Distr.
RESTRICTED
ODG/R.22
2 August 2001

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

EVALUATION OF THE

NATIONAL CLEANER PRODUCTION CENTRES IN CENTRAL EUROPE

US/CEH/94/071: Czech Cleaner Production Centre
US/HUN/96/093: Hungarian Cleaner Production Centre
US/SLO/94/072: Slovak Cleaner Production Centre

Volume 1

Summary - Conclusions and Lessons Learned

Report of the joint in-depth evaluation mission*

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This document has not been edited.

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Acronyms

BAT - Best Available Technologies
CCPC - Czech Cleaner Production Centre
CP - Cleaner Production
EMS - Environmental Management System
HCPC - Hungarian Cleaner Production Centre
NCPC - National Cleaner Production Centre
NEFCO - Nordic Environment Finance Corporation
QMS - Quality Management System
SCPC - Slovak Cleaner Production Centre
STU - Slovak Technical University

ABSTRACT

The Czech, Hungarian and Slovak National Cleaner production Centres were established by UNIDO projects funded by the Government of Austria. The support for the Centres ranged between 400 and 575 thousand USD and lasted 4-6 years.

After operational completion of the projects in 2000 the donor initiated a joint in-depth evaluation of all three projects. Main findings of the evaluation can be summarized as follows:

- All three Centres were successfully established and carried out activities exceeding (in terms of type and quantity) the original plans. Already during the lifetime of the UNIDO projects they managed to access other sources of funding so that, after completion of the UNIDO projects, they could sustain their operations, even though in some cases at reduced scale.

- Environmental policies promoting preventive approaches were adopted in all three countries, due to pressure by foreign customers the number of companies introducing EMS has been increasing, but demand by companies for CP advisory services has remained low in general. Lack of spontaneous demand for application of the concept by industry itself called for extensive awareness raising activities and a modification of the original project design recognizing that cleaner production is not purely a technical or engineering concept but also a managerial one. This resulted, among others, in integrating CP with EMS.

- Direct impact at industry level resulting from demonstration projects was systematically monitored and aggregated only in one Centre; even a conservative interpretation of the Centre's records allows for conclusion that financial and environmental benefits for companies compared well with the costs of the project.

A number of lessons learned were formulated regarding the CP concept, project strategy and design, status of NCPC and its position in the institutional framework, functions and financing of NCPC, networking and Government support. They are elaborated in Volume 1 of the report. Volume 1 contains also main conclusions of evaluation of all three Centres. Volumes 2-4 deal with individual Centres.

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1. INTRODUCTION

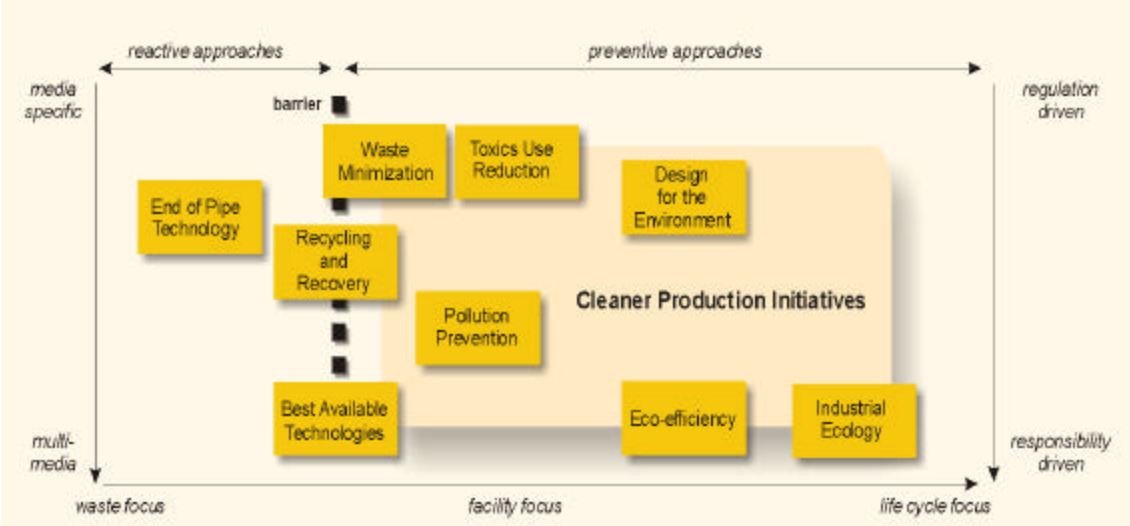
1.1 Concept of Cleaner Production

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

Production process: conserving raw materials and energy, eliminating toxic raw materials, and reducing the quantity of toxicity of all emissions and wastes at the source.

Products: reducing negative impacts along the entire life cycle of a product, from design to ultimate disposal.

Services: incorporating environmental concerns into designing and delivering services.



Adapted from: Prof. R. van Berkel, Centre of Excellence in Cleaner Production, John Curtin International Institute (University of Technology, Western Australia)

1.2 UNIDO/UNEP National Cleaner Production Centres in Central Europe

At the beginning of 1990s, UNIDO and UNEP initiated the programme of establishing National Cleaner Production Centres (NCPCs) as a vehicle to promote CP. Currently the network of UNIDO/UNEP NCPCs consists of 20 NCPCs, with some additional ones to be established and made operational in the near future.

Three UNIDO/UNEP NCPCs in Central Europe (in the Czech Republic, Hungary and Slovakia) were established and supported through UNIDO projects funded by the Government of Austria as follows:

	Budget (excl. support cost) (US$)	Expenditures (US$)
CCPC, 1994-2000	603,000	575,323
HCPC, 1997-2000	444,000	396,740
SCPC, 1995-2000	517,500	469,318

The Czech Cleaner Production Centre (CCPC) was established in 1994. The project could build on cleaner production activities already undertaken in the Czech Republic, funded by Norway. UNIDO chose as the director of the Centre Mr. Vladimir Dobes, who remained at its head until December

1999, when he handed over to the current Director, Ms. Anna Christianova. CCPC was initially hosted by the Czech Environmental Management Centre, receiving from this institution free office space and logistical support. In 1998 the Centre left the host institution, and is now located in offices that it rents. The Centre's legal status under Czech law is an NGO. Ever since the beginning of its operations, the Centre's activities have been overseen by a Steering Committee. CCPC operates in Prague and had (till end 2000) a subsidiary in Brno. In addition there were two representations, in Karlovy Vary (for Western Bohemia) and in Ostrava (for Northern Moravia), which had no permanent character, but contributed to promotion of CP in those regions.

