Ministry of Education and Training

Hanoi University of Technology

Institute for Environmental Science and Technology

Viet Nam Cleaner Production Centre

Annual Report 2003

Viet Nam Cleaner Production Centre

4th floor, C10 Building

Hanoi University of Technology, DHBKHN

Dai Co Viet Road

Hanoi, Vietnam

Phone: (84.4) 8 681 686

Phone/Fax: (84.4) 8 681 618

Email: vncpc@hn.vnn.vn

http://www.un.org.vn/vncpc

FOREWORD

Since its introduction into Viet Nam, 10 years ago, cleaner production has received increased attention from industrial enterprises and has been increasingly applied into many production processes. During the last five years (1998-2003), together with over 50 companies throughout the country, the Viet Nam Cleaner Production has confirmed the advantage of this new application in industrial environmental management. Cleaner production assessment helps companies to increase capacity and efficiency, to improve product quality, to better utilise raw materials, energy, chemicals, water…and ensure a better working environment. This brings economic benefits for many enterprises, and at the same time reduces significant amounts of waste, wastewater and emissions to the environment, and improves conditions for workers. These benefits actively contribute to the improvement of a company's competitiveness. The concept of cleaner production, to some extent, has been understood consistently accurately in the industrial community. This realisation has contributed towards the strategy of sustainable industrial development.

In 2003, our promotion activities have focused on metal fabricating and finishing. The results are briefly summarized in this report.

On behalf of the Viet Nam Cleaner Production Centre, I would like to express our sincere thanks for the support of the donor - SECO, the executing organizations - UNIDO, ministries, advisory board, host institution, cooperating institutions, participating companies and individuals, who have helped us to achieve the goals and objectives of 2003. Special thanks is conveyed to Prof. Heinz Leuenberger, Chief Technical Advisor of the centre for his great contributions from developing to executing and implementing our Business Plan.

We are looking forward to further cooperation with all of you in the future.

Prof. Dr. Tran Van Nhan

Director of Viet Nam Cleaner Production Centre.

In the past five years, the Viet Nam Cleaner Production Centre has achieved impressive results. Cleaner Production Assessments in several industry sectors showed clearly the benefits of the methodology and also the usefulness for the Vietnamese industries. Awareness raising seminars all over the country and several intensive, practical oriented training courses for cleaner production experts laid the baselines for a successful development of cleaner production in Viet Nam. However, to enhance the productivity and the competitiveness of the companies involved means more has to be done. The complete re-engineering of a production line, including the change to new and cleaner technologies will be needed to gain the full benefits of cleaner production approach. Again, these are the first steps towards the sustainable industrial development. New product design, corporate social responsibility, innovation management and a life cycle analysis for a product over its whole life will be some of the new issues for the industrial society. The Vietnam Cleaner Production Centre will contribute to this development by focusing and strengthening its core activities and by seeking strong and complementary partners, in order to be able to deliver the whole service package for companies. It means in the next years, VNCPC will develop new, attractive and strong technology oriented services in combination with specific services in occupational health and safety, environmental management systems (ISO 14000) and social accountability. VNCPC will also try to influence the design of the new incoming technology towards more resource-efficiency.

I would like to thank all involved Vietnamese Ministries and partner organizations, the donors UNIDO and SECO, the staff of INEST and VNCPC for their hard and dedicated work and contributions. Finally I would especially like to thank all of you for your good cooperation and friendship all over the years.

Prof. Dr. Heinz Leuenberger

Chief Technical Advisor, Viet Nam Cleaner Production Centre

During its five years of operation, VNCPC has made an impressive contribution to the dissemination of Cleaner Production (CP) principles and practices in Vietnam; it has attained the enviable status of a premier centre of services in this field, whose reputation today goes beyond the country's borders and reaches out to neighbouring Laos and Cambodia.

Over time, VNCPC has applied several instruments to make CP a rational part of business strategies in Vietnamese enterprises, from awareness campaigns through specially designed curricula in engineering schools and other training initiatives to, more recently, thorough in-plant audits of CP options.

The business case for the voluntary adoption of CP reforms is slowly gaining currency amongst Vietnamese firms. However, as convincingly documented in this *Annual Report*, firms have so far mostly —and quite understandably— implemented the cheaper elements of the CP package of recommendations formulated during an audit by VNCPC, that is, those such as better housekeeping, that require little, if any, investment by the firm.

There is undoubtedly much to be gained at national level by the introduction of these measures alone, and this is a market in which VNCPC will encourage the entry of capable service providers. Meanwhile, the Centre must shift its efforts to a second wave a CP action in Vietnamese enterprises, one that requires this time technology choices and the replacement of older machines by newer, a priori greener, equipment.

