Independent Ex-post Evaluation

UNIDO Support to the National Cleaner Production Center in Viet Nam

Funded by the Swiss State Secretariat for Economic Affairs (SECO)

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO EVALUATION GROUP

Independent Ex-post Evaluation

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Funded by the Swiss State Secretariat for Economic Affairs (SECO)

UNIDO Projects: US/VIE/96/063, US/VIE/04/063 and US/VIE/04/064

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We hope that the findings, conclusions and recommendations will contribute to the continuous improvement and the mobilization of funds for similar projects in other countries.

Notes

Mention of company names and commercial products does not imply the endorsement of UNIDO.

The views and opinions of the evaluators do not necessarily reflect the views of the Government of the Socialist Republic of Vietnam, the Swiss State Secretariat for Economic Affairs and of UNIDO.

Abbreviations and acronyms

APRSCP	Asian-Pacific Roundtable for Sustainable Consumption and Production
BAT	Best Available Technology
BEP	Best Environmental Practice
CDM	Clean Development Mechanism
CIDA	Canadian International Development Agency
CIEM	Central Institute for Economic Management
CP	Cleaner Production
CP4BP	Cleaner Production for Better Products
CP-EE	Cleaner Production and Energy Efficiency
CPA	Cleaner Production Assessment
CPI	Cleaner Production in Industry
CSR	Corporate Social Responsibility
CTA	Cleaner Technology Assessment
CTI	Cleaner Technology Implementation
DANIDA	Danish International Development Agency
DCE	Denmark-Vietnam Cooperation for Environment
DOIT	Department of Industry and Trade
DONRE	Department of National Resources and Environment
EC	The European Commission
EMA	Environmental Management Accounting
FEP	Financial Engineering Proposal
FIP	Factory Improvement Programme (ILO/SECO)
GAP	Technology Gap Assessment
GCTF	Green Credit Trust Fund (funded by SECO)
GERIAP	Green House Gas Reduction from Industry in Asia and the Pacific
GoV	The Government of the Socialist Republic of Vietnam
HUT	Hanoi University of Technology

IFC	The International Finance Corporation (under the World Bank)
ILO	International Labour Organization
INEST	Institute for Environmental Science and Technology
LPG	Liquefied Petroleum Gas
MDGs	Millennium Development Goals
MEAs	Multilateral Environmental Agreements
MOET	Ministry of Education and Training
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment
NCPC	National Cleaner Production Center
NCPP	National Cleaner Production Programme
OHS	Occupational Health and Safety
PDD	Project Development Document (relating to CDM)
PIN	Project Idea Note (relating to CDM)
PCD	Pollution Control Department (under VEA)
POPs	Persistent Organic Pollutants
PRE-SME	Promotion of Resource Efficiency in Small and Medium Enterprises
RBM	Result Based Management
RECP	Resource Efficient and Cleaner Production
SEMLA	Swedish Environmental Management and Land Administration Project
SDC	Swiss Organization for Development and Cooperation
SECO	Swiss State Secretariat for Economic Affairs
SEDP	Socio Economic Development Plan (of the GoV)
Sida	Swedish International Development Agency
SMEs	Small and Medium Sized Enterprises
SMTQ	Standards, Metrology, Testing and Quality
SPIN	Sustainable Product Innovation
TCB	Trade Capacity Building
ToR	Terms of Reference

UN	United Nations
UNEG	United Nations Evaluation Group
UNEP	United Nations Environmental Programme
UNIDO	United Nations Industrial Development Organization
US-EPA	US Environment Protection Agency
VCEP	Vietnam Canada Environment Project
VEA	Vietnam Environmental Agency
VNCPC	Vietnam National Cleaner Production Centre
VPEG	Vietnam Provincial Environmental Government Project

Glossary of evaluation related terms

Term	Definition
Conclusions	Conclusions point out the factors of success and failure of the evaluated intervention, with special attention paid to the intended and unintended results and impacts, and more generally to any other strength or weakness. A conclusion draws on data collection and analyses undertaken, through a transparent chain of arguments.
Effectiveness	The extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance.
Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.
Impacts	Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended.
Indicator	Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor.
Institutional development impact	The extent to which an intervention improves or weakens the ability of a country or region to make more efficient, equitable, and sustainable use of its human, financial, and natural resources, for example through: (a) better definition, stability, transparency, enforceability and predictability of institutional arrangements and/or (b) better alignment of the mission and capacity of an organization with its mandate, which derives from these institutional arrangements. Such impacts can include intended and unintended effects of an action.
Lessons learned	Generalizations based on evaluation experiences with projects, programs, or policies that abstract from the specific circumstances to broader situations. Frequently, lessons highlight strengths or weaknesses in preparation, design, and implementation that affect performance, outcome, and impact.
Logframe	Management tool used to improve the design of interventions, most often at the project level. It involves identifying strategic elements (inputs, outputs, outcomes, impact) and their causal relationships, indicators, and the assumptions or risks that may influence success and failure. It thus facilitates planning, execution and evaluation of a development intervention. Related term: results based management.

Term	Definition
Outcome	The likely or achieved short-term and medium-term effects of an intervention's outputs. Related terms: result, outputs, impacts, effect.
Outputs	The products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Recommendations	Proposals aimed at enhancing the effectiveness, quality, or efficiency of a development intervention; at redesigning the objectives; and/or at the reallocation of resources. Recommendations should be linked to conclusions.
Relevance	The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donors' policies. Note: Retrospectively, the question of relevance often becomes a question as to whether the objectives of an intervention or its design are still appropriate given changed circumstances.
Results	The output, outcome or impact (intended or unintended, positive and/or negative) of a development intervention. Related terms: outcome, effect, impacts.
Sustainability	The continuation of benefits from a development intervention after major development assistance has been completed. The probability of continued long term benefits. The resilience to risk of the net benefit flows over time.

Executive Summary

1. Background, purpose and methodology

This independent ex-post evaluation of UNIDO's support to the Vietnam National Cleaner Production Centre (VNCPC) between 1998 and 2010 was carried out by an international evaluation consultant upon UNIDO and SECO requests. The VNCPC is part of a world-wide network of National Cleaner Production Centers (NCPCs) that has been jointly established and supported by UNIDO and UNEP since 1994 as a cornerstone for the world wide promotion of sustainable industrial development. When the third phase of UNIDO's support to the VNCPC started in 2007, the NCPC network covered 37 countries. At this juncture, a thematic evaluation of the NCPC network was conducted whose lessons were incorporated into a new "Resource Efficient and Cleaner Production (RECP)" programme strategy approved in 2009. It should be borne in mind that the VNCPC was a "first generation NCPC" designed prior to this strategic shift.

The main purpose of this ex-post evaluation has been the assessment of relevance, impact and sustainability of the UNIDO/SECO support to the VNCPC and to draw lessons of wider applicability on the impact channels and potential impact drivers of NCPC projects.

The evaluation looked at the entire result chain of the project (inputs, outputs, outcomes and impact) and accounted for positive and negative external factors. For the assessment of *policy relevance and impact* a "virtual evaluation panel" composed of 20 high-level independent environmental experts from Vietnam and 5 international experts from institutions such as the World Bank and bilateral environmental agencies was set up.

A methodological limitation has been the lack of detailed monitoring data of enterprise *outcomes* for the time after 2007. Furthermore, the depth and extent of fact finding was limited by time and resources.

2. Main Findings and Conclusions

Policy relevance

The expert panel considered industrial pollution to be a significant threat for the environment in Vietnam and agreed that CP is an effective tool to tackle this threat. However, the panel underlined that there are other major sources of pollution such as deforestation, agriculture, fisheries and traffic that CP can hardly address. Notwithstanding these limitations, the NCPC intervention was highly relevant to GoV policies. The initiative was just-in-time to respond to the Directive on strengthening environmental protection in 1998 and the Declaration on Cleaner Production in 1999. Its policy relevance was further increased by a range of policy measures taken between 2000 and 2010, including the "Cleaner Production Strategy in Industry until 2020", approved by Decision No. 1419 (2009) of the Prime Minister.

Relevance to UNIDO and One UN Vietnam

The VNCPC project has been at the core of the UNIDO mandate and also highly relevant to the "One UN Programme" in Vietnam, which gives high priority to the environment.

Company relevance

Similar to other countries, the biggest industrial polluters in Vietnam are large companies. As CP is primarily relevant to SMEs, the choice of the project to focus on SMEs reflected the priorities of all parties, bearing in mind that the large polluting companies would have to be reached by other instruments.

Company outreach

VNCPC implemented a total of 340 consultancy projects in the form of CP Assessments (CPAs), Technology Gap Assessments (GAP), Clean Technology Assessments (CTA), Cleaner Technology Implementation (CTI), Financial Engineering Proposals (FEP) and Product Innovations (SPIN) with financial support from 10 different donors. However, statistics show that the penetration of CP in industrial manufacturing is still low.

Sector outreach

The monitoring data on the sectoral outreach of the VNCPC to companies is patchy. The majority of the 227 companies supported between 1999 and 2011 operated in six sectors: metal and steel (18.9%), food processing (17.6%), textile (13.7%), handicraft (11.0%), pulp & paper (11.0%), and construction material (10.6%). This distribution shows a moderate match with the qualitative needs assessment of the panel, who estimated the sectoral needs for CP on a scale of 1 (very high need) to 6 (low need) as follows: food processing industry (1.8), chemical industry (1.8), paper & pulp (2.7), dying industry (3.5), natural resources exploitation (4), cement (4.2), footwear & leather industry (4.8) and textile industry (5.7).

Geographical outreach

The VNCPC's strategy aimed at ensuring a balanced regional coverage. The analysis of the relatively scarce monitoring data and the panel assessment concluded that the VNCPC outreach was better on the Northern and Central part of the country than on the South. However, the VNCPC seems to have had at least some outreach to companies in the South. Overall, the project focus was on the most industrialized regions, but there was also some coverage of less industrialized provinces.

Outcomes at company level

Users were "very satisfied" (47%) or "satisfied" (53%) with VNCPC services. A similar reply was obtained on the *usefulness* of the services. Some companies expressed the wish for more specialized, industry-specific advice and support. The survey and internal VNCPC data indicate that 17% of the companies implemented all recommended CP options, 30% most, 35% several, and 13% none. Key enterprise benefits recorded are energy saving, reduction of water consumption, improvement of working conditions and meeting environmental regulations of the government. VNCPC was particularly successful in convincing companies about "low cost options".

On average, implementation of CP options proposed by VNCPC resulted in considerable resource savings (7% in electricity, 9% in coal, 7% in fuel, 7% in diesel oil, 20% in Liquefied Petroleum Gas (LPG), 18% in water and 25% in chemical consumption). On average, CP

projects achieved cost savings of USD 75,000/year. Companies invested on average USD 110,000 for the implementation of CP options resulting in an average pay-back period of 1.5 years (excluding cost of capital).

Company impact

Enterprises who participated in the survey assessed reduced energy and material consumption and better compliance with environmental regulations as strong environmental benefits. They considered other environmental improvements such as waste and water reduction as medium. The beneficiaries assessed the "availability of CP services" as an important competitiveness factor. Reducing manufacturing cost through CP measures contributes to higher competitiveness, especially for businesses with low production margins and high resource consumption.

Better working conditions and product quality are perceived as strong impacts, which is remarkable. However, companies assessed the potential CP impacts on social standards, higher prices and better exports as comparatively low. These findings were corroborated by the assessment of company impact by the panel.

The evaluation also provided clear evidence that CP, energy efficiency, corporate social responsibility, and better access to Standards, Metrology, Testing and Quality (SMTQ) services are all relevant for improving SME competitiveness and export performance. Delivering the respective support services through separate channels causes inefficiencies and increases transaction costs for the clients.

Policy outcomes and wider impact of policies

The expert panel found that the VNCPC has been successful in providing policy advice and leveraging its company support into the policy realm. The combination of policy advice, networking and demonstration projects appears to have been the right strategy to effectively achieve policy outcomes. VNCPC was successful in putting CP on the agenda of businesses and the GoV. According to the assessment of the panel, the VNCPC has made significant contributions to three policies that effectively tackled industrial pollution, including the Cleaner Production Strategy in Industry until 2020, approved by Decision No. 1419 (2009) of the Prime Minister.

Wider impact on CP expertise in the country

VNCPC networking and training contributed to developing Vietnam's emerging CP sector. Many Vietnamese CP specialists benefitted from VNCPC training and some of them are former VNCPC staff.

Wider impact on industrial competitiveness

Lowering manufacturing cost and better compliance with environmental standards are only two of the elements that companies need to strengthen for better competitiveness. Compliance with quality standards was also ranked very high. This indicates the potential of leveraging UNIDO's support to the competitiveness of industries through a better integration of services provided under the different branches of UNIDO. A successful integration of companies into

multinational supply chains needs a whole set of coordinated measures. The expert panel stressed that effectiveness could be further increased by applying CP along value chains. The VNCPC already applied this approach under the One UN programme.

Wider impact on poverty

This evaluation provides only weak evidence for a wider impact of VNCPC activities on poverty reduction, including on environment as another dimension of poverty. Given the limited evidence for an impact on competitiveness, the job creation potential is also limited. The most plausible impact on poverty could come from improved working conditions, which ranks high in the companies' assessment of CP benefits. However, cottage industries, which are widely known as the type of production units where working conditions tend to be worst, were reached only marginally, if at all.

Impact drivers

The project impact was enhanced by the skilful combination of different measures such as VNCPC capacity building, policy advice, CP demonstration through pilot projects, awareness raising and dissemination of results, together with the contribution of the VNCPC to projects of other donors. Anchoring the VNCPC in a university instead of a government agency was suitable and the transformation of the VNCPC from a project into a public sector company was a crucial success factor. In contrast, the importance of the Green Credit Trust Fund was only marginal.

South-South Cooperation

Project benefits extended beyond Vietnam and contributed to South-South cooperation. The VNCPC involvement in UNIDO's CP projects in Lao PDR and Cambodia under SECO-funding is a good example of South-South cooperation. Furthermore, the VNCPC contributed to the regional and international network of the CP community.

Leveraging funds from other donors

From the beginning, the UNIDO capacity building strategy at the VNCPC aimed to position the VNCPC as a service provider not only for UNIDO but also for other donors. This strategy was very successful. Over time, the VNCPC became involved in more than 10 environmental programmes of major donors and agencies such as CIDA, DANIDA, ILO, UNEP and the EU. The financial leverage of this strategy allowed implementing at least 276 out of 340 consultancy projects through funding from non-UNIDO/SECO sources.

Sustainability

The results of the UNIDO/SECO support to the VNCPC are technically, institutionally and financially sustainable. As long as there is a sustained demand for CP services, the VNCPC is likely to generate sufficient revenues as a subcontractor of development projects. In the long run, the sustainability of the VNCPC depends on the emergence of a market for commercial CP services. There is no reason, why the VNCPC should not be able to compete in this market with other commercial players. Considering the increasing emphasis of the GoV on

sustainable economic growth, policy outcomes are likely to be maintained or even further developed.

3. Recommendations

Recommendations specific to Vietnam

(1) UNIDO should phase out its direct support to the VNCPC but continue its collaboration with the VNCPC and provide opportunities to further develop its services, possibly under a “privileged partnership” arrangement. However, such collaboration should avoid distortions of the emerging market for CP services in Vietnam.

General recommendations for further development of UNIDO’s CP approach

(2) UNIDO should consider opportunities to further refine the monitoring schemes of CP projects. Monitoring should not only cover outputs (services provided) but also outcomes at various levels (client satisfaction; improved environmental performances of client companies). Ultimately, the monitoring scheme should enable estimating the environmental benefits the CP project has contributed to.

(3) To enhance the impact of CP projects on the competitiveness of SMEs, UNIDO should further integrate CP and other SME support services. CP, energy efficiency, corporate social responsibility, industrial upgrading, better access to SMTQ services are all relevant for improved SME competitiveness and delivered through “One stop shops” to reduce the clients’ transaction costs.

(4) In order to enhance the outreach of the CP approach to vulnerable informal sector producers and populations surrounding the corresponding units, UNIDO should develop a more tailor made approach to address “environmental poverty”. It is widely recognized that poor target groups tend to suffer badly from hazardous technologies and production methods and there is a potential for UNIDO to leverage its CP experience into integrated programmes for “craft villages” and other vulnerable groups.