The Hungarian Cleaner Production Centre (HCPC). The project document was signed in August 1996 but HCPC could start operations only in 1997. UNIDO chose as the Director of the Centre Prof. Sandor Kerekes. Since two years he has been supported by Gyula Zilahy as Deputy Director of the Centre (as of January 2001 Executive Director). The Centre is hosted by a University that provides free office space, secretarial and logistical support. HCPC initiated establishment of four regional cleaner production centres hosted by four technical universities. Since the beginning the Centre´s activities have been guided by an Advisory Board. HCPC has also an Executive Council, made up of the director, three deputy directors and directors from three of the regional centres.

The Slovak Cleaner Production Centre (SCPC). The project document was signed in 1994, the Centre started operations in 1995. The project could build on cleaner production activities already undertaken, funded by Norway. The initial Slovak counterpart was the Association of Industries, which hosted SCPC in the first phase. After some months the Association stopped its activity and the SCPC was transformed to an NGO. In 1997 Dr. Viera Feckova replaced Prof. Blazej as director and SCPC rented offices at the Slovak Technical University (STU), Faculty of Mechanical Engineering. The members of the SCPC make up the General Assembly. Since the beginning of operations a Steering Committee supervised SCPC activities. SCPC has also an Advisory Committee, composed of three members of SCPC, reviewing and monitoring financial operations.

1.3 The Evaluation

After operational completion of all three projects the donor initiated a joint in-depth evaluation of all three Centres. UNIDO prepared Terms of Reference for the evaluation (see 4. Annex) and nominated Mr. Jaroslav Navratil, Office of Internal Oversight and Evaluation, in the team. After nomination by the donor (March 2001) of Mr. Andreas Windsperger as team leader the timing of evaluation was set and country missions carried out. In each country the core evaluation team (Mr. Windsperger, Mr. Navratil) was complemented by national experts as follows:

Czech Republic	14 - 18 May	Mr. Zdenek Beranek
Hungary	28 May – 1 June	Mr. Miklos Bulla
Slovakia	11 - 15 June	Mr. Martin Hauskrecht

As a rule, in each country 2 days were devoted to interviews and visits of the Centre and key stakeholders and 3 days were devoted to visits of companies and other organizations served by the Centres. When visiting the companies the evaluation team was joined by Mr. G. Götz (Ministry of Foreign Affair, Austria) or Mr. E. Clarence-Smith (UNIDO) as observers. Lists of persons and organizations visited and interviewed are annexed to reports on each Centre.

Main conclusions and lessons learned were presented to the donor and UNIDO staff concerned at a meeting on 2 July 2001 at the Ministry of Foreign Affairs, Vienna. The team leader also met and interviewed on 5 July 2001 Mr. P. Wallner and K. Schauer, STENUM Graz. Draft reports were provided to the Directors of the Centres for comments. Comments raised during the presentation as well as those received from the Centres were considered by the team when finalizing the report.

The final report consists of a summary (of conclusions and lessons learned from evaluation of all three Centres) and three detailed reports on each Centre.

The evaluation was financed from unspent budget of US/CEH/94/071.

2. CONCLUSIONS

2.1 Socio-economic Context

During the last decade all three countries progressed in reducing industrial pollution partly due to reduction in industrial production and partly due to higher attention paid to environmental objectives both at policy and industry levels. In the second half of the decade when the projects were implemented all three countries aimed at preparing legislation and institutions for accession to EU. In the course of this process the countries adopted environmental policies with accent on promotion of preventive approaches, including cleaner production and best available technologies (BAT).

At industry level the end-of-pipe treatment prevailed. However, in recent years – primarily as a response to foreign clients requirements – more and more companies have been introducing environmental management systems (EMS) which provide a management framework for applying preventive measures, including CP. This segment of industry which is ready for adoption of CP is, however, still rather limited (number of companies certified against ISO 14000 ranges between 40 in Slovakia and 200 in Hungary) so that the demand by most companies for CP-related advisory services is rather low and the concept requires intense promotion to be adopted at company level.

2.2 Project Relevance, Concept and Design

Projects aiming at introduction and application of cleaner production in the three countries were based on promotion of a new concept generally conceived as sound, desirable and therefore worth of promotion from abroad. The projects were supported at policy level, however, without any firm financial commitment by the Government. Thus, an element of a "supply-driven" approach was present.

This influenced national Government ownership of the project but not necessarily its relevance. The method promoted by the project addressed actual shortcomings and problems of industry. This is the basic reason for relevance of the concept and of the project that promotes its application. The fact that the need for the concept was not felt by the companies themselves is not an argument against the relevance of the concept. In fact preventive approaches and their promotion gradually became the central theme of environmental policy in the countries concerned.

Lack of spontaneous demand for application of the concept by industry itself called for extensive awareness raising activities and modification of the original project design. All three project documents included the following design principles that proved sound:

- Combining national capacity building for direct advisory services to industry with creating conducive policy environment for CP.
- Capacity building carried out primarily through intensive training and on-the-job training (in-plant demonstrations), with support of a twinning organization from a developed country.
- Conceiving the Centre primarily as pivotal organization promoting CP both directly (awareness raising) and indirectly through policy dialog and not as a pure consulting organization to sell services to industry.

All three project documents included the following shortcomings:

- Too optimistic expectations about "immediate and significant savings ... achieved at low (or no) cost" and the related assumption that CP financial benefits alone are significant enough to motivate companies for replication;
- Conceiving CP as a technical and economic concept in isolation from management (not linking it with EMS and/or quality management system);
- Paying no attention to assistance in accessing financial resources for implementation of CP measures;
- Absence of a firm commitment of the host country to subsidize public functions of the Centre (awareness raising, policy, training, information, etc.);

- The purpose as formulated in the project documents for CCPC and SCPC proved to be too ambitious (this is related to the optimistic expectations mentioned above). Prodoc for HCPC did not include any quantitative indicators (not even at output level).

Some of the shortcomings were rectified by the Centres in the course of project implementation. All Centres extended the services to integrate CP and EMS, the Czech Centre developed services to support access to financial resources for implementation of CP measures.

The Centres remained relevant also after project completion primarily thanks to their adaptation to felt needs of industry (EMS) and policy-making bodies (application of EU principles and directives) and continuing attention to public functions (policy advice, awareness raising, training).

2.3 Inputs, Budgets and Expenditures

Host country inputs – though planned at low level (salary for two staff, office space and logistical support) – were provided only partly and temporarily. Only in Hungary the host country inputs were provided at the level close to the planned one.

UNIDO budget was disbursed mainly on national experts (including the Directors of the Centre), training activities (primarily CP training) and international experts, with STENUM Graz share in total project expenditures being between 22% (CCPC) and 29% (SCPC). No laboratory/measuring equipment was procured. Structure of inputs and expenditures was adequate to the objectives of the project. The quality of provided inputs was in most cases good or satisfactory. Inputs of STENUM were appreciated particularly as regards transfer of the methodology. Direct training by STENUM of CP teams in the course of in-plant assessments was effected by translation and – in some cases – by some difficulties in acceptance of the delivered training by local technicians. In most cases STENUM was not used as source of information on technology.

