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FINAL REPORT TO UNIDO

Support to the National Cleaner Production Centre, Tunisia
on
Cleaner Production Capacity Building in Tunisia
prepared by

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Oslo, Norway 1. July 1999

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- Chapter 1: Abstract: Summary evaluation of the overall results of the first cycle CP program
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- Chapter 6: Recommendation to UNIDO, CITET and Ministry of Environment in Tunisia

CP-programmes: Tunisia final rep

1. Abstract

According to UNIDO Contract No. 97/335 with WCPS (UNIDO Project No.: US/TUN/97/060)

a Cleaner Production Capacity Building Programme designed according to the OECD Best Practices Guide for Cleaner Production Programmes was started in January 1998.

Prior to this start up preparatory work have been implemented in 1996 and 1997 according to report from WCPS/Oekoraad of 6. February 1998 to UNIDO.

The objective of the first Tunisian-Norwegian CP training program:

The aim of the project is to train CITET as the new NCPC of Tunisia and CP3 of Tunisia, and leaders from industry, consultants, universities etc as local CP trainers for CITET, in planning and operation of cleaner production capacity building and dissemination programmes designed according to the OECD Best Practices Guide for Cleaner production Programmes. This also includes the implementation of CP assessments/audits and action plans in production enterprises and the creation of demonstration projects/companies.

The overall results of the first program cycle:

After a review of the final reports from each participating production company, and the examination 29. and 30. June 1998 of each candidate, and a follow up of the CP implementation work in the factories in the winter/spring of 1999, and after the successful implementation of a dissemination seminar 22nd June 1999 we can state as our final conclusion:

The final result must be regarded as very satisfactory considering all the unexpected problems with partly lack of participation from production managers and large cuts in time for plenary sessions and in-company advise due, to unexpected and unnoticed holy days during first plenary etc and problems of communication especially due to the change in local organiser/co-ordinator for the program. (from CP3 to CITET)

The fact that more than 75 per cent of the candidates was passing the exam with excellent- or very good results was also above the expectations in earlier stages of the program. Out of these more than 30 per cent also had excellent or very good pedagogic presentations. Practically all of the candidates have earlier stated their high interest in joining a corps of part time advisors in new programmes. They must be trainees in 1-2 more programmes before they can qualify as full CP trainers. 15 participants from companies + 3 CP3/CITET advisors passed the exam. 10 production companies is satisfying the criteria as case companies and all will later probably be demonstration companies.

After having processed the data from the final company reports and from the exam in more detail, and after having conducted follow up meetings with the companies in winter/spring of 1999, we can state that the *implemented* environmental results and in-company savings are varying more than normally from company to company, but that the results as a hole are very satisfactory and at an average level (compared with other WCPS CP programmes internationally) All companies that completed the exam in the first program have followed up

their action plans. This means that they have implemented all housekeeping options. The medium term investment options that was scheduled to be implemented before the end of 1999 have been implemented or are under final detailed planning for implementation in 1999.

From the analyses of the results we refer the following headlines:

- A total investment in 10 enterprises of 417 863 dinars have resulted in yearly savings of 624 642 dinars
- 119 options was identified in the 10 enterprises during first program.
- 43 options implemented and 76 options under implementation. 9 rejected
- 25 % implemented waste reductions.

This is in line with WCPS program results in central Europe. Only a few of the companies have implemented or started the implementation of long term investments. About half of the companies have after having completed the action plan in the highest priority production line continued the assessment in other production lines, and all of the companies seems to be committed to continue where this is relevant. The in-company sustainability seems to be satisfactory. A good follow up program is however essential to secure the sustainability. CITET should give this high priority.