(5) UNIDO should consider whether the NCPC network could be used to deliver support services not only to SMEs but also to medium and large scale industries, which are often “big polluters” that cannot be reached by the traditional CP services. The NCPC network could make a contribution to improve the world-wide market for very specialized expertise by maintaining a roster of international environmental consultants who are specialized in specific technologies or sectors and offering North-South and South-South brokering of consulting services. Better linkages of the network to development banks and their lending programmes should also be considered.

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Background, objectives and methodology

1. Background and objectives of the evaluation

This report covers the independent ex-post evaluation of UNIDO's support to the Vietnam Cleaner Production Centre (VNCPC) between 1998 and 2010, which was funded by the Swiss State Secretariat for Economic Affairs (SECO).

Supporting the creation and development of the VNCPC has been a long standing priority of SECO as a donor and UNIDO as an executing agency, over three consecutive projects between 1998 and 2009 (see Table 1).

Table 1 UNIDO's support to VNCPC funded by SECO (1998 – 2009)

Project Number	Project Title	Budget (USD)	Start/End Date
US/VIE/96/063	Vietnam National Cleaner Production Centre (VNCPC)	**2,376,456**	03/1998 12/2003
US/VIE/04/063	Vietnam National Cleaner Production Centre (VNCPC)	**155,485**	03/2004 12/2004
US/VIE/04/064	Promotion of new CP services through the VNCPC	**2,168,294**	01/2005 12/2009
	Total	**4,700,235**	

According to the UNIDO evaluation policy, the project US/VIE/04/064 ending in 2009 ("Promotion of new CP services through the VNCPC") would have been subject to an independent evaluation. However, considering the availability of several prior evaluations[1] and that no follow-up project was foreseen, SECO and UNIDO decided that an ex-post evaluation of the entire sequence of projects would be more appropriate and beneficial than a standard end-of-project evaluation.

[1] Project US/VIE/96/063 underwent a mid-term evaluation in 2000 and a final evaluation in 2003. Projects US/VIE/04/063 and US/VIE/04/064 were reviewed within the evaluation of UNIDO's Integrated Programme in Vietnam. Furthermore, the Independent Evaluation of the UNIDO-UNEP, Cleaner Production Programme conducted in 2007/2008 included the VNCPC.

The purpose of this ex-post evaluation was threefold:

- Assess the relevance, ownership, impact and sustainability of the three SECO/UNIDO projects related to the VNCPC;
- Feed into the Vietnam country evaluation conducted in November 2011 and provide guidance to future environment related projects in Vietnam;
- Draw lessons of wider applicability on the variety of impact channels and potential impact drivers of projects strengthening "National Cleaner Production Centers" and contribute to improving the project design in this area according to principles of result-based management (RBM).

The work was undertaken on behalf of UNIDO and SECO on the basis of the Terms of Reference (ToR) attached in Annex A, the UNIDO Evaluation Policy[2] and the UNEG Evaluation Norms and Standards[3]. The assessment focused on relevance, ownership, impact and sustainability of UNIDO's support to the VNCPC. In keeping with the UNIDO evaluation policy and while maintaining independence, the evaluation applied a participatory approach, taking into consideration the views of all parties.

The work was carried out by an independent international evaluation consultant (team leader).[4] Two teams of specialized Vietnam-based consultants conducted an enterprise survey[5]and contributed to the interviews with an international expert panel for the assessment of relevance and impact of the entire sequence of projects[6].

The methodology of the evaluation in general and of the surveys in particular was developed by the international evaluation consultant in close cooperation with the Senior Evaluation Officer of the UNIDO Evaluation Group[7].

The international evaluator was not involved in the preparation and/or implementation of the project[8], but he did participate in the evaluation of UNIDO's Integrated Programme in Vietnam in 2005, which covered the VNCPC[9].

2. The international network of CP centers

Since 1994 UNIDO and UNEP joined forces to establish and support National Cleaner Production Centers (NCPCs) and Programmes (NCPP) in developing and transition countries. In the absence of a formal programme approach, support was mainly provided within the framework of national and some multi-country projects. For UNIDO and UNEP,

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[2] Available from www.unido.org
[3] United Nations Evaluation Group (UNEG), Norms for Evaluations in the UN System, April 29, 2005
[4] Daniel P. Keller, Director, Swiss Consulting Co. Ltd., Hanoi - Vietnam
[5] EPRO Consulting JSC Vietnam (Ms. Tang Thi Hong Loan, Ms. Le Thi Thoa and Ms. Tran An)
[6] Central Institute for Economic Management (CIEM), Dr. Vu Xuan Nguyet Hong and Dr. Nguyen Kim Dung.
[7]Peter Loewe, Senior Evaluator, UNIDO Evaluation Group
[8]This principle is underlined in the UNIDO Evaluation Policy: "For independent evaluations, the members of an evaluation team must not have been directly responsible for the policy-setting, design or overall management of the subject of evaluation (nor expect to be so in the near future)".
[9]See report of the Independent Evaluation of the Integrated Programme of Cooperation
Between the Socialist Republic of Vietnam and UNIDO 2003-2005 Industrialization and Modernization along the Socio-economic Strategy: Towards Sustainable Growth in the SME Sector

the CP Programme was a cornerstone of their activities to foster sustainable industrial development.

While UNIDO focused on technical and institutional aspects, UNEP provided mainly strategic input, primarily through separately-funded multi-country projects on emerging topics in Sustainable Consumption and Production (SCP). Furthermore, UNEP involved the NCPCs (including VNCPC) in its series of regional and global strategic dialogues.

By 2007, when the third phase UNIDO's support to the VNCPC started, the CP Programme encompassed activities in 37 countries. The majority of NCPCs/NCPPs operated with limited independence, either as subsidiary of their host organization (formally or informally as an administratively and financially isolated activity area, e.g. a profit centre) or otherwise semi-autonomously, with only some 30% being fully independent. They therefore typically assume the legal status of their host institutions, which in about half of the countries is a public sector entity and in some 10% of the countries a private sector institution. In 2008, about 30% of the NCPCs/NCPPs described their legal status as unresolved.[10]

Cleaner production methodology briefly explained

CP aims at changing processes, products and services to increase efficiency and reduce risks to humans and the environment. Those changes may include a combination of:

1. **Good Housekeeping**: appropriate provisions to prevent leaks and spills and to achieve proper, standardized operation and maintenance procedures and practices;
2. **Input Material Change:** replacement of hazardous or non-renewable inputs by less hazardous or renewable materials or by materials with a longer service life-time;
3. **Improvement of Process Control**: modification of the working procedures, machine instructions and process record keeping for operating the processes at higher efficiency and lower rates of waste and emission generation;
4. **Equipment Modification:** modification of the production equipment so as to run the processes at higher efficiency and lower rates of waste and emission generation;
5. **Technology Change**: replacement of the technology, processing sequence and/or synthesis pathway in order to minimize the rates of waste and emission generation during production;
6. **On-Site Recovery/Reuse**: reuse of the wasted materials in the same process or for another useful application within the company;
7. **Production of Useful By-Products**: transformation of previously discarded wastes into materials that can be reused or recycled for another application outside the company; and
8. **Product Modification**: modification of product characteristics in order to minimize the environmental impacts of the product during or after its use (disposal) or to minimize the environmental impacts of its production.

[10]UNIDO Evaluation Group in cooperation with the Evaluation and Oversight Unit of UNEP, Evaluation and Oversight Unit Independent Evaluation of the UNIDO-UNEP, Cleaner Production Programme, 2008, with support from SECO and the Government of Austria, page 40

In 2008, the CP Programme underwent a Thematic Evaluation[11] to review the current status, the potential as well as the needs of the NCPCs and related initiatives. This resulted in specific recommendations for the future orientation of UNIDO's support to sustainable industrial production. UNIDO's support to the VNCPC was thus *a "first generation CP-project"*, designed prior to UNIDO's strategic reorientation.

Key lessons learned from the Thematic Evaluation included:

- CP is of continued and rising relevance, as a result of several trends, including: worsening industrial pollution and high industrial resource use; Multilateral Environmental Agreements (MEAs) entering into force; globalization and trade liberalization; and buyer pressure.
- NCPCs are appropriate for CP capacity building, but institutional development and positioning of NCPCs amidst other business services providers in their home countries deserve greater attention.
- There is a trade-off between the financial independence of NCPCs and the sustained impact of the Programme.
- The NCPC programme has a great potential. The predominantly country-based funding strategy had, however, not been conducive to networking, knowledge management and learning, between NCPCs operating in different countries and regions. Moreover, the potential for cooperation and leverage with other initiatives was not fully exploited.

The lessons learned from UNIDO/UNEP's support to Cleaner Production Centers were incorporated into a new "Resource Efficient and Cleaner Production (RECP)" programme strategy approved in 2009. The core objective of RECP is to decouple economic development from further environmental degradation and resource depletion. The Programme aims to improve resource productivity and environmental performance of businesses and other organizations in developing and transition countries. The envisioned principal outcome is the widespread adaptation and adoption of RECP methods, practices, technologies and policies.

The main aim of the strategy is to scale-up the application of CP to transform it into a common practice rather than isolated initiatives in a few selected enterprises by driving the institutionalization, positioning and profiling of NCPCs as change agents for sustainable industrial development.

The RECP Programme is implemented through four main intervention modules. Each covers several key activities and outputs.

- **RECP Service Delivery Network**: expanding, strengthening and further capacitating the network of NCPCs and other RECP service providers. This includes, intensive networking and knowledge management, expansion of RECP to new countries and supporting existing NCPCs to scale-up their activities and impacts;

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[11]UNIDO Evaluation Group in cooperation with the Evaluation and Oversight Unit of UNEP, Evaluation and Oversight Unit Independent Evaluation of the UNIDO-UNEP, Cleaner Production Programme, 2008, with support from SECO and the Government of Austria

- **Thematic RECP Applications**: implementation of RECP in enterprises and other organizations and monitoring of results, in particular on resource efficiency, waste and emission prevention and safe and responsible production;
- **RECP Incentives**: mainstreaming RECP into government policy and enterprise finance, to further incentivize enterprises and other organizations to implement RECP; and
- **RECP Innovation**: strengthening and/or creating national innovation capacities to support the adaptation and adoption of environmentally sound technologies and sustainable product developments that are appropriate in the national industry context.

3. Evaluation concept and methodology

For the assessment of impact, the basic concept of "realistic evaluation", i.e. "*Intervention plus Environment results in Impact*"[12], was applied. This means that the evaluation accounted for external factors that may have facilitated or impeded the achievement of impact.

Table 2 below captures the "result-levels" and the causal relationships between them[13]. It was developed by "reverse engineering" the intervention logic given by the project documents, starting from the two *main development objectives of UNIDO's support to VNCPC (G)*, which are deemed to the *expected project impact, back to the project outputs (A = project support to VNCC)*.

Adopting the "*theory based evaluation approach*" along the lines of the logic shown in Figure 1, the evaluation attempted to shed light on results (A to G) and causalities (1 to 9). In order to do so, each of the results is subsequently described in detail. Through an iterative approach, the evaluation also identified other changes (*unexpected effects at outcome and impact levels)* the project has contributed to (under results E, F and G). Where feasible, qualitative and quantitative indicators were developed. Subsequently, the *plausibility* of each of the causalities was assessed through qualitative and quantitative means, taking into account *causal* external factors and assumptions (6 and 7). This was also expected to provide insight into *reasons why certain expected results were achieved or not* and to derive *good practices* from these assessments.

Expected impacts (G) are the development objectives formulated in the project document. Phases I and II aimed at "reducing industrial pollution through application of CP". Development objective of phase III was to "improve the competitive position of the Vietnamese industry and its integration into the global supply chain through the promotion of sustainable production patterns".

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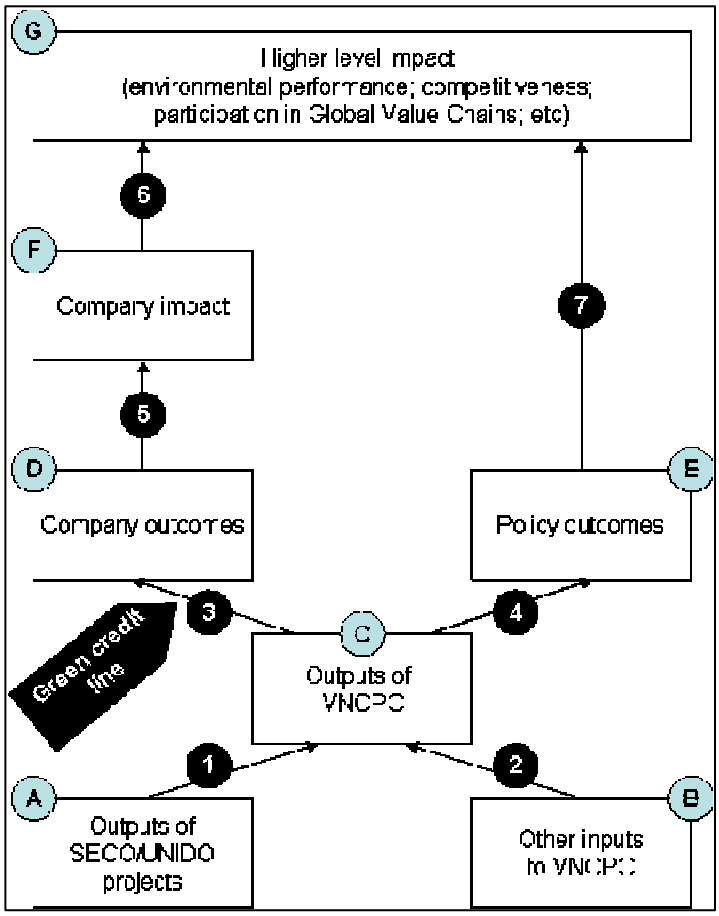
[12] See Pawson, Ray and Tilley, Nick; Realistic evaluation; 1997
[13] Based on diagram 1 included in the ToR, amended by the international evaluator.

Figure 1: Result chain of the UNIDO support to the VNCPC



Explanations to the causal chain in Figure 1:

- **A: Inputs of SECO/UNIDO projects to VNCP**: Includes all support provided by UNIDO to VNCPC, including funding, equipment, staff input, capacity building and advice. Project outputs were assessed based on evaluation reports, the final report of phase III, validated through face-to-face interviews.
- **B: Other inputs to VNCPC**: includes inputs to VNCPC provided by other donors/projects and the Vietnamese Government (GoV), including staff, facilities, capacity building etc. The evaluators tried to reconstitute other inputs provided to VNCP through desk study of project reports and interviews with other projects' staff.
- **C: Outputs of VNCPC**: CP services, other services, awareness raising, capacity building, advocacy delivered by VNCPC. The factual basis was established through interviews and desk study of project reports. The causal relationships (1 + 2) and the degree of contribution of UNIDO inputs (A) versus the contribution of other inputs (B) to the

outputs of VNCPC (C) was estimated through a *qualitative assessment* of UNIDO's versus other inputs.

- **D: Company outcome - uptake of CP services by companies:** The evaluation looked at changes of companies' performance caused by VNCPC services. Changes were understood as broadly as possible, i.e. beyond merely environmental aspects. Changes were assessed through project records available at the VNCPC until 2007 and through the enterprise survey conducted under this evaluation.
- **External Factor: Contribution of SECO's Green Credit Trust Fund (GCTF) to company outcome**: Because this credit line has not been implemented by UNIDO but through a separate mechanism, the evaluation dealt with it as an *external factor* and not as a project result. The contribution of GCTF to improved performance of target companies was assessed based on records of VNCPC, complemented by interviews of GCTF beneficiary companies in the survey and the Programme Manager of the GCTF at SECO Headquarters.
- **E: Policy and other outcomes of VNCPC:** The expert panel identified a list of 11 environmental policies and assessed the VNCPC contribution to these policies (causality 4). This assessment was complemented through desk study and stakeholder interviews.
- **F: Improved performance of target companies (project impact at company level):** VNCPC's records and the enterprise survey provided the factual basis for the assessment of impact at company level.
- **Other external factors**: **Contribution of external factors to F** (such as for instance energy prices, environmental regulations, other policies, pressure by customers etc.) = causality 5[14].The evaluation tried to *identify* other external factors and their *(negative and positive)* contribution to impact at enterprise level through the enterprise survey, the expert panel and stakeholder interviews. The importance of those factors to the improved performance of target companies was weighted as well.
- **G: Wider impact** (e.g. through replication, effect of policy input provided by VNCPC): The evaluation looked at secondary effects at non-beneficiary enterprises caused by government policies that were established based on demonstration effects (causality 6) and as a result of policy outcomes (causality 7). Broader impact was chiefly assessed through the expert panel, surveys of non-beneficiary companies, interviews with other project/donors and desk study of documents.