To facilitate tomorrow the voluntary adoption of cleaner technologies (CT) in Vietnam's enterprises, VNCPC should strengthen the line of technical services. However, it must also establish strategic partnerships with many suppliers, both Vietnamese and foreign, of grants and subsidized loans that can facilitate CT investment decisions in local firms. Finally, it must work alongside the science and technology policymakers in Vietnam to create the framework conditions that will gradually set Vietnamese firms onto a greener course of economic progress.

Philippe Scholtès,
UNIDO Representative in Viet Nam

It gives me great pleasure to note that the Vietnam National Cleaner Production Centre (VNCPC) has completed five years of operation. The achievements of the Centre during this period have been commendable. This is amply reflected by the fact that this was the first Cleaner Production Centre to be awarded both ISO 9000 and ISO 14000 certifications. Cleaner Production is now a well accepted strategy in Vietnam and a lot of credit goes to the Centre.

I had the great opportunity of being associated with VNCPC. First as an expert to build capacity on Cleaner Production assessments and later working with them on the project on integrating Energy Efficiency with Cleaner Production. I appreciate the involvement and dedication of the staff in the Centre. The leadership provided by the Director Dr. Tran Van Nhan is noteworthy. The Centre has ably responded to all the challenges and has now come to be an institution of excellence in the field of Cleaner Production in the country.

I take the opportunity to congratulate the Vietnam National Cleaner Production Centre for their achievements and wish all the success.

Surya P.Chandak

Chief, Cleaner & Safer Production and Sustainable Consumption

United Nations Environment Program (UNEP)

Cleaner Production

Cleaner Production (CP) is the continuous application of an integrated preventive environmental strategy applied to processes, products and services in order to increase eco-efficiency and reduce risks to humans and the environment.

For production processes: cleaner production includes conserving raw materials and energy, eliminating toxic raw materials, and reducing the quantity and toxicity of all emissions and wastes at the source.

For products: cleaner production includes the reduction of negative impacts along the life cycle of the product, from raw material extraction to its ultimate disposal.

For services: cleaner production is to incorporate environmental concerns into designing and delivering services.

Cleaner production requires changing attitudes, exercising responsible environmental management and evaluating technical options.

Definition by UNEP

TABLE OF CONTENTS

POLICY

QTW 00976 ETW 00053

In connection with the implementation of an Integrated Management System following ISO 9001 and ISO 14001, the Viet Nam Cleaner Production Centre has established and maintained the following Policy for Quality and Environment

The centre in the first days of its establishment

Our Centre was certified to ISO 9001 and 14001 in 2002

The integrated system will not only help us, but also industrial enterprises to have better and cleaner working environment

Policy for Quality and Environment

Viet Nam Cleaner Production Centre is a knowledge-based organisation delivering a wide range of high quality cleaner production solutions that gives added value to industry, consulting companies, research institutions, academia, and governmental organisations.

As a national focal point on Cleaner Production, we are committed to continual improvement and prevention of pollution. We will comply with legislation and are committed to the International Declaration on Cleaner Production.

We will continuously strive to improve the quality of our solutions and services and to improve the effectiveness of our Integrated Management System.

Based on our Policy we have formulated the following principles:

- *All staff have an impact on the quality of our services and on our environmental performance, and are therefore responsible for the work they deliver to internal and external customers;*
- *All staff shall inform the management if they cannot fulfil customer requirements; and*
- *All staff shall seek and share experience to continuously improve our services.*

VISION AND MISSION

First CP train-the-trainers program in 1999

Cleaner production is demonstrated to be advantage in different industrial sectors, different size and ownership of companies

Signing ceremony on international cleaner production declaration by the government of Viet Nam

Cleaner production achievements in participating companies are distributed by different media

The vision of Viet Nam Cleaner Production Centre is to play a catalytic and coordinating role in promoting Cleaner Production in Viet Nam.

The mission of Viet Nam Cleaner Production Centre is:

- To train the human resource base in enterprises, industry associations, consulting companies, research institutes, academic institutions, and governmental industrial and environmental management agencies in Cleaner Production methods;
- To demonstrate Cleaner Production Assessment in industries to show the advantages of the Cleaner Production approach, and at the same time adapt the internationally developed Cleaner Production approach to Vietnamese conditions;
- To assist policy-makers and make recommendations on how to promote the concept of Cleaner Production in industries and through legislation;
- To promote the concept of Cleaner Production and raise awareness among industries and governmental agencies;
- To assist universities in integrating Cleaner Production into their curricula;
- To co-operate with domestic and international organisations with the aim of supporting the implementation of preventive environmental protection; and
- To serve as a focal point of the UNEP/UNIDO Network of National CPC.