Budget revisions were justified.

In the financial statements of the Centres, UNIDO projects were the key source of funds/revenue for the Centres but not the only ones as transpires from Table CON-1.

Table CON-1: UNIDO project as source of the Centres' funding

		CCPC	HCPC[1]	SCPC
(1)	Total revenue of the Centres' budgets	1,150,000	536,000	500,000
(2)	Total UNIDO project expenditures	575,323	396,740	469,318
(3)	UNIDO expenditures implemented through the Centre (approx.)	200,000	314,742[2]	92,000
(4)	Share (%) of UNIDO project in total revenue of the Centre's budget (3) : (1)	17	58	18
(5)	Total resources (1) + (2) – (3)	1,525,323	617,998	877,318
(6)	Share (%) of the UNIDO project in total resources (2): (5)	38	64	53

The table also indicates that the Centres managed to mobilize considerable amounts of funds from other sources; however, income from sale of services to industry remained rather small. Most of the complementary funding came from other projects, including some EU-funded projects. In the case of Slovakia the share of income from foreign-funded projects was particularly high.

1 1997-2000

2 Includes also large part of the UNIDO direct funding (non-discretionary budget)

2.4 Activities

During the project lifetime two categories of activities were carried out:

a) internal activities institutionalizing the Centre (equipping the office, training of the staff, preparing manuals and guidelines, establishing the management information, accounting and reporting systems, etc.) and;
b) external activities consisting of services for various clients, promotion of CP and networking.

In all three Centres the activities had the following salient features:

- Intensive use of external consultants (primarily national ones)
- Cooperation with STENUM Graz
- Wide networking and cooperation in the country; partnerships with municipality and provincial authorities
- Great efforts in searching for clients
- Evolution of new activities (integration of CP and EMS, elaboration of studies for international organizations such as UNEP, UNIDO).

Some activities or their salient features were Centre-specific:

CCPC :

- Great attention given to in-plant assessments and related training of company staff in companies themselves
- Great attention to creating a CP-conducive policy environment
- Extensive implementation of CP projects abroad (funded by the Czech Government)
- New activities: CP financing; introduction of CP in curricula; introducing EMS in a Municipality Office

HCPC:

- Slow start of the project
- Intense cooperation with 4 regional centres established by HCPC
- Use of young graduates (usually from technical universities hosting the regional centres) working for 6 months in companies supporting them in identification and application of CP measures
- Focus on group training outside companies rather than company-targeted in-house CP training; intense use of Centre's staff as trainers
- Acting as platform for discussion between industry, Government and NGOs
- Attention to information dissemination, including use of advanced information technology
- New activities: environmental reporting, environmental accounting

SCPC:

- Slow start of activities, sharp rise in 2000
- Attention to building up managerial competence
- Application of EMS in a research and development organization and a municipality office
- Attention to short-term training of top managers on CP and proactive measures
- New activities: integrating CP with QMS and EMS, advisory services to companies on health and safety, audits for foreign consulting companies (for example validation of two projects under the Joint Activities in the framework of the Kyoto Protocol).

2.5 Project Management

In all three countries the role of Governments in supervising the project was confined to participation of some ministries in the Steering Committees. The Steering Committees, while formally approving reports and work plans, acted de facto as advisory bodies. The key management responsibility for the project on the host country side was with the national Director of the Centre. Only in Hungary the

national Director was in some management decisions subordinated to higher level management of the host organization (university).

National Directors of all three Centres performed their functions well, with a great deal of entrepreneurial spirit and focus on results. The following country-specific features can be highlighted:

CCPC:

- ⇨ good records of CP options accepted for implementation and their environmental and financial impact (no more in 2000);

HCPC:

- ⇨ separation of strategic and operational management; well elaborated annual reports;

SCPC:

- ⇨ intense marketing; well designed annual reports.

However, no Centre performs systemic monitoring of CP implementation once an in-plant assessment was completed. No Centre has a database of clients allowing for analysis of frequency and typology of services used.

On the UNIDO side there were several changes of Project Managers. The fact of changing Project Managers was found unfavorable particularly by HCPC.

Working contacts between UNIDO and the Centres were intense, both to seek help in solving or speeding up administrative processes and to consult conceptual issues. Contacts with UNEP were less intense but it was recognized that UNEP served as a useful source of information. Possibility of sharing experience with other Centres of the UNIDO/UNEP network - both individually and in the framework of the annual meetings of Directors – was generally appreciated. However, except for close contacts particularly between CCPC and SCPC networking with other NCPCs was rather sporadic.

2.6 Results – Production of Outputs

When comparing performance of the Centres it should be borne in mind that HCPC was established later than the other two Centres and was supported by a project of shorter duration.

2.6.1 Establishment of Centres

All three Centres are well established, with de facto number of staff (5-7) exceeding by far the original plan. Nominally some of them are linked to the Centre through long-term framework consultancy contracts. This arrangement is used by all three Centres to allow for flexibility in adjusting to demand for services.

Most of the staff have good educational background, there is an appropriate balance in all Centres between experienced senior staff and junior staff, with junior staff well educated and motivated. CCPC has staff and closely cooperating consultants with extensive experience in in-plant demonstrations. HCPC staff have excellent academic background. In SCPC the team is being reconstituted (after some departures) so that currently the set up is marked by strong leadership and professional dominance of the Director.

The Centres are capable of providing originally envisaged services as well as newly developed ones.

Two Centres are constituted as independent NGOs. HCPC is hosted by a university. HCPC has the most elaborate network of regional focal points. It seems that hosting a Centre by a university (or any other well established sustainable organization) facilitates public functions of the Centre whereas independent status places cash flow very much in the focus of every decision.

All three Centres, irrespective of their legal status, have adequate office space and equipment. SCCP has contractual access to measuring equipment.

Assessment: All three Centres – More than planned

2.6.2 Information Dissemination

In quantitative terms dissemination of information and awareness raising activities were very extensive (newspapers, TV, press conferences, newsletters, brochures, handbooks, websites, stands at fairs, etc.). Particularly active was HCPC (large international conferences, production and distribution of CD-ROM on CP and HCPC, etc.). All three Centres became recognized as focal points for CP and the CP concept became well known among environmental professionals and within a certain segment of government organizations, municipalities and industry. However, the CP concept has not yet become known or fully understood by all industrial and service companies but it would be unrealistic to expect such a result from this project alone.

