



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

Viet Nam Cleaner Production Centre

Annual Report 2001



Viet Nam Cleaner Production Centre

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FOREWORD



Cleaner production, with its proven advantages, has been adapted to Viet Nam through cleaner production assessment in the following industries: pulp and paper, textile, metal finishing, food processing, beverage, cement, pesticides, footwear. More profits, less wastes, and therefore, cleaner production is one of the promising approaches to make Vietnamese industrial enterprises become more competitive. All participating companies have achieved good results and significant savings in money. However, to achieve the full cleaner production potentials in the companies, management and staff must undertake cleaner production as an on-going, day-to-day activity.

Thank to the efforts of its staff, the Viet Nam Cleaner Production Centre has achieved ISO 9001 and ISO 14001 certificate. From now on, we shall maintain the system to confirm the commitment of the centre to deliver a wide range of high quality solutions to customers. As a certified centre in quality and environment, we strive to maintain the Viet Nam Cleaner Production Centre as a reliable address in cleaner production and cleaner technologies.

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 helped us to achieve the goals and objectives of 2001.

Special thank is conveyed to Prof. Heinz Leuenberger, our Chief Technical Advisor 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.

Dr. Tran Van Nhan
Director of Viet Nam Cleaner Production Centre.



The last year was challenging and intensive for the Viet Nam Cleaner Production Centre, and the workload was quite heavy. Besides the normal activities, ie. training, in-plant assessment, information dissemination, awareness raising and policy advice, we prepared our centre for ISO 9001 and ISO 14001 certification. In January 2002, we passed successfully both audits by SGS Viet Nam.

The main goals of Viet Nam Cleaner Production Centre were once again reached or surpassed thanks to the strong commitment and the hard work of all centre staff members and the very good support of our partners, our host institution, the Institute for Environmental Science and Technology (INEST), the United Nations Industrial Development Organization (UNIDO) in Hanoi and Vienna and our donor, the State Secretariat for Economic Affairs (SECO), Switzerland.

Slowly “cleaner production strategy” is being recognized as an issue by the Vietnamese industry. Seven cleaner production service providers have conducted around 25 assessments all over Viet Nam, and for the year 2002, several projects are planning to conduct CP-assessments. In the environmental strategy 2000-2010 for Viet Nam, cleaner production is foreseen as one of the core activities, and the National Environment Agency worked out a Draft National CP - Action Plan for Viet Nam 2000-2005.

There are still many barriers to overcome until CP is a common activity in Vietnamese industries. Besides several obstacles on the macro level (low price for resources, weak enforcement of environmental laws etc.), there are also some challenges in the practical implementation of CP such as lack of technology information, missing environmental data at the enterprise level, lack of environmental analytical laboratories, and lack of enough qualified CP experts. The next years will show if the “cleaner production strategy” can achieve its full potential in Viet Nam or if CP will lose its momentum.

Once again, I would like to thank all involved Vietnamese ministries and partners, the national project director Professor Dinh Van Sam and the staff at INEST, and, last but not least, all my VNCPC colleagues for their support, hard work and effort to reach our common goals. I am looking forward to continuing our work.

*Dr. Heinz Leuenberger
Chief Technical Adviser, Viet Nam Cleaner Production Centre.*

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 TIE

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1 POLICY

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

2 VISION AND MISSION

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 Cleaner Production Centres.

3 ORGANISATION AND FACILITIES

The Viet Nam Cleaner Production Centre was established in 1998 within the framework of UNIDO/UNEP National Cleaner Production Centres Project. It is 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 11 members at managing levels of relevant ministries and organizations: MOET, MOI, MOSTE, MOF, MPI, VCCI, HUT, INEST, HCM National University, UNIDO and SECO/SDC. The Vice-Minister of Education and Training, Mr. Vu Ngoc Hai, is Chairman of the Board.

Organisational Structure

The organisational structure of Viet Nam Cleaner Production is shown below.