Vietnamese delegation at Asia Pacific Roundtable for Cleaner Production

ORGANISATION AND FACILITIES

The Viet Nam Cleaner Production Centre was established in 1998 within the framework of UNIDO/UNEP National Cleaner Production Centres Project, sponsored by the Swiss Government through the State Secretariat for Economic Affairs (SECO) and located at the Institute for Environmental Science and Technology of the Hanoi University of Technology.

Advisory Board

The Centre has one Advisory Board consisting of 12 members at department managing levels of relevant ministries and organizations: MOET, MOI, MONRE, MOF, MPI, HUT, INEST, HCM DONRE, UNIDO and SECO/SDC. The Vice-Rector of Ha Noi University of Technology, Prof. Hoang Ba Chu, is the Chairman.

Organisational Structure

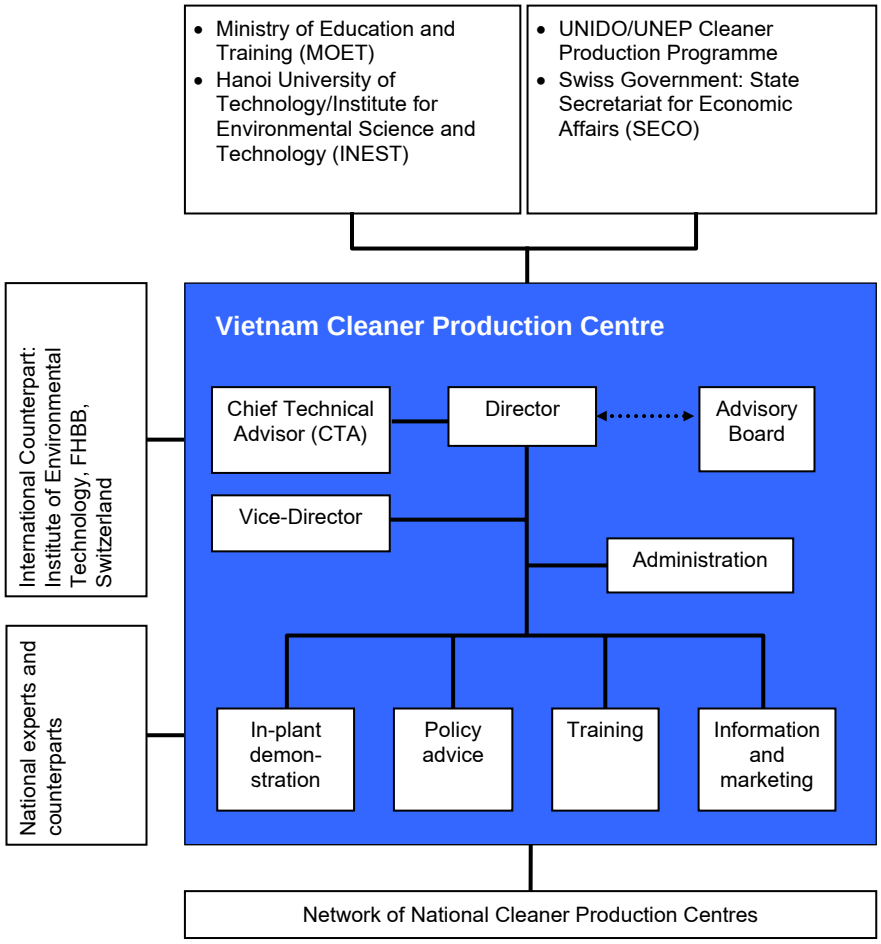


Figure 1. Organisational set-up of Vietnam Cleaner Production Centre.

Staff

Staff at the Centre

Mr. Tran Van Nhan, Prof., Ph.D., Director
Ms. Ngo Thi Nga, Prof., Ph.D., Vice Director
Mr. Do Trong Mui, M.Sc., CP Expert
Mr. Dinh Manh Thang, Eng., CP expert
Mr. Nguyen Quang Trung, M.Eng., CP expert
Ms. Vu Tuong Anh, M.Sc., CP Expert
Ms. Tang Thi Hong Loan, M.Sc., CP Expert
Ms. Nguyen Thanh Tam, M.Sc., Junior CP expert
Ms. Nguyen Le Hang, B.Eng., Junior CP expert
Mr. La Tran Bac, M.Sc., Junior CP expert
Mr. Pham Sinh Thanh, B.Eng., Junior CP expert
Mr. Bui Manh Cuong, B.Eng., Junior CP expert
Mr. Dinh Quang Hung, B.Eng. Junior CP expert
Mr. Tran Duc Chung, B.Eng, Support staff
Ms. Vu Minh Trang, B.Eng, Support staff
Ms. Vu Thanh Tu, B.Sc, Secretary
Mr. Pham The Hung, Driver
Mr. Heinz Leuenberger Prof., Ph.D,, CTA

