



**Ministry of Education and Training**  
**Hanoi University of Technology**  
Institute for Environmental Science and Technology

# **Vietnam Cleaner Production Centre**

Annual Report 1999



***Vietnam Cleaner Production Centre***

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## FOREWORD

Cleaner Production as an effective tool for industrial performance, is now gaining acceptance within industrial entrepreneurs worldwide. Cleaner production brings economic, social and environmental benefits by savings of energy and raw materials, and reduction of pollution as well as enhancing the competitiveness of products in marketplaces. The cleaner production concept is, however, very new to Vietnamese industry. To disseminate the concept and gradually adopt this approach among the industrial communities have become imperative, particularly at the time when the process of industrialization and modernization of the country starts.

In September 1999, the Viet Nam Government signed the International Declaration on Cleaner Production. The signature again confirms Viet Nam's continuous and strong commitment to environmental protection. A National Action Plan for Cleaner Production is under preparation by the Ministry of Science, Technology and Environment (MOSTE), with the technical assistance from Asia Development Bank (ADB). The General Department of Metrology and Standardization under MOSTE, has encouraged national industrial businesses to enhance their environmental and economic performances through programs on the adoption of ISO 9000 and ISO 14000 series to be integrated with the cleaner production approach.

Results from cleaner production studies carried out within the framework of a SIDA funded project (TF/VIE/97/001) by Ho Chi Minh City Department of Science, Technology and Environment (DOSTE), and preliminary evaluations of 15 companies participating in a cleaner production demonstration project launched by Vietnam Cleaner Production Centre (VNCPC), have confirmed that cleaner production is one of the most effective strategies applicable by local industrial communities.

Again, cleaner production will benefit industries through improvement of economic and environmental performances and enhancement of the competitiveness in the processes of international integration and economic globalisation. Materialization of the cleaner production strategy requires our further efforts to raise awareness of cleaner production among industries, policy/decision makers, to create changes in their environmental attitude, as well as to develop an appropriate legal and institutional framework on which the CP strategy would be virtually materialized.

Within the framework of project VIE/96/063, Vietnam Cleaner Production Centre at the Institute of Environmental Science and Technology, Hanoi University of Technology, has significantly promoted the application of cleaner production through a wide range of activities including training programs, technical demonstration projects and workshops since 1998. I am fully confident that the Centre with its established strategic orientations and proper development objectives will become a national focal point of cleaner production and proactively contribute to environmental protection and industrial sustainable development.

Dr. Pham Khoi Nguyen

Vice Minister of Science, Technology and Environment

## CLEANER PRODUCTION

Cleaner Production 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.

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## TABLE OF CONTENTS

1	Introduction .....	3
2	Vision .....	3
3	Functions .....	4
4	Strategy .....	4
5	Activities 1999 .....	4
	5.1 Establishment of the Centre .....	5
	5.2 Training.....	8
	5.3 In-plant demonstration projects.....	10
	5.4 Information Dissemination and Awareness Raising.....	12
	5.5 Policy Advice .....	15
	5.6 Assistance to other Projects.....	16
	5.7 Visits of guests to the Centre .....	16

## 1 INTRODUCTION

Vietnam is still at the beginning stage of industrialisation and the problems faced in terms of industrial pollution are therefore not as severe as those faced by many other more developed countries. However, rapid growth of the industrial sector creates stress on the natural resources and the environment. Furthermore, pollution from existing enterprises tends to be relative high compared to their output, mainly because most of the enterprises are old and rely on outdated technologies and inefficient resource management. The wasteful use of resources creates negative impacts on the environment, and also has a considerable negative impact on the competitiveness of the industry of Vietnam.

Experience gained from implementation of cleaner production in other countries and in Vietnam (Ho Chi Minh City), shows that a proactive, preventive approach is the best way towards sustainable development of industry. Cleaner production not only reduces the negative impact on the environment, it also brings general benefits to society and economic benefit to responsible companies as well.

In order to promote the application of cleaner production in industry, Vietnam Cleaner Production Centre has been established in the Institute for Environmental Science and Technology of Hanoi University of Technology and within the framework of the UNIDO/UNEP Network of National Cleaner Production Centres. During the first five years Vietnam Cleaner Production Centre will receive assistance from the State Secretariat for Foreign Economic Affairs (SECO) Switzerland. This assistance is divided into two phases: phase I is from November 1998 to November 2000 and phase II is from November 2000 to November 2003. Phase I focuses on building up the infrastructure of the Centre and developing a strategy for promotion of cleaner production. This report covers the activities carried out during the first year, from January 1999 to the end of December 1999.

