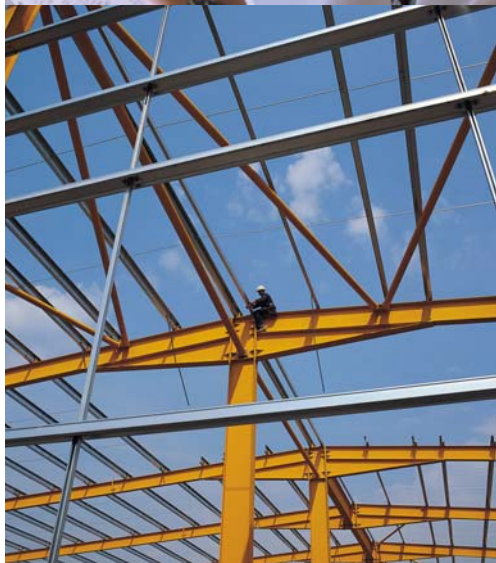




**CHANGING PRODUCTION PATTERNS:**

# **LEARNING FROM THE EXPERIENCE OF NATIONAL CLEANER PRODUCTION CENTRES**



United Nations Environment Programme  
Division of Technology, Industry and Economics



In collaboration with the United Nations  
Industrial Development Organisation



**UNITED NATIONS ENVIRONMENT PROGRAMME**

**Division of Technology, Industry and Economics**

39-43 quai André Citroën  
75739 Paris Cedex 15 - FRANCE  
Tel: +33 1 44 37 14 50  
Fax: +33 1 44 37 14 74  
Email: [unep.tie@unep.fr](mailto:unep.tie@unep.fr)  
Internet: <http://www.uneptie.org>

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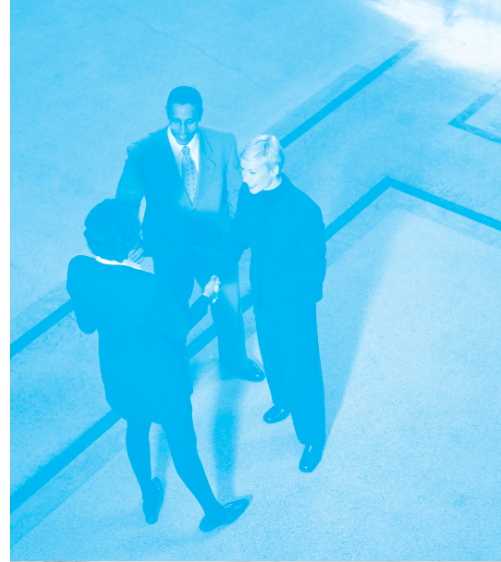
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# FOREWORD

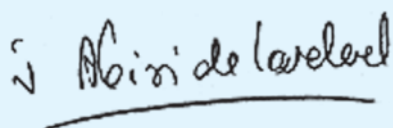
***"To a large extent we have built the world-wide consensus on Cleaner Production. However, we have not reached the end of the road and we must foster greater commitment."***

Dr. Klaus Toepfer, Executive Director, United Nations Environment Programme,  
at the Sixth International High Level Seminar on Cleaner Production, October 2000

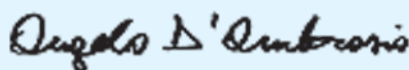
**O**ne of the keys to achieving sustainable development is changing the production patterns that waste resources and emit more pollutants than our ecosystem can absorb. It is to promote this change that UNEP established its Cleaner Production Programme in 1989 with the goal of preventing pollution at the source and of managing the raw material (including energy and water) more efficiently. At the time, Cleaner Production was a scarcely known concept advocated by a small group of forward-thinking people from around the world. Only two years later, at the Earth Summit in Rio de Janeiro in 1992, Cleaner Production had already become internationally acclaimed and incorporated into Agenda 21 as a preferred strategy in reconciling the dual needs of environmental protection and economic development. Since then, large companies have integrated the concept of Cleaner Production into good environmental management practices and documented the economic savings and advantages.

**H**owever, it soon became obvious these case studies and experiences were not enough to change production practices in developing countries and economies in transition. The challenge is still greater in case of small- and medium-sized companies, which perhaps stand to gain the most in adopting effective environmental protection strategies that are also economically attractive. It was also clear that there is a need to sustain in-company momentum towards Cleaner Production. The need to build local expertise and indigenous capacity to demonstrate that Cleaner Production can simultaneously bring economic and environmental benefits was felt more than ever. What was needed was the technical and financial assistance to help companies getting started. This led UNEP and UNIDO, working in a proactive partnership, to establish the "National Cleaner Production Centres" with the hope that this would serve as a model to be replicated by other countries.

**W**hat was started as a catalytic programme has proven to be a big success. The keen expressions from countries for establishing their own National Cleaner Production Centres along with requests for help in this process has been increasing. Furthermore, the expectations and needs of the Centres, once established, have also been growing exponentially. The aim of this publication is to provide some guidelines to those wanting to learn from the experiences, positive or negative, of the UNIDO/UNEP National Cleaner Production Centres, so that they can move forward on their own and thus contribute towards changing production patterns in their countries, benefiting from UNEP's and UNIDO's international network on Cleaner Production.



Jacqueline Aloisi de Larderel,  
Assistant Executive Director,  
Division of Technology, Industry and Economics,  
United Nations Environment Programme



Angelo D'Ambrosio  
Managing Director  
Sectoral Support & Environmental Sustainability Division  
United Nations Industrial Development Organisation

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24. Rene van Berkel, *Curtin University of Technology (Australia)*
25. Frans Verspeek, *Unit Manager, Cleaner Production and Technology Transfer IVAM Environmental Research (Netherlands)*

***This booklet was prepared by:***

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Surya Chandak, *Chief, Cleaner Production and Consumption Unit, UNEP*  
Edward Clarence-Smith, *Team Leader, NCPC Programme, UNIDO*  
Clare Cocault, *Consultant*

# INTRODUCTION

## *Changing production patterns through Cleaner Production*

---

In the past, industrialised countries have responded to pollution and environmental degradation in four characteristic ways:

- First, by ignoring or denying the problem;
- Second, by diluting or dispersing the pollution, so that its effects are less harmful or apparent;
- Third, by trying to control the pollution and the wastes (the so-called end-of-pipe or pollution control approach);
- Fourth, and more recently, by changing production patterns with a Cleaner Production approach, preventing pollution and waste at source and reducing raw material and energy use.

## *Cleaner Production is ...*

---

**Cleaner Production is defined as the continuous application of an integrated preventive environmental strategy applied to processes, products and services to increase overall efficiency and reduce risks to humans and the environment.**

For production processes, Cleaner Production includes conserving raw materials and energy, substituting toxic/hazardous processing materials by more benign ones and reducing the quantity and/or toxicity of all emissions and wastes before they leave a production process.

For products, the approach focuses on the reduction of environmental impact during the entire life cycle of a product, from raw material extraction to the ultimate disposal of the product, by appropriate design.

For services, Cleaner Production entails incorporating environmental concerns into the design and delivery of services.

# INTRODUCTION

... an ideal opportunity for developing countries and economies in transition to become economically more efficient and competitive by reducing waste, material and energy inefficiencies.

Cleaner Production provides developing countries and countries undergoing economic transition an ideal opportunity to 'leapfrog' over the past environmental mistakes of industrialised countries while at the same time enabling their industries to become more economically efficient and competitive by reducing inefficiencies, waste and material costs.

... providing that they have local expertise to promote and implement Cleaner Production.

However, Cleaner Production will only be truly integrated into a country's industry and government strategies if local capacity is in place to sustain it. To help developing countries and countries with economies in transition build their own local Cleaner Production capacities, the United Nations Industrial Development Organisation (UNIDO) and the Division of Technology, Industry and Economics of the United Nations Environment Programme (UNEP DTIE) have combined their expertise and resources in an innovative joint initiative, the National Cleaner Production Centres (NCPC) Programme, established in 1994.

**Figure 1: Examples of Cleaner Production in Practice** ▼

| Improve Housekeeping   | Process Modification  | Product Redesign  |
|--|---|---|
| <ul style="list-style-type: none"> <li>→ Reduce raw material and product loss due to leaks, spills, drag-out, and off-specification solutions.</li> <li>→ Improve monitoring of operations and maintenance of all facets of the production process.</li> <li>→ Schedule production to reduce equipment cleaning, e.g., formulate light before dark paints so that vats do not have to be cleaned out between batches.</li> <li>→ Improve management of inventory of raw materials and products.</li> </ul> | <ul style="list-style-type: none"> <li>→ <b>Filtration and washing:</b> Use counter-current washing, and recycle used solvent.</li> <li>→ <b>Parts cleaning:</b> Use mechanical cleaning devices; improve draining before and after cleaning; use plastic bead blasting.</li> <li>→ <b>Surface coating:</b> Use electrostatic spray-coating system; use powder coating systems; use airless air-assisted spray guns.</li> </ul> | <ul style="list-style-type: none"> <li>→ <b>Consumer Goods Redesign:</b><br/>A traditional flashlight, running on dry cell batteries that are usually disposed of with domestic waste, is redesigned to run on a manually powered dynamo, eliminating the dry cells altogether</li> </ul>                                 |
| Technology Change  | Input Material Substitution   | On-Site Recycling   |
| <ul style="list-style-type: none"> <li>→ <b>Olive Oil Production:</b> Install a machine that removes the pit before the olives are crushed.</li> <li>→ <b>Leather Tanning:</b> Use a machine that de-hairs and de-fleshes hides at the same time.</li> </ul>   | <ul style="list-style-type: none"> <li>→ <b>Printing:</b> Substitute water-based ink for solvent-based ink.</li> <li>→ <b>Textiles:</b> Reduce phosphorus in wastewater by reducing use of phosphate-containing chemicals; use ultraviolet light instead of biocides in cooling tower.</li> <li>→ <b>Electronic components:</b><br/>Replace water-based film developing system with a dry system.</li> </ul>                    | <ul style="list-style-type: none"> <li>→ <b>Printing:</b> Use a vapour recovery system to recover organic solvents.</li> <li>→ <b>Textiles:</b> Use ultra filtration system to recover dye-stuffs from waste-water.</li> <li>→ <b>Metal rules:</b> Recover nickel-plating solution using an ion-exchange unit.</li> </ul> |

Source: UNEP DTIE



▼ **Figure 2: The Benefits of Cleaner Production**

**1 Reducing overall operating costs:**

Cleaner Production helps to reduce generation of waste and consumption of raw materials, energy and water. As a consequence, the costs are likely to be reduced, sometimes substantially. Environmental protection is no longer a separate add-on cost. Instead, the overall cost of the primary activity is reduced due to reduced costs of inputs, such as materials and energy, and the costs of waste disposal. Avoidance of waste saves money because it eliminates both the cost of treating and/or disposing of waste and the cost of the raw materials or services that are wasted. Some Cleaner Production projects lead to the recovery of valuable by-products, which can be used or sold, thus increasing the economic benefit of the approach.

**2 Improving the environmental situation:**

Cleaner Production implementation ensures continuous environmental improvement, which is an essential component of sustainable development. One-off environmental improvements or changes are less important than recognising that in every activity there will always be further potential for improvement of environmental performance.

**3 Gaining competitive advantage:**

Companies gain increasing competitiveness through the use of new and improved technologies. Companies that have good environmental practices and products have a market advantage with the growing number of environmentally conscious purchasers.

**4 Increasing productivity and product and process improvement:**

The efficiency and productivity of company operations is improved in a number of ways by using the Cleaner Production approach. Some of these benefits include:

- More efficient use of human and physical resources
- Greater certainty in schedules and budgets
- Improved working conditions
- Reduced legal liability

**5 Advanced workplace quality:**

Cleaner Production implementation improves the health and safety of employees by reducing pollutants and exposure to toxic materials.

**6 Better media and public profile:**

The media can play a pivotal role in determining a company's public image. An adverse media report can instantly damage a reputation built over years. With public interest in environmental issues on the rise, many non-governmental organisations (NGOs) gain a high profile by acting as watchdogs and informers against polluters. Cleaner Production, being a positive proactive approach to environmental management, demonstrates environmental responsibility and promotes confidence of NGOs, pressure groups and media in the company.

**7 Better compliance with environmental regulations:**

Regulatory standards for discharge of waste (liquid, solid or gaseous) are continually becoming stricter. Meeting these standards often requires installation of expensive and complex pollution control systems. Cleaner Production makes the treatment of residual effluents, and thus compliance with discharge standards, easier, simpler and cheaper, thereby reducing the need for more restrictions and prohibitions.

## **Sharing the experience of UNIDO/UNEP National Cleaner Production Centres**

---

The National Cleaner Production Centres Programme has not always been able to keep up with the demand and expectations of developing countries and economies in transition.

To date, twenty-one National Cleaner Production Centres have been established, but many more countries have requested assistance in developing their own Cleaner Production capacities. A frequent request from countries is for advice and know-how on how to establish a self-sufficient Cleaner Production centre in order to change local production patterns.

The objective of this publication is to share some of the experiences of the first UNIDO/UNEP National Cleaner Production Centres, and to provide guidance, in an easily readable and interesting way, to the different types of audiences or stakeholders (e.g. government, academic/research/training institutes, business associations, etc.) that may be interested in having such a centre in their country.

**It should be stressed, however, that there is no one recipe for success in establishing a successful Cleaner Production Centre.** Countries are at different stages of socio-economic development, with different industry structures, cultures, and challenges. What works in one country will not necessarily work in another.

**Consequently, this publication is intended not to provide rigid guidelines, but rather insight into the experiences and lessons in the words of those in the field,** in developing countries and economies in transition, and drawing out the 'guiding messages' wherever possible.

**It is divided into five main sections:**

- 1 Frequently Asked Questions** about the UNIDO/UNEP National Cleaner Production Centres Programme.
- 2 Setting up a National Cleaner Production Centre**, providing details, guiding messages and experiences on the topics of: host institutions, advisory and executive boards, counterpart institutions, staff and funding.
- 3 Activities of a National Cleaner Production Centre**, covering awareness-raising, demonstration projects, training, financial investment assistance, technical information dissemination, and government policy advice.
- 4 Integrating Cleaner Production** with other concepts and tools such as environmental management systems, health and safety, energy efficiency, industry modernisation, etc.
- 5 Financial Sustainability**, providing guidance on how to work towards eventual financial self-sufficiency of the Centre.

*Finally, a summary of the guiding messages is included at the end of the publication. This can be photocopied and disseminated to those who may be interested in the main messages and not having a full copy of the publication.*

# FREQUENTLY ASKED QUESTIONS

## What is the National Cleaner Production Centres Programme?

The National Cleaner Production Centres (NCPC) Programme is a joint initiative by the United Nations Industrial Development Organisation (UNIDO) and the Division of Technology, Industry and Economics of the United Nations Environment Programme (UNEP DTIE) to build local capacity to implement Cleaner Production in developing countries and economies in transition. The Programme is based on the premise that Cleaner Production will only be truly integrated into a country's industries and policies if local capacity is in place to sustain it. True appreciation of Cleaner Production and therefore its application can only come about if the concept is promoted by professionals in the beneficiary country itself and adjusted by them to the local conditions.

The Programme targets primarily the development and transfer of know-how and not the transfer of technology.