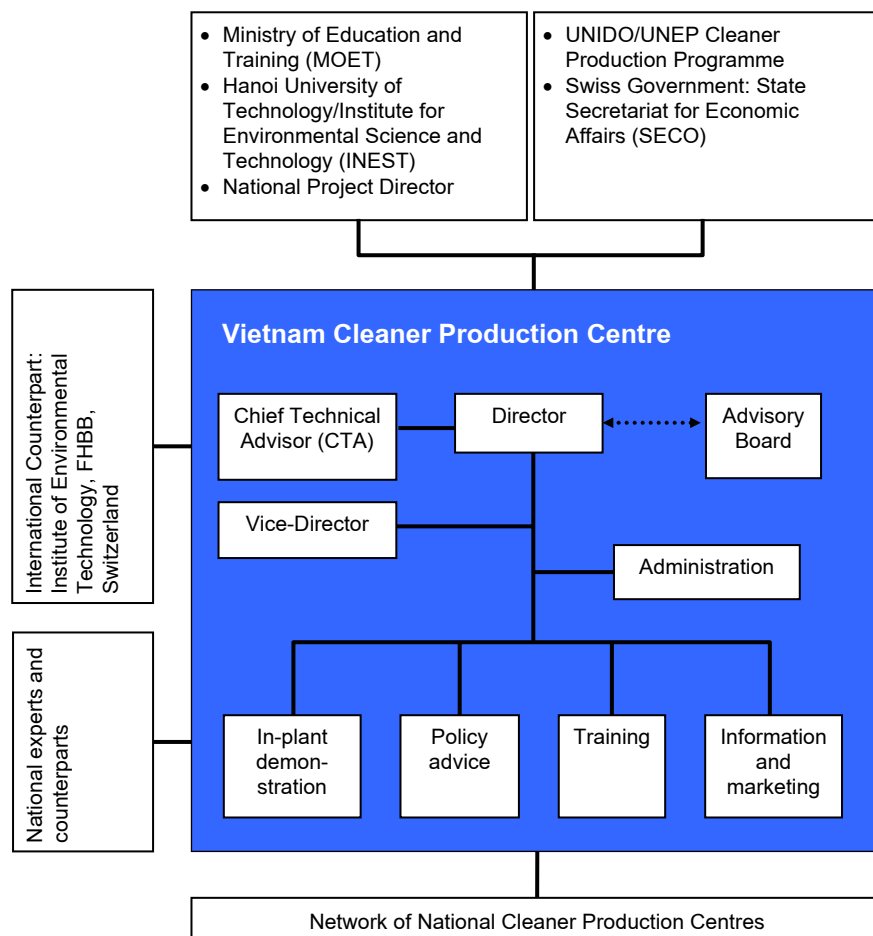


Figure 1. Organisational set-up of Vietnam Cleaner Production Centre.

Staff

At the end 2001, the VNCPC team counted twelve Vietnamese and two foreigners. Four staff members hold a Ph.D's., three hold M.Sc's., and three hold a B.Sc's. Currently five of the Vietnamese staff members are qualified to facilitate Cleaner Production Assessments in industries.

During 2001 one staff member and one future member of VNCPC attended a twelve-week training programme in cleaner production at the Asian Institute of Technology (AIT) in Thailand. The management and staff of the Centre have received training through participation in seminars, international workshops and roundtables on cleaner production. Especially important was the intensive training in ISO 9001 aspects during the year.

Staff at the Centre

Mr. Dinh Van Sam, Prof. Ph.D., National Project Dir.
Mr. Tran Van Nhan, Ph.D., Director
Mrs. Ngo Thi Nga, Ph.D., Vice Director
Mrs. Tang Thi Hong Loan, M.Sc., CP Expert
Mrs. Vu Tuong Anh, M.Sc., CP Expert
Ms. Nguyen Thanh Tam, M.Sc., Junior CP expert
Ms. Nguyen Le Hang, B.Sc., Junior CP expert
Mr. Pham Sinh Thanh, B.Sc., Support staff
Mr. Bui Manh Cuong, B.Sc., Support staff
Ms. Vu Thanh Tu, B.Sc, Secretary
Ms. Tran Le My, B.A., Interpreter
Mr. Pham The Hung, Driver
Mr. Heinz Leuenberger Prof., Ph.D., CTA
Mr. Bent Hummellose, M.Sc., UN Volunteer



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.