Assessment: CCPC, SCPC – As planned
HCPC – More than planned

2.6.3 Demonstration Projects

According to project documents for CCPC and SCPC, demonstration projects should have been carried out and at least partly implemented in 20 industrial companies. Though demonstration projects differed this target was achieved in all Centres:

Centre	**CCPC**	**HCPC**	**SCPC**
Number of companies in demonstration projects	65	42	115

In terms of exposure of company teams to CP the most intensive demonstrations seem to have been carried out by CCPC and SCPC when conducting CP alone demonstrations. The evaluation team could verify this particularly in the Czech Republic. Once CP becomes part of an EMS project it becomes only a component of a broader project, with less time allocated for it. This should not raise doubts about desirability of integrating CP with EMS, this finding only concludes that the original objective of demonstrating CP as a technical method was best (and sufficiently) performed by the CP-alone demonstrations.

In Hungary the demonstration projects (EKOPROFIT) were carried out mainly through workshops conducted outside companies, with less intense support of the teams in companies themselves. The Young Graduate programme was innovative in placing a CP agent into a company for 6 months so that practical results were much better. However, the number of such cases was limited (8).

All three Centres felt it necessary to move from CP-alone demonstrations to integrating CP with EMS. This experience proves that CP is not only – and probably not primarily – a technical concept but rather a managerial one.

Assessment CCPC, SCPC - More than planned
HCPC – As planned

2.6.4 Training

According to project documents for CCPC and SCPC, at least 50 people should have been trained in CP practices and application. This target was achieved in all Centres:

Centre	**CCPC**	**HCPC**	**SCPC**
People trained in CP	219	50-60	391

Again, CP training courses differed. In CCPC the number of people not only exposed to long–term training but also involved in demonstration projects (altogether more than 200 hours) was approximately 80. In SCPC training within CP-alone projects amounted to approximately 120 hours with 221 people participating.

In spite of large number of people trained in CP the number of those who actively continue to pursue CP either as trainers of consultants is limited and does not exceed very much a dozen in each country. This fact confirms and is related to the finding mentioned elsewhere that demand by companies for CP advisory services is low. It is, however, assumed that some trainees continue to apply the concept in their own work.

In addition to intensive CP training the Centres organized numerous training workshops in various fields, including EMS, QMS, environmental auditing, environmental reporting, etc. SCPC was very successful in raising interest of company top managers for short term CP training courses.

Assessment: CCPC, SCPC – More than planned
HCPC - As planned

2.6.5 Research Institutes

According to the project document two R&D efforts in the field of process and product modifications should have been initiated in research institutes. Working with research institutes is desirable but it turned out difficult to achieve. In the Czech Republic it was dropped completely. In Hungary the result was not achieved either but HCPC hosted a workshop on green engineering and management methods which included life-cycle analysis. In Slovakia SCPC initiated some R&D projects and supported a R&D organization in introducing EMS. The organization did achieve some research results in their long-term programme to utilize waste from leather processing.

Assessment: CCCP, HCPC – Less than planned
SCPC – As planned

2.6.6 Documentation and Manuals

All three Centres prepared a number of manuals and handbooks, many more than what was expected at the start of the projects.

Assessment: CCPC, HCPC, SCPC – More than planned

2.6.7 Policy Advice

Project documents aimed at increased awareness among key policy makers and financial institutions. As regards *policy makers* all three Centres established close and very effective working contacts and dialog with some policy bodies, particularly with the Ministries of Environment. They prepared a number of inputs (studies, publications, reports, etc.) for their work and decision making processes, participated in inter-ministerial working groups organized by the Ministries or even represented the Ministry in some intergovernmental committees (SCPC). In all three countries the Centres supported the Ministries in harmonization of legislation with EU directives, in particular in promoting preventive measures. SCPC's Director represented the Ministry in some international working groups. HCPC acted as a platform for discussion among NGOs, industry and local governments. The best results were undoubtedly achieved by CCPC. Thanks to CCPC interventions and support the Government adopted a National Cleaner Production Programme involving several ministries.

As regards *financial institutions* some initial contacts were established by SCPC but only CCPC achieved tangible results. CCPC was instrumental in introducing a CP sub-programme within the State Environmental Fund. The CP sub-programme initiated by the CCPC provides for soft term loans or payment of interest on commercial loans for implementation of CP (and more recently BAT) measures. CCPC was also involved in negotiations with the NEFCO fund. NEFCO and CCPC signed an agreement

about CCPC consultancy services for NEFCO. One application is currently under consideration by NEFCO, CCPC searches for new suitable candidates.

Assessment: CCPC – More than planned
HCPC, SCPC – As planned

2.6.8 Other Outputs (not foreseen)

The preceding description of Outputs mentions several times activities which were not originally foreseen in the project document (such as integration of CP with EMS, etc.). Two other unplanned activities deserve to be mentioned: integration of CP in curricula of universities and international activities of the Centres.

Integration of CP in curricula of universities turned out to be very important vehicle for broader dissemination of the CP concept as well as for training future proponents of CP. Good results were achieved particularly by HCPC thanks to establishing regional centres at other universities. Good results were achieved also by CCPC which managed to market the concept to several universities. In both cases CP became an integral part of curricula of different university courses, ranging from 4 hours of awareness raising for large number of students to 100 hours of specialized training for limited number of students.

SCPC cooperated with several universities as well but did not pursue the idea of having CP included in curricula as a distinct subject. However, similar like the other two Centres, SCPC also advised some students on their diploma work dealing with CP/EMS.

As regards international activities, all three Centres maintained contacts among themselves and with other Centres within the UNIDO/UNEP NCPC network as well as with numerous other foreign agencies and organizations. All three Centres managed to become implementing agencies for projects funded by other foreign donors or organizations. CCPC became an implementing agency for several CP projects abroad funded by the Czech Government. All these activities and exposure to contacts abroad have further supported capacity building of the Centres themselves.

2.7 Results - Achievement of Purpose

The purpose of the projects was "to achieve a critical mass of awareness, expertise and experience in the application of cleaner production in industry so that the application and dissemination of the concept can proceed on a sustainable basis". Thus the purpose was not establishment and operations of Centres alone. The project documents also formulated the purpose as "Wide scale and sustainable application of cleaner production to ... industry".

It can be concluded that a critical mass of expertise and experience in the application of cleaner production was actually achieved by all three projects. There are enough consultants acquainted with and experienced in application of CP methodology, there is adequate awareness of CP at policy level.

"Wide-scale and sustainable application of CP" was not achieved and needs to be pursued further. However, it should be recognized that analysis of project design qualified this objective as too ambitious and its non-attainment therefore should not be interpreted as a failure. The projects achieved what was realistic and made a considerable contribution to introduction of preventive environmental approaches in industry.