## What is the purpose of a National Cleaner Production Centre?

The purpose of an NCPC is to promote the Cleaner Production strategy in enterprises and government policies, in harmony with local conditions, and to develop local capacity to create and meet Cleaner Production demand throughout the country. The Centres (and the personnel trained by them) do not deliver ready-made solutions, rather they train and advise their clients on how to find the best solutions for their specific problems.

### Figure 3: Mission of a National Cleaner Production Centre (Hungary) ▼

#### **The Hungarian Cleaner Production Centre's objectives are:**

- to contribute to sustainable industrial development in Hungary;
- to improve the environmental performance and competitive advantage of industry through Cleaner Production;
- to increase nation-wide awareness of Cleaner Production in industry;
- to therefore reach an overall reduction of environmental pollution.

**The Centre works on a non-profit basis and assists companies, consulting firms and policy-makers to understand the concept of Cleaner Production and to put it into practice. The Centre intends to reach these objectives concentrating its activities on the following fields:**

- organisation and co-ordination of in-plant demonstration projects in Cleaner Production assessments, and the dissemination of the results among other companies. Special emphasis is given to solving environmental problems of small- and medium-size companies;
- building up and developing information systems about Cleaner Production and environmentally benign technologies and new developments in this field. The Centre aims at disseminating this information throughout the country;
- developing educational programmes, organising conferences, trainings and courses in preventive environmental protection;
- giving policy advice and preparing environmental policy papers to help expand the use of preventive technologies.

Source: Hungarian Cleaner Production Centre, Report of Activities, 1998-2000

# FREQUENTLY ASKED QUESTIONS

## What does a National Cleaner Production Centre actually do?

**National Cleaner Production Centres offer six basic services:**

### → Raise awareness of the benefits and advantages of Cleaner Production.

Awareness-raising is a primary activity for an NCPC, particularly in its early years. A vital element of the Centres' awareness-raising activities are in-plant Cleaner Production Demonstration Projects. Through these, a NCPC can show that the concept of cleaner production can be applied to any industrial sector of the country, resulting in economic as well as environmental benefits.

### → Train local experts and build local capacity for Cleaner Production.

Training in Cleaner Production methodology is an essential NCPC activity to build local expertise and capacity to spread Cleaner Production. Training may be:

- 1) in-plant training, as a part of in-plant demonstration projects; or
- 2) outside plant training, conducted through workshops and seminars for specific target groups.

→ Offer individual enterprises technical assistance in Cleaner Production. NCPCs can offer technical assistance to individual enterprises that request it. An important element of this technical assistance are Cleaner Production assessments, but NCPCs can also offer services in closely related fields: energy efficiency audits, establishment of environmental management systems, occupational safety and health assessments, life cycle analysis, etc.

### → Help in preparing project proposals for Cleaner Production investments.

The Centres create a core capacity in the promotion of Cleaner Production investment projects to facilitate implementation of Cleaner Production. This activity is closely linked to the in-plant assessments, and in each country, a number of national experts are being trained in identifying and formulating Cleaner Production investment projects.

### → Disseminate technical information.

Growing awareness of Cleaner Production generates a growing demand for policy or industry-specific information on Cleaner Production. In being a part of an international network on Cleaner Production, NCPCs are able to access Cleaner Production information from around the world, and thus have an important role in making such information available to those seeking it locally. NCPCs also have an important role in nationally and internationally disseminating technical case studies of Cleaner Production techniques that emerge as a result of local demonstration projects.

→ Provide policy advice to national and local governments. Governments, particularly in developing countries and economies in transition, play an important role in providing the overall policy and economic framework for a country's development. The Centres thus have an important role in helping governments to identify and develop the policy tools and economic instruments suitable to their country's context, which would encourage industry to favour Cleaner Production over end-of-pipe treatment.

**Figure 4: Environmental and Economic Impacts of National Cleaner Production Centres ▼**

| Indicator  | Czech Republic<br>(1994-99) | Brazil<br>(1995-99) | China<br>(1995-99) |
|--|-----------------------------|---------------------|--------------------|
| <b>Environmental improvement</b>   |                             |                     |                    |
| Quantity of energy saved (in GJ)   | 50,000                      | 6,886               | -                  |
| Quantity of water saved (in metric tonnes)   | 7,000,000                   | 247,946             | -                  |
| Quantity of solid waste reduced at source (in metric tonnes).<br>Total (metal, paper, plastics, other)               | 1,035,005                   | 30,386              | 1,938,181          |
| Quantity of water pollutants reduced at source (metric tonnes)   | 4,350                       | -                   | 44,462             |
| Quantity of air pollutants reduced at source (excl. GHG) (metric tonnes)   | 2,715                       | 52,45               | 510,155            |
| Quantity of greenhouse gases reduced at source   | 2,130                       | -                   | -                  |
| <b>Economic improvement</b>  |                             |                     |                    |
| Sum of the NPV for all Cleaner Production options which were at least partially implemented during the period (US\$) | 6,900,000                   | 5,059,971           | 228,280,000        |

Source: Based on estimates from in-plant Cleaner Production assessments carried out by NCPCS.

## What difference does a National Cleaner Production Centre really make?

In just a short period of time (e.g., three to five years), the effects of having a Centre in a country soon become apparent, both in terms of real environmental and economic improvements, and in local capacity-building for identifying and implementing further Cleaner Production options.

Some of these effects can be quantitatively measured, such as:

### → The reduced environmental impact and economic savings in:

- energy use
- water use
- solid waste generation
- water pollutants
- air pollutants
- greenhouse gases, etc.

### → The increase in the number of:

- **companies or plants** for which Cleaner Production options have been assessed and implemented (demonstration projects/technical assistance);
- **national experts** trained by the

Centre to assess and implement Cleaner Production options within their company, industry or country;

- **universities, consulting companies and other national institutions** which have included Cleaner Production in their activities after cooperating with the Centre;
- **policy recommendations** made by the Centre that are being implemented by national or local government;
- **financial institutions or experts trained** to consider Cleaner Production aspects when considering loans and investments.

→ **Other effects** of the Centres are more qualitative in nature, but are equally important as they are prerequisites for self-sustaining implementation of Cleaner Production. Such effects include:

- greater awareness in industry on the economic benefits and environmental advantages of Cleaner Production;
- greater understanding by national regulatory institutions of the potential of a harmonized environmental legislation that promotes the concept of Cleaner Production;

**Figure 5:**  
**Local Capacity-Building Effects of National Cleaner Production Centres ▼**

| Indicator  | Czech Republic<br>(1994-99) | Brazil<br>(1995-99) | China<br>(1995-99)    |
|--|-----------------------------|---------------------|-----------------------|
| <b>Awareness Raising Activities</b><br><i>People who participated in Cleaner Production awareness-raising activities arranged by the NCPC</i><br><i>Awareness-raising activities organised by the Centre</i>   | 1,000<br>100                | 1,461<br>22         | 15,580<br>104         |
| <b>Training Activities</b><br><i>Persons receiving training</i><br><i>Person-days of training</i>  | 450<br>200                  | 1,319<br>8238       | 741<br>2,586          |
| <b>Technical Assistance Activities</b><br><i>Plants submitted to in-depth Cleaner Production assessments</i><br><i>Plants which have implanted EMS with the assistance of the Centre</i><br><i>Applications for investment funding (or number of projects) prepared by/with the assistance of the NCPC and submitted to financial institutions</i><br><i>N° of submitted projects/applications that have been accepted</i>   | 125<br>12<br>22<br>12       | 52<br>3<br>22<br>11 | 130<br>10<br>14<br>10 |
| <b>Institutional Development</b><br><i>Universities, consulting companies and other national institutions which have included Cleaner Production in their activities and services after cooperating with the Centre</i><br><i>Cleaner Production Assessors (trained by the NCPC) that work in the field of Cleaner Production and apply the know-how obtained.</i><br><i>Policy papers prepared and submitted by the NCPC</i><br><i>Recommendations in the policy papers prepared by the NCPC that have been/are being implemented</i> | 60<br>130<br>40<br>25       | 36<br>75<br>5<br>4  | 85<br>640<br>20<br>4  |

Source: Statistics kept by Centres.

# FREQUENTLY ASKED QUESTIONS

- awareness in financial institutions of the importance of Cleaner Production programmes as an important factor in the profitable operation of industrial companies and thus an important criterion in evaluating a loan application.

→ In addition, the **Centres provide developing countries and economies in transition with:**

- **improved access** to information on cleaner technology development;
- **improved interchange** of national know-how and experience obtained in Cleaner Production between the countries;
- **an active network** of Cleaner Production centres, national and

regional institutions and individuals to promote Cleaner Production.

## Where are the National Cleaner Production Centres located?

The NCPC Programme began in 1994 with eight Centres established in Brazil, China, India, the Czech Republic, Mexico, the Slovak Republic, Tanzania and Zimbabwe. These eight Centres were selected from solicitations received from 39 institutions in 25 countries. In 1996, Tunisia was included in the programme and in 1997 a Centre was also established in Hungary.

Based on the encouraging progress of the NCPC Programme and the strong request from developing countries and countries with economies in transition, by 2001, additional funding was obtained to enable eleven additional Centres to be established in Costa Rica, El Salvador, Ethiopia, Guatemala, Kenya, the Republic of Korea, Nicaragua, Morocco, Mozambique, Uganda and Viet Nam.

## Who funds the NCPC Programme?

The bulk of UNIDO/UNEP NCPC Programme has been funded through country contributions from the governments of (in alphabetical order): Austria, Italy, The Netherlands, Norway, and Switzerland. A number of other governments have also contributed smaller amounts. The Centres in Brazil, Republic of Korea and Russia are funded through a self-financed trust fund. UNEP, UNIDO and UNDP have also provided substantial funding for the NCPC Programme.

**Figure 6: National Impact of a National Cleaner Production Centre (China) ▼**

*Before the establishment of the Centre, hardly anyone in China knew of Cleaner Production. Today most of the officials of governmental bodies at national and provincial level know the Cleaner Production concept and are willing to promote it. Managers of many large enterprises know about Cleaner Production to different extents. NCPCs play an important role in promoting Cleaner Production in China. Through its successful operation and activities, the concept of Cleaner Production has been understood and accepted by administrative bodies of China's industries and the central and local governments. The China National Cleaner Production Network was established in 1996 and the China NCPC acts as the secretariat responsible for operating and managing the day-to-day tasks. The China NCPC has completed Cleaner Production audits in over 100 enterprises in more than 10 sub-sectors. Fifteen Centres for Cleaner Production have been established in various provinces, cities and industrial sectors; several thousands of people have received Cleaner Production training in various ways. The China NCPC has developed 7 manuals, guidelines or training kits. And with the effort of the China NCPC, the China State Environmental Protection Administration (SEPA, the former National Environmental Protection Agency (NEPA)) has issued a policy command entitled "Several Regulations on Promoting Cleaner Production" and is planning to formulate the implementation plan for it.*

Source: China NCPC.

**Figure 7: From National Centre to National Network (China, Hungary, India) ▼**

*In China, the NCPC has led to 15 Cleaner Production Centres being established in industrial sectors (e.g., aviation, chemical, metallurgical, petrochemical), provincial governmental bodies (e.g., Heilongjiang, Shaanxi, Liaoning provinces) and municipalities (e.g., Changsha, Tianjin, Xinjiang). The China National Cleaner Production Network was established in 1996 and has since developed rapidly. At present, the network has 87 member units.*

*In Hungary, three regional Cleaner Production Centres have been established (Gyor, Debrecen and Veszprém) and work with the NCPC. Five municipalities have designated Cleaner Production representatives.*

*In India, the NCPC has helped set up four domestically funded regional Centres in the states of Karnataka, Gujarat, Punjab and West Bengal.*

## What is the organisational structure of a Centre?

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The National Cleaner Production Centres have a relatively lean organisational structure. Each Centre is directed by an experienced country national, supported by professionals and secretarial staff, and, in nearly all cases, hosted within a local organisation. For successful capacity building, it is crucial to form partnerships with local organisations that are willing to invest resources for promoting Cleaner Production. Host organisations and other local stakeholders make both financial and in-kind contributions to the Centre, such as secondment of personnel, office facilities and equipment. This arrangement has been effective in building ownership of the activities in each country. Furthermore, co-operation with a strong national host institution increases possibilities for the sustainability of the Centre once the project period has elapsed. More details are provided in section two.

In the early years, the Centres benefit from being twinned with a counterpart organization that has a strong experience in Cleaner Production.

## What are the roles of UNIDO and UNEP?

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The NCPC Programme is jointly managed by UNIDO and the Division of Technology, Industry and Economics of the United Nations Environment Programme (UNEP DTIE).

UNIDO is the executing agency for the Programme, managing donor funding and providing technical expertise. It:

- establishes the Centres;
- is responsible for providing the Centres their initial technical and management training;
- provides oversight of the Cleaner Production demonstration projects, which are organised by the Centres together with their counterpart organisations;
- monitors the performance of the Centres, bringing to bear corrective action where necessary; and
- runs annual meetings for the directors of the Centres.

UNEP:

- develops conceptual, strategic and policy guidance and materials on Cleaner Production and disseminates them to the Centres;
- organises in-country training activities;
- hosts international and regional conferences;
- mobilises key policy-makers, particularly in Ministries of Environment; and
- co-ordinates an international network of institutions and professionals.

## What does the UNIDO/UNEP Programme offer to the Centres?

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*“The UNIDO/UNEP programme design provides a unique set-up in terms of offering a profound infrastructure for international co-operation and networking between Cleaner Production actors throughout the world, which bilateral programmes cannot provide”.*  
Evaluation Report of the NCPC Programme, 1996, Lund University, Sweden

Besides benefiting from the cumulative lessons learned since the beginning of the NCPC programme, Centres benefit from:

- experienced international counterpart (twinning) institutions;
- participation in a well established network of Centres;
- continuous data and information exchange;
- training material on Environmentally Sustainable Industrial Development;
- Cleaner Production and Environment Management Systems;
- sub-sectoral Cleaner Production studies and information and promotional material; and
- UNIDO's and UNEP's expertise and competence in establishing National Cleaner Production centres.