## 2 VISION

Industrial enterprises of Vietnam are facing a huge challenge in meeting the requirements of the competition that is caused by the regional and global integration. Cleaner production is one of the most important factors helping industries overcome the challenge and cleaner production also contributes to sustainable development within Vietnam.

Vietnam Cleaner Production Centre strives to become a centre of excellence in widely promulgating and promoting cleaner production to industries through capacity building, in-plant demonstration activities, information dissemination and policy assistance. Further, the Centre will be establishing an effective cleaner production network in Vietnam.

### **3 FUNCTIONS**

The functions of Vietnam Cleaner Production Centre are:

- To train the human resource base in cleaner production methods for enterprises, industry associations, consulting companies, research institutes, academic institutions, and governmental industrial and environmental management agencies;
- To demonstrate cleaner production assessment in industries to show the advantages of the cleaner production approach, and at the same time adapting the internationally developed cleaner production approach to Vietnamese conditions;
- To assist policy-makers on the subject and to make recommendations on how to promote the concept of cleaner production in industries and through legislation;
- To promote the concept of cleaner production and to raise awareness among industries and governmental agencies;
- 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 Cleaner Production Centres.

### **4 STRATEGY**

To fulfil this vision, Vietnam Cleaner Production Centre gives the highest priority to capacity building, developing trainers on CP-audit and raising awareness among managers of industries and officers of governmental institutions. The next priority is given to in-plant demonstration projects.

In 1999 these two priority areas have been linked by combining the training-of-trainers-course with in-plant demonstration projects. Thus, the trainees get practical training in industry and at the same time the management and employees of the participating companies are trained in cleaner production and are assisted in the implementation of cleaner production.

In the years to come, the training activities and the in-plant demonstrations will be partly paid for by individual industries. Furthermore, a network of regional cleaner production centres will be established to promote and sustain the cleaner production concept throughout the country.

### **5 ACTIVITIES 1999**

From January 1999 to the end of 1999 Vietnam Cleaner Production Centre has focused its activities on:

- Establishment of the centre;
- Training;

- In-plant demonstration projects;
- Awareness raising and information dissemination; and
- Policy advice.

To ensure satisfactory information dissemination, capacity building and technical advice, the centre needed to establish the infrastructure and to obtain basic measurement equipment. The centre staff have had the first training abroad and also within Vietnam. Furthermore, an Advisory Board had to be established.

## **5.1 Establishment of the Centre**

### **Inception Workshop**

On 23 - 24 March 1999, Vietnam Cleaner Production Centre organised the Inception Workshop. Several different speakers gave valuable input, and approximately 50 Vietnamese and 10 foreign experts in four working groups had extensive discussions about the future of the Centre. They discussed the opportunities and barriers for implementation of a cleaner production strategy in Vietnamese industry; they also discussed how to overcome these barriers and constraints. Based on this discussion and the project document, Vietnam Cleaner Production Centre finalised the activity plan for 1999 and 2000.

### **Facilities**

- The office was provided and renovated in October 1998 by the host, The Institute for Environmental Science and Technology of Hanoi University of Technology;
- Office equipment such as phone, fax, computers, printer and copying machine was purchased and put into operation;
- The library has been established, however more books still have be purchased; and
- The laboratory equipment came later than planned and some equipment is still on its way.

### **Advisory Board**

An Advisory Board has been established to give advice and support to Vietnam Cleaner Production Centre regarding its plans and activities. The Board has 11 members with representatives from the following ministries and organizations: MOET, MOI, MOSTE, MOF, MPI, VCCI, HUT, INEST, HCM National University, UNIDO and SDC. The Vice- Minister of Education and Training, Mr. Vu Ngoc Hai is the Chairman of this Board. Below is the list of Advisory Board members.

Table 1. *Advisory Board of Vietnam Cleaner Production Centre*

<b>Name</b>	<b>Title and organization</b>
Mr. Vu Ngoc Hai	Vice-Minister of Education and Training
Mr. Nguyen Xuan Chuan	Vice-Minister of Industry
Mr. Pham Khoi Nguyen	Vice-Minister of Science, Technology and Environment
Mrs. Tran Thi Thu Ha	Director, Department of Public Expenditure Administration, Ministry of Finance
Mrs. Phan Thu Huong	Director General, Department for Science, Education and Environment, Ministry of Planning and Investment
Mr. Vu Tien Loc	Secretary General, Vietnam Chamber of Commerce and Industry
Mr. Banh Tien Long	Vice-Rector, Hanoi University of Technology
Mr. Lam Minh Triet	Director, Institute for Environment and Resources of Ho Chi Minh National University
Mr. Dinh Van Sam	Director, Institute for Environmental Science and Technology of , Hanoi University of Technology
A Representative	United Nations Industrial Development Organization
A Representative	Swiss Agency for Development and Cooperation

## **National Project Director**

Professor Dinh Van Sam, director of The Institute for Environmental Science and Technology, is National Project Director of the Vietnam Cleaner Production Centre.