A major change in financing policy will occur later this year; The environmental fund (FODEP) will be opened for CP investments. 20 % of the investment sum will be given as grants, 50 % as soft loans (low interest rate) and 30 % has to be financed by the company. This is expected to speed up the implementation of investments requiring outside loans considerably, and we expect that average emission reduction will reach more than 50 per cent less than 2-3 years after exam. (as in other WCPS programmes)

With a proper and optimum participation from both production industry and from consultants, branch organisations, universities etc. in the 2nd. and 3rd. programmes, the *total capacity* will then be minimum 70 certified trainer candidates, out of which minimum 20 will be highly qualified CP trainers willing to work full or part time for the dissemination program. We will also have a minimum of 40 approved CP case projects (all of which are or can be expected to be demonstration projects with implemented long term bank financed investments). We expect CITET to be a highly qualified CP centre with highly qualified local CP co-ordinators (program leaders) in min. 2-3 industrialised cities of Tunisia. (See the attached 2. WCPS draft of a National CP plan for Tunisia for further details)

It should be noted that the unit cost per case company and per trained local advisor in the coming programmes is expected to be reduced to about 30 per cent of the unit cost of the first program, partly due to increase in participation to optimum (30 companies and 50 participants instead of 15 companies and 27 participants as the case was in program 1) and partly due to considerable less need for foreign advisors. (only quality control/examination and some administrative support and supporting post examination programmes).

WCPS/OEKORAAD was in January 99 asked by CITET's director to prepare a proposal for a National plan for capacity building and dissemination of cleaner production in Tunisia. A first draft was submitted to CITET March 31 1999. A slightly revised edition was prepared after a meeting in CITET 17 and 18th. of June 1999. This is attached to this report as appendix 2. The meeting had no comments to the included budget. CITET presented the main elements of a National Action Plan for CP at the delayed dissemination seminar June 22 1999. A draft

for this presentation is attached as appendix 3 (CITET's final budget proposal is expected to be ready soon). Based on the speeches given by CITET's general director and the Minister of Environment at the dissemination seminar June 22 1999 we expect it realistic with a 6-7 year time for full dissemination of CP to all relevant industrial enterprises in Tunisia.

The participation in the dissemination seminar of enterprises with interest to take part in new CP programmes was very good, and we expect that CITET will reach the optimum participation of 30 production enterprises and 45-50 relevant participants (from production co. And also from consulting firms, branch org., universities etc) in the next CP OECD/WCPS model program without much extra marketing efforts.

Major conclusions and recommendations:

In Chapter 5 is included some major conclusions and results from the first CITET/WCPS training of trainers and CP demonstration program included an evaluation of the present local CP capacity. In Chapter 6 is given recommendations to CITET, the Tunisian government and to UNIDO which we regard as crucial for the success of CP capacity building, dissemination of CP action planning and implementation in all relevant Tunisian enterprises. We refer to this chapter for careful considerations.

2. The Main Programme

A short summary evaluation of each session of the training and demonstration program is given in each sub-paragraph For a more detailed review we refer to our progress report 1 and 2.

1 plenary 5-7 January 1998

15 production companies and 27 participants completed the first plenary.

Evaluation: Major deviations from OECD Best Practices Guide gave a lower than normal quality/quantity of options generated and a serious lack of participation from outside production companies (consultant, universities, branch organisations etc) Change from CP3 to CITET as local co-ordinator (NCPC) caused misunderstandings.

1. Intermediate period

Evaluation: Lack of time and recourses to follow up advise given from WCPS resulted in a not so satisfactory follow up of balancing and option generation work as may be expected at this stage.

2. Plenary Session 3-5 March 1998

12 production companies met to the 2. Plenary. (-3)*Evaluation: The lack in in-company progress was partly compensated in plenary 2, but 3-4 companies was still lagging behind normal progress.*

2. Intermediate period.

Evaluation: Still serious lags from normal status for 3-4 companies. Satisfactory follow up in the others.

3. Plenary Session 21 - 22 April 1998

11 production companies met to the 3 plenary (-4)

Evaluation: The overall impression of the status is now good. Still considerable variations from company to company, but excellent work in some. Implementation of actions hampered by complicated in-company decision process. The CP competence of $\frac{3}{4}$ of the participants is now good or excellent.

3. Intermediate period

A final report was submitted from all 11 companies that had been permitted to the exam

Evaluation: A much better follow up by the new CITET's project leader in close co-operation with WCPS/CP3, and the latest in-company achievement combined with the incentive to get the certificate, had created a high motivation by the participants. Status for 7-8 of the remaining 11 companies was now good compared with other WCPS programmes. .. The environmental results and savings in companies was generally at the same level as for the first WCPS programmes in other countries.

