent lamps. This project by El Nasr Electric and Electronic Apparatus Company in Alexandria was financed with 0,2 M\$. It achieved a reduction of mercury consumption by 70% and reduced the mercury concentration in the working environment from 0.25 mg/m<sup>3</sup> to 0.01 mg/m<sup>3</sup>.

Substituting solvent based spraying in tire manufacturing into water based spraying and simultaneously switching from manual spraying to automated enclosed process. This project by Transport and Engineering company TRENCO in Alexandria was financed with 0,47 M\$. It achieved reduction of heptane consumption per unit by 50% and decreased the heptane concentration in the occupational air to a safe level (about 30% of the limit of the law).

Replacing a polluting old lime kiln with a modern kiln with superior energy and raw material efficiency. This investment of Alexandria Sodium Carbonate company ASCC will be financed with about 4.2 M\$. Improved raw material efficiency is expected to contribute to a saving of about 15% in the limestone consumption and coke consumption is expected to be reduced by 60%! Improved pollution control is expected to bring down the dust level in the occupational environment from about 20 mg/m<sup>3</sup> to the limit of the law, which is 2 mg/m<sup>3</sup> for CaO. The supply and installation of the kiln is scheduled in 2004.

Reducing hexane emissions from soy seed extraction by replacing a highly corroded toaster by a new toaster with low leakage of hexane. This project by Tanta oil and Soap company TOSCO in Banha is financed by 0.2 M\$. The hexane consumption has been reduced from about 11 to about 4 kg of hexane per ton of raw material. The occupational concentration of hexane was decreased from over 600 ppm to under 20 ppm. The hexane residual in the fodder product was also reduced.

Substituting of a direct cooling system producing wastewater and hazardous waste emissions in a food oil deodorizing process by indirect cooling. This project of Arma company for food oil in 6<sup>th</sup> of October city will be financed by 2.34 M\$. The main benefit of the project is preventing of contamination of the cooling tower and spreading of oily mist in the environment. Instead of producing hazardous waste in the form of flammable oily waste from skimming the circulated cooling water, the new process will recover uncontaminated fatty acids that can be used in fodder production.

### **Integration of CP in industrial modernization and privatization**

The experience of EPAP in promoting environmental investments in Egyptian industry shows that purely environmental investments – end-of-pipe solutions – are difficult to justify under the economical conditions of the industry and given the weaknesses in the enforcement of the environmental laws. The examples demonstrate how cleaner technology should be integrated in the industrial modernization process on going in Egypt. All of these projects significantly reduce the production or maintenance costs and so increase profitability of the company, improving the sustainability for financing future modernization steps.

The WB is not allowed to finance projects that increase the production capacity of companies, because this would intervene with fair competition of the market share. However in some cases the modernization included removing of bottlenecks in the

production process, or reduced downtime due to frequent process failure or maintenance, and assisting thus the company in reaching or approaching the nominal capacity and in improving cost efficiency. This is acceptable for WB and represents the type of CP integration that is most attractive to industry.

In many cases the companies did not identify the significant environmental benefits of process rehabilitation projects and for this reason didn't approach environmental donors before technical assistance was provided. In some cases the company proposed end-of-pipe investments, for example wastewater treatment plants that could be markedly downsized by first implementing in process modifications, re-circulation and effluent segregation.

The need for rehabilitating degrading production equipment is urgent in most public companies, which are often posing severe health risks both to their own workers and to the neighboring residential areas. Environmental concerns are often not recognized as priority issues compared to other threats such as harsh competition by private sector and foreign companies, poor profitability due to overstaffing and inefficient technology and skyrocketing of costs of imported inputs.

Many polluting public companies are burdened with heavy old debts and sometimes government imposed duties that are not fully compensated for. If the production is aiming to the home market only, applying for a WB loan is in most cases not realistic, because the cost of imported equipment must be paid back in foreign currency, which is not accessible for these companies.

However some EPAP success stories can be presented also in the public sector. Misr Aluminum Company has invested massively in new production technology switching from self-baking anodes to pre-baked anodes, which is much cleaner technology. At the same time the company is substituting a wet fume treatment system with a dry system, with dramatic benefits in cost reduction, improving recovery of raw material losses and avoiding wastewater treatment.

Alexandria Sodium Carbonate is a public company owned by the Holding company for Chemical Industries (HCCI). This seems to be the most active holding company in Egypt in regard to planning and implementing environmental

projects. It has boldly guaranteed the loans needed to revamp most of the production technology including the new limekiln, ammonium absorber, salt purification etc. Also better housekeeping and environmental management are introduced and the company has gradually risen from the state of making annual loss.