## **Staff**

During 1999, all open positions at our centre were filled and we had one UN-Volunteer to strengthen our capacity. Now Vietnam Cleaner Production Centre has a staff of 8 persons, of which 6 are Vietnamese, three of whom hold a Ph.D., three hold M.Sc.; the staff also contains one engineer and one driver.

To fulfil the task of being a centre of excellence, the staffs of Vietnam Cleaner Production Centre are trained continuously in new developments regarding cleaner production. During 1999, Vietnam Cleaner Production Centre staff attended nine courses and seminars on cleaner production related topics. Table 2 shows the list of staff and the training that they have attended. Furthermore, the responsibilities of the staff are listed in the table.

Table 2. List of full-time staff and training provided in 1999.

Name	Position	Responsibilities	Training provided
Mr. Tran Van Nhan, Ph.D.	Director	<ul style="list-style-type: none"> <li>▪ Overall management of the centre</li> <li>▪ Responsible for policy component</li> <li>▪ Supporting in-plant demonstration</li> </ul>	<ul style="list-style-type: none"> <li>▪ Asia-Pacific roundtable, Brisbane (Australia), 21 - 24 April</li> <li>▪ Study tour to Slovakia, Austria, Switzerland, 4 - 17 September</li> </ul>
Mrs. Ngo Thi Nga, Ph.D.	Vice-Director	<ul style="list-style-type: none"> <li>▪ Responsible for training</li> </ul>	<ul style="list-style-type: none"> <li>▪ Curriculum development at university, Lund University, Sweden, 29 May-19 June</li> <li>▪ APO workshop, India, 13 - 17 September</li> </ul>
Mrs. Tang Thi Hong Loan, M.E	Junior expert	<ul style="list-style-type: none"> <li>▪ Responsible for information dissemination, raising awareness and marketing</li> </ul>	<ul style="list-style-type: none"> <li>▪ Marketing Management, AITCV, 14-18 June</li> <li>▪ International workshop on cleaner production and waste prevention, Institute of Technology and Management of University of Applied Science, Switzerland, 11-22 October</li> <li>▪ ISO 14000 and support tools, Vietnam Productivity Centre, 16-19 November</li> </ul>
Mrs. Vu Tuong Anh, M.Sc	Junior expert	<ul style="list-style-type: none"> <li>▪ Responsible for in-plant demonstration</li> </ul>	<ul style="list-style-type: none"> <li>▪ International workshop on cleaner production and waste prevention, Institute of Technology and Management of University of Applied Science, Switzerland, 11-22 October</li> </ul>
Ms. Nguyen Le Hang, B.E	Secretary	<ul style="list-style-type: none"> <li>▪ Administration and finance</li> </ul>	<ul style="list-style-type: none"> <li>▪ Green Productivity workshop, Vietnam Productivity Centre, 4-9 January</li> </ul>
Mr. Pham The Hung	Supporting staff	<ul style="list-style-type: none"> <li>▪ Driver, assistance in administration</li> </ul>	
Mr. Heinz Leuenberger Prof., Ph.D.	Chief Technical Advisor	<ul style="list-style-type: none"> <li>▪ UNIDO representative executing the project</li> <li>▪ Advising all activities of the centre</li> </ul>	
Mr. Bent Hummelose, M.Sc	Cleaner production expert	<ul style="list-style-type: none"> <li>▪ Supporting information, raising awareness, in-plant demonstration and marketing</li> </ul>	

## Organisational structure

The organisational structure of Vietnam Cleaner Production is shown in Figure 1 below.