[14] Contribution of "external factors" to F (causality 7): Only factors to which the project did not contribute. Policy outcomes and their impact on F are dealt with under causality 8 and 9 (their impact to F and G).

4. Evaluation tools and steps

Different evaluation tools were combined to ensure evidence-based qualitative and quantitative assessment. Particular emphasis was given to cross-validation of data and an assessment of plausibility of the results obtained. The methodological mix included desk studies, literature review, an enterprise survey, an expert panel, statistical analysis, individual interviews, interviews of focal groups and direct observation. The main steps undertaken and evaluation tools were:

Comprehensive desk study

Prior to the field work, the evaluators conducted a comprehensive study of literature, background documents and reports. A detailed list is included in Annex B.

Mapping and analysis of policy and donor landscape

The evaluators mapped and analysed relevant policies and initiatives of the Government of Vietnam (GoV), of other donors and of the private sector that are related to environment and trade. This analysis of the wider policy and institutional landscape was used as a basis to assess the relevance of the SECO/UNIDO support and enable an assessment to what extent their *contribution* to changes in environmental and trade-related aspects can be *plausibly assumed*. As an input to this, CIEM conducted on behalf of UNIDO a comprehensive mapping and analysis of all policies relating to the project's objective. Findings were validated through a study of relevant documents, interviews and an assessment by the independent expert panel.

Interviews (individual, focal group discussion)

The international evaluator and the Senior Evaluation Officer of the UNIDO Evaluation Group conducted interviews with a wide array of stakeholders in the field of environmentally friendly production, corporate social responsibility, support to export-capability of companies and other related areas. This included counterparts, beneficiaries, partner agencies, donor representatives, and several rounds of in-depth discussions with management and staff of the VNCPC. Interviews were also used to assess the plausibility of the different causalities, taking into account the external factors and assumptions. A list of interlocutors is included in Annex C to this report.

Virtual evaluation panel

As it would not be possible to *causally attribute* environmental and policy improvements to the VNCPC and even less so to the UNIDO intervention, the UNIDO/VNCPC *contribution* to this broader impact was assessed through an independent[15] "virtual evaluation panel" comprising 20 national experts including technical specialists, representatives of government institutions and academics as well as 5 international experts (see list in Annex B). The panel was solicited through two "rounds" of questions, similar to a Delphi exercise[16] on the basis of

[15] Regarding independence of panel members, the provisions of the UNIDO-Evaluation Policy were applied.
[16] In order to create favorable conditions for the panel to answer questions as openly as possible, panel members were interviewed individually (email, face-to-face), therefore: "virtual panel". Answers of the first round were summarized and fed-back to panel members in an anonymous form.

a questionnaire using Likert scales[17] plus open comments. The sequence of the survey[18] steps included: (a) First round, a questionnaire was circulated to all members - panel members commented on the questions and answered the questions; (b) during the second round, panel members received an amended version of the questionnaire (based on the inputs of the panel) together with the results of the first round, asking for additional comments raised by the panel and revisiting answers. The second round served the purpose of building consensus. All panellists were – although to a different degree – acquainted with the role and the activities of the VNCPC, while fulfilling the criteria of independence according to UNIDO's evaluation guidelines. The expert panel also contributed to the assessment of relevance.

Analysis of project records and enterprise survey to assess the relevance of VNCPC services provided to companies and their benefits[19]

The use of VNCPC services by target companies (outcomes) and the impact resulting from it was assessed through an analysis of *quantitative* data compiled by the project. VNCP's services include both those provided with UNIDO support and those supported by other donors. Detailed data was available until the year 2007[20]. The data was used to estimate the direct environmental and other effects of UNIDO's support on beneficiary enterprises prior to 2007. However, no systematic data was available on the *outcomes* (e.g. savings of production resources, reduction of emissions) resulting from the services provided with UNIDO's support from 2007 – 2010 and for those funded by other donors[21].

In order to complement the missing data for 2007 – 2011 and collect additional qualitative information (e.g. on service quality, additional benefits of CP, importance of CP services as a factor for competitiveness of companies relative to other factors), the evaluation conducted an in-depth company survey through face-to-face interviews and on-site visits. The survey included three samples of users of CP services: (a) A randomly selected sample of 10 companies that benefitted from CP *services provided by VNCPC under UNIDO-funding between 2007 and 2010*; (b) a randomly selected sample of 10 companies that benefitted from *CP services provided by the VNCPC not under UNIDO funding* (i.e. independent from donor support or through support of other donors) and (c) a sample of 10 companies that *received CP services from other institutions*, including private service providers (as a reference group). Quantitative data received from samples (a) and (b) were used to estimate benefits for companies directly generated by CP services provided by VNCPC from 2007 – 2010.

Expertise on environmental and export-related policies

Various other sources of information included a comprehensive desk analysis, interviews with counterparts, beneficiaries, partner agencies, donor representatives, management and staff of the VNCPC and cross-validation of data.

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[17] Answers on a "agree – don't agree-scale". The survey used four possible choices for answers: "strongly agree, agree, less agree and don't agree". For most of the questions, an option "don't know" was not provided to prevent panel members from not taking position.
[18] For practical reasons, international members answer by email, national members through face-to-face interviews.
[19] See separate report on "Independent Evaluation of the Impact of the UNIDO/SECO Support to the National Cleaner Production Centre in Vietnam (VNCPC), Enterprise Survey, EPRO Consulting JSC, January 2012.
[20] Data limited to environmental/cost impact of the implementation of CP recommendations.
[21] Tables 1 and 2 of the Project Completition Report of VIE/04/64 include data on number of projects and savings in absolute terms achieved between 2005 and 2009, however no data on savings in relative terms and no data on qualitative benefits.

5. Limitations

- The main limitation to assess the benefits of the project for enterprises was the lack of systematic information at the VNCPC on the use of its services by companies. Also, specific data on the impact of services the VNCPC provided with funding of other donors was not available.

- Furthermore, the depth of the assessment of relevance and impact by the panellists varied, which was mainly to a variable degree of insight into the VNCPC. Nevertheless, the panel discussion revealed a wealth of interesting information, views and recommendations on the state of industrial pollution and options how to improve.

- Finally, the time and funding available for this evaluation were considerably below of what would be typically required for an in-depth ex-post evaluation. It was for instance not possible to conduct a large scale company survey with a control group. Furthermore, the "virtual panel" methodology used was new and the short time available did not allow for a test run. In order to cope with the time pressure while not compromising the quality of work, the analysis and the presentation of evaluation results focused on those relevant for future support in the field of resource efficient industrial production.

II

Findings and assessment

1. Relevance

The assessment of relevance looks at the extent to which the objectives of the projects were consistent with the requirements of the end-users, the GoV, international priorities and donor policies. The stated project objectives were twofold:

- Achieving a positive impact on the environment through reducing industrial pollution;
- Improving the competitive position of the Vietnamese industry and its integration into global supply chains through the promotion of sustainable production patterns.

A. Relevance of objectives to environmental problems in general

The expert panel considered industrial pollution as a significant threat for the environment in Vietnam, compared with other forms of pollution. All experts agreed that in Vietnam, industrial pollution is a major source of pollution of rivers, air and soil. Experts agreed that CP is an effective tool to reduce environmental pollution. They also highlighted the potential of CP to reduce Greenhouse Gases and global warming.

According to panellists, industrial pollution is however only one of several threats to Vietnam's environment. Specifically mentioned were deforestation, pollution caused by agriculture and fisheries. A major source of pollution is the excessive use of fertilizer, chemicals, and agricultural waste[22]. Pollution caused by traffic – and the use of fuel with high sulphur content – was also mentioned. Several experts found it difficult to rank the threat of industrial pollution against other forms of environmental threats. As a "point source" form of pollution with a high concentration rate, industrial pollution is easily recognizable, while other types of pollution (traffic, agriculture, fisheries) are "non-point type of pollution sources" and thus less known to the public. One expert assessed the problem of solid and liquid waste, including household waste, as of highest importance, but not in terms of its potential hazard. The most dangerous threat according to this expert is the use of persistent organic pollutants). Several experts ranked exploiting and using natural resources by all kinds of industrial, agricultural, and urbanization activities as the biggest and most dangerous impact on the environment. The discussion also revealed that the notion of "industrial pollution" needs to be clearly defined.

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[22] Around 50% highly toxic chemicals (insecticides, fertilizer) used in agriculture are wasted through inappropriate use. This also leads to financial losses of around 3 billion USD per year. The production of every million ton of fish produces 4 million tons of waste, which is also a significant source of polluting the environment.

All experts agreed that VNCPC services are highly relevant to the improvement of Vietnam's environmental performance. However, there seems to be a consensus that tackling industrial pollution addresses only one of several threats to the environment and needs to be combined with other measures. The fast development pace of the Vietnamese industry requires further sustained efforts for addressing the problem of industrial pollution.

B. High relevance of CP as a competitiveness factor for companies

The enterprise survey and the expert panel concluded that the project was of high relevance to companies that directly and indirectly benefitted from it. Services provided by VNCPC were well tailored to company needs, in particular in regards to reducing input cost to production and helping them to improve their environmental performance, while at the same time reducing costs.

Table 2 shows the result of the enterprise survey, which asked companies to rank 17 factors, which they consider most relevant for their competitiveness, on a scale of 1 to 6 (1: = most important impact on competitiveness, to 6 = no impact on competitiveness).

10% of the surveyed companies considered CP of top importance, 43% as very important, 30% as important and only 13% as less important for their competitiveness. None of the companies considered CP as unimportant for its competitive edge. Among the competitiveness factors shown in Table 2, CP ranks forth. As a caveat, it should be noted that the survey only included enterprises that have already benefitted from CP services. The high relevance of CP for companies is however also confirmed by the assessment of results (outputs, outcomes and impact) in section 2 below.

Table 2: The availability of CP services as a factor for competitiveness compared with other competiveness factors rated by enterprises surveyed

Competitiveness factor (ranked from most to least important)	**Rating**						
	1	**2**	**3**	**4**	**5**	**6**	**Average Score**
Cost of raw material	19	6	2	1		1	1.68
Compliance with quality standards of clients	14	10	2	2	1		1.82
Availability of qualified labour	9	14	3	2		1	2.07
Availability of CP services	**3**	**13**	**9**	**4**			**2.48**
Compliance with other social/environmental standards	9	4	9	5	1	1	2.58
Compliance with social/environmental standards of clients	8	5	8	5	2	1	2.72
Availability of calibration services, industrial metrology		5	10	7	2	5	2.86
Cost of bank loans	5	10	5	3	5	1	2.86
Access to capital (bank loans)	4	10	6	3	2	4	2.89
Exchange rate fluctuations	6	9	5	3	3	3	2.89
Transportation cost	4	6	10	5	2	2	3.03
Taxes/Tax procedures	6	3	10	6	3	2	3.21
Availability of testing services (laboratory testing)	3	4	10	5	3	4	3.45
Availability of land	6	3	6	3	6	5	3.51
Competition from other countries	7	5	4	2	1	10	3.52
Government incentives	4	5	4	7	4	5	3.58
Customs procedures		3	7	5	6	8	4.31
Corruption		2	4	8	4	11	4.62

Source: Enterprise survey

All respondents using VNCPC services (both within the UNIDO project and under other donor-funded projects) assessed the received support as “useful” (47%) or “very useful” (53%).

The analysis however also reveals that CP is only one of many competitiveness factors. Interestingly, some of the competitiveness factors promoted by UNIDO’s Trade Capacity Building Branch are also ranked as very important, in particular the compliance with different types of standards. This indicates a strong potential of leveraging UNIDO’s support to the competitiveness of industries, in particular through a better integration of services provided by the different branches of UNIDO.

C. Relevance of CP to policies of the GoV

(a) Environmental policies

The project was timely. It started right after Vietnam signed the “Declaration on Cleaner Production” on 22 September 1999. Immediately prior to this, the Communist Party undertook a significant shift towards a greater emphasis on preserving the environment, which is reflected in Directive No. 36/CT-TW of the Political Bureau (dated 25 June 1998) on “strengthening environmental protection in the period of industrialization and modernization of the country”. This important Directive outlines the causes of environmental degradation, sets goals, criticizes attitudes and defines fundamental solutions for the environmental protection, in which cleaner production plays an important role. Specifically, the Directive calls for "issuing policies on tax and credit to encourage the application of clean technologies" and "to apply technologies which are clean, reduce waste, and consume less raw material and energy" in industrial production.

CP is in line with key policies of the GoV related to environmental protection in general and industrial pollution in particular. Environmental protection is a key objective of the GoV as enshrined in the revised Law on Environmental Protection (2005).

Several of these policies explicitly call for the application of CP in industry as a tool to enhance the environmental balance of industrial production.[23] CP also contributes to the implementation of other laws and policies aiming at energy conservation and efficiency[24], pollution control[25] and addressing climate change through the reduction of greenhouse gases.[26] The Five-Year Socio-Economic Development Plan (SEDP, 2011 – 2015, approved by the National Assembly in November 2011) puts a strong emphasis on sustainability issues, including tackling the negative impact of industrialization. The GoV’s resolution No. 01on the implementation of the SEDP includes “strengthen natural disasters prevention and mitigation, environment protection and response to climate change” as priorities. Furthermore, the GoV has recently decided to levy an environmental tax on five groups of products namely, petroleum, coal, hydro chlorofluorocarbon liquid (HCFC), plastic bags and chemical pesticides, with each product being subject to an individual tax rate.

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[23]Industrial Cleaner Industrial Production Strategy until 2020, Decision No. 1419/2009 of the Prime Minister (2009); The National Action Plan on CP 2001 - 2005 (Document No. 1146/BKHCMT-MTg); Cleaner Production Application in Industry (Directive No. 08/2007 of the MOI), Decision of the Prime Minister No. 64 on eliminating the most polluting industries (2003) mentioning CP as a tool.
[24]Circular No. 01 of the Ministry of Industry Guidance On Energy Conservation and Efficient Use for Manufacturing Facilities (2004); National Target Programme on Energy Conservation and Efficient Use (Decision No. 79 of the Prime Minister) (2006)
[25]National Plan on Environmental Pollution Control until 2010 (Decision No. 328 of the Prime Minister) (2005);
[26]National Target Programme on Climate Change (Decision No.158/2008)

(b) Policies aiming at increasing international competitiveness and integration of the Vietnamese economy

The project objectives are aligned to the GoV's efforts of regional and international integration, in order to spur economic development, create new jobs and improve the living standards of the population. The GoV sees boosting exports as key for tackling the increasing trade deficit. The previous Five-Year Socio-Economic Development Plan (SEDP) 2006 - 2010 approved by the National Assembly in 2006 aimed at accelerating the international integration of the Vietnamese economy into the world economy, to increase the competitiveness of products and services of Vietnamese enterprises and to create favourable conditions for promoting exports. Competitiveness of products, which is a growing concern of the GoV, was one of the objectives of the project. A stronger emphasis on "competitiveness" is reflected in the new SEDP (2011 – 2015), which stresses that Viet Nam's competitiveness and ability to continue rapid growth will depend on the *quality* of its products rather than quantity of output.

(c) Relevance to the GoV's poverty reduction efforts

A competitive industry potentially contributes to the creation of employment, higher salaries and increases of tax revenues, which all have a direct link to poverty reduction.

Beyond this, as indicated by the expert panel, the relevance of reducing industrial pollution also extends to the people's health and wellbeing, thus to broader aim to reduce "multidimensional" poverty. Medical costs to cure health problems caused by pollution put a significant burden on individuals and the government. The cost of treating environmentally related diseases further limits the purchasing power of the poor and impacts their ability to earn a living. This indicates that the relevance of CP goes beyond merely environmental and competitiveness aspects.[27]

D. Relevance of CP to SECO's strategy

Objectives of UNIDO's support to the VNCPC are fully consistent with SECO's overall objective to promote sustainable economic development. The project objectives contribute to SECO's aim to increase the competitiveness of Vietnam's industry, increase the participation of companies in international trade, while addressing environmental sustainability and climate change as transversal themes.

