



PROMOTING CLEANER PRODUCTION INVESTMENTS IN DEVELOPING COUNTRIES

ISSUES AND POSSIBLE STRATEGIES

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Cleaner Production – Doing More With Less

Cleaner Production (CP) provides a practical way of moving towards sustainable development. It allows the producers of goods and the providers of services to produce more with less – less raw material, less energy, less waste, and

thus, less environmental impact and greater sustainability. CP is a step beyond waste management – it deals with the source of the problem, rather than the effects. CP is efficient management and good business.

Challenge and Opportunity

Capital investments in developing countries have multiplied during the 1990s. Although international financing institutions such as the World Bank and regional development banks have played an important role in this development, most growth has taken place through private sector investments. This investment flow has been similar to the investment pattern during the industrialization period of OECD countries. These investments have often, though not always, led to increased

pollution loads and inefficient use of energy and natural resources.

Globalization presents a major challenge to developing countries in their attempts to promote economically viable domestic and international investments, decisions that are generally based on financial criteria. Consumer demand for competitive products manufactured in an environmentally sound manner is also increasing rapidly.

Environmental considerations often deal with emission standards only and they typically rely on an “end-of-pipe” approach to making changes in companies. These tools do not address the challenge of generating investment without depleting resources and burdening the environment any further.

One effective way of achieving such sustainable development is to redirect the flow of capital towards cleaner production (CP), i.e. to direct local industries and financial institutions towards cleaner production processes and practices rather than older polluting technologies. According to estimates by the Asian Development Bank and depending on the industry, 30-70 percent of current industrial pollution is linked to wastes and inefficiency from the use of

obsolete technology, inadequate knowledge of available CP technologies, low level of environmental awareness and poor enterprise management. This estimate is also in line with UNEP/UNIDO experience in the last ten years.

Most of the installed industrial base and of the energy production capacity in Africa, Asia and Latin America will be new in the coming decades. This presents an opportunity to avoid the costly waste management solutions that have burdened the industrialized world. Whether countries seize this opportunity depends greatly on the types of technologies they choose to adopt and the sufficient availability of appropriate financing.

Why This Issue Paper?

Several international organisations, development banks and donors have initiated and implemented projects to facilitate the introduction of cleaner production investments in developing countries. Most projects have been in the form of technical assistance grants and training to industries and/or loans at below market rates from dedicated trust funds. Yet the present level of lending through such projects is by far not sufficient to trigger widespread adoption of cleaner production.

To address this complex issue, UNEP launched a research project in 1997, with financial support from Norway, to

review the current state in cleaner production investments, and prepare a status report on key issues. The report also included strategies related to promoting cleaner production investments in developing countries.

A major part of the research project was carried out by IVAM Environmental Research of the Netherlands. Through this brief issue paper, UNEP is disseminating the findings of the research project to institutions and individuals in the financing and industrial sectors as well as agencies involved in development research and assistance.

What Is Cleaner Production?

Many terms are currently used to describe measures that prevent environmental harm. These include eco-efficiency, Green Productivity, pollution prevention, waste minimisation and source reduction. The term “cleaner production” was chosen by UNEP to define:

- The recognised strategy for improving the efficient use of natural resources while concurrently minimising the generation of waste, pollution and risks to human health and the environment. This includes hazardous and toxic wastes as well as wastes that enter the environment through the air, water or land;
- An integrated prevention strategy addressing waste at the source rather than at the end of the production process;
- An approach that is based on life-cycle assessments that involve the modification of production processes, technology, and operation/maintenance practices. It covers all processes, products and services as well as their environmental impact. It also includes product design and the use of raw materials and energy;
- A managerial tool to help meet customer needs by producing more environmentally responsible and higher quality products and services; and
- A production process that brings tangible economic benefits in terms of financial savings through improved overall efficiency and competitiveness.