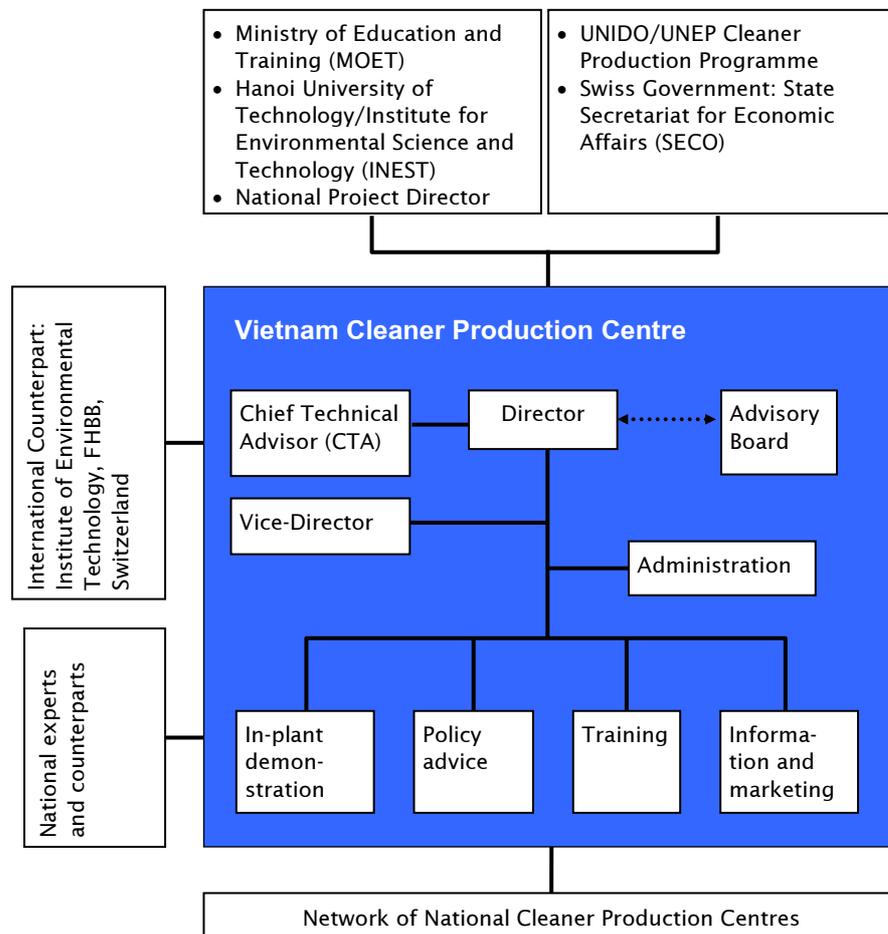


Figure 1. Organisational set-up of Vietnam Cleaner Production Centre.

## 5.2 Training

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 Vietnam Cleaner Production Centre has started to train CP-trainers with a systematic, in depth training programme, consisting of 7 modules (see Table 3). During the programme, participants will go through a complete cleaner production assessment, coached by national and international experts. The programme is directly linked to the in-plant demonstration projects; therefore the trainers will have a good theoretical and practical knowledge in cleaner production at the end of the course. A selection of these trained national experts will serve as CP-trainers/coaches in phase II, where Vietnam Cleaner Production Centre will conduct about 15 in-plant demonstration projects. Part of the trainers will work as independent consultants on cleaner production.

Table 3. Overview of the seven-module training course.

Module (Venue)						
1 (Hanoi)	2 (In-plant)	3 (Hanoi/ HCMC)	4 (Hanoi/ HCMC)	5 (HCMC)	6 (Hanoi/ HCMC)	7 (Hanoi)
Train the CP Trainers and Workshop 3-8 May' 99 (6 d)	CP pre-assessment  July-Aug. 99 (2 d)	CP Pre-Assessment  23-25/27-29 Sep. 99 (3 d)	CP Assessment  1-3/6-8 Dec. 99 (3 d)	Select CP Opportunities  14-17 Mar. 2000 (4d)	CP In-plant Demo  17-19/22-24 May 2000 (3d)	Implement CP-Measures  22-24 Aug 2000 (3 d)
<ul style="list-style-type: none"> <li>▪ Introduction to cleaner production</li> <li>▪ CP-strategy and methodology</li> <li>▪ UNEP/ UNIDO CP-program</li> <li>▪ Material balance, energy balance</li> <li>▪ How to start a CP-project</li> <li>▪ Opportunities and constraints for CP in Vietnam</li> <li>▪ Discussion</li> </ul>	<ul style="list-style-type: none"> <li>▪ Getting started in an in plant-demo unit</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 in the plant</li> <li>▪ Identify and select wasteful process steps and discuss on CP 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:               <ul style="list-style-type: none"> <li>- improve material and energy balance</li> <li>- assign cost to waste streams</li> </ul> </li> <li>▪ Report: Pre-assessment</li> </ul>	<ul style="list-style-type: none"> <li>▪ Final presentation, material and energy balance, compare to bench- marking system</li> <li>▪ Cost</li> <li>▪ 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 CP measures</li> <li>▪ Selection solution for implementation</li> <li>▪ Report: CP-assessment</li> <li>▪ Next steps</li> </ul>	<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: CP-opportunities (selection)</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 CP 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>▪ LCAC</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, constrains</li> <li>▪ Lesson 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>
<b>37 participants</b>	<b>263 participants</b>	<b>45 participants</b>	<b>45 participants</b>			

Lecturers in the first 4 modules:

Mr. S. P. Chandak, NCPC India; Mr. Nguyen Cong Thanh, AIT Bangkok; Mr. Tran Van Binh, HUT;  
 Mr. Nguyen Quy Trach, HUT; Mr. Thomas Bürki, FHBB Switzerland; Mr. Nguyen The Bao, HCM University of Technology;  
 Mr. Tran Van Nhan, VNCPC; Mrs. Ngo Thi Nga, VNCPC; Mr. Heinz Leuenberger, VNCPC/FHBB.