Within the UNIDO/UNEP network, the VNCPC is working closely with the 22 other National Cleaner Production Centres worldwide as well as with the participants at the Asia Pacific Roundtable for Cleaner Production. The VNCPC is starting to establish a formal network of CP experts and institutions throughout Viet Nam for the years to come.

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 materials and energy consumption in several different industrial sectors.

The library at the Centre now counts around 300 titles (books and journals) related to environment, cleaner production and environmental management. Additionally, more than 1,000 books and reports are kept in an electronic library.



4 ACTIVITIES 2001

4.1 Overall

Although the activities in 2001 only actually started in April due to delays in the approval of the second phase of the project, the Viet Nam Cleaner Production Centre has achieved or surpassed most of the planned activity goals.



After nine months of preparation work for ISO 9001 and ISO 14001 certification, the centre passed the main ISO 9001 and ISO 14001 audits, ensuring the quality and environmental performance of its management system for servicing industrial clients. A major challenge in the year 2002 will be to maintain and to ensure our integrated quality and environmental management system.

Since April 2001, the Viet Nam Cleaner Production Centre has carried out the following:

4.2 Training



The lack of well-trained and experienced Cleaner Production specialists is one of the main 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 resource base of national experts on Cleaner Production. The overall results of training in 2001 are as follows:

Table 1. Overview of training in 2001

Type of training	Planned man-days	Achieved man-days	Explanation
Sector specific training	210	299	Four-module training program "Cleaner production and Environmental Management in Pulp and Paper Industry". Three modules were organized in 2001.
Special skill training	90	110	Energy efficiency audit
Tailor-made training	50	582	- Cleaner Production training for environmental staff of DOSTEs as requested by the Viet Nam Canada Environment Program (VCEP) - Financial Engineering training as requested by the UNEP project on "Mechanisms and Strategies for Promoting Cleaner Production Investment in Developing Countries" - Cleaner Production in Seafood processing as requested by SEAQIP Danida
University lecture training	60	0	Training is moved to 2002, seminars were organized

Intensive CP Training Programme

In 2001, three modules of a four-module training programme called "Cleaner Production and Environmental Management in Pulp and paper Industry" were conducted. Participants are from the pulp and paper industry, corporations and environmental authorities, consultancy organizations, universities and research institutes. Module four will be organized in January 2002 to complete the program. These training activities were combined with in-plant demonstration activities so that participants gained practical experience in Cleaner Production Assessments. The total duration of this training was 14 days of classroom training and around 11 days of practical work in companies.

By the end of 2001, intensive long-term cleaner production training has been delivered to 61 certified participants throughout Viet Nam.

Table 2. Overview of the four-module training programme

Module (Venue)			
1 (Hanoi)	2 (Ha Noi)	3 (HCMC)	4 (Hanoi)
Cleaner Production Methodology 4-8 June 2001 5 days & company practice	Cleaner Production Assessment 29-31 August 2001 3 days & company practice	Cleaner Production Assessment 29-31 October 2001 3 days & company practice	Completion of Cleaner Production Assessment 15-17 January 2002 3 days & company practice
<ul style="list-style-type: none"> ▪ Introduction to cleaner production ▪ Pulp and paper processing ▪ Cleaner production Assessment Methodology ▪ Getting started ▪ Analysing process ▪ Material balance ▪ Boiler efficiency ▪ Generating cleaner production options ▪ Selecting cleaner production options 	<ul style="list-style-type: none"> ▪ Presentation of pre-assessment ▪ Discuss results and problems ▪ Case studies to illustrate methodologies ▪ Best available technology in pulp production ▪ Fundamentals of electricity savings 	<ul style="list-style-type: none"> ▪ Presentation of assessment ▪ Discuss results and problems ▪ Best available technology in paper production ▪ Wastewater treatment for pulp and paper production ▪ Implementing cleaner production options ▪ Company visit 	<ul style="list-style-type: none"> ▪ Presentation of assessment and status for implementation ▪ Cleaner production Investment ▪ Introduction to environmental management system and ISO 14001 ▪ Maintaining cleaner production program
25 participants	23 participants	23 participants	

Special skill Training

These courses were organized mainly for our CP trainers and our staff to improve and to enlarge their own skills in conducting CP assessment.