Main Constraints

Investments in CP can have attractive economic benefits due to the reduction of input costs for materials, energy and water and reduced expenditures on waste treatment and disposal. Benefits can also be derived from an increase in production and a higher quality output. Payback periods may, however, be longer than in alternative investment options. Small and medium sized industries have a particularly difficult

time making CP investments for reasons that range from the cost of capital to the absence of appropriate funding mechanisms. Furthermore, CP is less likely to be economically attractive in countries with few and/or unenforced environmental regulations, under-priced or free natural resources and little consumer interest in products that are produced in a more environmentally responsible manner.

Six categories of constraints for Cleaner Production investments
(from the perspective of industries considering to adopt Cleaner Production)

FINANCIAL

- High cost of external capital for investments in industry
- Lack of funding mechanisms (lending schemes etc.) appropriate for CP investments.
 - Perception that investments in CP present a high financial risk due to the supposedly innovative nature of CP.
- CP is not properly valued by credit providers in their evaluation procedures (for lending, equity contribution etc.).
- Lack of knowledge in industry (in particular among small and medium sized industries) on available funding channels.
- High transaction costs.
- Size of investments in the environmental field is often too low to interest bank loan or investment officers.
- Incentive systems in financial institutions discourage loan/investment officers to consider environmental elements in applications.
- Environmental investments are often evaluated by the environment department which is less influential in bank structure.
- CP investments are seldom hard assets.
- Lack of confidence in non-biased expertise of environmental consultants.

ECONOMIC

- CP investments are not sufficiently cost effective (compared with other investment opportunities), given present resource prices.
- Immaturity of the company's internal cost calculation and cost allocation practices.
 - Immaturity of the company's internal capital budgeting and capital allocation procedures.

POLICY-RELATED

- Insufficient focus on CP in environmental, technology, trade and industrial development policies and strategies.
- Immaturity of the environmental policy framework (including in particular the lack of enforcement and low prices for natural resources (energy, water, etc.).

ORGANISATIONAL

- Lack of leadership for environmental affairs.
- Perceived management risk related to CP (i.e. no incentives for managers to put their efforts into the implementation of CP).
- Immaturity of the environmental management function in the company's operations.
- (General) immaturity of the organisational structure of the company and its management and information systems.
- Limited experience with employees' involvement and project work.

TECHNICAL

- Absence of a sound operational basis (well established production practices, maintenance schemes etc.).
- Complexity of CP (i.e. need to undertake a comprehensive assessment of all production processes to identify appropriate CP opportunities).
- Limited access to equipment supportive to CP (e.g. high quality process instrumentation devices etc.).
- Limited accessibility of reliable technical information tailored to the company's needs and capacity to assimilate.

CONCEPTUAL

- Indifference: perception regarding own role in contributing to environmental improvement.
- Narrow interpretation or misunderstanding of the CP concept. (General) resistance to change.

Investment in Cleaner Production

Cleaner production investments make up two main types: investment in new production facilities and investment to upgrade existing production facilities:

- *Existing production facilities*, where CP investment is an industrial project designed to capture commercially valuable emissions and waste that either avoids the use and/or creates hazardous components, and/or reduces the use of inputs (materials, energy, water). Such investments do not consist of the installation of additional production equipment or the

direct expansion of existing production facilities.

- *New production facilities*: As the concept of 'business as usual' engineering and conventional economics evolve at a rapid pace, it would be arbitrary to suggest a simple quantifiable definition that could be quoted as adequate and self-explanatory. A CP investment is not an additional cost related to environmental performance. It relates to the cost entailed by the choice of technology in an ever changing array of alternatives.

Financial Analysis and Investment Appraisal

Financial analysis is normally required to make a decision on any type of investment. Decision-making processes can be adapted and improved to translate CP assessments into feasible investment options. In most companies there is a single capital budgeting pool for all projects. This means that CP investments must compete with other projects. Even though a company has established environmental objectives, this does not automatically result in a lower “hurdle rate” for environmental projects.