There are 47 trainees (37 core trainees and 10 representatives of participating companies), of those 27 come from northern provinces and 20 from central and southern provinces. The distribution of the trainees is shown in the figure.

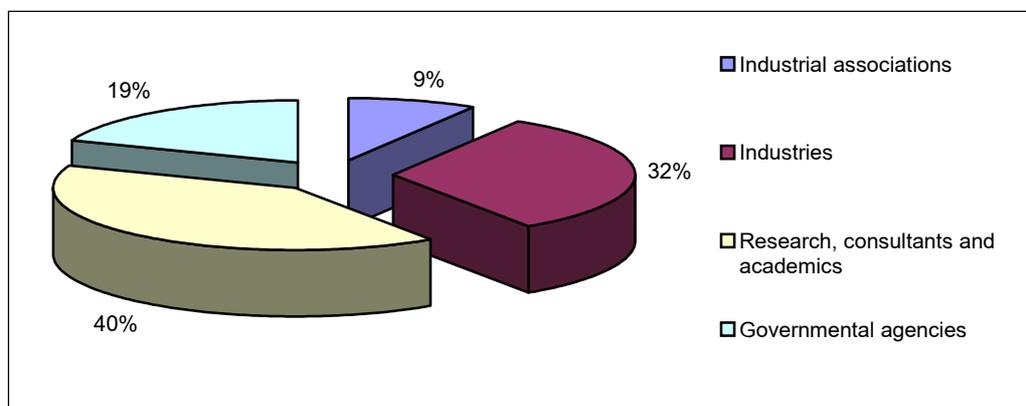


Figure 2. Distribution of participants in the seven-module training programme.

Till the end of 1999, the participants have participated in 4 modules as planned. Based on the feedback and evaluation of each module, the final programme of the following module has been adjusted. The training programme will be completed in August 2000.

Also, the Centre has assisted the Vietnam Paper Corporation in organising two three-day training courses on "Environmental Management in the Pulp and Paper Industry." The training courses were carried out in April at Bai Bang Company with 72 participants and at Tan Mai Company with 40 participants.

### 5.3 In-plant demonstration projects

The objectives of in-plant demonstration projects are to show how the concept of cleaner production works in Vietnam and to provide opportunities for hands-on training for our trainees. Vietnam Cleaner Production Centre planned to conduct in phase one (1999-2000) at least 10 in-plant demonstration projects (cleaner production assessments).

To recruit companies for the in-plant demonstration projects, the centre has visited 38 companies/enterprises. Out of these 22 applied to participate in the demonstration project. Finally, Vietnam Cleaner Production Centre selected 15 companies to participate in phase I. The companies have been selected based on the following criteria:

- Management commitment and willingness to co-operate;
- Belonging to a sector where the demonstration of cleaner production will have multiplier effect;
- Financial health;
- High pollution load and pressure from public and regulatory authorities;

- Potential for cleaner production;
- In-house availability of technical staff;
- Broad range of geographical ownership and distribution; and
- Existing know-how and experience in Vietnam Cleaner Production Centre.

Before the kick-off meetings in July and August one of the companies decided to drop out of the programme. This company has later been replaced with a galvanic company in Nam Dinh, where a Swiss student in eco-engineering is making a case study.

Hence, so far 15 companies are participating in our cleaner production programme. Eight of the companies are from the North and seven are from central and southern Vietnam, see Table 4 for more information.

*Table 4. List of companies participating in the in-plant demonstration project.*