VNCPC's staff in front of the new office

At the end of 2003, the VNCPC team consisted of 16 full time and two part-time employees. Three staff members hold Doctoral, five hold Master, and seven hold a Bachelor degree.

During 2003, one staff member of VNCPC attended a two-week training programme in Cleaner Production and Energy Efficiency Integration in the Philippines. Two staff members attended a three-week training program in Metal Surface Treatment and Finishing in Switzerland. One staff member attended three weeks of training in Occupational Health and Safety in Denmark. Another staff member attended a one week training course in ISO 14001 Lead Auditor in Ha Noi.

The management and staff of the Centre have received on-going training through participation in seminars, international workshops and roundtables on cleaner production.

Counterparts and Networks

The Viet Nam Cleaner Production Centre has established long-term cooperation with the Institute of Environmental Technology at FHBB in Switzerland. The Centre has contacts with numerous national and international experts in the fields of environment and cleaner production in order to exchange students and staff members.

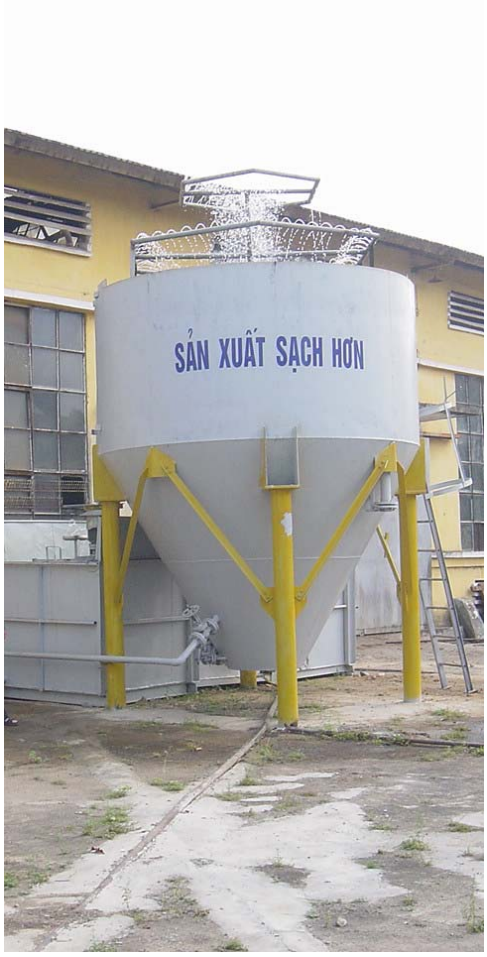
Within the UNIDO/UNEP network, the VNCPC is working closely with the 29 other National Cleaner Production Centres worldwide as well as with the participants at the Asia Pacific Roundtable for Cleaner Production. The VNCPC is building up a formal network of CP experts and institutions throughout Viet Nam in the coming years.

Facilities

The Viet Nam Cleaner Production Centre and its host institution, INEST, have been equipped with portable analytical equipment for both rapid and in-depth assessment of material and energy consumption in several different industrial sectors.

The library at the Centre now counts around 600 titles (books and journals) relating to environment, cleaner production and environmental management. Additionally, more than 1,000 books and reports are kept in an electronic library. Access to Internet is provided to all staff via ADSL connection.

OVERALL ACTIVITIES 2003



A sign means "Cleaner production" at a participating company

In 2002, the Centre achieved or surpassed the targets set in its business plan. The results of the surveillance audits for ISO 9001 and ISO 14001 proved the stability of the Management System to ensure the quality and environmental performance at the Centre.

In 2003, the centre focused on building up CP capacity for the metal finishing sector and started providing services to international funded projects in Viet Nam.

Intensive training course on cleaner production was designed and organized for metal fabricating and finishing

Depending on type of in-company service, the staff of centre might do measurements directly or instruct to the company's team

With a total of 177 man-months (or around 15 man-years) available in 2003, the Viet Nam Cleaner Production Centre carried out about double work load compared to 2002. It organized 22 training courses for 1,957 person-days of training (including 60person-days training cum study tour), 10 seminars equivalent to 417 person-days, and completed 15 full cleaner production assessments, and a number of other activities described below.