Capital budgeting is the decision-making process that prioritises alternate actions (investments) on which the company can spend its financial resources. The financial feasibility analysis can be carried out using different methods of investment appraisal or a combination of them, such as the *Discounted Cash Flow Models* (i.e. the *Net Present Value model (NPV)* and the *Internal Rate of Return (IRR)* model), or *conventional models* (e.g. the *payback period model*). CP investments may surpass an enterprise’s hurdle rate, but may still

have IRRs that are lower than alternative non-CP investment options, and thus they are often not pursued. It is necessary to make careful and realistic estimations of avoided costs realisable through CP in order to raise the IRRs and increase the NPVs to more competitive levels.

To correctly appraise CP options in a financial feasibility analysis and influence the capital budgeting process, two methods can be followed at the company level:

- Developing and promoting the use of *improved management accounting systems, techniques and practices* which facilitate a reasonable inclusion of environmental costs and benefits and favour the participation of various departments and management layers in the decision making part of the process;
- Promoting the use of *differentiated hurdle rates* for the approval of CP projects.

Investment Project Financing

Even when the management of a company has the intention to choose a CP option, as well as the knowledge and the skills to correctly appraise environmentally-related costs and benefits, the implementation of such a proposal can still be hindered by a lack of financial resources and/or a difficulty in accessing such resources. In the *banking sector* for instance, the appraisal

of a loan application from a *commercial bank* depends not only on the way financial costs and benefits are identified and quantified but also on the existing relationship between the bank and the company and on the firm’s overall creditworthiness. The following considerations may help banks to orient their lending towards CP:

- management competence (CP as an integral part of Total Quality Management),
- cash flow (CP reducing costs of production operation), and
- long-term competitiveness.

In terms of *equity financing*, companies must comply with reporting standards for stock exchanges to generate capital through the issuance of shares. As public environmental awareness increases, shareholders may consider more strongly environmental performance in their investment behaviour. This has led to the emergence of green investment funds. The Swiss Bank Corporation (SBC), for example, offers investments in “ecological leaders” or “innovators” which displays a significant “window” for CP opportunities.

Another alternative source of financing is *leasing* that can be geared towards facilitating the financing of CP investments.

Governments can also introduce *policy incentives that reduce the capital cost* of the CP investment (e.g. by tax credit or import tax exemption) or increase the operational benefits of the CP investment (e.g. by rational pricing of natural resources, environmental levies, low VAT on cleaner products, etc.). Conversely, disincentives can also be introduced for continued non-CP

practice, e.g. by implementing full-cost pricing of resources and removing subsidies that encourage the deployment of CP-options.

The success of *environmental funds* depends on the extent to which they manage to attract capital. Such funds can encompass various financial disbursement structures, including restricted accounts, lines of credit, revolving loans and guaranty funds with special emphasis on CP. For example, the Nordic Environment Financing Corporation (NEFCO) launched a revolving facility in 1997 for CP investments in Lithuania and Northwest Russia. A similar fund for Polish small and medium enterprises (SMEs) is being developed by the European Bank for Reconstruction and Development (EBRD).

Development assistance presents a specific form of special-purpose funds or soft loans which are often provided through financial intermediaries in developing countries. Examples of such facilities include World Bank and Kreditanstalt für Wiederaufbau (KfW) credit lines for CP and pollution prevention financing in China, India and some countries in Latin America. The Asian Development Bank is in the process of planning a special SME fund on CP for selected countries in the region.

Summary of conditions and requirements for financing of investments through different funding channels