E. Relevance in regards to UNIDO's core mandate

The project objectives are fully in line with UNIDO's core mandate to promote sustainable industrial development in developing countries and economies in transition. It particularly relates to UNIDO's core objectives to promote the integration of developing countries in global trade and fostering environmental sustainability in industry.

F. Relevance to the UN-Framework in Vietnam

Over the entire period, UNIDO's support to VNCPC has been fully aligned with the core objectives of the UN-Programme in Vietnam, in particular to its environmental objectives. In a broader sense, the project objectives also link into efforts of the UN ("One Plan") to promote employment and enterprise development[28].

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[27] See also UNIDO, Desk review, What has UNIDO done to reduce poverty – Evidence from UNIDO evaluations 2008 and 2009, 2010

[28] The **One Plan** seeks to combine and synthesize the work of the 14 resident UN organizations in Vietnam – namely FAO, IFAD, ILO, UNAIDS, UNDP, UNFPA, UN-HABITAT, UNIDO, UNESCO, UNICEF, UNIFEM, UNODC,

G. Relevance to international priorities

The project is highly relevant to addressing the global problems of industrial pollution and high industrial resource use – issues that several Multilateral Environmental Agreements (MEAs) aim to mitigate.

A reduction of material, energy and pollution intensity per unit of industrial output reduces the overall ecological footprints (carbon, water, etc.), while at the same time improving productivity and competitiveness. All of this is essential for the ultimate goal of decoupling of economic growth from increased resource use and further environmental degradation, which also affects the livelihood of the population in terms of health, income and wellbeing. In other words, CP addresses productivity, environmental and social imperatives in parallel. The project objectives directly contribute to Millennium Development Goal (MDG 7) (environmental sustainability) and more indirectly to MDG 1 (eradicating extreme hunger and poverty).

2. Inputs and achievements along the result-chain

The following section describes and discusses the results achieved along the causal chain presented in Table 2 above. It provides information on inputs to the VNCPC by the project (A), and others (B), outputs delivered by the VNCPC (C), the use of VNCPC outputs by target companies (D), policy and other outcomes (E), improved performance of target companies (F) and the broader impact (F). External factors (the Green Credit Trust Fund and others) that contributed or impeded the achievements of results at all levels are also discussed. For each of the results and the external factors, the degree of causality is briefly assessed.

A. Inputs of UNIDO to VNCPC

The support from UNIDO was instrumental to setting up and developing the VNCPC. It combined "technical" capacity building with institutional strengthening and linked the VNCPC to the international CP community and the network of NCPCs. UNIDO's expert advisory services to VNCPC were delivered through an experienced long-term technical adviser (CTA), UN-volunteers and short-term on-site advisers. UNIDO also arranged international training courses on subjects such as CP in specific sectors, industrial waste water management, CSR, process simulation in industry and industrial maintenance. UNIDO also procured the necessary equipment and subsidized staff salaries. UNIDO moreover sourced different services from the VNCPC under a number of other UNIDO projects.

B. Inputs of other donors and the GoV, provided to VNCPC

VNCP benefitted from inputs of a number of other donors, such as additional capacity building in fields that allowed VNCPC to expand its scope of services. Examples include renewable resource utilization, waste recycling (UNEP), Environmental Management Accounting (EMA – through InWent, Germany), and industrial maintenance (Wallonia-Brussels). The Ministry of Education of Training (MOET) made in-kind contributions, in

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UNV and WHO – within a single planning framework to better support the Socio-Economic Development Plan and the achievement of the Millennium Development Goals

terms of providing facilities and human resources plus some limited cash contributions. A pro-active approach to creating donor awareness and attracting additional donor funding has been a deliberate part of VNCPC's strategy and a critical success factor. Other NCPCs could learn from this. Additional donor funding was significant and essential for VNCPC to conduct the services summarized in section C below.

Assessing the degree of contributions of UNIDO (A) and others (B); causality for delivery of outputs (C):

- **UNIDO's technical and financial support** was instrumental for setting up and developing the VNCPC. It enabled VNCPC to deliver most of the services/other outputs described in detail in section (C) below. Without UNIDO's financial and technical input over the more than 10 years, it is unlikely that VNCPC would exist and operate in its current form.

- **Other donors' inputs (B)** were however conditional for many of the outputs of VNCPC that are described in section C, including expanding the scope and volume of CP services and scaling up (implementation of projects in related fields for other donors). Non-UNIDO inputs also contributed to complementing capacity building. Proceeds from providing services to other donor-funded initiatives (B) also contributed to core funding to cover the cost of VNCPC's operations.

C. VNCPC outputs

This section describes VNCPC outputs, including services to companies provided under funding from different donors (a + b) and other outputs (c). Services to enterprises before and after 2007 are reported separately, because, from 2007 onwards, the scope of VNCPC's CP-related services expanded.

(a) VNCPC services to companies prior to 2007 (funded by different donors)

Prior to 2007, VNCPC implemented 133 CP Assessments (CPAs) with financial support from 8 different donors (see Table 3). The content of the services was defined by focus of the respective donor. Some donors required the inclusion of additional aspects, such as energy efficiency, environmental management system, social responsibility, occupational health and safety (OHS) and hazardous waste management. The following summarizes the key services (outputs) of the VNCPC.

- **Within the framework of UNIDO projects:** At the beginning of the project, an in-depth CP audit of 14 firms was conducted, followed by the development of manuals and network building. Subsequently, three sector-specific demonstration programs for textile, paper and metal finishing were conducted. During this period, VNCPC started introducing new services such as GAP and subsequent implementation.

- **Swiss Organization for Development and Cooperation (SDC):** From 2004 – 2006 VNCPC delivered CPAs to industrial enterprises under the hazardous waste management program in Nam Dinh and improvement suggestions to households in the Van Chang village.

Table 3: Donor funded CP assessments 1999 – 2006

	Funding Source									
	SECO	SDC	DANIDA	DONRE	DOST	EPA	UNEP	CIDA	Company	Total
Number of CP Assessments	40	37	16	4	1	3	20	11	1	133

Source: Reports VNCPC

- **United Nations Environment Programme (UNEP):** VNCPC delivered consultancy on CP and energy efficiency were delivered under two programs of UNEP, introduction of energy efficiency into cleaner production (CP-EE) from 2003 - 2004 and Greenhouse Gas Emission Reduction from Industry in Asia and the Pacific (GERIAP) from 2003 - 2005. VNCPC managed and delivered services to industries in Vietnam.

- **The Danish International Development Agency (DANIDA):** Under the DANIDA program in Viet Tri City (2003 – 2004), VNCPC was contracted to deliver consultancy on CPA to companies, with a focus on occupational health and safety (OHS). Similarly, consultancy on CPA through introducing simple environmental management systems was delivered by the VNCPC under the "Cleaner Production in Industry (CPI)" component of the Ministry of Industry and Trade (MOIT) funded by DANIDA from 2005 – 2011.

- **Department of National Resources and Environment (DONRE) in Binh Dinh:** VNCPC delivered CPA to industrial enterprises in Binh Dinh under the provincial environmental protection program from 2003 – 2005, funded by the GoV.

- **Department of Science and Technology (DOST) in Hanoi:** VNCPC delivered CP and EE services to industrial enterprises under a provincial energy efficiency program between 2006 and 2007.

- **Environmental Protection Agency of the United States (EPA):** Optimization of boiler operation was carried out under the EPA energy efficiency program between 2004 and 2005. VNCPC was contracted to deliver this service.

- **International Labour Organization (ILO) with funding from SECO:** Under phase I of the Factory Improvement Programme (FIP), VNCPC delivered CP services to industrial enterprises in Hanoi and surrounding areas in 2005 and 2006. VNCPC was also responsible for the overall coordination of the programme, including support in worker/manager relations, OHS, product quality/productivity and other fields.

- **Canadian International Development Agency (CIDA):** Within the framework of the Vietnam Canada Environment Project (VCEP), VNCPC delivered CPAs to one company in Binh Duong and nine companies in Bac Ninh between 2003 and 2005.

- VNCPC further reported one CPA consultancy commissioned by a noodle production enterprise and one follow-up contract by a beneficiary company.

(b) VNCPC services to companies in Vietnam delivered after 2007

Since 2007, the VNCPC implemented 207 consultancy projects in the form of Cleaner Production Assessments (CPA), Technology Gap Assessments (GAP), Clean Technology Assessments (CTA), Cleaner Technology Implementation (CTI), Financial Engineering Proposals (FEP) and Product Innovations (SPIN). These services were provided under the framework of the following seven different donor-funded initiatives:

- **UNIDO:** As a part of the SECO-funded project under evaluation, VNCPC delivered services in GAP, CT, CTI and FEP. Most of the FEP activities were carried out within the framework of the Green Credit Trust Fund (GCTF). The VNCPC managed and coordinated the activities of the GCTF in Vietnam.

- **GCTF:** The GCTF is a SECO-funded facility executed on behalf of SECO through the Royal Bank of Canada with three participating banks: Asia Commercial Bank, Vietnam Technological and Commercial Joint- stock Bank (Techcombank) and Vietnam International Bank. VNCPC identifies potential clients to register, approves technical feasibility of proposals and checks impacts to identify bonus credits. The expected lifespan of GCTF is from 2007 to 2012.

- **UNIDO/VEA:** As a UNIDO subcontractor, VNCPC delivered expertise to the two industry pilots conducted under the project "Introduction of BAT & BEP Methodology to Demonstrate Reduction or Elimination of Unintentional Persistent Organic Pollutants (UP-POPs) releases from Industry". UNIDO's counterpart was the Pollution Control Department (PCD) of Vietnam Environment Administration (VEA).

- **DANIDA**: Cleaner Production in Industry (CPI) is one of five components under the Denmark-Vietnam Co-operation for the Environment to promote CP application in Vietnam. This component is managed and executed by the Ministry of Industry and Trade (MOIT). VNCPC provided significant technical consultancy to this project in the form of CP demonstrations (2005 and 2011).

- **ILO**: In 2010, VNCPC was responsible for the coordination of phase II of the Factory Improvement Programme (FIP) in the northern part of Vietnam, which is similar to its phase I (see above). There, it provided a comprehensive set of business development services to companies, including two modules on CP. VNCPC directly implemented CPAs in beneficiary enterprises.

- **UNEP:** The project "Promotion of Resource Efficiency in Small and Medium Enterprises" (PRE-SME) was carried out in 2009/2010. VNCPC managed and coordinated the activities of this project, including policy advices and demonstration. Consultancy services provided under this project are similar to CPAs.

- **EU/CP4BP:** The project "Cleaner Production for Better Products" (2007 – 2009) funded by EU aimed at building up the capacity of selected industries in Vietnam, Cambodia and Lao PDR to develop environmentally friendly and socially responsible products adapted to the requirements of the European market through the application of product-related CP methodology. The project was executed by the VNCPC in cooperation with the Delft University of Technology, UNEP, the Lao National Chamber of Commerce and Industry and the Phnom Penh Association of SMEs. According to VNCPC, seven selected demo-companies in three priority sectors (furniture,

handicrafts and aquaculture) applied the methodology in the redesign and new design of 87 products and product packaging.

- **CIDA/VPEG**: The Vietnam Provincial Environmental Governance Project (VPEG) is managed and executed by the Ministry of Natural Resource and Environment (MoNRE) with focus on capacity building for local authorities in industrial pollution management. VNCPC provides training and CP consultancy to enterprises in target provinces of VPEG. The Project is being carried out from 2009 to 2013.

- **EU/World Wildlife Fund (WWF)**: The project "Establishing a Sustainable Production System for Rattan Products in Laos, Cambodia and Vietnam" is executed by the WWF, with co-financing of European Union (EU), the international home-products retailer IKEA and the German Development Finance Institution (DEG). VNCPC is a partner and provides CPAs to rattan producers in Hue and Quang Nam province. The project has been carried out from 2009 to 2011.

- **EU/SPIN**: SPIN (Sustainable Product Innovation Project) is managed and coordinated by VNCPC with the objective to demonstrate product innovation in 500 enterprises in Vietnam, Laos and Cambodia. The project, which applies CP4BP on a broader scale**,** is being implemented from 2010 to 2014.

Table 4: Donor funded VNCPC services (2007 – 2011)

Funding	**Type and number of VNCPC Services provided**						
	CP Assessment (CPA)	Technology Gap Assessment (GAP)	Cleaner technology Assessment (CTA)	Cleaner Technology Implementation (CTI)	Financial Engineering Proposal (FEP)	Product Innovation (SPIN)	**Total**
SECO/UNIDO		11	7	6			**24**
SECO/GCTF					10		**10**
UNIDO/VEA			4				**4**
UNEP/PRE-SME	11						**11**
DANIDA/MOIT	47						**47**
SECO/ILO	11						**11**
CIDA/VPEG	10						**10**
EU/WWF	24					2	**26**
EU/SPIN						64	**64**
Total	**103**	**11**	**11**	**6**	**10**	**66**	**207**

Source: Reports VNCPC

To summarize, since 2007 VNCPC has continued to provide traditional CP services and extended its services to new fields. The support of UNIDO/SECO focused on developing and applying new services (GAP, CT, and CTI), while Financial Engineering Proposal (FEP) services were added to support the operation of the GCTF. The projects covering Product Innovation service (CP4BP and SPIN) have been funded by the EU. The

continuation of the traditional services of VNCPC is covered by other donors (UNEP, DANIDA/CPI, ILO, VPEG and EU). Furthermore, VNCPC provided some services in other related areas without however further developing or up scaling them (e.g. EMA and industrial maintenance).

(c) Other outputs of VNCPC

In addition to the CP services to enterprises in Vietnam listed above, VNCPC also provided CP services in Lao PDR and Cambodia and services/advice on environmental/sustainability issues not directly related to the CP methodology. VNCPC further contributed to networking, awareness raising, research and teaching. The following paragraph specifies other outputs delivered and, where possible, the funding source.

- **VNCP provided substantive input to the two SECO-funded CP projects in Lao PDR and Cambodia:** VNCPC completed a CP assessment and training programme for 8 companies in Lao PDR and 9 companies in Cambodia, with a total of 1380 person-days of support[29]. Trainings were delivered through the CP centres of the Ministry of Industry and Handicraft in Lao PDR and the Ministry of Industry, Mines and Energy in Cambodia. This is a good example of promoting the exchange of expertise within a framework of south-to-south cooperation.

- **UN Joint-Programme for Clean Production and Trade[30]:** The objectives of this programme included the strengthening of value chains from the grower to the producer for a number of local products (sea grass, rattan, lacquer ware, sericulture, natural dying and handmade paper). VNCPC provided consulting and training services in the form of sustainability assessments of the chain, training of trainers at the village level (staff of the Department of Agriculture and Rural Development, producers). VNCPC in cooperation with sector-specific experts developed the methodology and implemented it at beneficiary companies. The project covered different rural provinces.

- Within the framework of the project **"Green Industry Policies"** executed by UNIDO, VNCPC trained 37 staff of 16 hotels in Hoi An and some government agencies. VNCPC's support also included a quick scan of 16 hotels (eight of which were selected for a more detailed assessment). Quick scans were also conducted for noodle and lantern producers, providing recommendations on how to reduce environmental impact.

- **UNIDO/CSR**: As a subcontractor of UNIDO, VNCPC implemented the component "Development of Implementation Guide and Delivery training for Consultants on Corporate Social Responsibility (CSR) for Small and Medium Enterprises (SMEs) in Vietnam" under the project "Helping Vietnamese SMEs Adapt and Adopt Corporate Social Responsibility (CSR) for Improved Linkages with Global Supply Chains in Sustainable Production".

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[29] See Independent Evaluation "Promotion of Cleaner Production in Lao People's Democratic Republic" UNIDO 2008 and Independent Evaluation of "Promotion of Cleaner Industrial Production in the Kingdom of Cambodia", UNIDO 2008. VNCPC reported that of those 17 enterprises, 6 companies in Cambodia and 3 companies in Lao PDR benefitted from CP services, the remainder from training.

[30] "Green Production and Trade to Increase the Income and Employment Opportunities for the Rural Poor", jointly executed by UNDP, UNESCO, UNIDO and the ILO.

- **Training and consultancy on Clean Development Mechanism (CDM):** With project support, VNCPC organized a training course for companies and consultancies on CDM. VNCPC also developed five Project Idea Notes (PINs) and one Project Development Document (PDD).