Name	Sector	Location	Production in 1998
Ninh Binh Breweries	Alcoholic beverage	Ninh Binh	▪ Bottled beer: 2,5 million litter/year
Viet Tri Sugar - Beer - Alcohol company	Alcoholic beverage	Phu Tho	▪ Draft beer: 5,5 million litter/year ▪ (Capacity: 5 million litter/year)
Nam O Sea Food Processing	Food processing	Da Nang	▪ Fish filet: 3,3 t/year
Hai Long Company Ltd.	Food processing	Hai Phong	▪ Agar-agar: 36 t/year
Cau Tre Sea Food processing Enterprises	Food processing	HCMC	▪ Frozen fish: 525 t/year ▪ Frozen crab: 144 t/year
Nam Dinh Galvanic Company	Metallic product	Nam Dinh	▪ Zn galvanic wire: 9600 t/year ▪ Ni-Cr galvanic products: 4200m <sup>2</sup> /year ▪ Hard Cr galvanic products: 50-100 m <sup>2</sup> /year
VINAPIPE	Metallic products	Hai Phong	▪ Black steel pipe: 15,000 t/year ▪ Zn galvanic pipe: 15,000 t/year
Mai Lan Paper Company	Paper	HCMC	▪ Sanitary rolling papers: 1155 t/year
Vinh Hue Paper Company	Paper	HCMC	▪ Carton, packaging, joss, pipe paper: 6600t/year
Viet Tri Paper Company	Paper	Phu Tho	▪ Pulp: 4316 t/year ▪ Printing paper, sanitary, packaging paper: 7285 t/year
Trung Thu Textile Company	Textile	Hanoi	▪ CO, PRE/CO, shoe and military clothes (dyeing): 10000 t/year
Thanh Cong Textile Company	Textile	HCMC	▪ Weaving: 16,5 mil. m <sup>2</sup> /year ▪ Knitting: 16,5 mil. m <sup>2</sup> /year ▪ Sewing: 8 mil. products/year
Sai Gon Textile Company – Towel enterprise	Textile	HCMC	▪ Towel: 109 t/year
Nhat Tri Dyeing Unit	Textile	HCMC	▪ Plastic zippers, threads, fibres (dyeing): 530 t/year
Nam Dinh Silk Textile Company	Textile	Nam Dinh	▪ Fibre: 1000 t/year ▪ Dyeing: 8 million m/year ▪ Weaving: 5,5 million m/year ▪ Sewing: 250000 products/year

The following graphics show the distribution of companies/enterprises participating in the in-plant demonstration project in phase I (1999-2000).

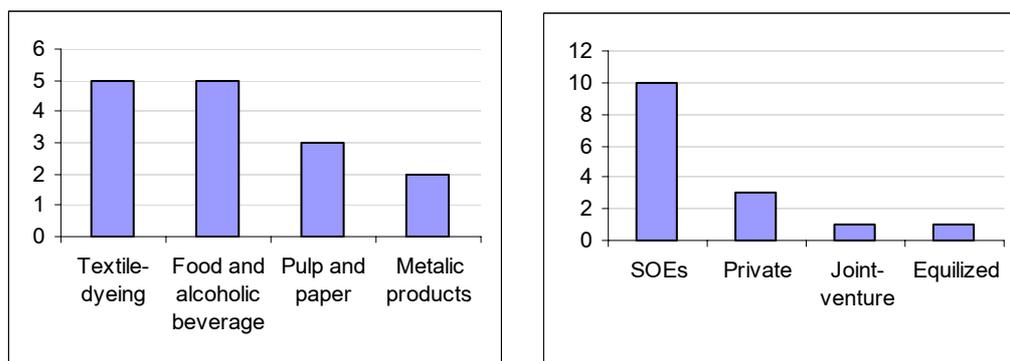


Figure 3. Companies by sector and ownership.

Together with our trainees and the CP teams in each company, Vietnam Cleaner Production Centre will conduct a full cleaner production assessment. National and international experts will assist in developing cleaner production options, carrying out technical and financial feasibility studies, and planning the implementation of the selected measures.

Vietnam Cleaner Production Centre applies the Cleaner Production Assessment methodology developed by the National Cleaner Production Centre of India to its in-plant demonstration projects. This methodology consists of the following six basic steps:

1. Getting started
2. Analysing Process Steps
3. Generating Cleaner Production Opportunities
4. Feasibility Analysis
5. Implementing and Monitoring Cleaner Production Solutions
6. Sustaining Cleaner Production

So far, the participating companies have completed step 1 and 2, and are working on step 3, and to some extent on step 4.

## 5.4 Information Dissemination and Awareness Raising

To inform industries, government agencies and universities on the CP-strategy and to promote the application of CP and to support industries with technology advice, VNCPC conducted a number of seminars, presented papers at different workshops or seminars and published technical papers or articles in newspapers and newsletters. For specific technical advice we have begun to set up a CP library; also, the CP networks in Vietnam will help share and exchange existing CP information and experiences in an efficient manner.

## Awareness raising seminars

To create awareness on the advantages of cleaner production in both the industrial sector and with governmental authorities, Vietnam Cleaner Production Centre planned to organise 10 awareness-raising seminars in year 1999 and 2000.

In 1999, 6 awareness-raising seminars with the title "Cleaner Production - Opportunities for Improvement of Business and production efficiency" have been organised in coordination with local Departments of Science, Technology and Environment (DOSTE) and Departments of Industry (DOI). Altogether 282 persons have participated in the awareness raising seminars throughout country. The first seminar was held on 27 April 1999 and the sixth on 9 December 1999. The figure below shows the distribution of the participants at each seminar.