# FREQUENTLY ASKED QUESTIONS

## What have been some of the achievements/successes of the Programme?

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*“The international support from UNIDO and UNEP gave us the added weight and credibility we needed to convince government and industry in Mexico that Cleaner Production is the future.”*

Mexico Centre

*“We feel that Cleaner Production is a very important approach for reaching companies and improving production efficiency in our development assistance efforts. We are pushing for Cleaner Production to be at the heart of international environmental treaties such as climate change and transboundary waste movements, not something added on afterwards.”*

SECO, Switzerland (donor)

*“The NCPC programme came in at the right time. New investment policies were being decided by the government – most of which were end-of-pipe oriented. With UNIDO/UNEP, we have been able to help change the policy framework.”*

El Salvador Centre

*“Being able to learn from the experiences of the first NCPCs - Brazil, Mexico, India, the Czech Republic and the Slovak Republic. This is the added value of being part of the NCPC group. Not just on the technical issues, but also on the other issues like how to handle relationships with government and enterprises. It is also a big advantage to have access to international information and resources from the network.”*

Costa Rica Centre

*“We have now been called to do Cleaner Production in industries that already have ISO 14000! They have realised that ISO is (only) compliance, and Cleaner Production is far more than this: process, products, raw material, energy – all is discussed, assessed and improved. Economic savings and lesser environmental impact are the consequences.”*

Brazil Centre



*“The NCPC programme kept us motivated and committed to keep going when things got rough.”*

Tunisia Centre



*“The concept of Cleaner Production and implementation in companies has become quite common. I don't think this would have happened without locally based Cleaner Production centres.”*  
Slovak Centre

*“It was interesting for us to see that others have the same ideas internationally, and how the ideas could be put into practice - this is a huge challenge for us.”*  
Hungary Centre



*“Setting up of the NCPCs themselves, and the promotion of Cleaner Production itself, has been a big achievement, resulting in dialogue between industry and government. If a country has no NCPC, there is no other institution to do it.”*  
Zimbabwe Centre

*“The programme initiated Cleaner Production in developing countries, which is in urgent need of advanced methods to overcome the barriers not only in the field of environmental protection but also in industrial production.”*  
China Centre



# SETTING UP AN NCPC

## HOST INSTITUTION

### Guiding Messages

- The host institution **should have a stake in promoting** Cleaner Production; Cleaner Production **should fit into the mainstream business** of the host institution.
- The host institution **should have the confidence and trust of industry**, the Centre's primary target for Cleaner Production. Otherwise, receptivity to Cleaner Production and sharing of information may be compromised.
- The host institution should preferably **have some experience in running capacity building/development projects** and be patient and supportive during the Centre's infancy period.
- The **long term stability of the host institution** to continue to host the Centre should be examined to avoid having to change host institutions before the Centre has become self-sufficient.
- The host institution should be willing and able to **provide timely, logistical support** to the Centre to enable it to start functioning and deliver output as soon as possible.
- The host institution **should participate in the selection of a director** to ensure a certain degree of compatibility.

### Brief Description

The National Cleaner Production Centres are hosted by well-established national institutions, which provide office space and logistical support (communications, supplies, etc.), support staff and a facilitated access to industry, government and other stakeholders.

The host institution may be a government organisation, an industry association, an academic or technical institution, a non-governmental organisation or a non-profit association. What works best depends upon a country's culture and socio-economic context, requiring a certain flexibility on the part of the host institution when the country context changes.



### Costa Rica's Rotating Institutions

During the first three years of operation, the location of Costa Rica's National Cleaner Production Centre is rotated among three institutions: Centro de Gestión Tecnológica (CEGESTI), a private foundation; Cámara de Industria de Costa Rica (CIC), the national chamber of commerce; and Instituto Tecnológico de Costa Rica (ITCR), a private training institute. According to this agreement, each of these institutions hosts the NCPC for one year. The NCPC acts independently from its host institutions and is in the process of obtaining its proper legal status. *"It is interesting to have three rotating host institutions, with different orientations. All have the same level of influence and input to the Centre; not a single institution has overall influence – this gives the Centre more freedom."* Costa Rica National Cleaner Production Centre.



# SETTING UP AN NCPC

## Words of Experience (+ and -)

→ **Selecting a host institution needs to be done with great care.** Having a strong, supportive host institution is a key prerequisite for success. Getting it wrong means you have to start all over again.

+ “Our host institution strongly supports the Centre and has long-term development of Cleaner Production as a specialisation of the institute.”

Viet Nam Centre

+ “Our host institution was well selected through the visit of UNIDO and UNEP to all the Institutions that applied. It was chosen for being an industry-related institution, supported by industry, which makes the access to entrepreneurs easier. It has schools and technology centres in most of the states of the country, allowing the possibility of spreading the actions of the NCPC. The only barrier was that the institution did not understand what Cleaner Production was about, and had a strong interest in end-of-pipe solutions.”

Brazil Centre

→ **Host institution (or host country) contributions to the Centre can make the difference between a well-functioning and a struggling Centre.**

In cases where a host institution or government could not deliver its promised contributions, the NCPC took much longer to generate a threshold level of activity that would enable it to become self-sustaining.

- “The Government did not or could not deliver on its commitments of local resources to the NCPC. This caused a lot of problems in the beginning.”

Tanzania Centre

+ “Our host institution, the Chinese Research Academy of Environmental Sciences (CRAES), provided the necessary logistical support, including office space, supplies and favourable management fees, during the start-up phase. When you give a lot of early support to the Centre, it can become profitable earlier.”

China Centre

→ **The host institution needs to participate in the selection of the director** to facilitate a good working relationship between the host institution and the Centre.

- “When we started we had a lot of difficulties that slowed us down. The main problem was that the host institution didn’t agree on the selection of the director.”

Tanzania Centre

Figure 8: Types of Host Institutions ▼

| Country        | Host Institution   | Type  |
|----------------|--|---|
| Brazil         | Servico Nacional de Aprendizagem Industrial (SENAI)  | Autonomous institution dedicated to industrial training.                          |
| Czech Republic | None. The Centre is independent  |   |
| China          | Chinese Research Academy of Environmental Sciences (CRAES).  | Institution attached to national government                                       |
| Costa Rica     | Centro de Gestión Tecnológica (CEGESTI), Cámara de Industria de Costa Rica (CIC) Instituto Tecnológico de Costa Rica (ITCR). | Private foundation, national chamber of commerce, and private training institute. |
| El Salvador    | Asociación Nacional de la Empresa Privada (ANEP)   | National industry association.  |
| Ethiopia       | Committee of Science and Technology (CST)  | National government.  |
| Guatemala      | Cámara de Industria de Guatemala   | National chamber of industry.   |
| Hungary        | Dept of Environmental Economics and Technology, Budapest University of Economic Sciences and Public Administration           | Public university   |
| India          | National Productivity Council (NPC)  | Autonomous institution attached to Ministry of Industry                           |
| Kenya          | Kenyan Industrial Research and Development Institute (KIRDI)   | Institution attached to national government                                       |
| Mexico         | Instituto Politecnico Nacional   | Public university   |
| Morocco        | Confédération Générale des Entreprises du Maroc (CGEM)   | National industry association.  |
| Mozambique     | Environment Forum of Mozambique (FEMA)   | NGO closely linked to the national chamber of commerce                            |
| Nicaragua      |  | Public University   |
| Slovakia       | Originally hosted by an industry association which no longer exists. The Centre is now independent.                          |   |
| Tanzania       | Tanzania Industrial Research and Development Organisation  | Institution attached to national government                                       |
| Tunisia        | Centre International de Technologies Environnementales (CITET)   | Government institution to assist industry   |
| Uganda         | Industrial and Research Development Institute  | Institution attached to national government.                                      |
| Viet Nam       | Hanoi University of Technology   | Public university   |
| Zimbabwe       | Originally hosted by the Environment Forum of Zimbabwe,  | First, industry association; then national government now by government ministry. |

Source: Based on estimates from in-plant Cleaner Production assessments carried out by NCPCs.

# ADVISORY AND EXECUTIVE BOARDS

## Guiding Messages

### I. Advisory Boards

- The Advisory Board should be **constituted of members who are in influential positions or who are well-known experts.**
- The Advisory Board should be **composed of a cross-section of stakeholders** (government, industry and other important communities), although membership should not be so large that it becomes difficult to manage (*it is suggested that the Advisory Board have 5 to 10 members*).
- The Advisory Board is neither a decision-making nor a consensus-building body. **It should provide different perspectives and suggestions on the work of the NCPC.**
- **Members should have a genuine interest in the success of the Centre.** Members who are likely to have conflicting priorities and/or individual interests that are not compatible with the collective interest of the Centre should be avoided.

### 2. Executive Boards

- The Executive Board should have a **small membership** (not more than 5) to facilitate consensus building and decision-making.
- Members should be **willing to dedicate (unpaid) time** to overseeing the Centre.
- Members are expected to make **other in-kind contributions** to the Centre.
- **Members should have good management/business skills.**

## Brief Description

The first National Cleaner Production Centres received guidance from a national Advisory Board consisting of representatives from the industrial, governmental, academic, financial and NGO sectors. Its function is to provide advice and various stakeholder perspectives to the Centre. It is neither a decision-making or consensus-building body.

New Centres have an Executive Board, consisting of five to seven members, including representatives from the host institution, UNIDO/UNEP and the donor country, with an overseeing role. Several mature Centres (Mexico, Hungary, the Czech Republic, the Slovak Republic) have also established Executive Boards as a decision-making or overseeing body for the Centre. In some cases, particularly where the Centre is registered as a NGO, an executive body with final decision-making or overseeing powers is required by national law. Advisory Committees may be established by the Executive Board to provide advice to the executive body.



### India's Advisory Board

Like most NCPCs, the India Centre's Advisory Board consists of a broad range of influential members including:

1. Ministry of Industry (Joint Secretary);
2. Ministry of Environment (Senior Advisor);
3. UNIDO (Country Director);
4. Central Pollution Control Board (Chairman);
5. Confederation of Indian Industries (Head Env. Mgmt. Division);
6. National Productivity Council – the host institution (Director General)



### Guatemala's Executive Board and Advisory Committee

The Guatemala Centre has an Executive and an Advisory board. Its Executive Board consists of:

1. Cámara de Industria de Guatemala (national chamber of industry and NCPC host institution),
2. Presidencia de la República (the Office of the President of Guatemala),



# SETTING UP AN NCPC

3. Universidad del Valle (university),
4. Federación de Pequeña y Mediana Empresa (FEPYME) (federation of small and medium enterprises),
5. Swiss Government,
6. UNIDO/UNEP (as long as there is funding through UNIDO).

To ensure good co-operation of the NCPC with small- and medium-sized enterprises, academic and governmental sectors, the Advisory Committee includes the following members:

1. Universidad de San Carlos (university),
2. Comisión Nacional de Medio Ambiente (CONAMA) (national commission on the environment),

3. Consejo Nacional de Ciencia y Tecnología (CONCYT) (national council of science and technology),
4. Comisión Centroamericana de Ambiente y Desarrollo (CCAD) (central American commission of environment and development). The co-operation of the NCPC with the CCAD is especially important to support the harmonization of national legislation within the region. The following institutions also co-operate closely with the NCPC: SYME (Programa Nacional para Fomento de la Micro y Pequeña Empresa) (national program for the development of small and micro-enterprises) and SEGEPLAN (Ministerio de Planificación) (ministry of planning).

## Words of Experience (+ and -)

→ **Advisory Board members can be instrumental in providing credibility and reflecting the importance of Cleaner Production back into their own constituency.**

+ “All those represented on the Advisory Board are very important in Hungary. This gives the NCPC real credibility among government and business. You need well-known expert name recognition in your country. Otherwise government and business would feel that Cleaner Production is just about theory.”

Hungary Centre

+ “We have had a very high level of representation on the Advisory Board from the beginning, which helps give Cleaner Production a high profile.”

Mexico Centre

→ **Advisory Board members may have individual interests that are not compatible with the collective interest of the NCPC.**

- “At the beginning, people thought the Centre was going to be a profitable business. So some Advisory Board members focused on business profits, expecting directors fees. When they discovered there was no profit, they lost interest. We brought in some more visionary type people, but we still have problems of expectations of economic profitability.”

Zimbabwe Centre

+ - “Our first Advisory Board was a failure, largely because of conflict of interest. We had to disband it and set up a second one.”

Hungary Centre

→ **An Advisory Board provides advice; an Executive Body makes or approves decisions.**

- “After our first Advisory Board meeting, it became clear that if the NCPC depended upon approval of the Advisory Board, it would not be able to do anything, there would be so much delay in decision-making.”

Brazil Centre

+ - “We have 24 members on our Advisory Board. Trying to get consensus is impossible! Our Board of Directors, representing the private sector, university and government, works better.”

El Salvador Centre

+ “As a civic association, we have a General Assembly as our ultimate top decision maker. It has its own Advisory Committee that is responsible for advice and controlling financial issues. Our Steering Committee is the stakeholder advisory body.”

Slovakia Centre

# STAFF

## Guiding Messages

- It helps to have a **director who is already well respected and accepted by government or industry or both.**
- Select **staff who are committed to the Cleaner Production concept.**
- Staff assigned by the host institution should be **working exclusively for the Centre on a full time basis or at least should be made available as and when required by the Centre.**
- Keep the centre staff small, and **build up a network of national experts** who can help out on an as-needed basis.

## Brief Description

All Centres are directed by an experienced country national funded by the Programme for the first three to five years. The number of staff in a Centre varies between 1 (Zimbabwe) and 13 (China), provided by the host institution or funded by the host country or other resources. Centre staff are directly involved in awareness-raising and demonstration projects, training, dissemination of generic Cleaner Production information and policy dialogue activities. Staff is also involved in technical assistance to individual enterprises, helped by external experts in the beginning, or even later on in industry sectors in which the Centre has not yet acquired industry-specific experience. The Centres create a national network of experts which help in carrying out Cleaner Production work, thereby considerably reducing the Centres overhead.

## Recommended Staff

To begin with, the following core staff of an NCPC is recommended:

- **Director**  
**Responsibilities:** Planning, management/administration, represent the Centre, provide guidance and support to other staff, liaise with stakeholders and develop networks.  
**Qualifications:** Managerial qualities. Excellent communicator, rapport building capabilities, contacts with stakeholders, team builder.
- **Technical staff**  
**Responsibilities:** Carry out Centre's activities (awareness creation, training, in-plant assessments/demonstrations, policy studies, information dissemination), preparation of manuals, reports and other information materials.  
**Qualifications:** Technical capabilities, training and communication capabilities, ability to work with industries, team working ability.
- **Support staff (secretary)**  
**Responsibilities:** Provide all support facilities, office maintenance, programme organisation, accounts, etc.  
**Qualifications:** Secretarial qualities, computer skills, basic accountability, office organisation and maintenance.

Subsequently, depending upon need and demand, more staff can be added or contracted on a regular or as-needed basis. The following are examples of possible future needs:

- additional technical personnel
- economist
- information management specialist
- industry sector specialists
- specialists in allied subjects such as environmental management systems, energy efficiency, health and safety
- policy analyst



# SETTING UP AN NCPC



## The China Centre's staff

### The China National Cleaner Production Centre has 13 staff:

- 1 Director, responsible for overall programme direction;
- 1 Deputy director, for assisting overall programme direction and conducting implementation of projects;
- 1 Division Chief of Cleaner Production, for conducting Cleaner Production projects;
- 4 Technical staff of Cleaner Production division, for assisting conducting Cleaner Production projects;
- 1 Division Chief of environmental management system (EMS), for studying the relationship between Cleaner Production and EMS and conducting projects concerning ISO 14000;
- 3 Technical staff of EMS Division, for assisting the chief to conduct EMS projects;
- 1 Division Chief of public-relations and information exchange, for operating the China National Cleaner Production network and other daily tasks;
- 1 staff of public-relations and information exchange, for assisting the chief to deal with day-to-day tasks and translation tasks
- support/secretarial staff

## Words of Experience (+ and -)

→ It helps to have a director who is already a well-respected local figure who can gain the confidence of government, industry and other stakeholders.

+ “It is important to have a director who is already known and accepted within government or industry or both. This helps give the Centre greater credibility and opens doors in government (a very important player in developing countries) and industry for getting across the Cleaner Production message.”

India Centre

→ Staff need to be committed to the Cleaner Production concept.