Tailor-made Training

There was a great demand for tailor-made courses by different projects like VCEP, UNEP and Danida. Some of the training programs developed by VNCPC will be conducted again in 2002.



Curriculum Development at University Level

In 2001, two-day seminars were organized in Ha Noi and Ho Chi Minh City in order to evaluate the interest and to define concrete ways to introduce cleaner production into food processing and chemical and environmental engineering curricula. 77 participants from 15 universities attended these seminars. The planned four day training to develop curriculum in the university is postponed to February 2002 due to time constraints.

4.3 In-Plant Demonstration Programme

The objective of the in-plant demonstration programme is to show the benefits of Cleaner Production when implemented in Vietnamese industries. The in-plant demonstration programme has furthermore been used to provide hands-on training for the participants in our train-the-trainer programme.

The Pulp and Paper industry was selected as a sector in which to demonstrate cleaner production in 2001.

Besides cleaner production assessments, the Viet Nam Cleaner Production Centre also provides advice on cleaner technology implementation and financial engineering.

Cleaner Production Assessment

In 2001, the centre initiated **Cleaner Production Assessments** conducted in 11 companies manufacturing pulp and paper, instant noodles, cement, sugar, footwear and pesticides, of which 5 were completed. The CP assessment in 6 pulp and paper companies will be finished in March/April 2002. Besides these new assessments, follow-up in the first 13 demonstration companies was carried out.

In addition, seven cleaner production service providers trained by the centre delivered **Cleaner Production Assessments** to 25 companies in different industrial sectors

The centre undertook **Rapid Assessment** at four companies in Ha Noi under the framework of the UNDP/SDC project “Sustainable Industrial Development “

Table 3. Overview of CP assessment by sector carried out with assistance of Viet Nam Cleaner Production Centre since 1999

Sector	Number of companies	Products	Location	CP started in	Annual benefits until 2001
Textile	4	Dyed fabric, zippers, thread	Nam Dinh, Ha Noi, Ho Chi Minh City	1999	Savings of 115,000 USD reductions up to 14% in air pollution, 14% in GHG, 20% in chemical use, 14% electricity consumption and 14% in fuel oil consumption
Food and beverage	4	Agar-agar, beer, seafood	Hai Phong, Ninh Binh, Da nang and Ho Chi Minh City	1999	Savings of 55,000 USD reductions up to 13% in air pollution, 78% in GHG, 34% in solid waste, 40% in chemical use, 78% in electricity consumption and 13% in coal consumption
	1	Noodle	Ho Chi Minh City	2000	Savings of 300,000 USD other benefits not yet completely verified
	1	Sugar	Can Tho	2001	Savings of 125,000 USD other benefits not yet completely verified
Pulp and paper	3	Prining paper, tissues, carton	Phu Tho, Ho Chi Minh City	1999	Savings of 344,000 USD reduction up to 35% in air pollution, 15% in GHG, 20% in fibre loss, 30% in wastewater, 24% in electricity consumption, 16% in fuel oil consumption and 20% in coal consumption
	6		Phu Tho, Hoa Binh, Nghe An, Dong Nai, Ho Chi Minh City	2001	Benefits not yet completely verified
Metal	2	Wire and nets, steel pipes	Nam Dinh and Hai Phong	1999	Savings of 357,000 USD reduction up to 15% in air pollution, 20% in solid waste, 5% in electricity consumption, 15% in coal consumption
Other	3	Footwear	Can Tho	2001	Savings of 33,000 USD reduction of 50% in fuel oil consumption, 19% in electricity consumption
		Pesticides	Can Tho	2001	reduction of 0.1% in active ingredient (1684 kg) other benefits not completely verified
		Cement	Can Tho	2001	Savings of 249,000 USD reduction of 2% in clinker, 14% in gypsum, and 7.4% in electricity consumption