- **Trainings on Environmental Management Accounting (EMA)** for 135 enterprises in Hanoi, Ho Chi Minh City, Danang, Nhatrang and Long An funded by InWent Germany and implemented in cooperation with the Asian Society for Environmental Protection. The business line of EMA was subsequently not further applied.

- **Under funding from OXFAM,** VNCPC provided two training programmes for poor household women businesses in Quang Ninh and Thanh Hoa.

- **Training and Consultancy on Industrial Maintenance**: Under a project funded by Wallonia-Brussels (Belgium), VNCPC conducted awareness raising activities among a total of 8 companies on good "housekeeping" practices.

- **Renewable energy/waste recycling:** In cooperation with the UNEP Environmental Technology Centre in Japan, VNCP developed a project on "Resource enhancement through promoting the use of renewable energy and waste reuse, which was subsequently carried out in two sugar producing companies.

- **VNCP has significantly contributed to building a strong CP network in Vietnam.** This includes a "Service Provider Network" that supports its members financially to improve the quality of their service. VNCPC supported a total of 10 additional CP projects conducted by the members of the network. VNCP also formed an expert group to contribute to internationally-funded projects. 10 training courses were conducted to improve the capacities of those service providers.

- **Organization of Conferences on CP**: VNCPC actively contributed to organizing conferences on CP, including the 7th Asia Pacific Roundtable for Sustainable Consumption and Production (APRSCP) in 2007, with more than 160 and 190 international participants. VNCPC also cooperated with the MOIT in the organization of regular National Roundtables on CP. These conferences aimed at sharing information and experience among experts spurring the dialogue among the academia, enterprises and government agencies.

- **VNCPC contributed to the development of several new projects that subsequently received donor funding**. In partnership with UNEP and the Delft University of Technology, VNCPC developed a project on "Cleaner Production for Better Products", which was subsequently funded by the EU Asia-Invest Programme (2007 – 2009). Its successor project "Establishment of a sustainable production system of rattan projects in Cambodia, Lao PDR and Vietnam" received funding by the SWITCH Programme of the EC and is in the process of being carried out.

- **VNCPC provided recommendations to the CP strategy** developed by the MOIT within the framework of the Denmark-Vietnam cooperation for the environment.

- **Research projects:** VNCPC contributed to different research projects. In cooperation with its host institution (INEST), a survey on "Energy Efficiency Potential Assessment in

Industry" was conducted with funding of the DOST in Hanoi. The survey assessed the potential of reducing energy consumption in a total of 10 companies.

- **Curriculum development for universities:** VNCPC provided training for faculty and staff for universities, both in the form of tailored training (technical universities) and a train-the-trainer course. Consultancy on curriculum development and training was provided to the Food Processing Faculty of University of Nhatrang.

- **VNCPC participated in the working group for developing the ISO 26000 Standard on CSR** led by the General Directorate for Standards and Quality (STAMEQ).

- VNCPC also produced a comprehensive set of manuals and guidelines[31].

- Last but not least, VNCPC continued to conduct regular awareness raising activities through seminars, mass media and participation in exhibitions.

(d) Assessment of VNCPC's contributions to tackling industrial pollution

Table 5: Panel assessment of the importance of VNCPC to tackling industrial pollution relative to other institutions

Type of contribution by VNCPC	High	Medium	Limited	None
Training and pooling CP specialists in Vietnam	11	1		
Promoting teaching/training CP at universities	12			
Triggering donor assistance in this field	3	10		
Mobilizing state support	1	7	4	
Lobbying for the cause of CIP	4	3	5	

As shown in Table 5, the panellists consider that VNCP's contributions to training and pooling CP specialists and promoting/teaching CP at universities were high. Beyond CP in a narrow sense, VNCPC also contributed to promoting other tools, such as eco-labelling and eco-products. According to this assessment, VNCP's contribution to trigger donor assistance and mobilizing state support in the field were less important. Opinions of panellists on the degree of VNCP's contribution to lobbying for the cause of CP are mixed, but none of the experts felt that VNCPC did not contribute.

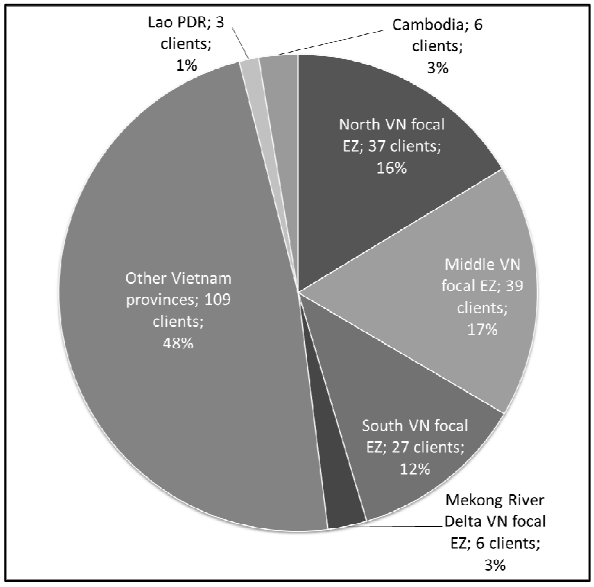
(e) Geographical outreach of the VNCP

According to the expert panel, the three major economic areas, i.e. the Southeast region around Ho Chi Minh City, Hanoi, Haiduong, Haiphong, Quang Ninh and, Da Nang, Quang Ngai, in which 80% of all industries are concentrated, are those most in need of CP services. The expert panel concluded that VNCPC reached more enterprises in the Northern

[31]See detailed list in Annex 6 to Project Completion Report, January 2010.

and Central part of the country than in the South. However, VNCPC seems to have reached companies in the South reasonably well. Although the focus was on the industrialized regions, less industrialized provinces were also reached, as seen from the analysis of VNCP monitoring data in Figure 2 below. Many severe environmental problems occur outside the large industrial zones. A single heavily polluting factory or a craft village in a remote area can affect the livelihood of thousands of people. Craft villages for instance, mostly located in residential quarters, pose a significant threat to the health of the population. Such small scale industries in suburban and rural areas tend to use rudimentary, often highly polluting techniques.

Figure 2: Geographical locations of VNCPC's clients



Source: Analysis of Customer list VNCPC (excluding SPIN)

(f) Assessment of sectoral outreach

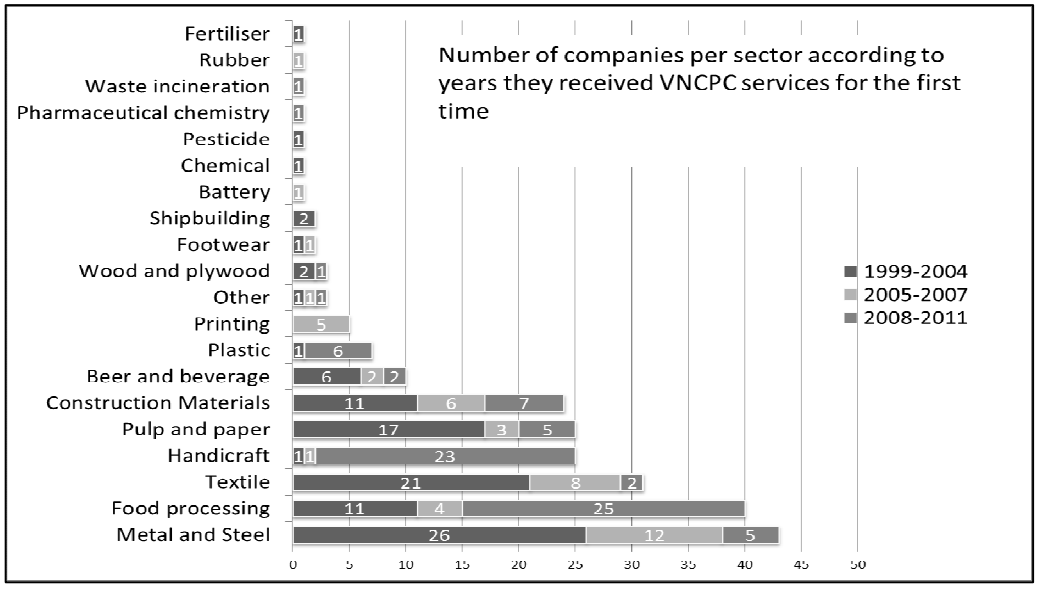
Figure 3 shows the distribution of VNCPC clients by sector and years. Interestingly, the handicraft sector[32] was only covered when VNCPC became involved in the implementation of the project "Establishing a Sustainable Production System for Rattan Products in Laos, Cambodia and Vietnam", the UN Joint-Programme for Clean Production and Trade, and the project "Green Industry Policies" (see brief description of those projects in section 2.C.b/c above). This indicates that donor preference played a role in selection of industries (see also comments on the selection of economic sectors and companies below).

On a scale from 1 (most important) to 6 (least important), the expert panel considered the food processing industry (1.83), the chemical industry (1.83), paper & pulp (2.66), the dying industry (3.5), natural resources exploitation (4), cement (4.16), the footwear& leather industry (4.83) and the textile industry (5.66) as those in most urgent need of CP interventions. According to the assessment of the expert panel, VNCPC had a good coverage of the food processing, paper & pulp, the dying, footwear & leather, and textile

[32] Mainly SMEs with mainly manually processing bamboo, rattan, wood and clay (pottery)

industries. According to the expert panel, the VNCPC did not reach the natural resource exploitation industry and only marginally reached the cement industry. Those two industries tend to be dominated by large state-owned companies, most of which have, due to a lack of appropriate incentives for management, little motivation to improve their financial or environmental performance.

Figure 3: Analysis of VNCP's clients by industrial sectors



Source: Analysis of Customer list VNCPC (excluding SPIN)

(g) Assessment of types of companies reached

The VNCPC seems to have reached state-owned, foreign-invested, local private companies, and household businesses. Larger companies were only marginally covered. The majority of beneficiaries are SMEs. While household businesses in craft villages received services under a number of above mentioned projects, the coverage of this segment of the economy was rather limited. Working with small scale industries was clearly offered by opportunities to contribute environmental support to donor-funded projects using a wider approach to provide support to rural industries. Focusing on SMEs was a deliberate strategic choice of UNIDO, taking into account the overall strategy of the project, the general SME-focus of SECO and initiatives of other donors. Beneficiaries include both exporting and non-exporting enterprises.

(h) Good quality of VNCPC services provided to companies

Respondents who had used VNCPC's services (under the UNIDO project and other donor-funded projects) were "very satisfied" (47%) or "satisfied" (53%). The same reply was obtained by asking about the *usefulness* of the service received. Some companies expressed the wish for more specialized, industry-specific advice and support. While covering a broad range of industries was appropriate at the infancy stage of CP in Vietnam, demand for in-depth expertise is likely to increase in the future. This might require a stronger sector-focus and in-depth specialization of staff at the VNCPC.

(i) Room for improvement in marketing and branding

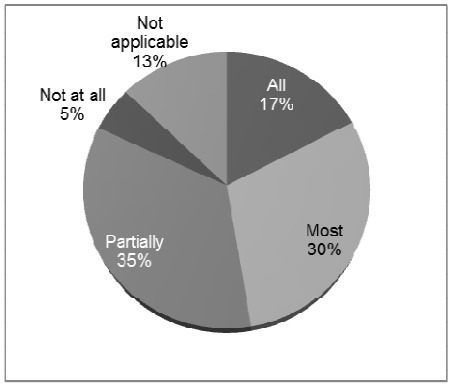
Many companies attributed the services received to the respective donor-funded projects rather than to the VNCPC. This indicates a need to further strengthen marketing and branding of the VNCPC as an institution. Parts of this might be due to donors' wishes for visibility.

D. Use of outputs by target companies

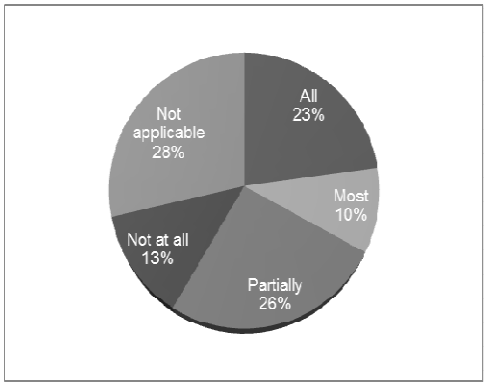
This section assesses to what degree companies who used CP services actually implemented the proposed solutions. Figure 4 shows that 47% of the VNCPC clients implemented all or most of the recommended solutions, 35% several, and 18% none. The picture for the control group of clients of other CP service providers is less favourable. There, only 33% implemented all or most of the recommended solutions, 26% several and a significant portion of more than 40% did not implement any option.

Figure 4: Percentage of companies applying CP options recommended by VNCPC and reference group in comparison

4a VNCPC clients



4b Clients of other CP service providers



Source: Enterprise survey

Low-cost options such as Good housekeeping and process control were more easily implemented as compared to modifications of process and equipment or even more radical changes of technology. Responses of the control group indicate that VNCPC provided a broader range of CP options than its competitors (e.g. two of the enterprises in the control group did not receive any services on process- and equipment modifications). This might be a sign of a diversified and client oriented structure of VNCPC services.

Table 6: Application of CP options

CP solutions applied	VNCPC				
	All	Most	Partially	Not at all	Not applicable
Material substitution	3	3	6	1	6
Good house keeping	5	10	4		
Process control	6	9	4		
Process/ equipment modification	4	5	10		
Technology change	2	1	9	2	5
Reuse & recycle	3	9	5		2
Product modification		3	8	4	4
Total	**17%**	**30%**	**35%**	**13%**	**5%**

Source: Enterprise survey

Reasons for not applying CP options are variable. Survey participants mentioned insufficient economic benefits, unavailable funding and unclear technical feasibility as main reasons for not applying CP options.

Assessment of causality of outputs delivered by VNCPC (C) for the implementation of CP options in companies (D) – Link Number 3:

Lack of appropriate financial services is widely recognized among the CP community as one of the main reasons why companies do not implement CP solutions. SECO tried to lower this barrier by setting up a "Green Credit Trust Fund" with the basic idea to make VNCPC's services "marketable". The GCTF guarantees 50% of the value of loans provided by three selected banks for investments into environmentally friendly technology. The guarantee is subject to a technology assessment. Loans are provided at the discretion of the banks and on commercial terms. GCTF does not provide credits. The guarantee of GCTF is conditional to a technical assessment of the environmental impact of the proposed investments. For larger investments, a second opinion from Switzerland is needed. Companies that have successfully implemented the technological changes receive a bonus, upon confirmation of the environmental impact by the VNCPC. VNCPC markets the GCTF, identifies potential clients, assesses the technical feasibility of proposals and checks impacts to identify bonus credits.

Records of the GCTF and interviews show that to date, the GCTF has only guaranteed five bank loans to companies. One of the loans went concern, due to bankruptcy.

The key reasons for the rather limited use of the GCTF are:

- **The design was based on two similar funds in Peru and Columbia, but not adapted to the Vietnamese context:** Procedures to apply for a guarantee are complicated, because the fund deals with each case individually and does not have "standard models. Similar instruments of other donors (e.g. the IFC, technical support provided by DANIDA) are much easier to access and provide immediate benefits (grants, subsidies of interest rates, incentives for banks), not only a differed bonus. GCTF is thus not competitive and difficult to sell to banks and companies.

- **VNCPC is too technology-minded to work with financial instruments:** While VNCPC seems to have done a good job in identifying possible technology options,

marketing and selling the GCTF seems to have been a challenge, at least at the beginning. It was unrealistic to expect that VNCPC, which had been previously working in research, teaching or under a technical cooperation project would develop a sense of business and easily take up the role of advising companies on financing options.

- **High interest rates, tightening of borrowing by banks**: Besides the above, high interest rates of currently around 22 – 26% per annum make borrowing by companies difficult. In the current economic situation, banks typically require a pledge of assets that are equivalent to 70% of the loan (thus the guarantee by SECO is not sufficient, without additional security). Unclear financial information of companies and the lack of collateral are both common phenomena in Vietnam and present additional problems. After all, decisions to grant loans are taken by banks according to risk factors, not environmental considerations.

To conclude, the contribution of the GCTF to the uptake of CP solutions by companies was marginal, compared with the total number of CP projects implemented by VNCPC. Furthermore, there is no evidence that GCTF's beneficiaries would not have been able to obtain funding elsewhere.