4. plenary - Exam

The 4th plenary - Exam was conducted 29 and 30 th. of June 1998.. 16 participants met for exam. The rest had been excluded or had felled off earlier due to their lack of full follow up of the requirements. 12 production companies was represented at exam. 3 companies had left at earlier stages of the program due to lack in required follow up and presence at all plenaries. 15 participants passed the exam

Evaluation: All the 15 candidates that passed the exam, had done a very good or excellent assessment work in the production companies. More than half also had excellent pedagogic presentations. One candidate had failed to get an assessment done properly in a production line in his own company but had a good understanding of the procedures from classroom work. . 11 final reports from 10 production companies was approved. (2 separate departments in one company) The reports and action plan was good or excellent in 8 companies and satisfactory in 2. Implementation of housekeeping options varied from satisfactory to good/very good. Implementation of short term investments was slightly less than normal compared with other WCPS programmes.

Other activities to safeguard sustainability and secure implementation.

WCPS/Oekoraad have as mentioned in 1 progress report, offered to conduct a support seminar on Policy Instruments and Strategies for high level governmental officials with the aim to support the dissemination of CP programmes to all relevant industry and to secure the in-company sustainability and the implementation of action plans from the CP Capacity Building Programmes.

CITET are still considering this offer, but we have understood that there are another programme ongoing with this aim in Tunisia. CITET have also expressed their interest in WCPS support programmes in Financial Engineering, EMS, Reporting and follow up. A CP follow up system have been discussed between CITET and WCPS.

3. Follow up after exam.

After the 4th plenary the 10 companies with approved final reports have been followed up after ¾ to one year (after exam.)

Evaluation: The follow up one year after exam, shows that all companies in general have followed their action plans presented at the exam. and have implemented CP options according to the action plan. This is an even better follow up than WCPS have experienced in many other countries.

The average implemented emission reduction is ca. 25 per cent which is about average compared with results from WCPS programmes in other countries only one year after exam. The in-company implemented yearly savings varies considerably. An average payback period for investments in all 10 companies of less than one year is caused by implementation of both short term and long term investments.

A draft National Plan for CP capacity building and dissemination of CP to all relevant industry with a total budget of 1.2 million US dollar over a 6 year period, was prepared by WCPS/Oekoraad (attached to this report), and seems to be adapted by CITET with some minor adjustments of organisation and budget.

4. Dissemination seminar

The dissemination seminar that originally was scheduled to October 1998, was finally carried out on 22nd of June 1999 (program attached). The latest two postponements was due to changes in political leadership in the Ministry of Environment and other causes not in control of the organiser CITET.

In her welcoming speech the General director of CITET Mme Amel BENZARTI made a strong commitment for CITET to implement a National Plan for further CP capacity building and dissemination of CP to relevant Tunisian enterprises within the next 5-6 years.

The Minister of Environment in Tunisia Mne Faiza KEFI said that the government would give high priority to the implementation of CP in Industry and supported the implementation of the National CP plan. Representatives of P.N.U.E., Industrial and Trade Union of Tunisia

(U.T.I.C.A), UNIDO, The Environmental Fund (F.O.D.E.P.) and other stakeholders, gave honour to the results all-ready achieved and underlined the need for a good follow up.

The National and International Declaration of Cleaner Production was signed by the main stakeholders present.

200 leaders and experts from local government, Tunisian industry, local NGO and international organisations was present. 50 invited production companies with potential interest to join new CP programmes was among the participants.

Evaluation: A very good dissemination seminar showing high commitments from CITET and from government to follow up the intentions of CITET to implement a National CP plan, and with high interest also from a large number of companies and leaders/experts to join new CP programmes.

5. Conclusions from the first WCPS/CITET CP training of trainers and in-company demonstration programme.

In this chapter is included some major conclusions and results from the first CITET/WCPS training of trainers and CP demonstration program included an evaluation of the present local CP capacity.