Cleaner Technology and Financial Engineering Advice

Based on cleaner technology assessment and financial engineering, three companies implemented/installed new technology/equipment including new boiler (Hanoi Environment Fund), a new cooling system (internal funding), and a new electricity system (Ho Chi Minh city Environment Fund). One company replaced its entire production unit and one company requested an offer for a new, bigger production line.

4.4 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. Because the focus of 2001 was the pulp and paper sector and that of 2002 is the textile industry, the following activities were carried out:

Public Media

In 2001, the Viet Nam Cleaner Production Centre made presentations at 12 workshops and seminars in Viet Nam. Two presentations were made at the Asia and Pacific Roundtable in Manila.

The 30-minute Taiwanese video "Save the materials, save a fortune - Waste minimization in pulp and paper industry" was translated into Vietnamese to present at cleaner production trainings for the pulp and paper industry. The draft translation of an Indian manual "From Waste to Profits" for the textile industry was completed in 2001, and is now available for publishing and distribution.

The Viet Nam Cleaner Production Centre is working with Viet Nam Television to make a short film on cleaner production activities. It is expected to be shown in February 2002. Two short films and one interview with the VNCPC Director were broadcast in 2001. Brochures and leaflets of each of our services are now available. The first CP fact sheet was published in December 2001 with a focus on the textile industry.

Awareness Raising Seminars

In 2001, 8 awareness-raising seminars were organised in different provinces. Five of them were organized in Ha Noi, Da Nang, Hai Phong, Can Tho and Thai Nguyen under the framework of the UNEP project "Mechanisms and Strategies for Promoting Cleaner Production Investment in Developing Countries".

Including the 571 participants from 1999-2000, a total of 796 participants took part in awareness raising cleaner production events conducted by the centre by the end of 2001.

Table 4. Overview of awareness raising seminars

Date	Location	Number of participants	Partners
15 March	Khanh Hoa	41	DOSTE Khanh Hoa
29 June	Ha Noi	25	-
15 August	Da Nang	27	DPI Da Nang
20 September	Hai Phong	27	DPI Hai Phong
5 October	Can Tho	25	DPI Can Tho
13 November	Ha Noi	33	VINATEX

Date	Location	Number of participants	Partners
16 November	Ho Chi Minh City	22	VINATEX
20 November	Thai Nguyen	25	DOSTE Thai Nguyen

4.5 Policy Advice

An effective policy framework for Cleaner Production is essential to promote this concept with industry. Such a framework must involve not only administrative measures like 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.

At the Government level, following the signing of the International Declaration on Cleaner Production in 1999 by the Minister of MOSTE and numerous cleaner production study tours for policy makers in 1999-2000, the Viet Nam Cleaner Production Centre is supporting the MOSTE/NEA in making cleaner production a main activity in the Environmental Strategy 2000-2010 and in drafting the National Cleaner Production Action Plan 2000-2005. Both reports are awaiting the Governmental approval.

At the local level, as mentioned in the training section, under the framework of VCEP, the official capacity building partner and advisor for NEA, the Viet Nam Cleaner Production Centre was hired to present four cleaner production training courses to environmental officials in four selected provinces. The centre also gave a presentation at the NEA/VCEP workshop "Development of a Strategy for Industrial Pollution Control in Viet Nam", attended by representatives of DOSTEs from 61 provinces.