Funding channel	General conditions	Requirements for project financing
1. Commercial credit	<ul style="list-style-type: none"> • Proof of creditworthiness of borrower (sufficient liquidity, solvency and profitability). • Sound business plan. 	<ul style="list-style-type: none"> • Sufficient collateral value. • Sound repayment plan. • Sound financial projections.
2. Equity	<ul style="list-style-type: none"> • Comply with financial external reporting standards. • Proven financial strength and management competence. • Sound business strategy and convincing business plan. 	<ul style="list-style-type: none"> • Proper inclusion of environmental costs and projected savings. • Integration in overall business strategy.
3. Leasing	<ul style="list-style-type: none"> • Existence of an at least moderately developed leasing market in the country. 	<ul style="list-style-type: none"> • Sufficient collateral value. • Sufficient business volume (number of potential lessees for certain type of investment).
4. Special purpose funds	<ul style="list-style-type: none"> • Capitalisation of the fund (i.e. willingness of national government to impose pollution charges, or donor interest). • Proper design and management to target priority environmental concerns. 	<ul style="list-style-type: none"> • Proven contribution of the project to address priority environmental concerns. • Requirements may vary by disbursement method (e.g. guaranty, grant, etc.).
5. Development assistance	<ul style="list-style-type: none"> • Comparatively well developed financial infrastructure to administer lending programmes on behalf of international donors and development banks. 	<ul style="list-style-type: none"> • As for commercial credit, however compared against below market thresholds.

Status in Selected Developing Countries

The research project carried out by IVAM researched five countries in detail: Guatemala, Nicaragua, Tanzania, Vietnam and Zimbabwe. These countries represent all three most important regions in the developing world. They have not yet undergone extensive industrialisation but are likely to start the process in the near future. All of the selected countries also have a UNEP/UNIDO National Cleaner

Production Centre as a repository of knowledge and expertise on CP.

The research project analysed the current situation and constraints in each of the five countries. The aggregated outcome of that analysis provides a fairly accurate overview of the general constraints in developing countries that can be summarised as follows:

Problems to be addressed

Causes

Inability of financial institutions and industrial authorities to assess the technical and financial merits of Cleaner Production investment proposals.



- Lack of awareness on the part of financiers and to fully understand the impact of Cleaner Production on investments' profitability.
- Lack of knowledge and skills on the part of credit providers to assess the Cleaner Production content of investment proposals.

Lack of credit schemes customised to Cleaner Production investments.



- Limited development stage of banking system, reflected in focus on traditional collateral value (land and buildings), short repayment periods and provision of working capital only.
- High interest rates, (largely) caused by macro-economic and financial instability.

Inability of to develop creditworthy Cleaner Production investment proposals.



- Lack of Cleaner Production assessment capacity, and Cleaner Production assessments undertaken not directed to result in creditworthy investment proposals (including business plans).

High cost of implementation of Cleaner Production.



- Limited local availability of Cleaner Production a technology, devices, engineering and installation services.
- Perceptions of technology risks associated with Cleaner Production investments.

Lack of enabling environment for Cleaner Production.



- Lack of a conducive policy environment for Cleaner Production.
- Lack of demand for Cleaner Production from industrial community.

Possible Strategies and Responses

As outlined above, financial institutions and other sources of private sector funding follow a well defined process of “due diligence” when evaluating loan and investment proposals. This process consists of verifying the technical, financial and legal aspects of the project, evaluating the creditworthiness of the borrower, and assessing the different potential risks involved.

Environmental risks are often undervalued and the costing of inputs often favour less efficient options – particularly in developing countries. Consequently, projects incorporating local or national environmental benefits, and that might be good investments, fail to advance because of a misconception of the risks involved and misleading financial assessment.

There is a need to *develop financial and economic tools and instruments* that correct this bias and address less tangible items factors, such as avoided costs, compliance, training, liability, quality or products or corporate image. The time horizon needed to calculate a profitable payback period and that can also capture long-term benefits will also need to be addressed.

Cleaner production is *a means to improve and manage a company’s image* and reputation, promote efficiency and make the capital stock less environmentally damaging. Financial institutions have an interest in guiding their customers to positions that consider supply-side pressures, anticipated legislation, licenses and permits, and

market trends. This is often a fast-moving arena.

Governments can facilitate this process by introducing policies and instruments (import tax reductions, special funds and credit windows for cleaner production, pricing of water and energy, etc.) that promote cleaner production solutions in the selection of technology for retrofits and new investment. Policies that prevent pollution tend to be more effective and cheaper in the long term than policies that induce the treatment and disposal wastes which could be avoided. This will require the participation of a number of ministries and agencies in the process, such as the ministry of finance, customs and tax departments, investment promotion and licensing authorities, industrial promotion and control agencies, etc.