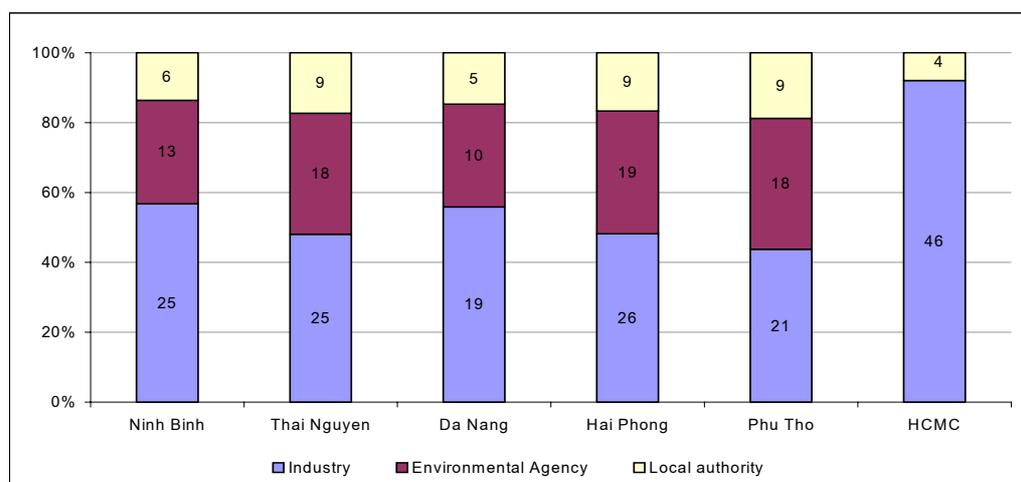


Figure 4. Numbers and distribution of participants at the awareness raising seminars.

On average almost 50 persons have attended each of the seminars. However, the evaluation of the seminars shows that only about 50% are from our main target group, which is industry. The first five seminars were organised with the Department of Science, Technology and Environment (DOSTE) as partners, and the last seminar in Ho Chi Minh City was organised with the Department of Industry (DOI) as a partner. The results from the last seminar show that it is possible to reach a high percentage of industrial representatives in the seminars. Vietnam Cleaner Production Centre will therefore try to organise more of the awareness raising seminars in conjunction with the Department of Industry, the Vietnam Chamber of Commerce and Industry, and the Industrial Park Management companies.

## Presentations

Representatives from Vietnam Cleaner Production Centre also gave presentations on cleaner production at eight other workshops and seminars in 1999:

- "Industrial Sustainable Development" organised by The World Bank and Ministry of Industry. Hanoi 10 - 11/6/1999;
- "Small and Medium Industries in Asia: Energy-Environment- Climate Change Relation" organised by the Non-State Economic Development Centre. Hanoi 8/7/1999;

- "Interdisciplinary Approach of the habitat improvement at local level" organised by HCMC Department of Science, Technology and Environment. HCMC 15 - 16/7/1999;
- "Environmental Management of Industrial Zones" in framework of the First ASEAN Environment Forum organised by National Environment Agency, partly sponsored by Vietnam Cleaner Production Centre. Hanoi 20 - 24/9/1999;
- "Start-up Workshop for the Asian Development Bank (ADB)/Regional Environmental Technical Assistance for the Promotion of Cleaner Production Policies and Practices in Vietnam" organised by the National Environment Agency (NEA) and ADB. Hanoi 12/10/1999;
- "Pollution Prevention and protection for Food Industry in Vietnam" organised by the Vietnam Chamber of Commerce and Industry (VCCI) and the Kanagawa Environment Division (Japan). Hanoi 8–10/11/1999;
- "Environmental Monitoring and Technologies" organised by the National Environment Agency. Quang Ninh 8-12/11/1999; and
- "Seminar on Wastewater Management & Technology in the Seafood Processing Industry" organised by the Ministry of Fisheries. HCMC 11/11/1999.

## **Publications**

During 1999 Vietnam Cleaner Production Centre has published:

- Two articles in the Newsletters of the National Environment Agency and the Fishery Association in Vietnamese;
- UNEP Guidance Manual on Cleaner Production at Pulp and Paper Mills has been translated into Vietnamese, printed and distributed;
- A Technical Report of UNEP on "Environmental Management Pulp and Paper Industry" has been translated into Vietnamese, printed and distributed; and
- Forthcoming: a mini-guide on Cleaner Production Assessment in Vietnamese and English.

## **Library**

The set-up of the library is behind the schedule; however, most of the UNEP/UNIDO manuals are available. The coverage of books within textile, food, beverage, metal finishing and pulp & paper is good, but the textbooks and sector specific literature for other branches are lacking.