2.8 Results – Impact

Application of CP should result in impact at industry level: economic savings and environmental benefits (reduction in use of natural resources and reduction of pollution and waste "at the end of the pipe"). Such an impact can be generated through implementation of CP options identified or induced by the demonstration projects themselves (direct impact of the UNIDO project) or through

implementation of CP options identified by consultants or consulting companies trained by CCPC but operating independently (spin-off impact). The latter category would also include impact of CP applications induced by former students of universities cooperating with the Centres, as well as by the CP-conducive policy environment to the creation of which the Centres contributed significantly.

Out of the three Centres only CCPC monitored some results of its demonstration projects up to the end of 1999. The technical reports of each demonstration project included information about options identified, options selected for implementation and their (potential) impact. Aggregated impact of CP options implemented or approved for implementation appeared considerable (for example, reduction of more than 10000 t/year of hazardous waste, annual savings USD 6.5 mil. etc.) and compared extremely well with the budget of the UNIDO project. However, it can be estimated that the actual impact is going to be lower due to the following factors: First, not all CP options approved by management for implementation are actually implemented. (Experience from a company with highly environmentally conscious top management showed that approximately 60% of approved CP options were implemented.) Second, the scope of impact is higher in case of investment options with longer pay-back period. As the experience from the companies visited by the team suggests, rate of implementation of such investment options is lower compared to the rate of implementation of non-investment options.

HCPC did not aggregate impact of CP options implemented or approved for implementation but managed to provide an overview about the type of CP options identified and implemented at the end of their activities in a company. Most of the CP options belonged to the recycling category and equipment modifications with surprisingly low share of housekeeping measures. More than half of the CP measures were implemented or are under implementation. In view of shorter project duration the number of companies and CP options was smaller compared to CCPC.

SCPC aggregated neither the number and categories of CP options nor their impact with the justification that the aggregates are not very reliable and that introducing a process of improvement (through EMS, for example) is more important than a snapshot of the results at a certain point of time. In fact CCPC as of 2000 also stopped aggregating impact data for similar reasons: to give prominence to system changes rather than to one-event results.

While the arguments are well understood the evaluation team believes that monitoring of impact data – however rough estimates they might be – is useful and desirable not only for public relations but also as a management tool for internal analysis or self-evaluation of performance and success.

2.9 Sustainability

Sustainability of the Centres depends on effective demand for their services and on professional and managerial competence to deliver such services to the satisfaction of clients. In all three countries visits of organizations that had contact with the Centres signaled high client satisfaction and appreciation of the Centres' competence.

However, this is not a sufficient condition for sustainability of the Centres. First, as explained elsewhere, the demand for CP-alone services is low and so is the companies' willingness to pay for such services. Second, the Centres are not conceived as consulting companies but they are expected to carry out some public functions as well (awareness raising, information dissemination, etc.). In order to earn income for all such services the Centres had to diversify the activities and provide services also to other clients. This is reflected in the structure of income generated by the Centres. Income from direct services to industry represents a fraction of the total budget. A large share of the budget was covered by income from other clients such as ministries and various projects funded by foreign donors.

After completion of the UNIDO project the problem of financial sustainability was revealed fully and it seems that all three Centres could cope with it so far. In spite of current decrease of secured funding for HCPC activities it seems that in the long term perspective HCPC - for structural reasons - has good chances for sustainability. First, it has a team of competent CP trainers and consultants which results

from the Director's policy "to have experts, not organizers". Second, hosting of HCPC by the university has a double advantage: through part-time employment of HCPC staff by the university the funding pressure on HCPC is to some extent relieved. At the same time close links of HCPC with the university bring benefits in terms of access to and transfer of topical information and knowledge. Thus HCPC is well placed to be in a position to discharge public functions and be at the forefront in the field. However, these advantages are partly counterbalanced by some administrative hurdles, including financial ones.

The other two Centres (CCPC and SCPC) have also managed to restructure their activities, sources of income and staffing in such a way that they expect to sustain their core activities. In medium-term outlook (one-two years) financial sustainability appears particularly good in the case of SCPC. It is remarkable given the fact that none of the Centres can rely on any fixed allocation of Government funds for discharging of public functions as any Government-funded activity ("project") can be assigned to the Centre only through competitive bidding. It must be recognized that such a balance is very fragile, requires a lot of marketing efforts and often depends very much on the personality of the Director.

3. LESSONS LEARNED

The lessons spelled out below were derived from the experience of NCPCs operating in Central Europe, in countries with extensive industry, significant export of industrial products and policies aiming at accession to European Union. Some lessons, therefore, may not be applicable to countries with very different socio-economic conditions.

Relevance: should application of CP be supported?

The concept of CP is one of the approaches towards sustainable development and the methodology on which it is built is an effective tool for identification and prioritization of technology changes which yield both environmental and economic benefits. This applies particularly to existing establishments. However, application of the concept among SMEs on the basis of its own economic merits does not occur easily. Correlated with this is a very low demand for CP-alone advisory services. Yet, recognizing importance of environmental objectives and potential of CP in contributing to sustainable development, especially as the technical backbone for measures implemented in the context of EMS, its dissemination and application deserves to be supported.

Strategy

The evaluation suggests that CP is not purely a technological or engineering concept but also - or even primarily - a managerial one. Therefore, to become effective, a project supporting CP should be built on the following principles and strategies:

- CP conceived as a component of continuous improvement encouraged or imposed through a quality management system or environmental management system;
- a conducive policy environment, encouraging preventive approaches, including access to finance for their implementation;
- mainstreaming CP concept in technical education and in business development services, particularly in quality management and environmental management advisory services.

Achievement of the above requires extensive awareness raising, training and demonstration activities. In order to increase interest of the companies for the CP concept its marketing should stress its economic dimension. In fact it may be advertised under a different label (eco-efficiency, rationalization) and cooperation for its promotion should be sought not only with Ministry of Environment but also with the Ministry of Industry/Economy.

An organized and dedicated team needs to be available to promote the concept. A National Cleaner Production Centre proved to be a feasible option for establishing such a team.

Project concept and design

It is not realistic to aim at "wide-scale and sustainable application of CP in industry" as purpose (outcome) of a project lasting 3-5 years. Wide-scale application can be achieved in the long term only. At the same time the experience shows that the projects tend to support not only CP but other preventive approaches as well. Therefore, the purpose of such a project could be formulated as "creating a conducive policy framework and a critical mass of awareness, expertise and experience in application of cleaner production and other preventive approaches so that their dissemination and application can proceed on a sustainable basis".