4.6 Other activities

Beside the above mentioned activities, the following activities were undertaken during 2001:

- Six interns worked at the centre in the following fields: Feasibility study for brick kilns; software development for a flow diagram assistance; cleaner technology assessment in the textile industry; evaluation of VNCPC works; and development of a combined methodology for cleaner production and ISO 14001, and using Life Cycle Assessment (LCA) in designing water supply.
- At request of SDC, a mission for a project proposal on the reduction of industrial POPs in Viet Nam was initiated.
- A draft project proposal for hazardous waste and waste minimization concept in Nam Dinh was formulated and submitted to SDC.
- A seminar called "Environmentally-sound Technology Transfer" was organized in Ho Chi Minh City in co-operation with the Swiss Embassy, SECO and the Swiss South East Asian Chamber of Commerce.
- A six-day cleaner production mission was sent to Lao for Danida.

- The annual meeting of cleaner production centre directors in Seoul, Korea was attended.
- A Cleaner Production assessment in the supply chain of IKEA as a pilot activity was carried out. VNCPC had a presentation at their Asia meeting “Quality and Environmental Managers” in Ho Chi Minh City.

4.7 Cooperation

The Viet Nam Cleaner Production has set-up, maintained cooperation and provided services to:

- Ministry of Industry and Handicraft of Lao PDR under the framework of Danida.
- MPI-UNEP’s Project: "Strategy and Mechanism for Promoting Cleaner Production Investment in Developing Countries"
- The Ministry of Fisheries’ Project: “Seafood Quality Improvement Program” (SEAQIP)
- MOSTE’s “Viet Nam Canada Environment Program” (VCEP)
- MOSTE/NEA-ADB’s “Promotion of Cleaner Production Policies and Practices in Vietnam”
- MPI-UNDP’s “Agenda 21” (Environmental Issues in Investment Planning)
- CDG’s (Germany) on training for environmental management tools for SMEs
- Several CP seminar providers in Viet Nam
- Several DOSTEs

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

5 ENVIRONMENTAL PERFORMANCE

In connection with the implementation of an Integrated Management System at VNCPC, the Centre has reviewed its own direct and indirect environmental impacts. Through CP assessment programmes, our clients have achieved positive environmental impact in savings of fuel and reduction of pollution loads. These achievements are accounted for in Chapter 4.3.

On the other hand, through our work and in connection with our training activities, we are causing negative environmental impacts because of:

- Travel by car and by air (resulting in the emissions of GHG gases);
- Paper consumption and waste paper generation;
- Electricity consumption (resulting indirectly in emission of GHG gases and air pollutants); and
- Usage of printer and copy cartridges, stationery, etc.

In 2001 we have no records of the minor aspects related to cartridges, stationery, and waste paper generation. Regarding our electricity consumption we have only a rough estimation based on the second half of 2001. Using this estimation the consumption has been approximately 50 kWh per man-month of staff in the office.