Although the *pressure of consumer movements* in developing countries has so far had limited influence on decisions related to the choice of production technology, such pressure is likely to increase considerably in the coming years. “Greening” of the production process is already taking place with some multinational companies who extend such requirements to their *supply chains* in developing countries.

At the international level, mechanisms to *transfer intellectual property rights* to developing country agents are needed in order to stimulate local production and commercialisation of CP. Such mechanisms need not be complicated inter-governmental constructions, but instead rely on private arrangements

such as multinational joint ventures. Developing country agents can also make greater use of *pollution prevention trade promotion tools* to support investments in CP. This could include the proactive use of eco-labelling and participation in international standards programmes (e.g. ISO 14001) .

Developed countries need to *eliminate escalating tariffs* which prevent developing countries from moving up the production chain away from raw materials and commodities and towards products with substantial added value. This would allow developing country agents to internalise environmental costs into export production.

The main stakeholders in industrial investment are, however, the *investors or enterprises* themselves and the *financial institutions* providing the necessary funding for new and retrofit investment. The following strategies and responses should be considered for these important groups of stakeholders:

- Increased capacity of technical assistance providers and CP assessors in the preparation of creditworthy loan applications;

- Awareness of new tools and instruments to financial institutions in developing countries on the assessment of the economic merits of CP options;
- Capacity of policy makers to integrate CP in order to maximise internal rates of return of investments in production and infrastructure facilities;
- Mainstreaming of environmental investments into a bank's portfolio (adopting CP as a viable investment field by loan officers);
- Promotion of credit schemes customised to CP investments;
- Active match-making between potential investors and credit lines, trust funds, etc. dedicated for pollution prevention or other environmentally sustainable projects and initiatives; and
- Global networking and advocacy with multinational financing institutions to increase emphasis on the preventive approach in their commitment for and implementation of environmentally sustainable financing schemes.

Responses To Date

The possible strategies and responses have been debated in various CP-related fora during recent years. CP financing has emerged as a topic of most CP regional round tables held in Asia and the Pacific, Europe and the Americas. National CP round tables have also introduced this element to their agendas. Governments, industrial enterprises and financial institutions are increasingly

aware of the importance of the issues described in this paper.

The UNEP Financial Institutions Initiative on the Environment was founded in 1992 when “The Statement by Banks on the Environment and Sustainable Development” was signed by some 30 banks following the Earth Summit in Rio. Now over 170 financial

institutions are signatories. The Initiative promotes the integration of environmental considerations into all aspects of the financial sector's or individual companies' operations and services through building awareness, dialogue and understanding and by fostering private sector investment in environmentally sound technologies and services.

The number of dedicated revolving funds and credit lines for CP investment

has increased considerably during the last two years. Several initiatives by the World Bank, Asian Development Bank, Inter-American Development Bank, EBRD, KfW of Germany, etc. have been launched or are in the process of being formulated. A compendium of the main stakeholders in CP financing is available on this DC-ROM.

A major UNEP initiative to address financing issues discussed in this paper is the launching of project "Strategies and mechanisms for promoting cleaner production investments in developing countries". This three-year project is sponsored by Norway and executed by the UNEP Division of Technology, Industry and Economics, in close cooperation with the Financial Institutions Initiative. The project will be carried out during the period 1999-2002.

The project will demonstrate in five participating countries (Guatemala, Nicaragua, Tanzania, Vietnam and Zimbabwe) how to initiate and facilitate the financing of cleaner production investments by developing financing instruments for them, and by persuading public and private financial institutions and the industrial community to adopt these instruments. The results obtained and lessons learned in the demonstration countries will be used at the global level to motivate key decision-makers in the financial sector to pursue cleaner production investments in developing countries.

As part of the project, a study on past investment practices will be published by mid-2000. Field activities will be undertaken during 2000-2001. A separate briefing note is available to give further details on the scope and structure of this project.

For information on UNEP's activities in promoting cleaner production financing please contact:

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