TRAINING 2003

Participants learn in classroom, through company visit, and by working with the CP team at the participating companies

Participants at sector specific training

Group work at a training module in Viet Tri city

Training in Xuan Hoa Company

The lack of well-trained and experienced cleaner production specialists is one of the main barriers to implementation of cleaner production in Vietnamese industry. Therefore one of the key activities of the centre is to build up, through training, a resource base of national experts on Cleaner Production.

In 2003, the centre provided three types of training:

- Sector specific training: this is an intensive training program organized for representatives of selected sector and potential service providers/promoters of cleaner production.

- Special skill training: The CP trainees from previous intensive training program or CP service providers can enrich their skill through these courses

- Tailor-made training: designing and providing CP related training courses per demand.

So far, all types of training are considered as successfully completed. The overview of training in 2003 is shown is the below table

Table 1. Overview of training in 2003

Type	Planned man-days	Achieved man-days	Note
Sector specific training	210	183	Metal fabricating and finishing, the last training module will be organized in February 2004
Special skill training	135	163	Provided additionally to CP trainees after being certified
Tailor-made training	50	1611	Much higher demand than expected

Although the sector specific training program for metal sector was not completed by the end of 2003, the achievements of the training activities already surpassed their targets. This is a strong side of the centre due to the nature of belonging to the University.

Sector specific training program

Participants at the sector specific training program 2003

Experiment at a cleaner production intensive training for metal fabricating and finishing industry

The intensive training program, or sector specific training, was organized in combination with in-plant demonstration activities so that participants gained practical experience in Cleaner Production Assessments. The total duration of this training was 15 days of classroom training and between 11 to 15 days of practical work in companies. The program is designed as illustrated in table 2. Between each training module, participants and lecturers work together in the company to gain practical experience. At the end of the training, participants are able to carry out cleaner production assessment in industry and work with a team in a company to develop opportunities to increase competitiveness for the company. They are potential service providers or promoters for cleaner production in Viet Nam.

In 2003 the centre focused its intensive training to support the Metal Fabricating and Finishing Industry. Participants were from metal fabricating and finishing companies, environmental authorities, consultancy organizations and research institutes from different parts of the country. By the end of the training program, participants will have gained both theoretical and practical experience and will be able to carry out cleaner production assessment with limited support from the centre.

The training will be completed in February 2004. It is expected to have another 15-17 certified participants, counting to over 100 in-depth CP training participants by the centre through this program.

Table 2. Overview of the four-module intensive training programme

Module			
Cleaner Production Methodology 5 days	Cleaner Production Assessment 4 days	Cleaner Production Assessment 3 days	Completion of Cleaner Production Assessment 3 days
• Introduction to cleaner production • Sector specific processing – general introduction • Cleaner production Assessment Methodology • Company visit • Getting started • Electricity efficiency in industry production	• Presentation of pre-assessment • Discuss results and problems • Case studies to illustrate methodologies • Feasibility of CP options • Sector specific processing – environmental concern • Implementation of good house-keeping and low-cost options • Company visit	• Presentation of assessment • Discuss results and problems • Best available technology in the industry • Feasibility study of CP options • Company visit	• Presentation of assessment and status for implementation • Wastewater treatment in Viet Nam • CP Investment proposal • EMS, ISO 14001 and CP • Certification

Special Skill Training

These courses are organized in Vietnam mainly for the CP service providers and staff of the centre to improve and to enlarge their own skills in conducting CP assessment.

In 2003, two training courses were organized for 39 participants on Total Quality Management and Multi-Environmental Agreement (5 days, August 2003) and Environmental Management System and its tools (3 days, October 2003).

"This kind of training will definitely support the dissemination and implementation of cleaner production". (feedback in evaluation questionnaire from Total Quality Management and Multi-Environmental Agreement training course)

Tailor-made Training

CP & OHS training in Danida's project "Industrial and urban development in Viet Tri city"

There was great demand for tailor-made courses for projects executed by VCEP, UNEP and DANIDA. Beside the introduction to cleaner production and to energy efficiency, the demand of this year focused on related issues such as environmental management systems, energy efficiency and occupational health and safety.

There were 17 training courses delivered to 1611 participant-days designed and organized in 2003. The training did not only aim to provide the CP skill in improving efficiency to industrial staffs, but also to governmental officials on how to monitor and work together with industries. The training programs were evaluated as well designed and delivered by clients.