+ “Select a highly committed staff, that really understands what Cleaner Production means and what it stands for. The deputies should be good technicians, but the Director should be an entrepreneur.”

Brazil Centre

→ Host institution staff assigned to the Centre need to be available as and when the Centre needs them.

- “The first host institution assigned some of its own staff to the Centre, but they were not always available when they were needed.”

Nicaragua Centre

→ When market demand for Cleaner Production rises, the need for economic and technical staff grows.

+ - “In the beginning, the basic staff arrangement was appropriate. But it soon became insufficient. We would suggest adding to the 4-member staff, an economist to insert the economic values in the technical in-plant assessment from the beginning and an expert in computers.”

Brazil Centre



# COUNTERPART INSTITUTION

## Guiding Messages

- The counterpart institution **should first build the Centre's skills and expertise in Cleaner Production assessment and training**, as these are basic building blocks.
- **The need for counterpart expertise evolves as a Centre matures.**  
A certain flexibility is desirable to enable the Centre to obtain the needed expertise when required.
- The Centre should be fully **aware of the range of expertise and skills** that the counterpart institutions have and the counterpart institutions should be **willing to share all their expertise.**
- The counterpart institution should be **genuinely interested in identifying the professional needs of the Centre and providing the appropriate expertise required.**  
It should not be motivated simply by a desire to further its own interests.
- The counterpart institution should **be able and willing to source a particular expertise it may not have.**

## Brief Description

A Cleaner Production Centre does not have, nor is it expected to have, all the necessary expertise and skills to perform its task, especially at the beginning. There is a need to provide professional support to the Centre to train and develop its staff to undertake the tasks of Cleaner Production promotion and implementation. As the specific needs vary from Centre to Centre, it is important to tailor this support to the individual requirements of the Centre. Furthermore, as the responsibilities and functions of the Centre evolve, the nature of support needed also changes. Areas in which Cleaner Production Centres require support for building expertise include:

- Design and delivery of awareness programmes and training
- Design and implementation of demonstration projects

- Systems and techniques for information acquisition, processing and dissemination
- Preparation of Cleaner Production financing proposals
- Preparation of manuals and reports
- Administration and management of centres
- Project proposal preparation for local, national and/or international sources of funding
- Sectoral expertise and policy expertise

## Evolution of counterpart strategy

**Several alternative strategies have been tried to provide such professional support to the Centres:**

- The first generation of Centres was linked to a counterpart institution (mostly from Europe). The counterpart institutions supported the development of expertise in the Centres (and sometimes the counterpart institutions also learnt from the NCPCs).
- It soon became evident that one counterpart institution alone is unable to meet the different support needs of a Centre. Thus, a second strategy is being tried in one centre whereby a senior professional from a counterpart institution is stationed at the NCPC for the first few years, with the objective of helping the Centre assess its evolving support needs and sourcing the expertise needed from other institutions.
- A third strategy involves transferring the experience and expertise gained by mature NCPCs to new Centres. As the NCPCs mature, they are able to act as counterpart institutions themselves. Centres in Brazil, the Czech Republic, India, Mexico, and Slovakia for example, have started to exchange experiences and to offer their services to new Centres.



# SETTING UP AN NCPC

**Figure 9: Counterpart Institutions (1996-2000) ▼**

**1) First and Second Phase Counterpart Institutions:**

- Danish Technological Institute (DTI), Denmark
- EMPA/BOB Partners/Urbaplan
- Erasmus University, The Netherlands
- Fachhochschule beider Basel (FHBB), Switzerland
- Stenum (Stoff, Energie, Umwelt), Austria
- Technical University of Denmark (DTU), Denmark
- IVAM Environmental Research, Amsterdam University, The Netherlands
- University of Massachusetts at Lowell, Massachusetts, USA
- World Cleaner Production Society, Norway

**2) NCPC Counterpart Institutions:** Brazil, the Czech Republic, India, Mexico, and the Slovak Republic

## Words of Experience (+ and -)

→ **Having a counterpart relationship has proved to be helpful to new Centres.**

+ “Our counterpart institution was very useful in introducing us to the Cleaner Production methodology and to conducting Cleaner Production assessments in companies for the first year or two. After that, we were able to do it on our own.”

Zimbabwe Centre

+ “We did not have a formally assigned counterpart but we got the technical assistance we needed from one of the counterpart institutions which was very helpful in building up the necessary skills during the establishment of the Centre – starting demo-projects, holding a Cleaner Production course, etc. We still remain in contact, exchanging ideas and asking for help when necessary.”

Brazil Centre

→ **But as Centres evolve, their need for counterpart expertise also evolves (e.g., from training and methodology to technical aspects and policy).**

+ - “After the first couple of years, the counterpart institution was no longer relevant to our needs. It did not have the technical/industry expertise we needed. UNIDO experts have been more helpful for technical advice.”

Zimbabwe Centre

→ **The relationship between counterpart institutions and NCPCs needs to be clearly defined and transparent on both sides.**

- “We sometimes felt that the counterpart institution was furthering its own professional interests rather than ours. At times, it seemed reluctant to help us specify needs that it could not meet itself.”

Tanzania Centre

# FUNDING

## Guiding Messages

- **Centres need an average of five years of funding** (international and/or domestic) for them to reach a level of earning that will enable them to become financially self-sufficient. It is unrealistic to expect the Centre to start earning right away. The level of earning may be fairly low in initial years and increase towards the end of five years.
- Even when the Centre attains maturity, **all the activities may not be revenue generating.** Awareness-raising, for example, is an important precursor for other Cleaner Production activities but is unlikely to generate direct revenue for the Centre. External funding will thus be needed to support the broader dissemination of Cleaner Production.
- **The Centres must have autonomous control over at least part of the funds initially used to establish the centre to enable them to develop a business mentality.** In addition, this “discretionary budget” needs to incorporate a certain degree of flexibility and authority (e.g., choosing national consultants, etc.) to enable the Director to take certain decisions without having to wait for higher approval.
- **If the Centre does not have access to basic measuring and monitoring facilities, then funds should be earmarked for them.**

## Brief Description

An adequate level and duration of funding is needed to help the Centre get started, develop a favorable market, and reach a self-sustaining threshold of activity. Different countries have different development stages and therefore different support needs, but on average, five years of funding is needed to enable a Centre to become financially sustainable (see section on financial sustainability). After the first year of funding, some Centres are able to earn some income from certain services to help cover its expenditures.

The UNIDO/UNEP NCPC Programme typically provides funding, for the first three to five years: for the Centre director’s salary, short-term national and international consultancies, initial international training and study tours, some equipment, and discretionary funds to carry out the activities. The host country or institution typically provides the salaries of a deputy director, technical and administrative staff, office space and logistical support (communications, supplies etc). It should be mentioned, however, that host institutions have not always been able to meet their promised commitments to the Centre. This has led to situations in which the Centre becomes under-staffed or alternative funding has to be found.

As a result, the UNIDO/UNEP Programme now requires Centres to develop business plans to enable the Centres to plan activities around basic business principles and to update them according to local realities and financial possibilities.



### Typical Centre Revenues and Expenditures (Czech Rep., Hungary)

A Centre’s revenues generally increase after the first two or three years of operation. Expenses also increase however, and these need to be integrated into the Centre’s projections for the future. The Czech Republic and Hungarian Centres publicly report their annual revenues and expenditures for greater transparency of their operations.



# SETTING UP AN NCPC

**Figure 10: Czech Centre Revenues and Expenditures (US\$) ►**

|                            | 1998           | 1999           |
|----------------------------|----------------|----------------|
| <b>Revenues</b>            | <b>355,000</b> | <b>246,000</b> |
| Revenues from Operations   | 270,000        | 166,000        |
| Other Revenues             | 3,000          | 6,000          |
| Contributions              | 82,000         | 74,000         |
| <b>Expenditures</b>        | <b>317,000</b> | <b>261,000</b> |
| Material & Energy Expenses | 12,000         | 7,000          |
| Service Expenses           | 223,000        | 180,000        |
| a) direct                  | 148,000        | 110,000        |
| - personnel                | 66,000         | 70,000         |
| - non-personnel            | 0              | 0              |
| b) indirect                | 83,000         | 70,000         |
| Wage Expenses              | 24,000         | 31,000         |
| Social Security Expenses   | 8,000          | 11,000         |
| Depreciation Expenses      | 16,000         | 8,000          |
| Other Expenses             | 34,000         | 24,000         |
| <b>Balance</b>             | <b>38,000</b>  | <b>-16,000</b> |

Source: Czech Cleaner Production Annual Report, 1999

**Figure 11: Hungary Centre Revenues and Expenditures (US\$) ▼**

|                                 | 1997          | 1998          | 1999           | 2000           | Total          | % Share of total |
|---------------------------------|---------------|---------------|----------------|----------------|----------------|------------------|
| <b>Revenues</b>                 | <b>20,000</b> | <b>86,000</b> | <b>122,000</b> | <b>247,000</b> | <b>475,000</b> | <b>100</b>       |
| UNIDO discretionary budget      | 5,000         | 4,000         | 8,000          | 0              | 17,000         | 4                |
| UNIDO direct funding            | 15,000        | 21,000        | 51,000         | 182,000        | 269,000        | 57               |
| Domestic tenders                | 0             | 34,000        | 6,000          | 0              | 40,000         | 8                |
| Corporate support               | 0             | 0             | 3,000          | 0              | 3,000          | 1                |
| Operational incomes             | 0             | 28,000        | 46,000         | 65,000         | 139,000        | 29               |
| Other support                   | 0             | 0             | 8,000          | 0              | 8,000          | 2                |
| <b>Expenditures</b>             | <b>20,000</b> | <b>86,000</b> | <b>121,000</b> | <b>245,000</b> | <b>472,000</b> | <b>100</b>       |
| Salaries                        | 15,000        | 41,000        | 48,000         | 64,000         | 169,000        | 36               |
| Sub-contractors                 | 0             | 11,000        | 27,000         | 53,000         | 90,000         | 19               |
| Infrastructure and fixed assets | 0             | 2,000         | 34,000         | 33,000         | 69,000         | 15               |
| Travel expenses and per diem    | 5,000         | 7,000         | 800            | 55,000         | 68,000         | 14               |
| Overhead                        | 40            | 7,000         | 5,000          | 11,000         | 23,000         | 5                |
| Miscellaneous                   |               | 17,000        | 7,000          | 30,000         | 54,000         | 11               |
| <b>Balance</b>                  | <b>0</b>      | <b>0</b>      | <b>1,000</b>   | <b>2,000</b>   | <b>3,000</b>   |                  |

Source: HCPC Report of Activities, 1998-2000

## Words of Experience (+ and -)

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### → The budget should be well adapted to the particular needs of each NCPC

- "The realities of different NCPCs are quite different, with individual needs. The budget should be more flexible, so it would be easier to adapt the existing funds to the actual need of a particular NCPC."

Brazil Centre

### → Business plans need to take into account that it is not possible for the Centre to start charging for services from day one.

+ - "When we started, we thought we would be able to charge for services. But we soon learnt that we have to develop our image and position in the market before we could do this. So we had seminars for which we did not charge, and developed quality activities. We rewrote our business plan to take this into account, developing the market that would enable us to charge for services. Half a year later, we were able to start charging for services."

Costa Rica Centre

### → Additional funding may be needed to finance particular needs that can not be met within the country.

+ - "We had no equipment to sample air, effluents, etc. Eventually we got portable kits from a bilateral donor and only then were we really able to tell the companies where the problems were."

Zimbabwe Centre



# NCPC ACTIVITIES

## AWARENESS-RAISING

### Guiding Messages

- **Awareness-raising is most effective when it takes into account local conditions, language, culture, traditions etc.**
- **Awareness-raising programmes and materials need to be tailor-made** to meet the requirements of the target group.
- **Ensure that anyone charged with awareness-raising is an effective communicator.**
- **Direct, personal communication is the most effective way of raising awareness.**
- **Organising an awareness-raising event takes a lot of time and effort.** Instead of organising all the events on its own, the Centre should look for opportunities to 'piggyback' the Cleaner Production message onto events organised by others.
- **Do not overlook local and regional level associations, or non-technical forums** which often enable more direct contacts.

### Brief Description

Awareness-raising is a primary activity for a Centre, particularly in its early years when Cleaner Production is a new concept for the country's industry, government and other stakeholders. The purpose of awareness-raising is to explain what Cleaner Production is, what benefits it can bring and what roles people can play to implement it. The message is targeted primarily to industry and trade associations, but also to government departments, local authorities, financial institutions, individual enterprises, universities and colleges, community groups, consumer representatives and environmental associations.

Examples of NCPC activities to raise awareness include:

- dissemination of general Cleaner Production information (brochures, newsletters, press articles, etc);
- short seminars up to one day duration;
- formal presentations (e.g., industry annual general meetings)
- direct contacts with company or government representatives.

Before demonstration projects or training can be undertaken, a certain level of awareness of Cleaner Production needs to be in place. Thus, awareness raising is a distinct activity from demonstration projects and training, which broadens or deepens knowledge of Cleaner Production once initial awareness has been established.

# NCPC ACTIVITIES

## Words of Experience (+ and -)

### → Awareness-raising comes first.

+ “Our experience showed us that you need to focus on awareness-raising and demonstration projects first. Afterwards, you can build up your information dissemination capacity, and then provide policy advice.”

Brazil Centre

### → The Centre needs to be an expert in communication.

+ “When you talk of creating awareness, you are talking of creating interest. Success depends upon how well you are able to communicate the relevance and benefits of Cleaner Production to the target audience.”

India Centre

### → Direct, personal contact is the most effective way of creating awareness.

+ “You can send brochures to 10,000 people, but you can't be sure how effective it is. Direct contact is more work, time and cost intensive, but if you talk to 20 people, you get a feeling of how well the message is getting across.”

India Centre

### → Organising awareness-raising events takes too much of a NCPC's resources if it tries to do everything on its own. Others are often willing to integrate Cleaner Production topics into their events, including non-technical forums (e.g., Lions Club, Rotary Club, etc.) and municipal or regional industry chambers.

+ - “Instead of organising our own meetings and workshops ourselves, which proved to be very expensive, we now are doing more presentations at industrial meetings. Especially the smaller chambers of commerce and industry – at the municipal or regional levels – as this is more effective because more interested people go there instead of going to the large chambers.”

Mexico Centre

+ - “We could only do two half-day awareness-creating seminars a month when we tried to do everything ourselves – organisation, lecture, handling participants, etc. Now, we are able to do 70 or more awareness-creating workshops a year by ‘piggybacking’ on others’ events, such as industry association meetings. We also look for non-technical opportunities, such as the Lions Club, which are also good ways of reaching our target audiences.”

India Centre

# DEMONSTRATING THE SCOPE AND POTENTIAL OF CLEANER PRODUCTION

## Guiding Messages

### Before the demonstration:

- **Select demonstration companies carefully.** Develop criteria for selecting priority sectors and companies for demonstration projects.
- **Only really willing and convinced companies should be considered for demonstration projects.**
- The **contracts with companies should clearly specify the roles and responsibilities** of the company as well as those of the Centre.
- The objective of a demonstration project should not just be to identify a number of Cleaner Production options and present them in the form of a report. **It should be a satisfactory completion of the project with the maximum possible level of implementation of Cleaner Production options identified,** and to build company expertise to spread Cleaner Production in the company and industry sector.