E. E. Policy outcomes and other outcomes

(a) Policy outcomes

In addition to company outcomes, the VNCPC contributed to government policies and the "environmental cause" in general. The demonstration of financial, environmental and production benefits of CP in hundreds of enterprises combined with advocacy and advice to the GoV contributed to developing and implementation of a number of environmental policies. Table 7 shows the assessment of the panel to what degree the VNCPC has contributed to 11 environmental policies.

Not unexpectedly, the panel found that policy outcomes were strongest for those policies that are directly related to CP. But energy conservation policies were also found to be influenced by VNCPC. The combination of policy advice, networking and demonstration projects appears to have been the right strategy for achieving policy outcomes.

Table 7: Panel assessment of VNCP contributions to policies

Legal documents and policies	Contribution made by VNCPC
National Action Plan on CP 2001-2005	*Significant*
Cleaner Industrial Production Strategy in Industry until 2020, Decision No. 1419 of the PM (2009)	*Significant*
Cleaner Production Application in Industry (Directive No. 08/2007 of the Ministry of Industry	*Significant*
Decree 102/2003 on Energy Conservation and Efficiency	*Some*
Circular 01/2004 of MOI on Energy Conservation and Efficient Use for Manufacturing Facilities	*Some*
Decision of the Prime Minister No. 64/2003 on eliminating the most polluting industries	*Little*
National Target Programme on Energy Conservation and Efficient Use (Decision No. 79/2006 of the PM	*Little*
National Strategy for Environmental Protection and Action Plan until 2010 and vision towards 2020	*Little*
Revised Law on Environmental Protection 2005	*No contribution*
National Plan on Environmental Pollution Control until 2010 (Decision No. 328/2005 of the Prime Minister)	*No contribution*
National Target Programme on Climate Change (Decision No.158/2008 of the Prime Minister)	*No contribution*

(b) Other outcomes

- **VNCPC contributed to developing an external expert pool:** Several VNCPC experts trained under the UNIDO projects have moved to the private sector, to other research institutes, other donor-funded projects or to government agencies. New employers include: the Institute for Natural Resources and the Environment (Ho Chi Minh City), the CP centre under DONRE in Ho Chi Minh City, the MOIT, and the International Finance Corporation (IFC). This indirectly contributed to mainstreaming CP into the work of other institutions in the country. One former VNCPC staff has opened her own company, which is providing an extensive range of services to private companies and other donor-funded projects. Staff turnover was a concern of the donor, because of its risk of weakening VNCPC as an institution. University institutions and donor-funded projects often have a training mandate. The fact that trained staff are capitalizing on their know-how as they move forward in their careers should rather been sign as a success than a failure of the project. It is furthermore also an indication that capacity building was successful!

- **Teaching of CP has been integrated into the curricula of several universities**, other than the Hanoi University of Technology (host institution of VNCPC). Some is directly attributable to VNCPC – e.g. through support provided to the University of Nhatrang.

- **VNCPC contributed to attract donor funding:** There is furthermore evidence that in several instances, the existence of VNCPC triggered other donor-funded projects. This is in particular evident where VNCPC directly contributed to drafting project proposals, see section C. above. Some of those initiatives might however not be attributed to VNCPC, but to the fact that environmental issues and Vietnam became a priority for donors.

F. Company impact

Until 2007, VNCPC documented perceived changes in company performance generated by its services. Although the collected data was limited to financial and environmental benefits, this monitoring mechanism contributed a great deal to the credibility of the UNIDO project and of the CP approach as a whole. Unfortunately, this practice was discontinued in 2007. The enterprise survey conducted under this evaluation (see in detail section I, methodology) tried to fill at least some of the data gaps. Table 8 compares the average resource savings based on survey results with data from the VNCP database.

Table 8: Resources saved by companies benefitting from CP services

Resource	Unit	VNCPC data prior to 2007	2011 survey
Electricity	%	7%	8%
Coal	%	9%	10%
Fuel Oil	%	7%	N/A
DO	%	7%	65%
LPG	%	20%	40%
Water	%	18%	30%
Chemicals	%	25%	45%
Electricity	MWh	53	182
Coal	Ton	90	300
Fuel Oil	Ton	41	N/A
DO	Ton	11	10
LPG	Ton	1	130
Water	m^3	14.750	14.000
Chemicals	Ton	22	0,5

Source: VNCPC's records and enterprise survey

Table 9 summarizes and analyses the qualitative assessment of wider benefits of CP services by the enterprises who participated in the survey. Reduced energy and material consumption and better compliance with environmental regulations were considered as key benefits of CP. Waste and water reduction come out mid-range. Among the "non-environment-related" benefits, companies ranked improved working conditions and product quality come as important, which is remarkable. The potential CP impacts on social standards, higher prices and better exports are assessed as comparatively low.

Table 9: Benefits of CP as perceived by VNCP clients

	Strongly agree	Agree	Less agree	Not agree	Overall score
Reduction of energy consumption	11	8			49
Better compliance with environmental regulations of the government	10	9			48
Reduction of input material consumption	10	8	1		47
Working conditions for staff improved	9	10			47
Better product quality	9	10			47
Higher production (volume of output)	8	11			46
Reduction of waste and emissions volume	8	10	1		45
Reduction of waste and emission treatment costs	7	11	1		44
Better compliance with environmental standards requested by buyers	7	11	1		44
Reduction of water consumption	7	11	1		44
Higher labour productivity	6	12	1		43
Company was better able to comply with social standards required by buyers	6	10	3		41
Company achieved higher sales price	4	10	5		37
Company was able to increase export revenues	2	10	7		31

Source: Enterprise survey. The overall score weights answers with a factor 3 - 0

The assessment by the expert panel presented in Table 10 *validates* the survey results.

Table 10: Benefits of VNCP's services according to the expert panel

Qualitative assessment of CP benefits for companies	Strongly agree	Agree	Less agree	Do not agree	Overall score
Reduction of production cost	4	6	1		25
Better compliance with government regulations	3	3	5		21
Obtain access to finance Clean Technology	2	7	5		18
Better compliance with environmental buyer standards	1	4	5		16
Health and safety at work		4	7		15
Reduced environmental impact	2	8	1		15
Better compliance with social standards of buyers		4	6		14
Improved product quality		4	6		14
Ability to find new international buyers		3	7	1	13
Ability to find new national buyers		2	8	2	12
Ability to increase product prices		1	6	3	8

Comment: The overall score weights answers with a factor between 3 and 0

G. Wider impact

This section looks at wider impact in different dimensions.

Wider impact on policies

Table 11 looks again at the 11 environmental policies already dealt with in Table 7. This time, the contributions of the policies to tackling industrial pollution is assessed. Five policies come out as effective policies with significant or at least some contributions. Quite remarkably, the VNCPC has made significant contributions to three of these effective policies. On the other hand, the VNCPC has made no or only little contributions to two of the most effective policies, namely the *Revised Law on Environmental Protection 2005* and the *Decision of the Prime Minister No. 64/2003 on eliminating the most polluting industries.* The latter assessment of the panel is corroborated by the records from the VNCPC database and the enterprise survey, from which only one company could be identified that was removed from the list of most polluting enterprises as a result of a CP intervention.

Table 11: Panel assessment of environmental policies

Legal documents and policies	Contribution made by VNCPC to policy development and implementation	Contribution of policy to tackling industrial pollution
National Action Plan on CP 2001-2005	*Significant*	*Some*
Cleaner Production Strategy in Industry until 2020, Decision No. 1419 of the PM (2009)	*Significant*	*Some*
Cleaner Production Application in Industry (Directive No. 08/2007 of the Ministry of Industry	*Significant*	*Significant*
Decree 102/2003 on Energy Conservation and Efficiency	*Some*	*Little*
Circular 01/2004 of MOI on Energy Conservation and Efficient Use for Manufacturing Facilities	*Some*	*Little*
Decision of the Prime Minister No. 64/2003 on eliminating the most polluting industries	*Little*	*Significant*
National Target Programme on Energy Conservation and Efficient Use (Decision No. 79/2006 of the PM	*Little*	*Little*
National Strategy for Environmental Protection and Action Plan until 2010 and vision towards 2020	*Little*	*Little*
Revised Law on Environmental Protection 2005	*No contribution*	*Significant*
National Plan on Environmental Pollution Control until 2010 (Decision No. 328/2005 of the Prime Minister)	*No contribution*	*No contribution*
National Target Programme on Climate Change (Decision No.158/2008 of the Prime Minister)	*No contribution*	*No contribution*

Quite remarkably, the panel assessed that the majority of the environmental policies (6 out of 11) had made only little or even no practical contributions to tackling industrial pollution. To further explore this rather worrying result, the panellists were asked to identify and assess barriers why policies did not yet lead to the expected results. Table 12 lists 13 barriers and shows the experts' assessment of their relative importance.

Table 12: Panel assessment of barriers
why policies did not yet lead to expected results

	Strongly agree	Agree	Agree less	Do not agree	Overall score
SMEs lack awareness	7	2	2		27
Environmental aspects not sufficiently considered for new investments	7	3			27
Insufficient awareness of government officials	7	2	1		26
Lack of financial incentives by the government for companies to apply CP (e.g. subsidies, tax breaks)	6	3	1		25
Insufficient outreach of administration to provinces	5	4	1		24
SMEs lack the necessary know-how	5	4	1		24
Industry is small-scale, does not have resources/know-how to address pollution	4	4	2		22
Lobbying of powerful interest groups	4	3	3		21
Lack of consumer awareness	4	4	1		21
Insufficient environmental inspection and enforcement	5	3			21
Energy prices too low	1	6	2	2	17
Policies/emission standards of Ministries not aligned	3	2	4	1	17
Access to credit for financing technological upgrading		5	2		12

Although perhaps not entirely consistent, the assessment in Table 12 provides some valuable hints to barriers that could be tackled by the VNCPC in the future. Lack of awareness of SMEs and government officials come out as strong barriers, which the VNCPC could address more forcefully in the future. The lack of the necessary CP know-how and hence the core competence of the VNCPC come out mid-range. The lack of policy instruments such as tax incentives and weak enforcement of environmental regulations are identified as high ranking barriers but which need to be addressed by policy projects going beyond CP. Quite interestingly, access to credit for environmentally friendly technology comes out as the least important barrier, which confirms the negative assessment of the relevance of the Green Credit Scheme mentioned above.

Wider impact on awareness

The still very limited penetration of CP into Vietnam's industrial fabric is confirmed by other sources. In 2010/2011, the Denmark-Vietnam co-operation programme for the environment undertook a baseline survey covering 63 Departments of Industry and Trade (DOITs) and 9,012 industrial production units. This survey concluded that by February

2011 only 1,031 enterprises had applied Cleaner Production, which is equivalent to only a tiny fraction of the estimated existing 600,000 industrial production units nationwide.

Table 13 shows the result of a survey of the General Statistical Office (GSO) on the implementation of the *Industrial Cleaner Industrial Production Strategy until 2020,* (listed as policy number 2 in Tables 7 and 11). The survey confirms that only 28% of the SMEs are aware of CP benefits and that only 11% already apply CP. Both benchmarks are considerably below the respective targets of the CP Strategy. However, the capability of the assigned GoV staff to provide guidance and advice on CP application ranges even lower: only 18% have the required capabilities, which compares badly to the respective target of 70%. These findings confirm the deficits in awareness and capacity building mentioned above.

Table 13: Targets of the GoV's CP Strategy versus achievements

Strategy's objective	**Objective for the period**		**Status reported in 2011**
	2010 – 2015	**2016 – 2020**	
Percentage of industrial production units aware of CP application benefits	50%	90%	28%
Percentage of industrial production units applying CP and able to cut down the consumption of energy, fuel and raw materials per product unit	25%	50%	11%
Level of reducing consumption of energy, fuel and raw materials per product unit	5 - 8%	8 - 13%	Varying
Percentage of medium- and large-sized enterprises having focal points responsible for CP on-site		90%	-
Percentage of DoITs having full-time cadres fully capable of providing guidance and advice on CP application	70%	90%	18%

Wider impact on industrial competitiveness

Although this evaluation does not allow making a quantitative assessment of the wider impact of CP on industrial competitiveness, several qualitative hypotheses can be made. From the analysis in the chapter on company impact above, a positive impact on the competitiveness of companies applying CP can be plausibly assumed. CP leads not only to significant cost reductions for material, energy and water inputs but also to reduced waste and emission treatment costs. But CP is also recognized for its benefits on product quality and, to some extent, on labour productivity. However, there are many other parameters that are critical for industrial competitiveness that are not or only marginally influenced by CP, such as marketing (branding), compliance with quality standards and research and development. As such, CP contributes to competitiveness and facilitates the integration of SMEs into international supply chains, but needs to be combined with other Trade Capacity Building measures.

Wider impact on poverty

This evaluation provides only weak evidence for a potential wider impact of CP on poverty reduction. Given the limited evidence of competitiveness impact, the job creation potential is also uncertain. The most plausible impact channel in this respect appears to be the very high ranking of improved working conditions in the companies' assessment of CP benefits. However, cottage industries, which are known as the production units with the worst working conditions, were reached only marginally, if at all.

Wider impact on UNIDO visibility and recognition

Table 14 shows how the panel perceived UNIDO's contribution to tackling industrial pollution relative to other players. It is remarkable that UNIDO is seen as one of the strongest or even the key player, in particular if one considers its relatively limited budget.

Table 14: Panel assessment of UNIDO's contribution to tackling industrial pollution relative to other players

Donors and executing agencies	At national level				At provincial level			
	Significant support	Some support	Limited support	No support	Significant support	Some support	Limited support	No support
Canada International Development Agency (CIDA)	5	4	1		2	3	1	
Danish International Development Agency (DANIDA)	5	5			1	6		
European Commission (EC)		5	4			2	3	1
Global Environment Fund (GEF)	3	4	3		1	4	2	
Japan International Cooperation Agency (JICA)	6	2	1		2	3	1	
Swedish International Development Agency (sida)	6	4			4	3		
Swiss Org. for Development and Cooperation (SDC)	4	4	1		4		2	1
United Nations Development Programme (UNDP)	7	2	1		4	2	1	
United Nations Environmental Programme (UNEP)	5	4	1		3	3	1	
UNIDO	8	2			5	1	1	
World Bank	5	1	1		1	2	1	

3. Sustainability

This section looks at the likelihood of continued benefits beyond the end of the project, by assessing the institutional and financial sustainability of the VNCPC.

(a) Institutional sustainability

By the end of the project, VNCPC was successfully transformed from a university research institute into a GoV owned company embedded into the "Bac Khoa Group", which holds all companies that provide commercial services of the university. The institutional set up is sustainable and a good example of how to transform a project into a permanent operation. Anchoring VNCPC in a university as opposed to an administrative government agency was the appropriate choice for VNCPC's mandate.

(b) Financial sustainability

The project worked under the assumption that VNCPC would become gradually financially sustainable by selling CP services to the private sector on a commercial basis. VNCPC did continue to provide an extensive range of services after the end of the project. Currently, most VNCPC services are delivered under subcontracts with different development institutions, meaning that VNCPC gets paid for contributing to project implementation. From today's perspective, VNCPC is likely to continue this business model. VNCPC has developed a good reputation among donors. Thus, over the next few years, service provision to donors (which might include CP projects in companies funded or subsidized by donors) should allow VNCPC to cover its costs.

Long-term financial sustainability depends on the emergence of a market for CP services, where enterprises are willing to pay cost covering prices and the ability of VNCPC to compete against other players. Although the financial benefits of CP services are evidenced by survey results, abundant donor support in this field has created the wrong perception of CP consultancy as a "public service" that is provided either free of charge or at highly subsidized rates. Most respondents of the enterprise survey expect further financial support in that sense. As for most other business support services in Vietnam, the continuing provision of free services by donors distorts the market by which the competition from donor-funded initiatives prevents private consultants from charging cost covering rates. VNCPC cannot be blamed for this distortion. Other VNCPC services such as research and policy advice are however even less likely to become profitable. Although VNCPC Ltd is a company, its "business purpose" is still very much oriented towards creating benefits for the public rather than profits. Teaching and research can hardly be charged at cost covering rates and would have to be cross-subsidized by revenues from consulting to companies or through a public project. While medium term financial sustainability seems to be ensured through services commissioned by donors, long-term sustainability depends on a number of external factors beyond the control of VNCPC.