IN-COMPANY SERVICE 2003

One of the follow-up meeting during assessment

The objective of the in-plant demonstration programme is to show the benefits of cleaner production when implemented in Vietnamese industries. In addition, the in-plant demonstration programme is used to provide hands-on training for the participants of our intensive training programme.

Since 1999, together with the team from participating companies, the staff of centre have shown benefits of cleaner production mainly in pulp and paper, textile, metal finishing, construction materials, food processing and beverage sectors. The participating companies have their own resources to maintain the program.

Working at a metal finishing company

Measurement with combustion analyser can prove the potential of CP immediately at site

Energy efficiency program proved to bring enterprise significant savings

In 2003, the centre focused its efforts not only on cleaner production assessments, but also on the introduction of energy efficiency and occupational health and safety to the application of cleaner production. Applying the approach of cleaner production assessment to energy efficiency has brought about quite positive results.

Assessment

I have not seen any organization as the Vietnam CPC working with effective results. Through cleaner production program, we even changed our management system to make production more effective.

Mr. Hoang Quoc Phan,

Deputy Director, Vinh Phu Textile Company

Working at a metal company

There are still number of companies loose the money by not recycling condensates

The objective of cleaner production assessment is to reduce material use, reprocessing rate, thus improve production efficiency

In 2003, the centre initiated 6 integrated cleaner production programs in over 50 companies. The companies came from textile, pulp and paper, metal products, chemical, food processing, construction material, plastic, wood, beverage, and sugar sectors. By the end of 2003, 15 companies have completed their assessment, and the rest are expected to complete by the end of 2004.

There are kick-off and number of follow-up meetings with the company's staff during the assessment

The VNCPC uses three approaches in carrying out its assessments of companies. They are:

- ***On-the-job training combined with demonstration***: The centre organized an intensive cleaner production training program (4 modules). Selected technical staff of the companies joined the training program and applied in their own company with assistance from the centre staff. In-company training is organized for the whole CP team of the company. This was applied to companies in the sector selected as the year's focus sector. After the program, the technical staffs of participating companies are able to maintain the cleaner production themselves.

- ***Semi-consultancy***: The centre also organized concentrated technical training for selected staffs of companies and worked together with their CP team. During the assessment, the centre staff helped team members to develop cleaner production opportunities and to monitor results.

- ***Consultancy:*** The staff of the centre worked together with cleaner production teams of the companies to develop their options. The staffs of the centre carried out necessary measurements and analysis.

Results

Thanks to cleaner production program, the results of surveillance audit this year is very positive - we are certified to continue the ISO 14001 certificate without any non-conformance.

After the intensive training, we are now well understood what CP is and very happy to apply this approach in our company. The efforts were well paid in the end of the year.

Ms. Dang Thanh Thuy, Chief of Administration, Xuan Hoa Company.

Through its assistance to companies, the centre proves the applicability of this method to different types of industries. The potential for savings does not depend on ownership, sector or size of the companies, but the effort made.

In 2003, the results received from 15 completed assessments show that the participating companies easily paid investment back within 3-4 months of implementation. Theses companies are pulp and paper, textile, construction materials, food processing and metal finishing. By the end of 2003, 33% of identified CP options had been implemented, bringing the companies the following benefits:

Table 3. Overview of benefits from 15 completed assessments 2003

Technical benefits		**Economic benefits**	
Electric consumption:	40,838 MWh	Total investment	650,000 USD
Coal consumption:	19,113 ton	Annual savings	2,435,000 USD
Fuel oil consumption:	1, 951 ton	**Environmental benefits**	
Diesel consumption:	64 ton	Reduction in dust emission	483 ton
LPG consumption	74 ton	Reduction in SO_2 emission	364 ton
Water consumption:	160,000 m^3	Reduction in CO_2 emission	70,846 ton
Raw materials and chemicals:	787 ton	Reduction in wastewater and solid waste	As per reduction of consumption

Investment to capacitor is proved to be worthy in many companies

All these benefits were mainly achieved by reduction-at - source measures. Due to the relatively short period of the implementation (within one year), the full potential of cleaner production is not yet illustrated. However, cleaner production has already proved its advantage.

It is noted that after the demonstration, most of the companies still maintain cleaner production as part of their daily work, but the information of benefits are not always shared with us. However, we are happy to learn that the CP participating companies, which have stable production, are still maintaining the program as well as taking cleaner production methodology into their decisions.

INFORMATION DISSEMINATION AND AWARENESS RAISING

The purpose of these activities is to create awareness of the Cleaner Production concept among industries, government agencies and universities. There was no target for 2003, nevertheless there were many achievements.