### During the demonstration:

- The implementation phase should not wait for the whole assessment to be complete. **The implementation of straightforward Cleaner Production options should take place alongside the assessment so that the company can start seeing the savings.**
- **Take time to develop good relationships with company personnel** – the number of demonstration projects is less important than their effectiveness.
- **Include company's financial managers in the demonstration project** so that the company can accurately calculate its economic interest in adopting Cleaner Production options.
- **Find ways to motivate companies that do not implement even no- or low-cost options,** or to recover the costs if they don't.

### After the demonstration:

- **Evaluate demonstration projects periodically** for a better understanding of which options did or did not get implemented, and why.
- If capital-intensive Cleaner Production options are not taken up for implementation for lack of finance, the Centre should **develop the expertise to convert such Cleaner Production options into bankable loan proposals and act as intermediary between financial institutions and companies;**
- **Take measures to ensure that results of demonstration projects get communicated outside the company to the wider industry.**
- **Do not forget that demonstration projects can not do it all** - policy dialogue, training, technical information, etc. will also be needed.



## Brief Description

A common barrier to Cleaner Production is the lack of local examples demonstrating that Cleaner Production can be applied to any industrial sector and that waste can be turned into profit. Local entrepreneurs are usually not aware of the scope and potential of Cleaner Production. A key activity of NCPCs, particularly in the beginning, is in-plant demonstration projects which assess Cleaner Production opportunities in a local company and help it to implement them (see Figure 13: *Types of Cleaner Production options identified and implemented in Demonstration Projects*). This creates successful examples of local applications of Cleaner Production which can be used to convince policy and industry decision-makers. The purpose of demonstration projects is thus four-fold:

- to demonstrate the scope and potential of Cleaner Production;
- to lead to a multiplier effect;
- to provide first-hand experience and knowledge to personnel trained by the Centre;
- to build up capacity in a few companies to take Cleaner Production further.

Demonstration projects are spread over diverse sectors such as textiles, pulp and paper, electroplating, etc. There is a wide mix in the coverage of the demonstration projects, ranging from unit level to region-based.

## Selecting the Right Industry Sectors

Selecting the right industry sectors in which demonstration projects can obtain early successes is vital to create momentum not only for subsequent demonstration projects but also for the Centre's entire programme. For example, the criteria which the India NCPC uses are:


❶ **Significant multiplier effect.** The basic purpose of a demonstration project is to show and convince other industries of the potential and feasibility of Cleaner Production. It is therefore essential that the sector selected is large enough to have a significant multiplier effect. The multiplier effect is governed by two factors:

- a) number of clusters of similar units
- b) total number of units in the selected sector.

A sector with a large number of units in clusters would be preferable to one with a few, dispersed units.

❷ **Substantial Cleaner Production potential.** Not all industry sectors have the same potential for Cleaner Production. In the early stages, when success needs to be demonstrated to prove the usefulness of the Centre, industry sectors with the greatest Cleaner Production potential should be selected over those where it may be more difficult to obtain clear results.

❸ **Significant pollution intensity.** The advantages of Cleaner Production may at first be more persuasive in industry sectors that are pollution intensive rather than those in which pollution is much less, although the Cleaner Production potential will also need to be considered. Pollution intensity could be measured in terms of waste quantity, toxicity, concentration of pollutants in waste streams, etc. Cleaner Production in a pollution intensive sector could also lead to a substantial decline in end-of-pipe pollution control requirements, thus making Cleaner Production a more obvious and attractive preference.

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- 4 **High economic importance.** It has been the experience of the India NCPC that industry sectors which are important in the national economic scenario accept newer concepts like Cleaner Production more readily. The economic importance of the sector has several facets such as impact on imports/exports, overall gross output, relationship with other up-stream or down-stream sectors, etc.
- 5 **Good potential cooperation from industries.** Industry cooperation in Cleaner Production assessment and implementation is vital for a successful demonstration project. It has been observed that the cooperation from industries varies widely from sector to sector as well as from place to place.
- 6 **Stable financial health of the sector.** In the experience of the India NCPC, there is no clear correlation between an industry sector's financial situation and its receptivity to Cleaner Production. The sectors which have reached a plateau of growth and can foresee a possible decline in future profits unless corrective measures are taken, have tended to be the most suitable ones for early successes.
- 7 **Intense intra-sectoral competition.** Industry sectors characterised by intense competition tend to be the most receptive to Cleaner Production. However, when Cleaner Production demonstrations have proved successful, there is less willingness to share the information with other units in the industry.
- 8 **Sufficiently organised sectoral structure.** To obtain early success, the Centre should begin with industry sectors which are sufficiently organised (e.g., textile dyeing, printing, pulp and paper, agro-industries) to be able to initiate and sustain a Cleaner Production programme. Industry sectors with informal structures (e.g., small electroplaters, fish-peeling units) are likely to be more difficult to obtain success for reasons such as lack of trained/technical manpower, over-burdened management, lack of measurement/monitoring facilities etc.
- 9 **High possibility of replication by other units.** It is important that demonstrated Cleaner Production measures are able to be replicated by other units throughout the sector. Two factors should thus be considered when selecting an industry sector:
- 1) uniformity of production processes and products;
  - 2) availability of technical manpower within the units.
- 10 **High national priorities.** Finally, the selection of sectors should also recognise governmental priorities (e.g., Ministry of Environment, Ministry of Industry, Pollution Control Boards, etc.) as, in the long run, demonstration projects may not serve much purpose unless they are able to further government policies and programmes.

## Selecting the Right Companies

Selecting companies for successful Cleaner Production demonstration projects is not simple in difficult economic situations or transitions. The Slovak Centre found that companies in its country, used to a centrally planned economy, were not always able to make the transition to a business culture of economic savings and profits, important prerequisites to drive the process of Cleaner Production. Several demonstration projects failed because companies went bankrupt during the project life-span or because allocated funds were used for purposes other than Cleaner Production.

This experience led the Slovakia Cleaner Production Centre to develop a list of prioritised criteria for selecting companies for future Cleaner Production demonstration projects:

- 1 Management involvement
- 2 Good or excellent Cleaner Production potential in the company
- 3 Company is willing to pay a participation fee
- 4 Stable economic situation of the company with the perspective of possible investments
- 5 Company wants to develop an accredited environmental management system
- 6 Company wants to develop an environmental management system not necessarily approved by recognised auditor.

Centres in Costa Rica, El Salvador and Guatemala also use specific criteria for selecting companies for demonstration projects, namely:

Companies must agree to introduce environmental management and to apply a long-term Cleaner Production programme.

- Each company must have a known prevention potential for significant reduction in pollution (e.g., basic metal and metal products industry, chemical industry, machinery industry, textile industry, food industry).
- Companies should be willing to share examples of Cleaner Production with other enterprises with similar technologies.
- Companies should be situated in one of the most polluted regions of the country.

## Types of Cleaner Production Options Implemented

During 1997-98, in-plant assessments carried out by NCPCs in China, Mexico, the Czech Republic, the Slovak Republic, Hungary, Zimbabwe, India, for 71 enterprises (comprised of 35 small- and medium-sized enterprises, 25 large enterprises, 11 non-industrial establishments) showed that about 80% of the Cleaner Production options identified pertain to the categories of good house-keeping, better process control and equipment/hardware modification/replacement. Of the total options identified, 64% were implemented during the duration of the demonstration project.

**Figure 12: Types of Cleaner Production options identified and implemented in Demonstration Projects ▼**

| CP Options (technology changes)               | Identified Cleaner Production Options |             | Implemented Cleaner Production Options |            |
|---|---------------------------------------|-------------|--|------------|
|   | N°                                    | %           | N°                                     | %          |
| Good housekeeping                             | 218                                   | 50%         | 166                                    | 76%        |
| Input material change                         | 15                                    | 3%          | 12                                     | 80%        |
| Better process control                        | 67                                    | 15%         | 35                                     | 52%        |
| On-site recovery & reuse of waste (recycling) | 40                                    | 9%          | 20                                     | 50%        |
| Equipment/hardware modifications/replacement  | 58                                    | 13%         | 32                                     | 55%        |
| Change of process technology                  | 35                                    | 8%          | 13                                     | 37%        |
| Production of useful by-products              | 3                                     | 1%          | 3                                      | 100%       |
| Product modification                          | 3                                     | 1%          | 2                                      | 67%        |
| <b>Total</b>                                  | <b>439</b>                            | <b>100%</b> | <b>283</b>                             | <b>64%</b> |

Source: UNIDO, "In-Depth Evaluation of the UNIDO/UNEP NCPCs", July 1999



## Demonstration Projects in China

The China NCPC has conducted in-plant demonstration/training programmes in some 100 enterprises and Cleaner Production demonstration activities in more than 20 provinces and large cities. At the start of a Cleaner Production assessment in an enterprise, the CNCPC provides a one-day introductory seminar for managers and owners of the enterprises to disseminate information on experience with Cleaner Production techniques and technologies. In each of the 100 enterprises where Cleaner Production assessments were carried out, a comparison of the extent of pollution generated before and after implementation of Cleaner Production options was done, based on auditing data of material balance at the plant level. In all Cleaner Production assessments, the CNCPC provided technical expertise for the implementation of Cleaner Production options at company level. The CNCPC has held seminars to share results with industry associations, local environmental protection bureaus etc.



## Regional Demonstration Project in the Czech Republic

The Czech Cleaner Production Centre carried out a Regional Cleaner Production Assessment Project for the town of Moravska Trebova in 1999. The project, in line with the European Union's 5th Action Programme, was carried out in the form of a two-stage interactive course :

- **Stage 1:** Collective training for project participants in Cleaner Production methodology;
- **Stage 2:** Carrying out demonstration projects in the participating enterprises. The course participants applied the newly acquired knowledge in their enterprises, i.e., at the source of the waste and pollution generation, with assistance from the Centre's consultants. The concrete achievements of the project are as follows:
  - Reducing air emissions by 6 tons/year
  - reducing the generation of other types of waste by 662 tons/year
  - reducing the output of hazardous waste by 1.5 tons/year
  - reducing the wastewater output by 70,000 m<sup>3</sup>/year
  - reducing heat consumption by 37 thousand GJ/year
  - reducing the consumption of heating vapour by 5.5 thousand m<sup>3</sup>/year
  - reducing the consumption of electricity by 14 MWh/year.

After the implementation of all these measures, the annual savings will amount to US\$1.65 million with an average payback period of 4.5 years.

## Words of Experience (+ and -)

→ **Successful demonstrations will help to propel the Cleaner Production programme forward; unsuccessful ones will stall it.**

+ “Our successful demonstration projects gave us local economic examples of Cleaner Production, and how much they have saved the company – the definite argument for the entrepreneur.”

Brazil Centre

→ **Successful demonstration projects depends upon the Centre’s capacity to build interpersonal relationships with company personnel at all levels.**

+ “Do not make the mistake of imposing yourself as a fault-finding specialist. It is not enough to identify Cleaner Production opportunities; company personnel have to implement them for the demonstration project to be successful. Try to get the words from their mouth. Make them own the Cleaner Production options as if they have developed them. Then you have a fair chance of getting it implemented.”

India Centre

→ **Selected companies may not always be motivated to complete the project.**

- “In the beginning, we had some negative experiences that showed us that it is important to find ways to motivate the company to finish the project (e.g., company pays fixed fee and equal amount for training paid from the Cleaner Production savings) and to ensure that the money is used in the way intended. Be very careful how you frame the contract with companies; include clauses that determine who is responsible for what.”

Slovak Republic Centre

→ **Demonstration projects need to be followed up periodically to ascertain which Cleaner Production options have and have not been implemented, and why or why not.**

+ - “We did some follow-up evaluations two or three years afterwards to make sure the all Cleaner Production options identified during a demonstration project had been implemented. We had some good and not so good surprises.”

Tunisia Centre

+ - “A successful demonstration project achieves positive as well as negative results. The positive results should be applicable widely in other places and the negative results should be fully summed up and analysed, so that the same mistakes can not occur again in the following Cleaner Production projects.”

China Centre

→ **Successful Cleaner Production demonstrations in one company will not automatically be transferred to other companies in the industry.**

- “We have had success in individual companies but not on an industry level. It has proved difficult to transfer from one company to another for reasons of competitiveness and confidentiality. We have thought about creating Cleaner Production clubs to make them communicate.”

Tunisia Centre

+ “Nothing works better within an industry group than a colleague telling them about things. Demonstration companies should become ambassadors of Cleaner Production. This they will only do if they get something out of it. So you need to make sure that you are passing on the skills, not taking the expertise out with you. This may take several months of building up relationships, but if you are not able to develop personal relationships with your partners, the project will not be sustainable.”

India Centre

→ **Demonstration projects are only one component of a broader programme to build awareness and local capacity for Cleaner Production.**

+ - “The most successful demonstration projects are those that are integrated into a broader programme which includes policy advice, capacity building, individual demonstration in companies and summed-up.”

China Centre

+ - “The approach in the beginning placed too much focus on demonstration projects alone, not the context of the projects: the national policy situation, role of governments, industry branches, local communities, etc. When Centres start, they often have the idea that when demonstration projects are successful, they will automatically generate Cleaner Production elsewhere. You need much more than demonstration projects to spread Cleaner Production around the country.”

Erasmus University, The Netherlands

# TRAINING TO BUILD LOCAL EXPERTISE AND CAPACITY

## Guiding Messages

- **Incorporate training into assessments** so that Cleaner Production stays in the company when the Centre leaves.
- **Identify training requirements** with a formal training needs assessment.
- **Training must be adapted to meet local requirements.**
- **Good communicators with a little Cleaner Production knowledge make better trainers** than Cleaner Production experts with weak communication skills.
- **Building capacity in other institutions** should not be seen as creating competition but as **creating a supportive network.**
- **Training needs to be directed at all stakeholders** – current and future – so that all speak the same language.

## Brief Description

Training in Cleaner Production is essential to enable a country to build its own Cleaner Production capacity and reduce its dependence on external assistance.

Training may be:

- “Classroom” training. This type of training is conducted through workshops and seminars for specific target groups.
- In-plant training. “Classroom” training will take better hold if trainees can implement the concepts learned while still under the supervision of the trainer. In-plant Cleaner Production assessments are an especially useful vehicle for in-plant training. Training of company staff can be built into in-plant assessments.

Training subjects could include: generic in-plant Cleaner Production assessment methodology, sector specific Cleaner Production assessments, preparing loan proposals, conducting Cleaner Production awareness programs, conducting Cleaner Production training programmes, etc. The training could also vary from basic/ appreciation training meant for providing an overview and overall understanding of Cleaner Production (usually for senior managers) to intensive, in-depth training (for consultants and trainers).

Training target groups could include: industry and trade groups, government officials, research institutes, financial institutions, universities and consultants. In addition, national experts are trained in distinctive areas, e.g., investment promotion, Cleaner Production policy, data management etc.