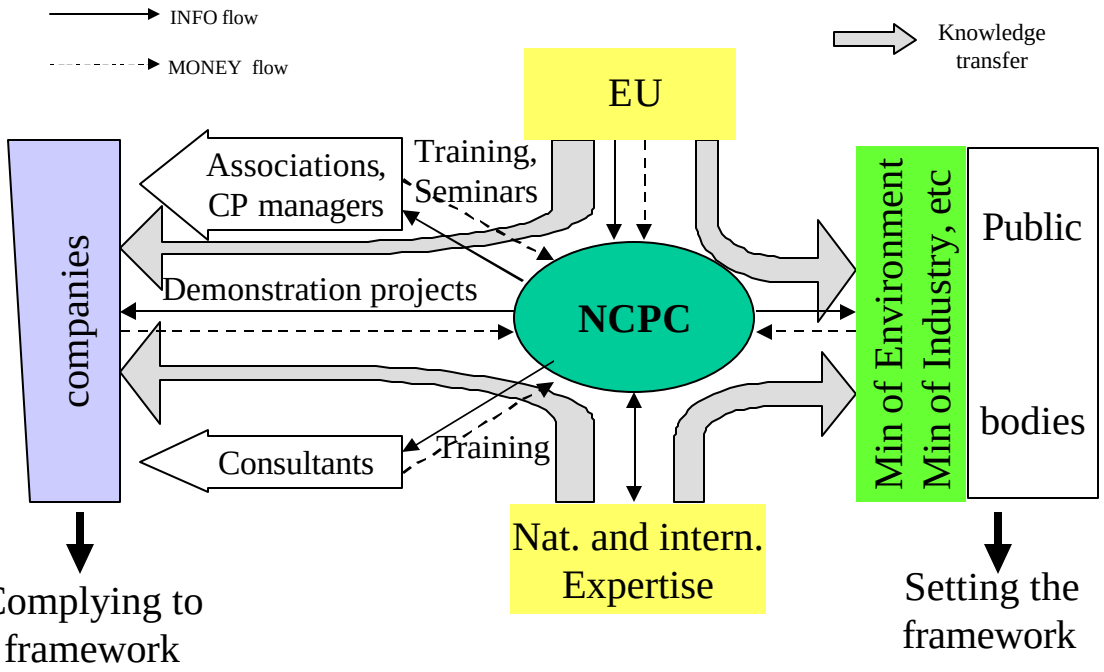
In view of amending the concept by stressing its management dimension and, consequently, integrating it with QMS and EMS the success indicators of the project should include "a number of companies and organizations <u>continuously</u> applying CP or other preventive measures".

Status of NCPC

An NCPC can be created within an existing organization or as an independent body. In this case two Centres were constituted as independent NGOs, one was hosted by a university. It seems that hosting a Centre by a well established sustainable organization facilitates public functions of the Centre whereas independent status places very much cash flow in the focus of every decision. In other words, a well established organization should be preferred as it is more stable while recognizing that in singular cases a one-person dominated structure can give better results (especially when the host turns to be more a resistance than help). However, the option to be selected depends on the conditions in the country, particularly on the availability of a suitable professional organization to host the team and the willingness of the Government to support it.

Position of NCPC in the institutional framework

NCPC should not be conceived as a consulting company earning money on selling advisory services to industry. The NCPC should serve as the national focal point on CP in order to introduce CP principles as extensively as possible in companies and government. For that purpose it should play a pivotal role between these institutions and bodies creating new expertise.



Continuous transfer of information and knowledge from applied research to practice will remain a challenging task. In order to remain demand driven, appropriate information should be offered. The NCPC should serve here as the link between the knowledge and methodology providers and the government on the one hand and the companies on the other hand. That knowledge shall be used at government level to set appropriate targets and conditions for welfare and development in the public economy. At company level it is needed to support them in their ability to comply with the set framework.

The knowledge and expertise comes on international level from foreign institutions, international working groups or networks, in which the NCPC can be closely involved. Close connection to the

national experts is also important in order to disseminate information widely and to ensure a broad basis for common understanding and further development or adaptation of the methodology and strategies.

Implementation of the concepts in companies themselves should then be supported mainly by external consultants and company staff. For that purpose a pool of consultants should be created and continuously trained to ensure their upgrading and standard application on a broad basis. Approaching companies directly by the NCPC should focus on testing new approaches and demonstration purposes. If an NCPC relies too much on income from companies a competition with consultants will be unavoidable. Therefore the NCPC should serve as the training institution for those who are directly working with and in the companies, using their expertise and helping them to find the right ways, but it should not replace them.

Financing of NCPC

As explained above, the revenues from companies should play the minor role in the financial statement of a NCPC. Income should be based on three pillars:

- foreign funds, EU, OECD, etc.;
- service for the governmental bodies (ministries of environment, industry, trade,...);
- training of consultants; seminars or workshops co-organized with Associations of consultants and experts or other organizations.

A balanced income from these sources is the best way to avoid competition with other consultants and to use the existing potential in an optimal way. On the other hand it stands also for a continuous improvement in the economy, leading to a permanent demand for the continuously upgraded services of the NCPC.

Government support

The minimum pre-condition for any project promoting CP is willingness of the Government to pursue environmental objectives and support application of preventive approaches. Project establishing an NCPC requires that the Government commit itself not only to logistical support but also to using the services of the NCPC in the policy work of the Government bodies and remunerating the Centre for such services (provided satisfactory quality of the service, of course). In the project document this should be reflected both under Government Inputs and in explicitly formulated requirements for policy advice under the Outputs.

NCPC functions

The functions as gradually evolved are adequate to the purpose of NCPC as defined above. Carrying out demonstration projects should remain one of the core functions as they provide a unique feedback on the practical dimension of the methodology and factors of its use. Another priority should be helping the Government in introducing a conducive policy framework, including access to finance for implementation of preventive measures in companies.

Networking in the country

Promoting CP concept at all levels requires intensive networking. Constituting regional centres or any other forms of dedicated teams outside of the capital helps in extending CP activities on a broader territory. These teams usually have an easier access to organizations and companies in their regions. Networking without organizational or financial linkages seems to be sufficient for this purpose.

Hosting of central and regional CPCs at universities definitely helped in an intense diffusion of CP-principles in the university curricula, and contributed by that to creating a very important vehicle for broader dissemination of the CP concept.

UNIDO network

Possibility of sharing experience with other Centres of the UNIDO/UNEP network - both individually and in the framework of the annual meetings of Directors - was generally appreciated. However, except for close contacts particularly between CCPC and SCPC networking with other NCPCs was rather sporadic. The Centres are busy with their own affairs and engage in activities only if they are beneficial for them. Headquarters may notify the Centres more frequently about new developments in the Programme and new sources of information and methodological guidance and – from time to time – inquire about their needs and expectations they may have towards the network, Programme and its website.