Public Media

DEVELOPMENT REPORT

For a cleaner tomorrow

The realisation that environmentally-friendly and cost-effective are not mutually exclusive concepts in manufacturing is starting to sink in

An article in Vietnam Economic Times

In 2003, another two 30-minute spots, “cleaner production in textile” and “cleaner production in pulp and paper”, were shown on National Television channel VTV2 several times. So far, all three spots from Viet Nam Television, including “Introduction to cleaner production” in 2002, are available in both Vietnamese and English.

The Voice of Viet Nam aired a 30-minute on-line forum about the application of cleaner production. Numerous articles were published in newspapers. This year saw quite a big change in information dissemination – the representatives of industries started talking about cleaner production advantages, instead of just from the side of the centre.

In the framework of a European Commission project, the VNCPC together with European partners and the National Cleaner Production Centre of India has developed an on-line information toolbox for the textile industry. The web-site will be fully functional by the end of 2004, at www.e-textile.org.

Awareness Raising Seminars

An awareness raising seminar for enterprises of HCMC Industrial Park

In 2003, nine awareness-raising seminars were organised in different provinces. This year, introduction of cleaner production was introduced together with other environmental management tools to industries, academic and research institutions as well as governmental officials.

Including the 1,150 participants from 1999-2002, a total of 1,406 participants had taken part in awareness raising seminars conducted by the centre by the end of 2003.

POLICY ADVICE

An effective policy framework for Cleaner Production is essential to promote the concept in industry. Such a framework must involve not only administrative measures such as licensing and the enforcement of the laws and guidelines, but also economic instruments such as a duty and tax system for waste disposal and a realistic pricing system for raw materials and energy.

In 2003, the centre was active in giving comments and holding discussions with the Ministry of Natural Recourses and Environment on how to implement the Government degree No 67/CP on waste water fees. The centre also gave contribution in supporting CP policy component of the UNIDO project on “Industrial Pollution Reduction in Ho Chi Minh city, phase III”

The centre supported Khanh Hoa DONRE to establish a provincial cleaner production action plan. The plan was approved and is now under implementation.

COOPERATION

Beside the tight cooperation with the Swiss partner, FHBB in Switzerland, as well as with UNIDO, UNEP and national cleaner production centres within the network, the Viet Nam Cleaner Production Centre has established and maintained cooperation with and provided services to:

- Ministry of Investment and Planning of Viet Nam;
- Ministry of Natural Resources and Environment / Viet Nam National Environment Protection Agency;
- Ministry of Science and Technology
- The Ministry of Fisheries;
- Viet Nam Industry Corporations (Viet Nam Textile and Garment Corporation, Pulp and Paper Corporation...) and enterprises;
- Departments of Nature Resources and Environment in the cities and provinces
- Ministry of Industry and Handicraft of Lao PDR
- Danida / different projects
- Viet Nam Canada Environment Project (VCEP);
- International eco efficiency organizations and individuals from Asia, Europe, America...

We are interested and willing to cooperate with all projects and institutions working in the environmental field to improve the environmental performance of Vietnamese industries.

ENVIRONMENTAL PERFORMANCE

All the targets of 2003 were met and even surpassed. In 2003, the new environmental benchmarks were set up, which were based on the productivity of the staff and we believe it will be more accurate than basing it on the available resources.

Table 4. Overview of environmental targets and achievements in 2003

Area	Aspects	Unit	Monitoring Frequency	Objectives/ Target	Implementation	Note
Office (all activities, but not trainig)	*Paper*	*kg/man-month*	*quarterly*	*reduced 1 % from 2.48 kg/man-month, mainly to set new productivity base benchmark*	*reduced 61%* *productivity base: 1.48 kg/productive man-month*	
	Electric	*kwh/man-month*	*monthly*	*reduced 1% from 95.65 kwh/man-month, mainly monitoring*	*reduced 33%* *productivity base: 98.68 kwh/productive man-month*	*re-location of the office*
	CO_2 emission by travel	*ton CO_2/man-month*	*quarterly*	*reduced 1% from 0.26 ton/man-month, mainly to set new productivity base benchmark*	*reduced 3.8%* *productivity base: 0.38 ton/man-month*	
	waste paper sold	*kg/man-month*	*quarterly*	*reduced 1% from 0.45 kg/man-month, mainly to set new productivity base benchmark*	*reduced 2.2%* *productivity base: 0.68 kg/productive man-month*	
	Others	*units*	-	-	86 kg cardboard, 113 cans and bottles, 6 cartridges (printer and photocopy)	
Training	*Paper*	*kg/person-day training*	*quarterly*	*reduced 2%, from 0.21 kg/participant-day, mainly to set new benchmark with better filtration of training*	*reduced 28%* *base of 2003: 0.19 kg/participant-day*	*Continue to change from one to both side printing.*
	CO_2 emission by travel	*kg CO_2 by participants / person-day training*	*quarterly*	*monitoring travel of lecturer and participants*	*6.64 kg/participant-day*	*Travel of international lecturers are not included*

OTHER CLEANER PRODUCTION ACTIVITIES IN VIET NAM

In addition to the activities directed by VNCPC, several other projects that focus on cleaner production or at least have a component on cleaner production have been started or designed in the country during 2002.