## Cleaner Production Training in Vietnam

The lack of well-trained and experienced Cleaner Production specialists is one of the important barriers to implementation of Cleaner Production in Vietnamese industry. Hence, one of the key activities of the Centre is to build up, through training, a human resource base (national experts) on Cleaner Production. **The Viet Nam Cleaner Production Centre trains Cleaner Production trainers with a systematic, in-depth training programme, consisting of seven modules.** During the programme, participants go through a complete Cleaner Production assessment, coached by national and international experts. Currently, the programme is directly linked to in-plant demonstration projects; therefore the trainees have a good theoretical as well as practical knowledge in Cleaner Production at the end of the course. A selection of these trained national experts will serve as Cleaner Production trainers/coaches in Phase II, where the Vietnam Centre will conduct about 15 in-plant demonstration projects. Some of the other those trained will work as independent consultants on Cleaner Production.



## Cleaner Production in Higher Education in Hungary

During the last few years, topics related to Cleaner Production, pollution prevention, environmental management and sustainable development have been added to the curricula of environmental economics at the Budapest University of Economic Sciences and Public Administration (BUESPA – the Hungarian NCPC's host institution) and other colleges and universities in the Hungarian Cleaner Production Centre's network. About 80% of the yearly enrolled 700-800 regular students of BUESPA study environmental economics for at least one semester at the University. Together with about 150 part-time students in each year also studying related topics, this makes about 750 graduate economists per year having received a basic education on preventive environmental approaches. Regional Cleaner Production Centres also included Cleaner Production in their curricula for environmental engineers and the three Centres together teach about the same number of students each year as the HCPC in Budapest.

**Figure 13: Seven Module Training Course developed by Vietnam Cleaner Production Centre ▼**

| 1. Train the Trainers<br>(6 days)  | 2. In-plant Cleaner Production Pre-Assessment<br>(2 days)  | 3. Cleaner Production Pre-Assessment<br>(3 days)  | 4. Cleaner Production Assessment<br>(3 days)   |
|--|--|---|--|
| <ul style="list-style-type: none"> <li>→ Introduction to Cleaner Production</li> <li>→ CP-strategy and methodology</li> <li>→ UNIDO/UNEP Cleaner Production Programme</li> <li>→ Material balance, energy balance</li> <li>→ How to start a Cleaner Production project</li> <li>→ Opportunities and constraints for Cleaner Production in Vietnam</li> <li>→ Discussion</li> </ul> | <ul style="list-style-type: none"> <li>→ Getting an in-plant demonstration started</li> <li>→ Designate CP-audit team (2-3 people from unit together with our trainees)</li> <li>→ List process steps, flow sheet</li> <li>→ Walk through plant</li> <li>→ Identify and select wasteful process steps and discuss Cleaner Production opportunities</li> <li>→ Collect data, measurements</li> <li>→ Develop rough material and energy balance</li> </ul> | <ul style="list-style-type: none"> <li>→ Presentation of pre-assessment</li> <li>→ Discuss results, problems</li> <li>→ Introduction of energy audit</li> <li>→ Theory of project management</li> <li>→ Control figures, material and energy balance</li> <li>→ Work plan next steps: improve material and energy balance, assign cost to waste streams</li> <li>→ Pre-assessment report</li> </ul> | <ul style="list-style-type: none"> <li>→ Final presentation, material and energy balance, compare to bench-marking system</li> <li>→ Cost/Measure the efficiency of a boiler</li> <li>→ Heat loss balance</li> <li>→ Assign costs to waste stream</li> <li>→ Define baseline</li> <li>→ Introduction of opportunities for Cleaner Production measures</li> <li>→ Selection solutions for implementation</li> <li>→ CP assessment report</li> </ul> |

## Training the Competition?

In 1999, an in-depth UNIDO evaluation of the eight oldest NCPCs found that competition in NCPC core activities is not very significant. There are other multilateral (World Bank) and bilateral (Norway, The Netherlands, Denmark, USA, etc.) programmes in Cleaner Production. They have the advantage that the technical support is backed by funds to support implementation of the high cost options. However, as they are usually targeted at large industry and – in countries like Brazil – operate in geographical regions in which NCPC activities are not very intense, they are not felt too much as competitors in the ‘market niche’ of the NCPCs. Furthermore, some NCPCs have been contracted for implementation of these programmes which strengthens the NCPCs reputation and financial standing.

True competitors are 1) the consulting companies in the field of end-of-pipe treatment and 2) consulting companies which provide advisory services which the NCPCs also want to enter (particularly EMS). While the first category (end-of-pipe treatment) requires conceptual competition with the possibility of co-operation at the operational level, the second category requires cooperation. It is not the purpose of the UNIDO/UNEP programme to subsidize activities which compete with services carried out by the private sector.

| 5. Select Cleaner Production Opportunities (4 days)   | 6. Cleaner Production In-plant Demo (3 days)   | 7. Implement Cleaner Production Measures (3 days)  |
|---|--|--|
| <ul style="list-style-type: none"> <li>→ Presentation of implemented low cost measures</li> <li>→ Assess technical feasibility</li> <li>→ Assess financial feasibility</li> <li>→ Evaluate environmental aspects</li> <li>→ Report: Cleaner Production opportunities (<i>selection</i>)</li> <li>→ Performance test</li> <li>→ ISO 14000</li> <li>→ BAT in Textile</li> </ul> | <ul style="list-style-type: none"> <li>→ Presentation of selected Cleaner Production measures</li> <li>→ Constraints for the implementation</li> <li>→ Action plan for implementation</li> <li>→ Monitoring of measures</li> <li>→ Follow-up</li> <li>→ Final report</li> <li>→ BAT in pulp and paper</li> </ul> | <ul style="list-style-type: none"> <li>→ Presentation of case studies</li> <li>→ Discussion, experience, opportunities, constraints</li> <li>→ Lessons learned</li> <li>→ Develop project for funding</li> <li>→ Certificate</li> <li>→ Press conference</li> <li>→ Performance test</li> <li>→ BAT in seafood processing</li> </ul> |

Source: Vietnam Cleaner Production Centre, Annual Report 1999



## Words of Experience (+ and -)

→ **Demonstration projects which include training of company personnel ensures that Cleaner Production continues after the external experts leave.**

+ “We combined training with Cleaner Production assessments in companies, a factor which made the demonstration projects work properly. We built upon the existing expertise and technical capacity of the company as we did not have much funding for international consultants. This actually had two advantages:  
1) the expertise stays in the company and  
2) it creates a sustainable momentum, because once the programme finishes, the people continue with the Cleaner Production philosophy.”

Tunisia Centre

+ “We believe the Centre has done quite a lot of things right when it comes to training. As a consequence, many companies have asked for specific training to learn more about CP. So we are planning to implement a modular system of training, to learn step by step, stretched over a period of months, as opposed to one intensive course of one week. This will be more like taking them by the hand, and our companies are willing to pay for this.”

Costa Rica Centre

→ **Properly identifying training needs is one of the most important aspect of training.**

- “We should have identified training activities with a formal needs assessment. We identified needs through experience but it took too long”.

India Centre

→ **Training has to be adapted to local requirements.**

+ “All mature NCPCs have developed their own training manuals. International Cleaner Production training manuals (e.g., UNIDO/UNEP manual, Norwegian model) may provide useful guidelines, but most NCPCs soon find the need to develop their own training materials to meet local needs.”

India Centre

→ **Specific training packages need to be developed to suit specific target audiences.**

+ “The training should be of various types, aimed at specific audiences. For example, we have developed a 5-day intensive training program for potential Cleaner Production trainers or auditors. A second type of training is for high-level managers of governmental bodies, related institutions, banks and companies, based on an extensive but high-quality lecture. Finally, a third type of training is used for factory staff, with simple examples and pictures, to let them know how Cleaner Production relates to their daily work.”

China Centre

+ “We realised through experience that while you can not tailor training for every situation, you do need to develop different training packages. For example, basic appreciation requires a half-day of basic training, which is different from the more intensive training on the job in a demonstration project”.

India Centre

+ “We found out that the enterprises that have developed internal Cleaner Production or waste minimisation measurements were those that had the support of a consultant. So we are now in the process of developing training for different types of consultants – e.g., universities, private consultants. We train them on the methodology, then on promotion and management of projects so that they can sell them, and then on training trainers so they can train others.”

Mexico Centre

→ **When training trainers, it is more important to have an effective trainer with basic Cleaner Production knowledge, than a Cleaner Production expert with no training skills.**

- “Cleaner Production expertise can be acquired with hard work but when we asked some good Cleaner Production experts to train trainers, they failed miserably. Good communicators, with some Cleaner Production training, did much better.”

India Centre

→ **Training needs to be directed at all stakeholders – current and future – so that all speak the same language.**

*“A valid programme should emphasize training of different stakeholders e.g., industry, government officers, consulting companies, as otherwise there will continue to be a language problem between these communities. Training also needs to reach university students so that future leaders are not reluctant to do it.”*

El Salvador Centre

→ **Training has an effective multiplier effect in building national expertise and capacity in Cleaner Production.**

+ *“The intensive training program for auditors is the most successful one for the China NCPC. A number of 5-day training programs have been organised, with hundreds of people trained. These people play a significant role in China to promote Cleaner Production in various fields.”*

China Centre

+ *“We have run 25 to 28 workshops of at least one to five days. Demand for our training workshops is almost doubling each year.”*

Mexico Centre

→ **Building capacity of other institutions and consulting companies should not be seen as creating competition but as developing a supportive network that can take over some of the NCPC activities and help stimulate market demand for new NCPC services.**

- *“Building capacity is a challenge for NCPCs because some see it as building competitors. But if Cleaner Production is to proliferate in a country, NCPCs need to build the capacity of others to spread the word. In India, we have built regional capacity through regional Cleaner Production centres. This way we don't have to do all the awareness-raising work, which we couldn't do anyway, and it allows us to focus on developing expertise and knowledge in leading areas.”*

India Centre

## ASSISTING IN OBTAINING INVESTMENTS

### Guiding Messages

- **Identify and establish good relationships with banks and financial institutions** so that they are willing to provide financial support for implementing Cleaner Production.
- **Check with your own bank** to see if it would be interested in developing new commercial projects for companies with whom you have a good track record.
- **Ask bilateral or multilateral donors if they would be interested in providing assistance** to help overcome foreign currency barriers to cleaner technology transfer.
- **Ensure that the company is genuinely interested in implementing Cleaner Production and obtaining the finance needed.**
- **Provide training to company finance managers and accountants** on internalising the cost of wastes and environmental risks in their accounting procedures.
- **Build the Centre's capacity to help small and medium size companies develop sound business propositions** for Cleaner Production loans or investments.
- **Provide training and information to personnel from banks and financial institutions** to enable them to appreciate Cleaner Production as a part of good management practice and to accord a priority to Cleaner Production proposals.
- **Convince and assist banks and financial institutions** in building specific, Cleaner Production financing schemes, revolving funds, etc.
- **Develop a complete package of financial counselling services specifically for small and medium enterprises:** e.g., assistance in identifying financing sources, preparing bankable proposals, soliciting support from appropriate institutions, etc.

### Brief Description

Usually, the Cleaner Production measures which get implemented first are those which require little or no investment, with short or rapid pay-back periods. Further Cleaner Production options, however, will require up-front capital investments for which the company may need some proportion of external financing until it is able to recuperate the Cleaner Production savings. To build the Centre's credibility and ability to spread Cleaner Production, it is essential that demonstration companies are able to procure/leverage external financing to implement identified Cleaner Production measures. Centre staff should be able to help small- and medium-sized enterprises to develop Cleaner Production options into bankable loan proposals. If need be, external expertise may be sought to build this capacity. It is equally important that the country's financial agencies understand and appreciate Cleaner Production and are willing to consider Cleaner Production proposals. Financing agencies may be persuaded to set up "easy access/easy clearance" schemes including revolving funds for financing Cleaner Production in small-scale industries.

## Words of Experience (+ and -)

To date, mature NCPCs have only a limited experience in helping companies to obtain investment finance as they are only just beginning to build their capacity in this area.

→ **A Centre's own bank may be interested in financing investments in companies that have a good management track record with the Centre.**

+ *"The bank which has held the Centre's own accounts for a number of years began to get interested in what we were doing as part of its commercial search for new products and projects. It became interested in developing preventive environmental financing with us because it wants to invest in companies that have sound business practices. So it was interested in knowing which companies we have worked with and could recommend! We are now trying to develop formal procedures which will make it interesting for the bank to make finance Cleaner Production investments."*

Slovak Centre

→ **Foreign funding may still be needed to help overcome the barrier of foreign currency constraints.**

- *"We experienced financial and foreign currency constraints when it came to some of the more significant Cleaner Production options we identified during demonstration projects. It took our national brewing company, for example, two years after our intervention before it invested in Cleaner Production. This delayed the data collection we needed to demonstrate success and convince others to follow. We eventually received some seed money for technology investments from a bilateral funding agency, but this would have been much more effective if it had been a part of the original funding, rather than letting the initial enthusiasm wind down."*

Zimbabwe Centre

→ **Companies must be willing to provide the commitments necessary to obtain Cleaner Production investments.**

- *"We did one demonstration project that included looking for financing which our consultant submitted to different banks. The loan was approved but the demonstration company didn't want to give the warranties required, so it ended there."*

Mexico Centre

→ **Include company finance managers and accountants in in-plant training/demonstration projects to help them understand their interest in Cleaner Production investments and environmental cost accounting.**

+ *"Cleaner Production costing at company level is probably one of the biggest pieces still missing. When it comes time for investing in Cleaner Production options, the company's financial managers also need to understand Cleaner Production, at least its economic savings. Now when we go into companies, we ask for a cost accountant to be included on the team."*

Zimbabwe Centre

## **UNEP Project on Financing Cleaner Production**

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To help NCPCs increase investments in Cleaner Production, UNEP started a four-year project in 1999 on “Strategies and Mechanisms to Promote Cleaner Production Investments”, financed by the Norwegian Government. The project demonstrates how such investments can be stimulated by helping financial institutions understand the importance of Cleaner Production and helping Cleaner Production experts develop creditworthy investment proposals. It focuses on five pilot countries in which an NCPC has already been established: Guatemala, Nicaragua, Tanzania, Vietnam and Zimbabwe, representing different socio-economic conditions, industrial sectors and stages of industrialization. The project will demonstrate in the five participating countries 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.

Under the project, four training courses have been developed;

- CP1 — Introduction to Cleaner Production concepts and practices
- CP2 — Introduction to capital budgeting and funding of capital projects
- CP3 — Profiting from Cleaner Production
- CP4 — Funding Cleaner Production projects

These training courses will eventually be condensed into a handbook and generic modules for publication by UNEP in 2002 for use in other countries and regions.

# DISSEMINATING INFORMATION

## Guiding Messages

- **The objective of information dissemination should be to provide information which is required by the user** (demand-driven) rather than providing information simply because it exists (supply driven).
- **Different stakeholders have different information needs.**  
A Centre should do an 'information needs' survey to identify and understand actual information needs. Specific information packages should then be developed taking into account:
  - a) the relevance of the information to the user
  - b) its presentation in a 'directly usable' format
  - c) the user's capability and facility to apply the information.
- **Maximise use of existing information dissemination channels and networks instead of creating new ones.** Piggyback on existing nodal points (industry associations, government agencies, etc.) as a resource-effective means of providing information.
- **Information dissemination is continuously evolving;** the information needs of yesterday may be quite different from the needs of today and tomorrow. Develop a feedback system to continuously assess and meet user needs.
- **Feedback from local Cleaner Production users should be made accessible to regional and global networks** to enable others to integrate grass roots needs into development projects.