In its privatization policy the holding company is considering case by case whether the company should be first upgraded and then sold or whether it is more feasible to sell it with a low price and transfer the environmental liabilities to the new owner, with more financing resources. A third option is to continue public ownership of companies that have strategic or social importance nationally.

EPAP has rallied for a transparent mechanism of taking the environmental liabilities into consideration in privatization procedures. It cannot be regarded as fair and good environmental policy, if public companies non-complying with environmental law are immediately enforced to comply, after the management is taken over by private sector. The cost of environmental upgrading should be included in determining the appropriate transaction value of the company.

Some holding companies are much more passive in grasping opportunities of environmental financing that could be used to radically bolster the feasibility of production or even saving the company from total collapse. The social and environmental benefits of upgrading existing factories would most probably be positive than having the private sector marginalize them with new, highly automated production plants – leaving the polluting public company gradually dwindle in losses, but continuing to pollute for several years.

EPAP conducted a feasibility study of transforming a production line for asbestos-cement sheets to using cleaner production ie. replacing asbestos fiber with a mix of synthetic and natural fiber. The study indicated that the production costs would increase, but the market price would still be very competitive and the investment would have a pay-back of less than four years. On the other hand there is no future for the existing product, as importing of asbestos is already banned.

Government intervention by providing loan guarantees should be used to cease such CP opportunities that would at the same time save jobs.

For SME industry an important environmental policy instrument in Egypt has been establishing of industrial cities or industrial areas where companies have been obliged to move from residential areas. This relocation strategy has been targeted eg. on foundries in Shoubra-el-Kheima and tanneries in Giza; some of the most polluted areas in Egypt. Unfortunately in many cases the companies that are evicted don't have the resources to build their facilities using cleaner technology, but only move their obsolete processes to a new site. Relocation is in many cases quite expensive, because all industrial parks do not offer infrastructure and the individual companies have to solve water, wastewater and electricity supplies on their own.

For SME industry receiving creditworthiness for bank loans for CP investments is usually unrealistic. They are unregistered, no financial statements or documents are available and they don't have the know-how needed to present an acceptable loan application. They are mostly also beyond environmental enforcement because of their vast number and unregistered operations. For the SME industry technical assistance for adopting low cost/no cost CP measures is the most feasible policy instrument. For CP investments with a short pay-back period the financing constraints could be solved by a special revolving CP fund, such as the model used successfully in Lithuania (ref). A facility providing guarantees for CP loans has been proposed in some other countries (ref). For energy efficiency investments so called Energy Service Companies (ESCO) have been successfully used for example in South Korea (ref) to identify and finance the needed investments and the beneficiary will pay back the technical assistance and the investment cost with the savings.

Also Egypt is looking for new sustainable mechanisms that could promote CP investments, also for public sector and SME industry.

### **Challenges in cleaner production policy**

One EPAP activity is supporting the Ministry of State of Environmental Affairs of Egypt (MSEA) in compiling a cleaner production policy bringing together the scattered efforts of MSEA units, other ministries and donor projects. In the committee the key roles of each ministry in CP policy will be clarified.

Information dissemination and training in cleaner technology are policy tools that are easy to start with, with a minimum of resistance from stakeholders. Companies that are adopting a systematic environmental management and a self-monitoring system are much more likely

to utilize this information than other companies. This is apparent also in the sample of companies that have benefited from the EPAP financing package.

Other projects that are targeting SME companies with a low cost/no cost approach of CP seem to be achieving even better results, because they don't have to tackle difficult financing and repayment constraints. Among these are the ACI component of the Environmental Sector Program supported by DANIDA and the SEAM project supported by Great Britain. UNIDO is planning to establish a CP center in cooperation with the Ministry of Industry and Technology and the Industrial Modernization Program IMP sponsored by EU is expected to adopt CP as an integral part of the modernization process.

### **Hazardous waste minimization as a priority in CP policy**

Hazardous waste (HW) minimization is one of the sectors where a cleaner production policy could bring major economical advantage both on national economy and company level. Treatment facilities for safe HW treatment, recycling or disposal are desperately needed in Egypt and evidently they should be mainly established through public investments and then cost recovery should be based on polluter pays principle.

Costly over dimensioning of the treatment capacity can be avoided by launching a program of promoting HW minimization.

The article 28 of the Executive Regulations (ER) of Law 4/1994 is the only article in the law that specifically uses the term cleaner technology. According to the article the generator of HW is obliged to strive for minimizing of HW. For emissions to air or water or non-hazardous wastes, the law does not refer to such pollution prevention or cleaner production objectives – for these emissions the law only acknowledges that the concentration of emissions shall not exceed limit values in the ER.