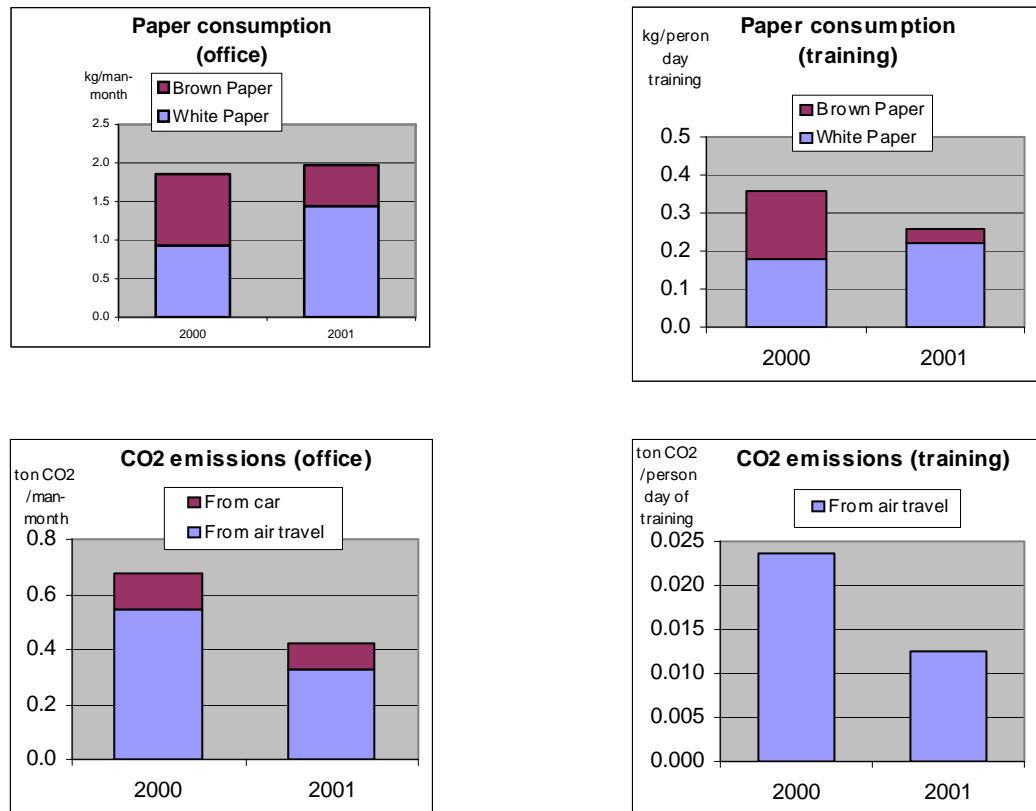


Figure 2. Environmental performance of VNCPC

The conversion from fuel consumption for the project car and from air travel to CO₂ emissions has been done using the guidelines and data from the GHG Protocol Initiative. In this way it is estimated that in 2001 the VNCPC caused CO₂ emission of about 47 tons. Compared with the savings of about 1000 tons CO₂ emissions (2000 data) in the enterprises, where the VNCPC undertook CP assessments, the centre had a very positive impact on the environment in Viet Nam from this perspective.

In 2002, the VNCPC will strive to reduce by 5% the energy consumption in its offices, the CO₂ emissions through our training and our office-travels, the paper consumption per person day of training and for the office in general. Furthermore, the VNCPC will use more brown paper as long as it gives an acceptable quality of the training material.

6 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 2001.

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 an efficient coordination.

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

Project	CP content	Donor	Counterpart	Location	Period
Environmental strategy for 2001-2010	Development of the Environmental Strategy for 2001-2010	Government of Viet Nam	NEA	Viet Nam	2000-2001
CP-action plan	Development of a National Strategy for CP for 2001-2005	ADB	NEA	Viet Nam	2000-2001
Environmental Management Thai Nguyen Province	Cleaner Technology and Industrial Pollution Project	Danida	DOSTE in Thai Nguyen	Thai Nguyen Province	2000-2002
Environmental Management in Viet Tri	Cleaner Production component	Danida	DOSTE in Viet Tri	Phu Tho Province	2001-2003
Environmental Pollution Prevention in HCMC	CP Assessments. Follow-up on earlier project	UNIDO/SIDA	DOSTE in HCMC	HCMC	2001-2003
Industrial Pollution Management. VCEP II	CP training and demonstration projects in 4 provinces	CIDA	NEA DOSTE in Hai Phong, Hanoi, Da Nang and Binh Duong	Viet Nam	2001-2005
Agenda 21	4 CP Assessments in Hanoi	UNDP and SDC	MPI	Hanoi	2000-2001
CP Investment	7-8 bankable CP projects	UNEP, Norway	MPI	Viet Nam	2000-2001
Wastewater treatment Technology transfer and Cleaner Production Demonstration AAIECP – Australia	Waste minimization audit at three candy/brewery companies	AUSAID	Institute of Brewery Research	Viet Nam	1998 – 2000

7 PROBLEMS ENCOUNTERED AND LESSONS LEARNED

Through our work, it is becoming clear that the adoption of cleaner technology by Vietnamese enterprises will need more time than was initially expected. Few companies are willing and able to invest in foreign, environmentally sound technologies. The necessary technical information is hard to obtain and full cost assessments are not made.