(c) Technical sustainability

Technical expertise of the VNCPC seems to be sustainable. The organization has faced staff turnover, but this hasn't been a major threat. The fact that VNCPC is part of a university is an advantage when it comes to sourcing and training new staff. UNIDO's efforts to embed VNCPC into international networks will be an advantage for the future access to specialized

international expertise. There is however a management risk. Currently, the VNCPC depends entirely on two managers, the Director and Vice-Director. Both are highly networked top specialists with a tremendous amount of credibility among companies and government institutions. In the foreseeable future it would be virtually impossible to replace these managers by other VNCPC staff.

To a certain degree, the VNCPC still lacks the spirit of "creative entrepreneurship" and some of the skills needed to manage a commercial business, including creating a strong brand and visibility. This is partially a result of the rather limited support of UNIDO in the area of managing a consulting operation.

(d) Sustainability of policies to which the project has contributed

Policy advice and lobbying of the VNCPC contributed to enacting specific policies, which all have been approved. Those are fully in line with the Party's and the GoV's long-term strategies. Therefore, perspectives that the current policy directions will continue to be applied are good. Considering the current policy shift towards sustainable growth, it is quite likely that in the medium-term, environmental regulations/policies will be further strengthened and their enforcement improved.

In conclusion: **From today's perspective, key results of the project are sustainable.** Policies developed with UNIDO support are enacted and implemented. An analysis of strategic plans of the GoV and the Party indicates that environment-related policies and regulations are – in line with international trends – likely to be further strengthened. VNCPC has been transformed from a project into a government-owned company, which creates the framework to sell its services on a commercial basis. Technical capacities of VNCPC are adequate to further pursue its mandate, without expert input from UNIDO. Over the next few years, the prospective that VNCPC will able to sustain financially as a sub-contractor of development institutions seem to be good. The potential for selling CP services at cost covering rates to companies are for the time still limited, as CP-services are provided free of charge or at highly subsidized rates by donor-funded projects. The long-term financial sustainability depends on the development of a market for environmental consulting services and whether at this time, VNCPC will be able to successfully compete – both of which is too early to be assessed.

III

Conclusions and recommendations

1. Conclusions

The conclusions of this ex-post evaluation are summarized as follows:

Policy relevance

The expert panel pointed out that industrial pollution is a significant threat for the environment in Vietnam and agreed that CP is an effective tool to tackle this threat. However, the panel underlined that there are other major sources of pollution such as deforestation, agriculture, fisheries and traffic that can only hardly be addressed by CP.

Notwithstanding these conceptual limitations, the NCPC intervention was highly relevant to GoV policies. The initiative was just-in-time to respond to the Directive on strengthening environmental protection in 1998 and the Declaration on Cleaner Production in 1999. Its policy relevance was further increased by a range of environmental policy measures issued between 2000 and 2010, including the Cleaner Production Strategy in Industry until 2020 - the key policy document for enhancing implementation of RECP in the coming years.

Company relevance

Vietnam's industrial fabric reflects the developmental stage of the country. It is very diverse and composed of heavy industries (mostly state owned); light industries in sectors such as textile and footwear that are often dominated by FDI; an increasing number of privately owned SMEs; and a large number of rather backward informal village industries. Similar to other countries, the biggest industrial polluters in Vietnam are large companies. But craft villages applying obsolete production technologies in densely populated rural areas can equally cause major pollution and a threat for vulnerable populations. However, as a concept, CP is primarily relevant to SMEs. Large industries often require specialized environmental engineering and heavy investment. And craft villages require an integrated approach towards tackling "environmental poverty". Adopting the CP approach has been an implicit choice of the project to focus on SMEs. This choice reflected the priorities of all parties, bearing in mind that large polluting companies would have to be reached by other instruments and initiatives.

For companies that are using CP services (which is however still a minority) CP is highly relevant. On a list of 18 competitiveness factors companies ranked the "availability of CP

services" as number four. 10% of the surveyed companies considered CP of top importance, 43% as very important, 30% as important and only 13% as less important for their competitiveness.

Relevance to UNIDO and One UN Vietnam

The VNCPC project has been at the core of the UNIDO mandate and also highly relevant to the "One UN Programme" in Vietnam, which gives high priority to the environment.

Company outreach

Prior to 2007, VNCPC implemented 133 CP Assessments (CPAs) with financial support from 10 different donors. Between 2007 and 2011, the scope of VNCP's CP-related services expanded. During this period, the VNCPC implemented 207 consultancy projects in the form of CPAs, Technology Gap Assessments (GAP), Clean Technology Assessments (CTA), Cleaner Technology Implementation (CTI), Financial Engineering Proposals (FEP) and Product Innovations (SPIN).

Sector outreach

Unfortunately, the monitoring data on the sectoral distribution of the VNCPC outreach to companies is patchy. The majority of the 227 beneficiary companies that were served between 1999 and 2011 operated in six sectors: metal and steel (18.9%), food processing (17.6%), textile (13.7%), handicraft (11.0%), pulp & paper (11.0%), and construction material (10.6%).

Comparing these figures with the panel assessment of sectors that are most in need of CP interventions, the expert panel concluded that on a scale of 1 to 6, the food processing industry (1.83), the chemical industry (1.83), paper & pulp (2.66), the dying industry (3.5), natural resources exploitation (4), cement (4.16), the footwear & leather industry (4.83) and the textile industry (5.66) were most in need of CP.

Therefore, the priority sectors of food processing, paper & pulp, dying, footwear & leather and textile industries were reached, according to the panel assessment.

Geographical outreach

Ensuring a balanced coverage of Vietnam's different regions was part of VNCPC's strategy. The analysis of the VNCPC customers shows that VNCPC served a total of 37 clients in the Northern Vietnam Focal Economic Zone (16%), 39 clients in the Middle Vietnam Focal Economic Zone (17%), 27 clients in the South Vietnam Focal Economic Zone (12%) and 6 clients in the Mekong Delta Vietnam Focal Economic Zone (3%). A total of 109 clients (48%) were located in other provinces; 6 clients in Cambodia and 3 clients in Lao PDR.

This geographical outreach matches the panel's assessment of geographical priorities. The panel concluded that the VNCPC reached enterprises in the Northern and Central part of the country better than those in the South but it seems to have reached companies of the southern industrial clusters reasonably well.

The focus was on industrialized regions but less industrialized provinces were also covered. This is justified because many severe environmental problems occur outside the large industrial zones.

Outcomes at company level

Users interviewed under the evaluation survey were "very satisfied" (47%) or "satisfied" (53%) with VNCPC services. A similar reply was obtained on the *usefulness* of the services. Some companies expressed the wish for more specialized, industry-specific advice and support.

Unfortunately, the VNCPC did not systematically monitor how its clients perceived the environmental and other impacts over the entire duration of the project. The evaluation survey tried to overcome this information gap. The survey and VNCPC data indicate that 17% of the companies implemented all recommended CP options, 30% most, 35% several, and 13% none. Key enterprise benefits recorded are energy saving, reduction of water consumption, improvement of working conditions and meeting environmental regulations. VNCPC was particularly successful in promoting low cost options.

On average, implementation of CP options proposed by VNCPC resulted in considerable resource savings (7% in electricity, 9% in coal, 7% in fuel, 7% in diesel oil, 20% in LPG, 18% in water and 25% in chemical consumption). On average, CP projects achieved cost savings of USD 75,000. Companies invested on average USD 110,000 for the implementation of CP options resulting in an average pay-back period of 1.5 years (not taking into account the cost of capital).

Companies ranked the "availability of CP services" high among different competitiveness factors. Especially for businesses with low production margins and high resource consumption, the reduction of manufacturing cost significantly contributes to higher competitiveness in terms of product prices.

Company impact

Enterprises assessed reduced energy and material consumption and better compliance with environmental regulations as strong environmental benefits and other environmental improvements such as waste and water reduction as medium. Among the non-environmental benefits working conditions and product quality come out very strongly, which is remarkable. However, companies assessed the potential CP impacts on social standards, higher prices and better exports as comparatively low. These findings were corroborated by the assessment of company impact by the panel.

Policy outcomes

The expert panel found that the VNCPC has been successful in providing policy advice and leveraging its company support into the policy realm. The panel analysed a list of 11 major environmental policies of the GoV and found that the VNCPC had made significant contributions to three of these policies (including the Cleaner Industrial Production Strategy until 2020 approved by the Prime Minister in 2009), and some contributions to two other policies. The combination of policy advice, networking and demonstration projects appears to

have been the right strategy to effectively achieve policy outcomes. VNCPC was successful in putting CP on the agenda of businesses and the GoV.

Wider impact of policies

Investigating further into the impact of these environmental policies and the contribution of the VNCPC intervention, the expert panel found that five of the 11 policies made significant or at least some contributions to tackling industrial pollution. According to the assessment of the panel, the VNCPC has made significant contributions to three of these effective policies.

Wider impact on industrial competitiveness

Networking and training of staff contributed to developing Vietnam's emerging CP industry. Many CP specialists in the country benefitted from VNCPC training and some of them are former VNCPC staff. The available statistics on the overall penetration of CP are inconclusive. In 2011 a survey conducted by the Vietnam-Danish environmental program found that 1,031 firms applied CP. The General Statistical Office counted 1,801 manufacturing companies applying CP in 2007 and 2,012 companies in 2012. Surprisingly, the figures for non-manufacturing companies applying CP are almost 10 times higher. The penetration of CP in industrial manufacturing is still low.

The expert panel stressed that effectiveness could be further increased by applying CP along entire value chains and not only at specific production sites. For instance in the seafood and agricultural industry, much waste and pollution occur before and after the processing stage.

Furthermore, lowering manufacturing cost and better compliance with environmental standards are only two of the elements that need to be strengthened in order to enhance competitiveness of companies. Interestingly, companies also ranked some of the competitiveness factors that UNIDO's Trade Capacity Building Branch aims to strengthen as very important, in particular the challenge to comply with different types of quality standards. This indicates the strong potential of leveraging UNIDO's support to the competitiveness of industries through a better integration of services provided under the different branches of UNIDO. A successful integration of companies into multinational supply chains (export capabilities) needs a whole set of coordinated measures, going beyond strengthening competitiveness. Delivering the respective support services through separate channels causes inefficiencies and increases transaction costs for the clients. The SECO-funded FIP executed by the ILO successfully integrated CP into a broader array of services to companies. Another example that goes into the right direction is SECO's holistic trade-cluster approach in Lao PDR, which bundles trade-related technical assistance services from different UN-agencies (CP, labour standards, quality, productivity, and trade promotion).

Wider impact on poverty

This evaluation provides only weak evidence for a potential wider impact of CP on poverty reduction. Given the limited evidence for impact on competitiveness, the job creation potential is also uncertain. The most plausible impact on poverty could be improved working conditions, which ranks very high in the companies' assessments of CP benefits. However, cottage industries, which are widely known as the type of production units where working conditions tend to be bad, were reached only marginally, if at all.

A single heavily polluting factory or a craft village in a remote area can affect the livelihood of thousands of people.

Key impact drivers

Key impact drivers were a combination of capacity building for VNCPC, policy advice, demonstration of benefits generated by CP through successful consulting projects, awareness raising and dissemination of results. VNCPC's contribution to the implementation of other donor projects significantly broadened the impact. The importance of the GCTF as an impact driver was marginal. Crucial was the successful transformation of VNCPC from a project into an institution (company). Anchoring VNCPC in a university as opposed to an administrative government agency was suitable for the role attributed to VNCPC.

South-South Cooperation

Project benefits extended beyond Vietnam and contributed to South-South cooperation. The VNCPC involvement in UNIDO's CP projects in Lao PDR and Cambodia are good examples of South-South cooperation. Furthermore, VNCPC contributed to the regional and international network of the CP community.

Leveraging funds from other donors

From its beginning, the UNIDO capacity building strategy at the VNCPC aimed to position the VNCPC as a service provider not only for UNIDO but also for other donors. This strategy was very successful. Over time, the VNCPC became involved in more than 10 environmental programmes of major donors and agencies such as CIDA, DANIDA, ILO, UNEP and the EU. This strategy allowed leveraging additional funds for the implementation of at least 276 out of 340 consultancy projects.

Sustainability

The results of the UNIDO/SECO support to the VNCPC are technically, institutionally and financially sustainable. As long as there is a sustained demand for CP services, the VNCPC is likely to generate sufficient revenues as a subcontractor of development projects. In the long run, the sustainability of the VNCPC depends on the emergence of a market for commercial CP services. There is no reason, why the VNCPC should not be able to compete in this market with other commercial players. Considering the increasing emphasis of the GoV on sustainable economic growth, policy outcomes are likely to be maintained or even further developed.

2. Recommendations

Recommendations specific to Vietnam

(1) UNIDO should phase out its direct support to the VNCPC but continue its collaboration with the VNCPC and provide opportunities to further develop its services, possibly under a "privileged partnership" arrangement. However, such collaboration should avoid distortions of the emerging market for CP services in Vietnam.

General recommendations for further development of UNIDO's CP approach

(2) UNIDO should consider opportunities to further refine the monitoring schemes of CP projects. Monitoring should not only cover outputs (services provided) but also outcomes at various levels (client satisfaction; improved environmental performances of client companies). Ultimately, the monitoring scheme should enable estimating the environmental benefits the CP project has contributed to. CP Monitoring should use the same nomenclature over time and across projects to make monitoring data comparable.

(3) To enhance the impact of CP projects on the competitiveness of SMEs, UNIDO should further integrate CP and other SME support services. CP, energy efficiency, corporate social responsibility, industrial upgrading, better access to SMTQ services are all relevant for improved SME competitiveness and delivered through "One stop shops" to reduce the clients' transaction costs.

(4) In order to enhance the outreach of the CP approach to vulnerable informal sector producers and populations surrounding the corresponding units, UNIDO should develop a more tailor made approach to address "environmental poverty". It is widely recognized that poor target groups tend to suffer badly from hazardous technologies and production methods and there is a potential for UNIDO to leverage its CP experience into integrated programmes for "craft villages" and other vulnerable groups.

(5) UNIDO should consider whether the NCPC network could be used to deliver support services not only to SMEs but also to medium and large scale industries, which are often "big polluters" that cannot be reached by the traditional CP services. The NCPC network could make a contribution to improve the world-wide market for very specialized expertise by maintaining a roster of international environmental consultants who are specialized in specific technologies or sectors and offering North-South and South-South brokering of consulting services. Better linkages of the network to development banks and their lending programmes should also be considered.

Annex A: Terms of Reference

I. BACKGROUND

Supporting the creation and development of the Vietnam National Cleaner Production Centre (VNCPC) has been a long standing priority of SECO as a donor and of UNIDO as an implementing agency. Table 1 lists the three SECO funded VNCPC support projects conducted between 1998 and 2011.

Table 1 VNCPC support projects

Project Number	Project Title	Budget (USD)	Start/End Date
US/VIE/96/063	Vietnam National Cleaner Production Centre (VNCPC)	**2,376,456**	03/1998 12/2003
US/VIE/04/063	Vietnam National Cleaner Production Centre (VNCPC)	**155,485**	03/2004 12/2004
US/VIE/04/064	Promotion of new CP services through the VNCPC	**2,168,294**	01/2005 12/2011
Total		**4,700,235**	

According to the UNIDO evaluation policy, the project ending in 2011 would be subject to an independent evaluation. However, considering that two independent evaluations of the VNCPC support were already conducted in 2005 and in 2009, that no further funding would be required and that, hence, no further follow-up project is foreseen, SECO and UNIDO decided that an ex-post impact evaluation of the entire sequence of projects would be more appropriate and beneficial than a standard end-of-project evaluation of the latest project only and SECO agreed, in principle, to fund this impact evaluation, subject to submission of the present TORs.

II. PURPOSE OF THE EVALUATION

The NCPC impact evaluation will be conducted as part of the country evaluation of all UNIDO activities in Vietnam that will take place in November 2011. The TORs of the country evaluation provide the overall country context and information on the portfolio of UNIDO projects in Vietnam.

The purpose of the NCPC impact evaluation is threefold:

1. Assess the relevance, ownership, impact and sustainability of the entire sequence of SECO/UNIDO projects related to the NCPC in Vietnam;
2. Feed into the Vietnam country evaluation and provide guidance to future environment related projects in Vietnam;

3. Draw lessons of wider applicability on the variety of impact channels and potential impact drivers of NCPC projects and contribute to improving the RBM based project design in this area.