## **Cleaner Production Network**

Vietnam Cleaner Production Centre is building up a network of cleaner production expertise. The network is based on co-operation and information sharing.

*Domestic counterparts are:*

- National Environment Agency/ Environmental Technology Division;
- Centre for Environmental Engineering of Towns and Industrial Areas, Hanoi University of Civil Engineering;

- Energy Efficiency and Conservation Programme of Ministry of Science, Technology and Environment;
- Ho Chi Minh City Department of Science, Technology and Environment;
- Ho Chi Minh City Department of Industry;
- The Institute for Environment and Resources of the Ho Chi Minh National University;
- The Environmental Protection Centre in Ho Chi Minh City; and
- The Environmental Protection Centre in Da Nang.

*International counterparts are:*

- CP centres in Asia through the Asia-Pacific Roundtable;
- National Cleaner Production of India;
- Institute of Technology and Management of University of Applied Science (Basel, Switzerland); and
- CP Asia Pacific Network.

## 5.5 Policy Advice

An effective policy framework in cleaner production is essential to promote this concept to industry. This involves not only administrative measures like licensing, but also economic instruments such as a duty and tax system for waste disposal and a realistic pricing system for raw materials and energy.

Vietnam Cleaner Production Centre can help decision-makers to have access to information and experiences of cleaner production and from abroad and to support them in developing new strategies and laws for promotion of cleaner production.

### Study tour for policy-makers

In 1999 Vietnam Cleaner Production Centre planned and organised a two-week study tour for policy makers to Slovakia, Austria and Switzerland.

The purpose of the study tour was to see, learn and discuss:

- Environmental policy framework;
- Implementation and enforcement of environmental laws;
- Cleaner Production benefits for companies;
- Economic instruments in environmental protection; and
- Applied research and training in cleaner production.

Representatives from five ministries were invited to participate in the study tour: Ministry of Planning and Investment (MPI), Ministry of Industry (MOI), Ministry of Science, Technology and Environment (MOSTE), Ministry of Finance (MOF), Hanoi University of Technology (HUT) of Ministry of Education and Training (MOET).

Table 5. Overview of the study tour for policy makers (4-17 September 1999)

Country	Places to visit	Participants
Slovakia:	<ul style="list-style-type: none"> <li>▪ Slovakia Cleaner Production Centre</li> <li>▪ Slovnaft Oil Company</li> <li>▪ Ministry of Economy</li> <li>▪ Ministry of Environment</li> </ul>	Mr. Do Van Giap, MPI Mr. Pham Duc Luong, MOI Mrs. Chu Thi Sang, NEA/MOSTE
Austria:	<ul style="list-style-type: none"> <li>▪ UNIDO Headquarters</li> </ul>	Mr. Ngo Huu Loi, MOF
Switzerland:	<ul style="list-style-type: none"> <li>▪ World Business Council for sustainable Development, Secretariat of economic affairs</li> <li>▪ Battery recycling, Environmental Authority federal and local level</li> <li>▪ Steel foundry, pulp factory, pharmaceutical factory</li> <li>▪ FHBB, EMPA</li> </ul>	Mr. Hoang Ba Chu, HUT/ MOET Mr. Tran Van Nhan, VNCPC Mr. Heinz Leuenberger, VNCPC

## Signing of the Declaration on Cleaner Production

Vietnam Cleaner Production Centre assisted the Ministry of Science, Technology and Environment/National Environment Agency in the promotion of and preparation for signing of the International Declaration on Cleaner Production. On behalf of the Government of Vietnam, Mr. Chu Tuan Nha, Minister of Science, Technology and Environment signed the declaration on Wednesday 22 September this year.

## 5.6 Assistance to other Projects

Vietnam Cleaner Production Centre is involved in the following projects:

- A Project of the Asian Development Bank (ADB)/Regional Environmental Technical Assistance for "Promotion of Cleaner Production policies and Practices in Vietnam", executed by NEA; and
- A Survey of Past Investment Practices in Vietnam within the framework of the UNEP project: "Strategy and Mechanism for Promoting Cleaner Production Investment in Developing Countries".

## 5.7 Visits of guests to the Centre

- January 1999, Mr. Fritz Balkau, Chief of Production and Consumption, UNEP, Paris;
- March 1999, Prof. Dr. Rhinow, Head of the Swiss Upper Parliament, and Mr. Leuthert, Ambassador of Switzerland;
- May 1999, Mr. Robert Ferrari, Vice-President, SNC-Lavatin Environment Inc. Canada;
- September 1999, Mr. Jang Won Shu, Director of UNIDO Asia and the Pacific Bureau; and
- October 1999, Mr. Chua Chin Pen from UNIDO Head Quarter.