## Brief Description

Access to information on proven Cleaner Production techniques and technologies is essential in convincing industry, local government and other stakeholders that Cleaner Production is a better approach. One of the key advantages of being part of an established international network is the greater access to the latest information on Cleaner Production and related topics. All Centres are connected to UNEP's electronic list-serve and have access to UNIDO/UNEP home pages with information on cleaner industrial production (case studies, sectoral reviews and technologies). Many Centres also establish their own Web site in their national language to facilitate exchange of information (see *Figure 13: NCPC Web sites*). Just as importantly, Centres also produce information, publishing their own newsletters, manuals and guides in local languages, and collecting case studies of local success stories for international and national dissemination.



## Information Dissemination in China

The China Centre has produced and disseminated many publications, in Chinese, on Cleaner Production, such as:

- Manual for Cleaner Production Audits in Enterprises (more than 6,000 copies sold)
- Training Material on Cleaner Production in Enterprises
- An Introduction to Cleaner Production Audit for Enterprises
- Guidelines for Cleaner Production in the Brewery Industry
- Guidelines for Cleaner Production in the Electroplating Industry
- Guidelines for Cleaner Production in Organic Chemical Industry
- Guidelines for Cleaner Production in Silk Dyeing and Printing Industry
- Guidelines for Cleaner Production in Pulp and Paper Industry
- Cleaner Production In China
- Proceedings of Symposium on Cleaner Production.

The China Centre also edits and publishes its own bi-monthly Cleaner Production Newsletter.

**Figure 14: NCPC Websites ▼**

| Centres with their own Internet Web sites |                   |
|---|-------------------|
| Brazil                                    | www.senai.br/cntl |
| Costa Rica                                | www.cnpml.or.cr   |
| Czech Republic                            | www.cpc.cz        |
| El Salvador                               | www.cnpml.org.sv  |
| Guatemala                                 | www.cgpl.org.gt   |
| Mexico                                    | www.cmpl.ipn.mx   |
| Nicaragua                                 | www.cpmnic.org.ni |
| Slovak Republic                           | www.cpz.sk        |

## Words of Experience (+ and -)

- **Greater access to Cleaner Production information is essential to enable a country to change its end-of-pipe bias.**

**+** **-** "Information is a key issue. Existing libraries and information sources are quite biased - there is not so much information on preventive environmental thinking. I'm pushing a lot to get a decent information centre to provide a way of bringing consultants and industry closer to the Centre. Requests for information have gone up quite a lot, with four times as many requests today than we had just over a year ago."

Costa Rica Centre

- **Centres need to have adequate capacity to be able to manage and disseminate information.**

**-** "In the beginning, our computer did not have enough hard disc capacity to be able to house the database or to effectively network."

Zimbabwe Centre

## GOVERNMENT POLICY ADVICE

### Guiding Messages

- **Policy work and dialogue is needed to sustain Cleaner Production activities.**
- Do not start with formulating a new Cleaner Production policy for government. **Start by identifying existing areas which discourage Cleaner Production and recommend practical measures that are not difficult for governments to implement.** Gradually build upon successes in these areas to integrate Cleaner Production into other policy areas.
- **The policy work should aim at mainstreaming Cleaner Production in the entire policy framework.** Thus it is important to target not just environmental policies but to take a more holistic approach and integrate Cleaner Production into industrial, economic, education and other government policy areas as well.
- **All the concerned stakeholders should be involved in the policy work** to increase the acceptability of the recommendations.
- **The policy work of other Centres in the region may provide useful opportunities** for international cooperation and harmonisation.
- **Use the International Declaration on Cleaner Production as a vehicle to obtain high profile commitment and involvement of policy makers.**

### Brief Description

Governments, particularly in developing countries and economies in transition, play an important role in providing the overall policy and economic framework for a country's development. NCPCs thus have an important role in helping governments to identify and develop the policy tools and economic instruments suitable to their country's context which would encourage and sustain Cleaner Production in the country. The International Declaration on Cleaner Production, launched by UNEP in 1998 could be a good vehicle to solicit public commitment from government. Subsequently, NCPCs could be instrumental in helping the government in developing and implementing 'CP-friendly' policy framework. This was the path taken in the Czech Republic.

*"In March 1999, during the 4th Annual Meeting of NCPC Directors, the Czech Minister of the Environment signed the International Declaration of Cleaner Production. To put into practice the commitments the Czech government made by signing the Declaration, the Czech Environment Ministry, in co-operation with other Ministries, prepared a National Cleaner Production Programme, which was promulgated by government decree in February 2000. The decree, which is aimed at government ministries only, recommends to all ministries to implement the preventive strategy in all their activities. To implement the decree, a committee has been established, chaired by the Ministry of the Environment, on which the ministries of Agriculture, Finance, Spatial Planning, Transport and Health are represented; as are industry organisations, the financial community, and relevant NGOs. The Czech Cleaner Production Centre acts as the Implementing Agency of the Committee. In this role, the Centre monitors implementation of the decree and reports back to the Committee. The CCPC also acts as a champion for Cleaner Production, educating ministries on the preventive concept and assisting them where requested to identify the programmes and activities where the preventive strategy could be inserted."*



# NCPC ACTIVITIES

## Words of Experience (+ and -)

→ **Government policy work and dialogue is needed to encourage demonstration companies to continue a Cleaner Production approach.**

– “Although almost all the enterprises participating in demonstration projects adopted very good Cleaner Production options, it’s estimated, however, that some 50% of them went back to “business as usual” six months after the Cleaner Production audit. Lack of policy and regulation is largely responsible for this. It’s therefore an urgent task for the Centre to work closely with government agencies on this important issue.”

China Centre

→ **In the beginning at least, policy work should be oriented towards things that are easy for government to implement.**

+ “Policy work should be workable at first, because any policy that is not able to come into effect is useless. For example, we worked with a government agency to develop the institutional framework and certification system for Cleaner Production auditors, including their qualification, standard audit procedure, etc. We were also engaged in a policy study mainly focusing on integration of Cleaner Production with the existing environmental management regulations in China.”

China Centre

→ **Policy work provides an opportunity for international harmonisation and cooperation.**

+ “Central America is made up of small countries that share a lot of the same problems and situations. We also have a common language. The four NCPCs in the region are thus able to pool their resources to achieve common goals. For example, we recently had a regional Cleaner Production policy workshop, which will help harmonise government policies in the region. Mexico and Brazil act as our reference Centres as they have a lot of experience in policy work already.”

El Salvador Centre

## International Declaration on Cleaner Production

*We recognise that achieving sustainable development is a collective responsibility.*

*Action to protect the global environment must include the adoption of improved sustainable production and consumption practices.*

*We believe that Cleaner Production and other preventive strategies such as Eco-efficiency, Green Productivity and Pollution Prevention are preferred options. They require the development, support and implementation of appropriate measures.*

*We understand Cleaner Production to be the continuous application of an integrated, preventive strategy applied to processes, products and services in pursuit of economic, social, health, safety and environmental benefits.*

*To this end we are committed to:*

### **LEADERSHIP**

*Using our influence*

→ *to encourage the adoption of sustainable production and consumption practices through our relationships with stakeholders.*

### **AWARENESS, EDUCATION AND TRAINING**

*Building capacity*

→ *by developing and conducting awareness, education and training programmes within our organisation;*

→ *by encouraging the inclusion of the concepts and principles into educational curricula at all levels.*

### **INTEGRATION**

*Encouraging the integration of preventive strategies*

→ *into all levels of our organisation;*

→ *within environmental management systems;*

→ *by using tools such as environmental performance evaluation, environmental accounting, and environmental impact, life cycle, and Cleaner Production assessments.*

### **RESEARCH AND DEVELOPMENT**

*Creating innovative solutions*

→ *by promoting a shift of priority from end-of-pipe to preventive strategies in our research and development policies and activities;*

→ *by supporting the development of products and services which are environmentally efficient and meet consumer needs.*

### **COMMUNICATION**

*Sharing our experience*

→ *by fostering dialogue on the implementation of preventive strategies and informing external stakeholders about their benefits.*

### **IMPLEMENTATION**

*Taking action to adopt Cleaner Production*

→ *by setting challenging goals and regularly reporting progress through established management systems;*

→ *by encouraging new and additional finance and investment in preventive technology options, and promoting environmentally-sound technology cooperation and transfer between countries; through cooperation with UNEP and other partners and stakeholders in supporting this declaration and reviewing the success of its implementation.*

# INTEGRATING CLEANER PRODUCTION

## Guiding Messages

- **Identify in the local context the allied tools and concepts into which Cleaner Production could be integrated to increase its efficiency and acceptance.**
- **Do not aim at building all the expertise within the Centre.**  
Use other expertise available outside the Centre by networking with other institutions and agencies.
- **Integration of allied tools and concepts should not divert attention away from the basic principle of the preventive approach.**

## Brief Description

At the strategic level, Cleaner Production is about much more than just reducing waste and emissions. Cleaner Production is also about environmental management systems, energy efficiency, health and safety, quality, life cycle analysis, sustainable consumption, etc. These tools and concepts need to be concretely integrated with Cleaner Production to make it more comprehensive and accepted by different audiences. Companies having or aspiring to ISO 14000 certification, for example, may be more receptive to Cleaner Production if it is integrated into an environmental management system approach. Company employees may be more enticed by a health and safety approach to Cleaner Production. Energy efficiency savings may open the door more easily to Cleaner Production in small- and medium-sized enterprises and non-profit institutions (e. g., hospitals). Industry modernisation/ restructuring programmes also provide unique opportunities for integrating Cleaner Production into mainstream decision-making processes. Recognising how Cleaner Production can be allied with other, more familiar concepts and tools, helps in mainstreaming Cleaner Production within the decision-making process and in widening the client base of the Centre.

# INTEGRATING CLEANER PRODUCTION

## Words of Experience (+ and -)

### → **Environmental Management System (EMS):**

Companies that want to be or have already been certified International Standards Organisation 14000 are likely to be interested in the additional benefits of Cleaner Production.

+ *Our Centre has been called to do CP in industries that already had ISO 14000. They realised that ISO is only compliance, and Cleaner Production is far more than this - process, products, raw material, energy, all is discussed, assessed and improved. Economic savings and lesser environmental impact are the consequences."*

Brazil Centre

+ *We include environmental management systems with in-plant assessments for companies and municipalities that want it. We have run 'quick scans' in environmental management systems in food processing companies and will take them up to point of ISO certification."*

Mexico Centre

→ **Energy efficiency** has a commercial appeal to both public and private institutions, large and small.

+ *We have successfully, commercially sold projects with energy efficiency to hospitals and small- and medium-sized enterprises last year."*

Mexico Centre

→ **Health and safety:** a Cleaner Production approach which includes health and safety aspects helps employees to see their own interest in Cleaner Production.

+ *Going through the 'Health and Safety' door incites employees to adopt Cleaner Production as their saviour as far as occupational hazards are concerned. We linked with factory inspectors as trainees in Cleaner Production programmes."*

Tanzania Centre

→ **Industry modernization:** A country's programme to 'modernise' its industry to meet neighbouring standards provide an ideal opportunity to integrate Cleaner Production into the development process.

+ *Tunisia has been looking at the possibility of applying for membership of the European Union. The government looked at upgrading technology, marketing, industry restructuring, etc. But it had forgotten to integrate the environmental component. We showed the government's technical teams how CP is compatible with industry upgrading. It has now got bilateral funding to help integrate CP into industry."*

Tunisia Centre

→ **Broadening coverage of Cleaner Production** can help a Centre to see through periods of economic or recession.

+ - *Our country is currently experiencing a lot of political and economic insecurities which has evidently had an impact on the Centre's activities. Broadening our activities beyond Cleaner Production, for example, energy audits, has helped us to keep running."*

Zimbabwe Centre

# FINANCIAL SUSTAINABILITY

## Guiding Messages

- **The difficulty of becoming financially sufficient should not be underestimated.**
- **Centres need funding support for about five years** to enable them to eventually become financially sustainable.
- **Funding from non-commercial sources** (e.g., domestic government, bilateral donors) **should be fully explored** to enable the Centre to continue to meet non-income earning goals (e.g., awareness-raising, assistance to small- and medium-sized enterprises, information dissemination, policy dialogue).
- **The revenue generating services** should not be limited to providing training of and Cleaner Production services to small- and medium-sized enterprises. Both the client base and the package of services should be continuously expanded.
- **Small funding from one source can often be used as leverage for obtaining larger funds from other sources.**
- The Centre should continuously **be on the look out for new, national or international schemes or sources of funding.**
- In the quest for financial sustainability, **the Centre should not lose track of its basic mission of promoting Cleaner Production.** It should avoid becoming a consulting company unwilling to share its expertise and exchange information.
- **The willingness of donors to contribute funds depends upon the Centre's credibility and capabilities.** It is important that the Centre focuses on these aspects during the initial funding phase.
- **The Centre should be alert and continuously responsive to the evolving needs and demands of the market and stakeholders.**

## Brief Description

Most Centres have been established with initial funding from donors supporting the UNIDO/UNEP programme. Few donors accept to continue funding a Centre for more than three years and often will not fund it for more than five. Therefore, Centres have a “window of opportunity” of three to five years in which to create a sufficient market for themselves in Cleaner Production to become financially sustainable after the initial funding finishes. Most of the first generation Centres have successfully made the transition to financial sustainability,

# FINANCIAL SUSTAINABILITY

financing their activities from various sources such as:

- **Domestic funding**  
national or local government grants or contracts
- **Operational income**  
Cleaner Production assessments, training programmes, consultancy fees, membership fees, publication sales, etc.
- **International funding**  
other multilateral/bilateral agencies – World Bank projects, bilateral assistance, etc.

Not all activities of a NCPC have the potential to become self-financing, raising difficult questions for each Centre on how to balance income-earning activities with the less profitable goals of a Cleaner Production Centre (e.g., helping small- and medium-sized enterprises, policy dialogue, etc.). However, as the Centre matures, the need for external technical assistance declines, reducing the proportion of external funding needed, and Centres become more adept at obtaining domestic or bilateral donor funding for non-income-generating activities.