Many factories are not used to hiring consultants. Therefore, in order to promote our field of work it will be necessary to develop a CP market in Viet Nam. For this to happen, it is crucial that CP service providers offer industry high-quality services. This is currently not always the case, and steps must be taken to remediate this situation. Capacity-building to ensure highly qualified and experienced CP experts must therefore be a core activity for the VNCPCC.

Many consultants do not have access to technology information, and suppliers are not willing to help because they fear that technology will be copied. This suggests that the VNCPC should seek a role as an impartial mediator between those looking for technology information and those that have this information.

There is still a lack of money for CP investments, and procedures and criteria used by existing environmental funds are too complicated and cumbersome.

8 ANNEXES

8.1 List of Certificated participants in Cleaner Production

Table 6. List of participants certified in cleaner production

	Name	Contact details	Note
Since 2000			
1.	Trương Thanh Cần <i>as consultant</i>	Binh Giang Private Company for Industry and Environment - 31/8C Đông An, Tân Đông Hiệp, huyện Dĩ An, Bình Dương Tel/Fax: (650) 824-421; (650) 730-534; Mobile: 090-752-917	Service provider
2.	Trần Phước Cường	DOSTE Da Nang / Environmental Protection Centre - 15 Quang Trung, Đà Nẵng Tel: (511) 892-822; Fax: (511) 822-864	
3.	Vũ Nhật Dự	Nam Dinh Silk Textile Company - 4 Hà Huy Tập, Nam Định Tel: (350) 849-622; Fax: (350) 849-652	
4.	Nguyễn Duy Dũng <i>as trainer & consultant</i>	Viet Nam Textile Corporation VINATEX - 25 Bà Triệu, Hà Nội Tel: (4) 826-5902; Fax: (4) 826-2269; Mobile: 090-441-718	
5.	Lê Trần Nguyên Hân <i>as trainer & consultant</i>	DOSTE Da Nang - 15 Quang Trung, Đà Nẵng Tel: (511) 892-823; Fax: (511) 822-864; Mobile: 091-494-661	Service provider
6.	Lê Thị Hiền <i>as trainer</i>	Bai Bang Paper Company - Phong Châu, Phú Thọ Tel: (210) 829-755; Fax: (210) 829-177	
7.	Nguyễn Văn Hiện	Viet Tri Paper Company - Thanh Miếu, Việt Trì, Phú Thọ Tel/Fax: (210) 846-702; Mobile: 091-282-716	
8.	Đinh Thị Thanh Hoa <i>as trainer</i>	Viet Nam Chamber of Commerce and Industry - 9 Đào Duy Anh, Hà Nội Tel: (4) 574-2022/ext. 244; Fax: (4) 574-2030	
9.	Nguyễn Xuân Hồng <i>as trainer & consultant</i>	Viet Nam National Productivity Centre - Đường Hoàng Quốc Việt, Nghĩa Đô, Cầu Giấy, Hà Nội Tel: (4) 756-1925; Fax: (4) 756-1502; Mobile: 091-226-130	
10.	Nguyễn Thanh Hùng <i>as trainer & consultant</i>	Centre for Environmental Technology CEFINEA - 142 Tô Hiến Thành, quận 10, HCMC Tel: (8) 865-1132; Fax: (8) 865-5670	Service provider, integrated CP into curriculum
11.	Trần Lan Hương	Hai Long Company Limited - 109 Trường Chinh, Kiến An, Hải Phòng Tel: (31) 876-449; Fax: (31) 837-300	
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8.2 List of Abbreviations

BAT	Best Available Technique
BEAT	Best Economical Attractive Technology
CDM	Clean Development Mechanism
CP	Cleaner Production
DOI	Department of Industry
DOSTE	Department of Science, Technology and 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 and Technology
LCA	Life Cycle Assessment
MOET	Ministry of Education and Training
MOF	Ministry of Finance
MOI	Ministry of Industry
MOSTE	Ministry of Science, Technology and Environment
MPI	Ministry of Planning and Investment
NEA	National Environmental Agency
SDC	Swiss Agency for Development and 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
VIZA	Viet Nam Industrial Zone Authorization
VNCPC	Viet Nam Cleaner Production Centre