However this article stipulating HW minimization has hardly been applied in practice by enforcing the obligation. This is an area where targeted policy actions could be taken to demonstrate innovative policy instruments.

For example HW minimization could be promoted by sector or chemical specific voluntary agreements with industry and by allowing them a sufficient time to demonstrate seriousness before adopting more coercive measures. Substituting asbestos with alternative fibers or alternative products is an example of CP that has been successful in many European countries, such as Finland. PVC plastic is another candidate for using a voluntary agreement approach. PVC is classified as HW in Egypt, contrary to the interpretation in EU. As disposal of discarded sewage pipes in a special HW landfill or incinerator would be unwise, the only feasible solution is recycling back to industry. This should be performed in partnership with the industry in a controlled way to prevent occupational hazards and deterioration of product quality.

In some cases also economic disincentives for HW generation could be used eg. fees or refundable fees on chemicals that will ultimately be disposed of as HW. This would work in cases where substituting chemicals are available, but at higher cost.

However the first precondition for creating a demand for HW minimization is enforcing the articles obliging the companies to separate HW from non-hazardous, use licensed HW transport companies and either store their HW safely on site, recycle HW or dispose them at

licensed HW treatment facilities. If the law is not enforced, HW is not separated and they will land in the desert, municipal and industrial landfills and in the sewerage system.

### **Introducing emission load limits in Egyptian law**

As mentioned above, the Egyptian industrial pollution abatement policy has so far been mainly based on taking samples of emission flows and comparing the concentrations of pollutants with the concentration limits in the ER. Thus huge industrial companies and small workshops with the same concentration of a pollutant, say hexavalent chromium are treated in principle similarly, despite the fact that the pollution load per annum can be 1000 times bigger in the former. Emission loads per unit of production tend to be higher in small industry than large due to more haphazard handling of chemicals.

The Executive Regulations (ER) of the Egyptian Environmental Law 4/1994 are presently being scrutinized by a team of experts assigned by EPAP. The tentative approach is that the concept of *emission load limits* should be introduced in the ER in addition to concentration limits of pollutants in emissions and concentration limits of pollutants in occupational or ambient air. Load limits could be defined case-by-case by EEAA in the EIA process for new establishments and by the Governorates for old establishments during renewal of operating licenses. The carrying capacity of the recipient environment should be estimated if possible taking into consideration the different sources of a specific pollutant. Higher load limits or appropriate grace periods should probably be accepted for old factories. A mechanism for gradual tightening of load limits should be considered. This way the Egyptian system would approach a plant specific environmental permit system.

### **Self-monitoring as a first step to reducing emissions and losses**

Self-monitoring and self-regulation of industry should be promoted in the spirit of transparency and trust, so that inspection resources could be mainly focused on non-cooperative cases or theme based inspection campaigns. Self-monitoring of emission loads is bound to facilitate increasing of energy and raw material efficiency and minimizing of waste and chemical consumption. This is why EPAP has used a considerable amount of effort in producing a general environmental self-monitoring manual, manuals for 11 industrial sectors, and cross-cutting manuals for HW management, wastewater management and industrial energy production. Sector specific training events are scheduled during autumn 2003.

Cleaner production can be implemented by low cost measures such as better housekeeping, improved monitoring of process conditions, better management, training, maintenance etc. Or cleaner production can be implemented by introducing cleaner raw materials, substituting chemicals, redesigning products, automation or switching to cleaner processes. This can be a very complicated change that can constitute a long planning phase, impacts on quality of the product, lengthy close down of production lines etc.

### **The role of environmental inspection in promoting CP**

It is understandable that CP investments must often be given a longer time frame than for end-of-pipe solutions. Introducing of cleaner technology is most feasible if it is integrated with production investments. This must be understood and recognized by the environmental administration. In seeking partnership instead of confrontation with industry EPAP is presently working with EEAA to institutionalize the concept of negotiated

agreements. This would allow companies that are willing to invest in cleaner technology more time for reaching compliance with the law than the 60 days mentioned in article 18 of the ER. Negotiated agreements do not mean a window for using corruption to avoid complying. Also these agreements should not be used in cases where health hazards are serious or where low cost measures are readily available. Finally sanctions, such as administrative fines, should be used strictly, if the company is deliberately violating the agreed milestones.

EPAP is presently supporting the task force of the Cairo Branch Office of EEA in experimenting with the concept of negotiated agreements in the highly contaminated Helwan area.