The Viet Nam Cleaner Production Centre tries to coordinate all these different activities to create as much synergy as possible. Cleaner Production will only have a significant impact on the industrial development of Viet Nam if it is possible to strengthen and mainstream the different inputs and to build up efficient coordination.

Table 5. List of coordinated cleaner production projects in Viet Nam in 2003

Project	CP content	Donor	Counterpart	Location	Period
Urban Development for Viet Tri City	Cleaner Production component	Danida	DONRE, DOST in Viet Tri	Phu Tho Province	2002-2003
Environmental Pollution Prevention in HCMC (phase III)	CP Assessments. Follow-up on earlier project	UNIDO/SIDA	DONRE in HCMC	HCMC	2002-2003
Industrial Pollution Management. VCEP II	CP training and demonstration projects in 6 provinces	CIDA	NEA DONRE in Hai Phong, Hanoi, Bac Ninh, Hai Duong, Da Nang, Long An	Whole country	2002-2005
CP-EE	CP-EE training and demonstration	UNEP/GEF	Companies	Whole country	2002-2003
GERIAP	CP-EE training and reduction of GHG emissions	Sweden/UNEP	Companies	Northern Vietnam	2002-2004

LESSONS LEARNED AND OUTLOOK

- To focus every year our in-depth training course in combination with CP assessments on only one industrial sector proved to be very successful.
- Dissemination workshops in corporation with industrial parks and state industry cooperation are an excellent way to approach new clients.
- The CP network in Viet Nam is still not very effective. Most of the service providers are considering the partners as competitors and are not willing to share and exchange know-how and experiences.
- It is still difficult to find money for bankable projects.
- Over the next three years, VNCPC will focus its technical activities mainly on two or three sectors, probably textile and metal finishing. The third priority is still to be determined.
- CP training courses will more and more focus on state of the art production technology and process control equipment and methods.
- The collection and evaluation of eco-efficiency benchmarks from all over the world will help us to demonstrate CP potential to clients.
- Energy focus could be an attractive point to promote cleaner production application due to its fast proven savings.
- Occupational health and safety, as well as social aspects will be included more in the CP assessments and therefore also in our training courses. For export oriented companies, VNCPC will be able to offer an attractive service package.
- VNCPC will concentrate its technical activities towards high quality services in the field of technology change management, technology gap analysis, re-engineering of the production line and technology transfer. Only with these sophisticated methods can companies be supported to enhance their productivity and competitiveness in the global market.
- Cooperation with other qualified organizations will help us to achieve these ambitious goals.
- The introduction and application of ISO 9001 and ISO 14001 in the centre proved to be a good management tool for our own activities. At the same time, it is an excellent training tool for our centre.

LIST OF ABBREVIATIONS

BAT	Best Available Technique
BEAT	Best Economical Attractive Technology
CDM	Clean Development Mechanism
COLENCO	A Swiss Consulting Company
CP	Cleaner Production
DOI	Department of Industry
DOST	Department of Science and Technology
DONRE	Dep. of Natural Resource & Environment
DPI	Department of Planning and Investment
EMS	Environmental Management System
FHBB	Fachhochschule bei der Basel
HUT	Hanoi University of Technology
INEST	Institute for Environmental Science &Technology
LCA	Life Cycle Assessment
MOET	Ministry of Education and Training
MOF	Ministry of Finance
MOI	Ministry of Industry
MOST	Ministry of Science and Technology
MONRE	Ministry of Natural Resource & Environment
MPI	Ministry of Planning and Investment
SDC	Swiss Agency for Development & Cooperation
SECO	State Secretariat for Economic Affairs
UNEP	United Nations Environment Program
UNIDO	United Nations Industrial Development Organization
VCCI	Viet Nam Chamber of Commercial and Industry
VEPA	Viet Nam National Environmental Protection Agency
VINATEX	Viet Nam National Textile and Garment Corporation
VNCPC	Viet Nam Cleaner Production Centre