4. ANNEX

IN-DEPTH EVALUATION
US/CEH/94/071 Czech Cleaner Production Centre
US/SLO/94/072 Slovak Cleaner Production Centre
US/HUN/96/063 Hungarian Cleaner Production Centre

TERMS OF REFERENCE

1. THE PROJECT

1.1 Overview of the UNIDO/UNEP National Cleaner Production Centre (NCPC) Programme

In 1994, UNIDO along with its partner the United Nations Environment Programme (UNEP) initiated a programme to create a global network of National Cleaner Production Centres (NCPCs). Initially, in the period 1994-95, the programme established eight NCPCs: in Brazil, China, Czech Republic, India, Mexico, Slovakia, Tanzania and Zimbabwe. Since then, it has gone on to establish 11 other NCPCs in various countries: Tunisia in 1996; Hungary and Nicaragua in 1997; Costa Rica, El Salvador and Viet Nam in 1998; Guatemala and Morocco in 1999; Ethiopia, Kenya and Mozambique in 2000.

1.2 Overview of the Czech Cleaner Production Centre

1.2.1 Historical Background

The Czech Cleaner Production Centre (CCPC) was established in 1994. The project was able to build on cleaner production activities already undertaken in the Czech Republic, funded by Norway. UNIDO chose as the director of the centre Mr. Vladimir Dobes, who remained at its head until December 1999, when he handed over to the current director, Ms. Anna Christianova. Currently, the centre has a permanent staff of 7.5: the director, 5 professionals, and 1.5 secretaries. The centre was initially hosted by the Czech Environmental Management Centre, receiving from this institution free office space and logistical support. In 1998 the centre left the host institution, and is now located in offices that it rents. The centre's legal status under Czech law is an NGO. Ever since the beginning of its operations, the centre's activities have been overseen by a Steering Committee. The current composition of the Steering Committee is as follows:

- Association of Cleaner Production Managers
- University of Chemical Technology
- Ministry of Environment
- Confederation of Industry and Transportation
- Director of the CCPC

Prior to December 1999, date at which the funding for the centre channeled through UNIDO came to an end, UNIDO and UNEP were also members. They are now honorary members.

1.2.2 Purpose, Main Outputs, Budget

The main purpose of the project was to establish the Czech Cleaner Production Centre, so as to achieve a critical mass of awareness, expertise and experience in the application of cleaner production in industry.

Initially, the outputs were:

- Output 1: The centre is established and operational
- Output 2: Information on cleaner production is disseminated in the Czech Republic.
- Output 3: Practical demonstrations (case studies) of the cleaner production approach have been undertaken.
- Output 4: Training programmes have been implemented.

- Output 5: Research work on prevention of industrial pollution has been initiated in selected research institutes.
- Output 6: Documentation describing the Czech experience in cleaner production has been prepared, along with a waste audit reduction manual in Czech.
- Output 7: There is increased awareness among key policy-makers and financial institutions of the advantages of applying preventive approaches to industrial pollution in order to facilitate the adoption of appropriate environmental policies.

Output 5 was dropped at the review meeting of October 1995.

The original budget (for a project period of three years) was USD 415,000. This was increased to USD 515,000 in 1997, with an extension to the project of two years, and again in 1998 to USD 603,000.

1.2.3 Date of completion, Status

The centre has received no funding from UNIDO as of 31 December 1999. At that date, the expenditures on the project were USD 588,518. A meeting for final tripartite review of the centre was held at the centre in August 2000, and was attended by the Centre staff, a representative of the Czech Ministry of the Environment, a representative of the Austrian Federal Ministry of Foreign Affairs, and UNIDO.

1.3 Overview of the Slovak Cleaner Production Centre

1.3.1 Historical Background

The project document for the establishment of the Slovak Cleaner Production Centre (SCPC) was signed in 1994, although the centre did not commence operation until 1995. The project was able to build on cleaner production activities already undertaken in Slovakia, funded by Norway. UNIDO initially chose as the director of the centre Prof. Blazej, however Dr. Viera Fiecková replaced him in 1997 and she still holds the post. Currently, the centre has a 9 people working full-time: 8 professionals, 1 office manager. Ever since the beginning of the project the centre has been hosted by the Faculty of Mechanical Engineering of the Slovak University of Technology, receiving from the department institution free office space and infrastructure. The centre's legal status under Slovak law is an NGO. Ever since the beginning of its operations, the centre's activities have been overseen by a Steering Committee. The current composition of the Steering Committee is as follows:

- Ministry of Economy
- Ministry of Environment
- Ministry of Agriculture
- Slovak Society for Sustainable Development
- CP Expert Club at SCPC
- Faculty of Chemical Technology at the Slovak University of Technology
- Faculty of Mechanical Engineering at the Slovak University of Technology
- World Cleaner Production Society – Norway
- UNIDO
- UNEP

The Centre also has an Advisory Committee. It is composed of three members of the Slovak Cleaner Production Centre. Their task is to focus on the centre's financial operations and economic balance. The full membership of the Slovak Cleaner Production Centre makes up the General Assembly.

In 1999, the centre took over what was left of the Slovak Pollution Prevention Centre, established in 1995 by the World Environment Council with USAID funds.

1.3.2 Purpose, Main Outputs, Budget

The main purpose of the project was to establish the Slovak Cleaner Production Centre, so as to achieve a critical mass of awareness, expertise and experience in the application of cleaner production in industry.

The main outputs were:

- Output 1: The centre is established and operational
- Output 2: Information on cleaner production is disseminated in Slovakia
- Output 3: Practical demonstrations (case studies) of the cleaner production approach have been undertaken.
- Output 4: Training programmes have been implemented.
- Output 5: Research work on prevention of industrial pollution has been initiated in selected research institutes.
- Output 6: Documentation describing the Slovak experience in cleaner production has been prepared, along with a waste audit reduction manual in Slovak.
- Output 7: There is increased awareness among key policy-makers and financial institutions of the advantages of applying preventive approaches to industrial pollution in order to facilitate the adoption of appropriate environmental policies.

The original budget (for a project period of three years) was USD 417,500. This was increased to USD 517,500 in December 1997, with an extension to the project of two years.

A review meeting of the centre, attended by the Centre staff, a representative of the Slovak Ministry of the Environment, a representative of the Austrian Federal Ministry of Foreign Affairs, and UNIDO, was held at the centre in May 2000. At that time, it was agreed to a further extension until July 2001 to complete two specific projects.

1.3.3 Estimated Date of Completion, Status

The estimated date of completion is July 2001. As of 31 September 2000, the expenditures on the project were USD 434,566.