III. METHODOLOGY

This independent evaluation shall be conducted in compliance with the UNIDO evaluation policy.[33] It will apply the basic principle of "realistic evaluation": "*Intervention + Environment = Impact"*.[34] This means that the evaluation will take into account external factors that may have facilitated or impeded the achievement of impact.

To this end, the evaluation will analyze relevant policies and initiatives of the Government of Vietnam, of other donors and of the private sector that are related to the environment. This analysis of the wider policy and institutional landscape will also be the basis to assess the relevance of the UNIDO support and enable an assessment to what extent a *contribution* of the SECO/UNIDO initiatives to changes in the environmental field can be *plausibly assumed*. In this connection it will be important to attempt an estimation of the overall financial volume of the donor support that went into "cleaner production" or "industrial pollution prevention" between 1998 and 2011.

Diagram 1 presents the tentative stylized intervention logic of the NCPC intervention. The evaluation will adopt the "theory based evaluation approach" along the lines of the logic shown in the diagram to shed light on the results (A to I) and the causal links (1 to 8) of the intervention logic.

The stylized intervention logic will be further developed in the inception report that will specify and describe each result in greater detail and develop, as far as possible, quantitative and qualitative indicators. The inception report will also identify external factors and assumptions.

To assess effectiveness, the relevant project outputs will be described under (A); other inputs to the NCPC coming, inter alia, from the Government or other donors will be described under (B); and the relative importance of these inputs and synergies will be assessed under (1).

The evaluation will give particular emphasis to company related impact channels. The services of the NCPC to target companies will be described under (C); the use of these services by the target companies and their relative importance as compared to other factors will be assessed (D) and (3) and the improved (environmental and other) performances of the target companies under (G).

In this connection, the evaluation will pay particular attention to a "Green Credit Line", which SECO put in place in Vietnam in parallel to the UNIDO project in order to facilitate the uptake of NCPC outputs by target companies. Because this credit line has not been implemented by UNIDO but through a separate mechanism, this evaluation will not deal with it as a project result but assess it as an external factor (assumption).

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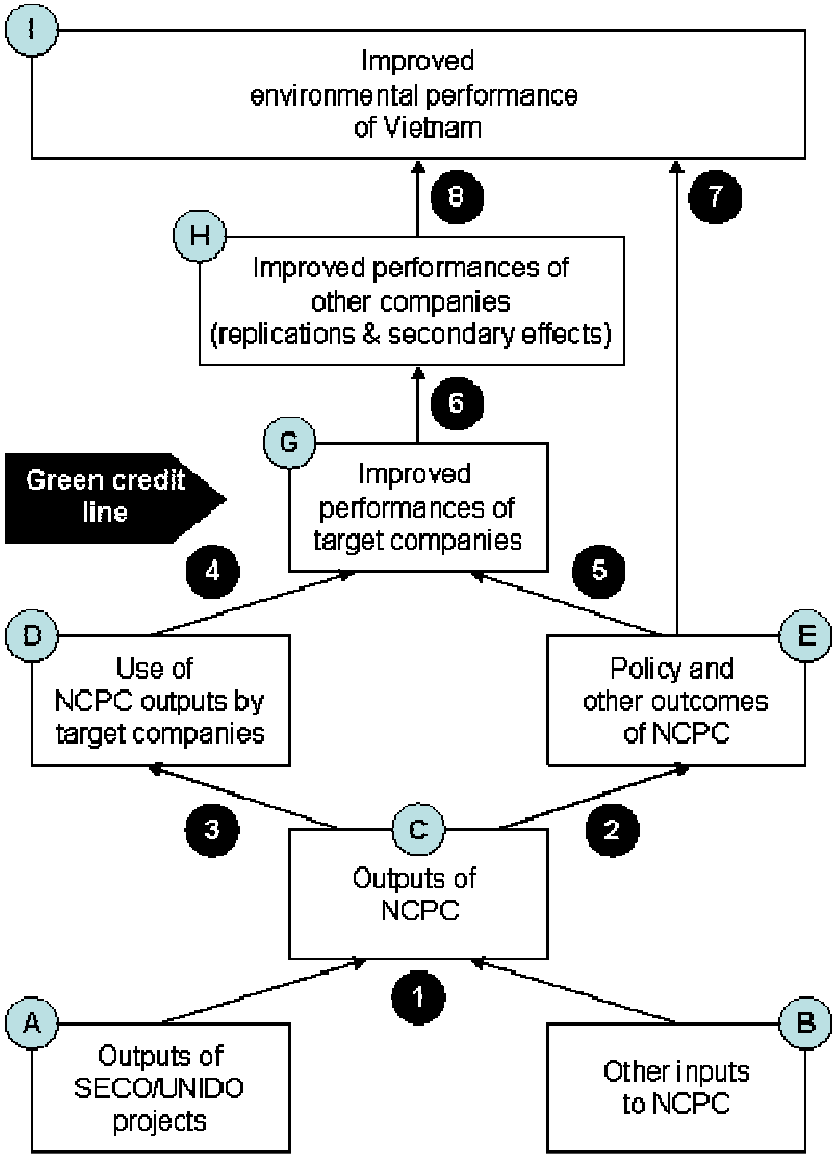
[33] Available from www.unido.org
[34] Pawson, Ray and Tilley, Nick; Realistic evaluation; 1997

Under (E), the evaluation will also attempt unpacking other outcomes of the NCPC such as knowledge flows to other institutions; trigger effects on other donor projects and formation of Government policies and initiatives. It will also explore to what extent these NCPC outcomes may have contributed (7) to Vietnam's environmental performance (I). All other results and causalities shown in Diagram 1 will be dealt with analogously.

The evaluation shall be carried out through analyses of various sources of information including desk analysis, interviews with counterparts, beneficiaries, partner agencies, donor representatives, project staff and through the cross-validation of data. It will also assess the plausibility of each of the causalities, taking into account the external factors and assumptions. In keeping with the UNIDO evaluation policy and while maintaining independence, the evaluation will be carried out based on a participatory approach, which will seek the views of all parties.

Diagram 1: Tentative stylized intervention logic



The company related impact channel (C) – (D) – (G) – (H) will be analyzed by a company survey to be conducted by a specialized consultant or organization in Vietnam. This survey shall cover a significant subset (sample) of the target companies and a control group of non-beneficiary companies. It shall also attempt to look into secondary effects (use of products and services from target companies by third parties) and replications of the approach.

The evaluation methodology will be based on the above considerations and further developed and refined by an iterative process. The cornerstones of the methodology will be as follows:

- Desk study of UNIDO project documents and reports;
- Collection and desk study of studies and reports from other sources describing the context conditions and other related projects and initiatives;
- Identification of relevant initiatives of other donors and of the Government of Vietnam and estimation of the overall financial volume of these initiatives;
- Compilation and analysis of available VNCPC monitoring data of beneficiary companies;
- Validation of monitoring data and interviews with a sample of beneficiary companies;
- Identification of stakeholders and experts with in-depth knowledge of the VNCPC and the cleaner-production-scene in Vietnam (based in Vietnam and abroad) and establishment of a "virtual evaluation panel" of about 20 members;
- Conducting a survey among the members of the "virtual panel" to assess the NCPC/UNIDO contribution to environmental progress in Vietnam. The survey will use a structured Likert scale questionnaire and go through two rounds of questions, similar to a Delphi exercise. The sequence of survey steps would be as follows:
    - Zero round: Panel members comment on the questions
    - 1st round: UNIDO submits the questionnaire for answers (likert assessments plus free text)
    - 2nd round: UNIDO circulates results of the first round and asks for additional comments and revisiting answers

The methodology will be described in detail in the inception report.

IV. THE EVALUATION TEAM

The evaluation will be carried out by an independent international evaluation consultant together with two teams of specialized Vietnam based consultants who will conduct the company survey and the national panel exercise.

The methodology of the evaluation in general and of the surveys in particular will be developed by the international consultant in close cooperation with the Senior Evaluation Officer of the UNIDO Evaluation Group.

The international evaluator will not have been involved in the design and/or implementation of the projects under evaluation.

The UNIDO Evaluation Group will manage the evaluation and be responsible for the quality control of the evaluation process and of the report.

V. TASKS, DELIVERABLES AND TIME SCHEDULE

Tasks of the international evaluator and time schedule of the evaluation:

Task descriptions	Deliverables	Venue	Person/ Days	Delivery dates
Initial desk studies and first round of stakeholder interviews	Inception report	Home base	10	10/10/2011
Guide consultants conducting the company monitoring	Company survey	Home base	3	15/11/2011
Conduct validation interviews with companies			5	
Establish and manage the international part of the "virtual evaluation panel" (~ 10 members)	Panel report	Home base	8	30/11/2011
Guide consultants conducting the national part of the "virtual evaluation panel" (~ 10 members)			3	30/11/2011
Desk studies and analysis of results	Draft report	Home base	5	10/12/2011
Writing of draft report	Draft report	Home base	6	18/12/2011
Presentation and discussion of draft report	Draft report	Vienna	2	20/12/2011
Finalization of report	Final report	Home base	4	15/01/2012
Total			**46**	

Tasks of the team of consultants conducting the company monitoring survey:

Task descriptions	Person/days
Compile existing data on impact of VNCPC at the company level until 2007	10
	10
Input to design of survey translation	5
Survey a sample of 10 beneficiary enterprises (UNIDO-VNCPC) through face-to-face interviews (on relevance and impact of CP) 2007 - 2011	10
Survey a sample of 10 beneficiary enterprises (DANIDA-VNCPC) through on-site interviews (on relevance and impact of CP)	10
Identify a sample of 10 beneficiary enterprises (non-VNCPC, e.g. VPC, HCMC CP Center, IFC or other projects) through on-site interviews	30
Summarize results for evaluation report (tables/charts, narrative text) according to guidance of team leader.	10
	10
Total	**95**

Tasks of the team of consultants conducting the national part of the "virtual evaluation panel":

Task descriptions	**Number of days**
Identify 10 local stakeholders for expert panel (government, enterprises, enterprise associations, other stakeholders). Provide input to questionnaire; translate questionnaire into Vietnamese; Conduct 2 rounds of face-to-face interviews with panel members. Summarize results of first rounds and contribute to the establishment of questionnaire for second round (Delphi method). Summarize results of second round (brief narrative summary of results as input to report)	20
Contribute to the assessment of the project (policy relevance, policy impact, brief narrative summary as input to report)	5
Review of/contribute to evaluation report	5
Total (within November 2011)	**30**

Annex B: Members of expert panel and list of persons met

Expert Panel

- Mr. Le Minh Duc, Institute for Industry Policy & Strategy (IPS), MOIT
- Mr. Dang Tung, Project Director, DANIDA CPI-Component
- Ms. Nguyen Thi Lam Giang, Expert, DANIDA CPI-Component
- Dr. Hoang Duong Tung, Deputy Director General, Vietnam Environment Agency (VEA)
- Assoc. Prof. Dr. Le Ke Son, National Project Director of VPEG, Vietnam Provincial Environmental Governance Project (VPEG) funded by CIDA
- Dr. Nguyen Danh Son, Consultant, Vietnam Provincial Environmental Governance Project (VPEG)
- Dr. Nguyen The Chinh, Deputy, General Director, ISPONRE, MONRE
- Dr. Le Thi Thu Hoa, Dean, National Economics University, Hanoi, Faculty of Urban and Environment Economics and Management
- Dr. Nguyen DucThang, Former Deputy Director General, Department of Science, Education, Natural Resources and Environment (DSENRE) - Ministry of Planning and Investment (MPI)
- Dr. Prof, Phan Thu Huong, Former Director General, DSENRE, MPI
- Ms. Do Thi Huyen, Program Analyst, Biodiversity and Climate Change, Sustainability Cluster, UNDP, Hanoi
- Mr. Nguyen Thien Phuong, Deputy Director General, Department of International Science and Technology Cooperation, VEA, MoNRE
- Mr. Nguyen Van Thanh, Deputy Director, Industrial Security and Environment Agency, MOIT
- Prof. Dr. Tran Huu Nhue, University of Construction Hanoi
- Mrs. Le Thanh Huyen, Project manager, UNICEF
- Dr. Nguyen NgọcSinh, Chairman, Vietnam Association of Nature and Environment Protection
- Ms. Nguyen Thi Tong, Vice Chairwoman, Secretary General, Association of Leather and Footwear Industry in Vietnam
- Mr. Cao Huu Hieu, Textile and Garment General Corporation, Hanoi

- Mr. Tran Anh Tan, Director, Center for Cleaner Production, MOIT.
- Dr. Tran The Loan, Deputy Director, Pollution Control Agency, VEA
- Mr. Jostein Nygard, Expert, World Bank
- Mr. Hans-Roland Lindgren, Expert, Swedish Environment Protection Agency
- Mr. John Patterson, former expert, CIDA-Project (VCEP phase I + II) and VPEC
- Mr. Ari Juhan Huhtala, Expert, World Bank
- Ms. Isabelle Thibeault, Project Manager in Vietnam, Vietnam Provincial Environmental Governance Project (VPEG) funded by CIDA.

List of Organizations and persons met

- VNCPC: Dr. Nhan, Director; Ms. Nga, Deputy Director; Mr. Thang, Ms. Hang, and a group of other technical staff (a total of three rounds of interviews)
- Swiss Coordination Office, Embassy of Switzerland in Hanoi, Ms. Brigitte Bruhin, Deputy Country Director, Ms. Giang, Programme Officer
- UNIDO Country Office, Hanoi, Mr. Patrick Gilabert, Country Director
- UNIDO CSR Project, Mr. Florian Baranek, Chief Technical Advisor
- Ms. Eva-Maria Krummenacher, Programme Manager, responsible for Green Credit Trust Fund, SECO; Ms. Hang (VNCPC) responsible for Green Credit Trust Fund within VNCPC
- Japan International Development Agency (JICA), Hanoi
- National Institute for Environmental Engineering, National Academy of Science (by phone)
- Institute for Natural Resources and Environment, University of Ho Chi Minh City, Ms. Tuyen(by phone)
- Centre for Sustainable Development and Environmental Engineering, Hanoi National University, Mr. Viet, (by phone).

Annex C: List of Documents

- Promoting Cleaner Production in Vietnam: The Role of Training & Education in Strengthening Industry's Environmental Behavior, Final Report, April 1, 2003 (prepared by Carrie Mitchel, for John Patterson, Chief Advisor and Project Manager, Vietnam – Canada Environment Project (VCEP)

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- UNCRD/UNEP/Institute for Global Environmental Strategies: National 3R Strategy Development, A progress report, on seven countries in Asia from 2005 – 2009, 2009. (Chapter 3.7 on Vietnam)

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- UNIDO: Report of the Independent Joint In-depth Evaluation Mission, Vietnam National Cleaner Production Centre (US/VIE/96/063), June 2003

- UNIDO: Report of the Independent Evaluation, Integrated Programme of Cooperation Between the Socialist Republic of Vietnam and UNIDO (2003-2005), Industrialization and Modernization along the Socio-economic Strategy: Towards Sustainable Growth in the SME Sector (March 2005)

- UNIDO: Final report of "Introduction of BAT and BEP methodology to demonstrate reduction or elimination of unintentionally produced persistent organic pollutants (UP-POPs) releases from the industry in Vietnam (GF/VIE/08/005), July 2011

- UNIDO: Independent Evaluation of the UNIDO-UNEP Cleaner Production Programme, Country Evaluation Report, Vietnam (2008)

- UNIDO/VNCPC: Project Completion Report, "Promotion of new cleaner production services in Vietnam through the Vietnam Cleaner Production Centre", VIE 04/064, January 2005 – December 2009, January 2010.

- UNIDO: Project sheet, project 4: "Promoting Industrial Energy Efficiency through System Optimization and Energy Management Standards in Vietnam", 2011

- UN and GoV: Joint-Programme on Green Production and Trade to Increase Incomes and Employment Opportunities for the Rural Poor, Programme Document (project 7, UNIDO)

- UNIDO: Final Report on Rattan and Bamboo Product Development, Joint Programme on Green Production and Trade to Increase Income and Employment Opportunities for the Rural Poor, April 2011

- Ralph (Skip) Luken, UNIDO Expert, Proposal for a Resource Efficient Greening of Industry Initiative in Vietnam, March 2011. Annex 1 on policies, Annex 2 of donor projects

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