## Words of Experience (+ and -)

- **The difficulty for a NCPC to become financially self-sustaining should not be underestimated.**

⊖ *The transition from being donor-financed to becoming self-sustainable can be best summarised as ‘desperate’! We will be covering between 20 and 25% of our costs this year, and maybe next year will be able to reach up to 50%. Many things are not paid for, for example, policy work and dialogue.”*

Mexico Centre

- **The Centre cannot become financially sustainable if small- and medium-sized enterprises are its only ‘clients’.**

⊖ *You can’t just focus on small- and medium-sized enterprises if you want a Centre to become financially sustainable. You also need to target big companies which not only easily appreciate what you are talking about (low hanging fruit), but can also financially contribute to the cost of demonstration projects.”*

Zimbabwe Centre

⊖ *Although small- and medium-sized enterprises are a primary target group for the UNIDO/UNEP programme, they alone can not provide a commercially viable basis for a Centre to become financially sustaining without some form of in-the-public-interest subsidies.”*

Hungary Centre

- **Donor or domestic funding will be needed to cover the costs of non-income generating activities to avoid the Centre becoming a consulting company unwilling to share Cleaner Production information.**

⊖ *We consider that promotional activities should be subsidized by domestic governments also after the donor assistance is over. Otherwise the NCPC is becoming a commercial firm not interested to transfer its know-how to others.”*

Czech Republic Centre

## Financing Potential of NCPC Activities

### → **In-plant assessments :**

*This activity has the largest self-financing possibility as it generates savings in processes. Depending on the prices charged by utilities for the provision of inputs and the levies charged for disposal, savings can be increased. The challenge is to market the service in such a way that it appeals to the manufacturer. The disadvantage of Cleaner Production in industry is that it interferes in more than one area: operational costs, environmental performance, quality management. However, through Cleaner Production, the manufacturer is able to solve only part of the problem(s) he is faced with. Thus, due to the prevailing command and control regime of environmental regulation, which gives only limited incentives for Cleaner Production, at first sight Cleaner Production is not the best tool when, for example, faced with an acute problem with the environmental enforcement agency. It is the task of the NCPC to disseminate the application and knowledge of Cleaner Production. One way the Centres do this is through training of consultants and consultancy firms. If the NCPC is successful and Cleaner Production becomes a popular tool for industry, NCPC trained consultants will start to offer this tool independently.*

### → **Information dissemination:**

*Information dissemination can be divided into two fairly distinct categories: technical information and promotion/awareness raising. Neither seems very viable as an isolated service. However, the first can be a very good marketing tool for in-plant assessments and training, as in most cases, recipients of technical information will need assistance in evaluating or applying this information. Awareness dissemination is viable only to a certain extent. For some of the seminars, a fee could be requested to cover costs. It must be noted, however, that the Centres will need to focus their seminars on those groups where they expect cost recovery through contracts.*

### → **Training:**

*Training also has the potential to become a self-financing activity. It should, however, be mentioned that, with successful dissemination, competition will be firm. As in the case of in-plant assessments, the Centre will need to develop a well-defined package of services.*

### → **Policy:**

*This is the most difficult activity to sustain without external funding. Apart from a few exceptions, no Centre will find that its local or national government is ready to pay for the services made available to such an extent that these will be viable activities.*

### → **Extended environmental activities:**

*Through their linkage with UNIDO and UNEP and other NCPCs, the Centres can gain the latest technical know-how on upcoming international trends. Based on this knowledge, the NCPCs provide extended environmental services to industry, e.g., ISO 14000, Cleaner Production technologies, eco-labeling, Environmentally Sound Technologies. Through continuous expansion and improvement of services, NCPCs are able to generate additional income and to reach sustainability.*

### → **Promotion of Cleaner Production technology investments:**

*The promotion of Cleaner Production technology investment projects will facilitate the access of the national industry to available funds and will result in an increasing demand for the services of the NCPCs. The financial support will allow companies to introduce Cleaner Production technologies and techniques into their production process and to produce in a more environment sound and competitive manner. The promotion of Cleaner Production technology investment projects will also strengthen the Centre's role as national focal and co-ordinating point for Cleaner Production activities.*





# SUMMARY

## GUIDING MESSAGES ON ESTABLISHING A NATIONAL CLEANER PRODUCTION CENTRE

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This is an extract of the UNIDO/UNEP publication “*Changing Production Patterns: Learning from the Experiences of National Cleaner Production Centres*”.

For a copy of the publication or for further information, contact:

**UNEP, Division of Technology,  
Industry and Economics**  
39-43 quai André Citroën  
75739 Paris Cedex 15, France  
Tel: 33 1 44 37 14 77  
Fax: 33 1 44 37 14 74  
Email: [unep.tie@unep.fr](mailto:unep.tie@unep.fr)

**UNIDO**  
Vienna International Centre  
P.O. Box 300  
A-1400 Vienna, Austria  
Tel: 43 1 26026 5079  
Fax: 43 1 26026 6819  
E-mail: [esmith@unido.org](mailto:esmith@unido.org)

### I. SETTING UP AN NCPC

#### *Host Institution:*

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- The host institution should have a stake in promoting Cleaner Production; Cleaner Production should fit into the mainstream business of the host institution.
- The host institution should have the confidence and trust of industry, the Centre’s primary target for Cleaner Production. Otherwise, receptivity to Cleaner Production and sharing of information may be compromised.
- The host institution should preferably have some experience in running capacity building/development projects and be patient and supportive during the Centre’s infancy period.
- The long term stability of the host institution to continue to host the Centre should be examined to avoid having to change host institutions before the Centre has become self-sufficient.
- The host institution should be willing and able to provide timely, logistical support to the Centre to enable it to start functioning and deliver output as soon as possible.
- The host institution should participate in the selection of director to ensure a certain degree of compatibility.

## Advisory and Executive Boards:

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### Advisory Boards:

- The Advisory Board should be constituted of members who are in influential positions or who are well-known experts.
- The Advisory Board should be composed of a cross-section of stakeholders (government, industry and other important sectors), although membership should not be so large that it becomes difficult to manage (it is suggested that the Advisory Board have 5 to 10 members).
- The Advisory Board is neither a decision-making nor a consensus-building body. It should provide different perspectives and suggestions on the work of the NCPC.
- Members should have a genuine interest in the success of the Centre. Members who are likely to have conflicting priorities and/or individual interests that are not compatible with the collective interest of the Centre should be avoided.

### Executive Boards:

- The Executive Board should have a small membership (not more than 5) to facilitate consensus-building and decision-making.
- Members should be willing to dedicate (unpaid) time to overseeing the Centre.
- Members are expected to make other in-kind contributions to the Centre.
- Members should have good management/business skills

### Staff:

- It helps to have a director who is already well respected and accepted by government or industry or both.
- Select staff who are committed to the Cleaner Production concept.
- Staff assigned by the host institution should be working exclusively for the Centre on a full time basis or at least should be made available as and when required by the Centre.
- Keep the centre staff small, and build up a network of national experts who can help out on an as-needed basis.

## Counterpart Institutions:

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- The counterpart institution should first build the Centre's skills and expertise in Cleaner Production assessment and training as these are basic building blocks.
- The need for counterpart expertise evolves as a Centre matures. A certain flexibility is desirable to enable the Centre to obtain the needed expertise when required.
- The Centre should be fully aware of the range of expertise and skills that the counterpart institutions have and the counterpart institutions should be willing to share all their expertise.
- The counterpart institution should be genuinely interested in identifying the professional needs of the Centre and providing the appropriate expertise required. It should not be motivated simply by a desire to further its own interests.
- The counterpart institution should be able and willing to source from outside its own institution a particular expertise it may not have.

## Funding:

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- Centres need an average of five years of funding (international and/or domestic) for them to reach a level of earning that will enable them to become financially self-sufficient. It is unrealistic to expect the Centre to start earning right away. The level of earning may be fairly low in initial years and increase towards the end of five years.
- Even when the Centre attains maturity, all the activities may not be revenue generating. Awareness-raising, for example, is an important precursor for other Cleaner Production activities but is unlikely to generate direct revenue for the Centre. External funding will thus be needed to support the broader dissemination of Cleaner Production.
- The Centres must have autonomous control over at least part of the funds initially used to establish the centre to enable them to develop a business mentality. In addition, this "discretionary budget" needs to incorporate a certain degree of flexibility and authority (e.g., choosing national consultants, etc.) to enable the Director to take certain decisions without having to wait for higher approval.
- If the Centre does not have access to basic measuring and monitoring facilities, then funds should be earmarked for them.

## 2. ACTIVITIES OF AN NCPC

### Awareness-raising:

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- Awareness-raising is most effective when it takes into account local conditions, language, culture, traditions, etc.
- Awareness-raising programmes and materials need to be tailor-made to meet the requirements of the target group.
- Ensure that anyone charged with awareness-raising is an effective communicator.
- Direct, personal communication is the most effective way of raising awareness.
- Organising an awareness-raising event takes a lot of time and effort. Instead of organising all the events on its own, the Centre should look for opportunities to 'piggyback' the Cleaner Production message onto events organised by others.
- Do not overlook local and regional level associations, or non-technical forums which often enable more direct contacts.

### Demonstrating the scope and potential of Cleaner Production:

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#### Before the demonstration:

- Select demonstration companies carefully. Develop criteria for selecting priority sectors and companies for demonstration projects.
- Only really willing and convinced companies should be considered for demonstration projects.
- The contracts with companies should clearly specify the roles and responsibilities of the company as well as those of the Centre.
- The objective of a demonstration project should not just be to identify a number of Cleaner Production options and present them in the form of a report. It should be a satisfactory completion of the project with the maximum possible level of implementation of Cleaner Production options identified, and to build company expertise to spread Cleaner Production in the company and industry sector.

#### During the demonstration:

- The implementation phase should not wait for the whole assessment to be complete. The implementation of straightforward Cleaner Production options should take place alongside the assessment so that the company can start seeing the savings.
- Take time to develop good relationships with company personnel – the number of demonstration projects is less important than their effectiveness.
- Include a company's financial managers in the demonstration project so that the company can accurately calculate its economic interest in adopting Cleaner Production options.
- Find ways to motivate companies that do not implement even no- or low-cost options, or to recover the costs if they don't.

#### After the demonstration:

- Evaluate demonstration projects periodically for a better understanding of which options did or did not get implemented, and why.
- If capital-intensive Cleaner Production options are not taken up for implementation for lack of finance, the Centre should develop the expertise to convert such Cleaner Production options into bankable loan proposals and act as intermediary between financial institutions and companies;
- Take measures to ensure that results of demonstration projects get communicated outside the company to the wider industry.
- Do not forget that demonstration projects can not do it all – policy dialogue, training, technical information, etc. will also be needed.

## **Training to build local expertise and capacity:**

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- Incorporate training into assessments so that Cleaner Production stays in the company when the Centre leaves.
- Identify training requirements with a formal training needs assessment.
- Training must be adapted to meet local requirements.
- Good communicators with a little Cleaner Production knowledge make better trainers than Cleaner Production experts with weak communication skills.
- Building capacity in other institutions should not be seen as creating competition but as creating a supportive network.
- Training needs to be directed at all stakeholders – current and future – so that all speak the same language.

## **Assisting in obtaining investments:**

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- Identify and establish good relationships with banks and financial institutions so that they are willing to provide financial support for implementing Cleaner Production.
- Check with your own bank to see if it would be interested in developing new commercial projects for companies with whom you have a good track record.
- Ask bilateral or multilateral donors if they would be interested in providing assistance to help overcome foreign currency barriers to cleaner technology transfer.
- Ensure that the company is genuinely interested in implementing Cleaner Production and obtaining the finance needed.
- Provide training to company finance managers and accountants on internalising the cost of wastes and environmental risks in their accounting procedures.
- Build the Centre's capacity to help small- and medium-sized companies develop sound business propositions for Cleaner Production loans or investments.
- Provide training and information to personnel from banks and financial institutions to enable them to appreciate Cleaner Production as a part of good management practice and to accord a priority to Cleaner Production proposals.

- Convince and assist banks and financial institutions in building specific, Cleaner Production financing schemes, revolving funds, etc.
- Develop a complete package of financial counselling services specifically for small- and medium-sized enterprises: e.g., assistance in identifying financing sources, preparing bankable proposals, soliciting support from appropriate institutions, etc.

## **Disseminating technical information:**

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- The objective of information dissemination should be to provide information which is required by the user (demand-driven) rather than providing information simply because it exists (supply driven).
- Different stakeholders have different information needs. A Centre should do an 'information needs' survey to identify and understand actual information needs. Specific information packages should then be developed taking into account:
  - a) the relevance of the information to the user
  - b) its presentation in a 'directly usable' format
  - c) the user's capability and facility to apply the information.
- Maximise use of existing information dissemination channels and networks instead of creating new ones. Piggyback on existing nodal points (industry associations, government agencies, etc.) as a resource-effective means of providing information.
- Information dissemination is continuously evolving; the information needs of yesterday may be quite different from the needs of today and tomorrow. Develop a feedback system to continuously assess and meet user needs.
- Feedback from local Cleaner Production users should be made accessible to regional and global networks to enable others to integrate grassroots needs into development projects.

### Government Policy Advice:

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- Policy work and dialogue is needed to sustain Cleaner Production activities.
- Do not start with formulating a new Cleaner Production policy for government. Start by identify existing areas which discourage Cleaner Production and recommend practical measures that are not difficult for governments to implement. Gradually build upon successes in these areas to integrate Cleaner Production into other policy areas.
- The policy work should aim at mainstreaming Cleaner Production in the entire policy framework. Thus it is important to target not just environmental policies but to take a more holistic approach and integrate Cleaner Production into industrial, economic, education and other government policy areas as well.
- All the concerned stakeholders should be involved in the policy work to increase the acceptability of the recommendations.
- The policy work of other Centres in the region may provide useful opportunities for international co-operation and harmonisation.
- Use the International Declaration on Cleaner Production as a vehicle to obtain high profile commitment and involvement of policy makers.

### 3. INTEGRATING CLEANER PRODUCTION:

- Identify in the local context the allied tools and concepts into which Cleaner Production could be integrated to increase its efficiency and acceptance.
- Do not aim at building all the expertise within the Centre. Use other expertise available outside the Centre by networking with other institutions and agencies.
- Integration of allied tools and concepts should not divert attention away from the basic principle of the preventive approach.

### 4. FINANCIAL SUSTAINABILITY

- The difficulty of becoming financially sufficient should not be underestimated.
- Centres need funding support for about five years to enable them to eventually become financially sustainable.
- Funding from non-commercial sources (e.g., domestic government, bilateral donors) should be fully explored to enable the Centre to continue to meet non-income earning goals (e.g., awareness-raising, assistance to small- and medium-sized enterprises, information dissemination, policy dialogue).
- The revenue generating services should not be limited to providing training of and Cleaner Production services to small and medium size enterprises. Both the client base and the package of services should be continuously expanded.
- Small funding from one source can often be used as leverage for obtaining larger funding from other sources.
- The Centre should continuously be on the look out for new, national or international schemes or sources of funding.
- In the quest for financial sustainability, the Centre should not lose track of its basic mission of promoting Cleaner Production. It should avoid becoming a consulting company unwilling to share its expertise and exchange information.
- The willingness of donors to contribute funds depends upon the Centre's credibility and capabilities. It is important that the Centre focuses on these aspects during the initial funding phase.
- The Centre should be alert and continuously responsive to the evolving needs and demands of the market and stakeholders.



**www.unep.org**

United Nations Environment Programme  
P.O. Box 30552 Nairobi, Kenya  
Tel : (254 2) 621234  
Fax : (254 2) 623927  
E-mail : [cpinfo@unep.org](mailto:cpinfo@unep.org)  
web : [www.unep.org](http://www.unep.org)



**UNITED NATIONS ENVIRONMENT PROGRAMME**

**Division of Technology, Industry and Economics**

Tour Mirabeau

39-43 quai André Citroën

75739 Paris Cedex 15 - FRANCE

Tel: +33 1 44 37 14 50

Fax: +33 1 44 37 14 74

Email: [unep.tie@unep.fr](mailto:unep.tie@unep.fr)

Internet: <http://www.uneptie.org>