1.4 Overview of the Hungarian Cleaner Production Centre

1.4.1. Hungarian Cleaner Production Centre

The project for the establishment of the Hungarian Cleaner Production Centre (SCPC) was signed in August 1996, although the centre did not commence operation until 1997. According to the initial agreements with the Hungarian counterparts, and reflected in the project document, the centre was to be hosted by the Miskolc Institute of Logistics and Production Engineering (BAYLOGI), part of the Zoltan Bay Foundation. However, soon after the signing of the project document, BAYLOGI pulled out. Negotiations were undertaken by UNIDO with the Hungarian counterparts to find another host institution. It was finally agreed in 1997 that the Economics University would be the host institution, which it has been ever since, and the centre could start operations. UNIDO chose as the director of the centre Dr. Sandor Kerekes, who still holds the post. Currently, the centre has 6 professionals working full-time for it, as well as a half-time secretary. The centre receives from the department institution free office space, the use of secretarial support staff and logistical support. The centre's legal status is a project office. Ever since the beginning of its operations, the centre's activities have been overseen by an Advisory Board. The current composition of the Board is as follows:

- Academy of Sciences
- Technical University
- Eötvös University
- UNIDO
- UNEP
- Ministry of Economy
- Ministry of Environment

- Dunapak Company
- Hungarian Technical Development Agency
- St. Stefan University

The Centre also has an Executive Council, which looks more at the day-to-day management of the centre. This is made up of the Director of the HCPC, the three deputy directors, and the directors from three of the regional centres that have been established.

1.4.2 Purpose, Main Outputs, Budget

The main purpose of the project was to establish the Hungarian Cleaner Production Centre, so as to build national capacity in cleaner industrial production in Hungary by transferring international and UNIDO/UNEP experience in cleaner industrial production and adjusting it to the national context, to enable a wide-scale and sustainable application of cleaner industrial production by industry.

The main outputs were:

- Output 1: the centre is established.
- Output 2: information on cleaner industrial production disseminated in Hungary.
- Output 3: Practical demonstrations (case studies) of the CIP approach undertaken.
- Output 4: Training programmes have been implemented.
- Output 5: Research work on CIP has been initiated in selected research institutes.
- Output 6: Documentation describing the Hungarian experience in cleaner industrial production has been prepared, as well as a CIP audit manual in Hungarian.
- Output 7: There is an increased awareness among policy makers and financial institutions of the advantages of CP

A review meeting of the centre, attended by the Centre staff, a representative of the Austrian Federal Ministry of Foreign Affairs, and UNIDO, was held at the centre in August 2000.

The budget for a project period of three years was fixed at USD 444,000. It has remained unchanged.

1.4.3 Estimated Date of Completion, Status

The estimated date of completion is 31 December 2000. As of 30 September 2000, the expenditures on the project were USD 352,527.

2. THE IN-DEPTH EVALUATION

2.1 Purpose, scope and method

2.1.1 Purpose

The in-depth evaluation was requested by the Austrian Ministry of Foreign Affairs, which is the funder of all three projects. Its purpose is to enable the donor, UNIDO and the relevant Government bodies to evaluate the impact that these projects have had, and learn lessons for use in the planning of future projects of this nature.

2.1.2 Scope

An in-depth evaluation is an activity in the project cycle that attempts to determine as systematically and objectively as possible the relevance, efficiency, effectiveness, impact and sustainability of the project. The evaluation will assess the achievements of the project against its objectives, including an examination of the relevance of the objectives and of the project design. It will also assess to what degree the assumptions/risks as identified in the project document held

true/occurred and identify other factors that have facilitated or impeded the achievement of the objectives. While a thorough review of the past is in itself very important, the in-depth evaluation is expected to lead to recommendations and lessons learned for the future.

In particular, the in-depth evaluation will pay attention to the following issues:

Relevance

- Is there demand for/need of CP services in the three countries?
- Is the concept of a Centre the best strategy to support the application and dissemination of CP?

Efficiency

- Have the inputs provided by UNIDO (expertise, training) been of good quality?
- How useful were the twinning arrangements?
- Have the Centres benefited from being part of the NCPC programme/network?

Effectiveness

Which services of the Centres are actually used (information – training- technical advice/CP assessment - policy advice...)?
To what degree do the CP assessors trained by the centres actually conduct CP assessments?
Which new/additional services are evolving?
To what degree do the Centres manage to market the CP concept through cooperation with other organizations/consultants/universities...?

Impact

- To what degree do the companies implement the measures resulting from CP assessments?
- To what degree do the companies continue implementing the CP options after completion of the NCPC intervention?
- What is the economic and environmental impact?
- Is there any evidence of CP in industry/the economy outside of direct NCPC interventions at company level?

Sustainability

- What is the professional and managerial competence to sustain the activities?
- What are the sources of funding, current and potential?
- What arrangements can be made to strengthen the sustainability of the Centres?

2.1.3 Method

The evaluation team will:

- Study basic project documentation sent to it by UNIDO Headquarters on each of the three projects.
- Be briefed by the Office of Internal Oversight of UNIDO on evaluation methodology.
- Interview UNIDO staff that has been involved in the management of the projects since the beginning.
- Interview the Directors and staff of each centre as well as the chairmen of their respective Steering Committees
- Study documents available in the centres;
- Visit and interview (1) at least three persons in each country that received training from the Centres, and (2) at least three companies in each country that were the subjects of in-plant assessments by the Centres;
- Interview other stakeholders and cooperating organizations or beneficiaries, such as ministries, universities, regional or local administrations, funding agencies, consulting companies, etc.

- Visit and interview STENUM–Graz, the company that was the counterpart institution for all three centres.

Although the evaluation team should feel free to discuss with the authorities concerned all matters relevant to its assignment, it is not authorized to make any commitment on behalf of UNIDO or a donor.

2.2 Composition of the evaluation team

A team made up of three persons will evaluate each centre. Two of these, the nominee of the donor and the nominee of UNIDO, will be the same for all three centres. The third, the nominee of the governments, will change from country to country. The nominee of the donor will act as the team leader.

The nominees should have the following backgrounds and qualifications:

- The nominee of the donor should have a technical or industrial background and should have experience in cleaner production or in related fields;
- The nominees of the respective Governments should have good knowledge of the industry-related institutional and policy frameworks of their respective countries;
- The nominee of UNIDO should have a good knowledge of UNIDO's NCPC programme.

The members of the evaluation team should not have been directly involved in the design or implementation of the three projects.

2.3 Timetable and reporting

The evaluation will be carried out during May – June 2001. The missions to the three countries will take one week each. The overall briefing prior to the missions will take three days. The team leader will require a week at the end of the missions to write up the evaluation report.

The evaluation report should follow a standard structure. In order to ensure that the report considers the views of the parties concerned and is properly understood and followed up by them, it is required that the draft report is presented to and discussed with the Project Managers and other UNIDO staff concerned with the NCPC programme and the representatives of donors at a meeting to be organized at UNIDO Headquarters after the mission.

As the report is the product of an independent team of persons acting in their personal capacities, it is up to that team to make use of the comments made by the parties involved and to reflect them in the final report. However, the evaluation team is responsible for reflecting any factual corrections brought to their attention prior to the finalization of the report.

The final report is to be submitted on a diskette (in WordPerfect or Word) to the Office of Internal Oversight and Evaluation two weeks after the completion of the field missions at the latest.