Participation

The aim of having min.15 production companies entering the program was as mentioned in first progress report achieved, but 3 companies have dropped out during the program in the very beginning and one later due to and heavy work load.

The number of participants was somewhat lower than planned and considerable lower that possible at start up. . Due to company drop-off and for some few also due to lower understanding and follow up abilities and fulfilment of in-company tasks than required for certification, only 22 candidates + 4 advisors from CP3/CITET was certified and will be ready to join the corps of advisors/assistant advisors in the next program, with the aim of being full trainers from program 2 and 3.

It was very promising that practically all participants indicated a clear interest in doing teaching/advising for other companies in the next program.

Main programme barriers and obstacles

Despite 35 per cent cut in time for first plenary due to the for WCPS advisors unexpected holydays, the motivation and understanding of the assessment procedures have generally been good in the companies that completed the program. The aim of having at least 15 % and up to 30 per cent participation from candidates from outside production companies (consultants, branch organisations, universities/research institutions etc) have not been implemented by local organiser. Since these candidates are the most willing to be trainers

in new programmes later this will give us a considerable lower number of trained advisors for the following programmes.

Extra efforts in the first intermediate period and in the second plenary was planned and partly implemented to make up for the shortened first plenary. WCPS therefor offered to include 2 x 2 days extra in-company option generation training/advise during the first intermediate period in February 1998. All production companies should have been invited to attend this. This was not followed up by the local organisers for different reasons, and instead only 2 companies was selected to be given extra in-company training.

Instead we included extra training in the second plenary on problem solving/option generation techniques in 6 case companies. One day was used for this and gave very good results. From 30- 67 options was generated per production line based on good draft balances. Due to this we had to shorten one of the other activities; financial engineering/ investment analysis.

We believe that nearly all of the participants, who was very active and highly committed during the second plenary, was given the necessary extra training, permitting them to continue their assessment work in their own company and make up for most of the lags compared with the original plans. During the third plenary we experienced that the extra efforts mentioned had given results.

Overall results

The overall result after exam 29. And 30. June 1998 is that 15 participants from companies + 3 CP3/CITET advisors passed the exam. 10 production companies is satisfying the criteria as case companies and will later all probably be demonstration companies. This final result must be regarded as very satisfactory considering all the unexpected problems with partly lack of participation from production managers and large cuts in time for plenary sessions and in-company advise due, to unexpected holy days etc and problems of communication especially due to the change in local organiser for the program.

Implemented environmental results and in-company savings.

We must regard the environmental results and savings *implemented* so far, in companies from the first CP Capacity Building Program in Tunisia program as very satisfactory. In appendix 1: "Synthese des Resultats du Programme de Renforcement des Capacitets Nationales en Matiere de Production Propre", is given a more detailed description of some of the results.

From the analyses of the results we refer the following headlines:

- A total investment in 10 enterprises of 417 863 dinars have resultet in yearly savings of 624 642 dinars
- 119 options was identified in the 10 enterprises during first program.
- 43 options implemented and 76 options under implementation. 9 rejected
- 25 % implemented waste reductions.

Educational results

More than 75 per cent of the candidates was passing the exam with excellent- or very good results. Out of these more than 30 per cent also had excellent or very good pedagogic presentations. Practically all of the candidates have earlier stated their high interest in joining a corps of part time advisors in new programmes. They must be trainees in 2 more programmes before they can qualify as full CP trainers.

Project leadership

When planning this program, the support from WCPS was based on an expected need for a low number of Norwegian CP trainers/experts and 3 very experienced CP advisors in CP3 (NCPC). NCPC was expected by UNIDO to play a co-ordinating and catalytic role. With WCPS support at a low level it is important that the local program co-ordinator also have good experience from CP assessment in industry. This requirement was also met by CITET, as the new NCPC, after the second plenary.

Evaluation of present local capacity and need for further foreign support:

Local competence for operating 2nd. basic program and support programmes/activities:

- *1-2 local trainers with very good competence for the basic training program (successful long experience with CP assessments in several industrial branches and full experience with working according to the OECD BPG). In addition 8-10 of the best CP qualified production leaders and CITET experts certified with WCPS - PD certificates from 1 st. program, should be mobilised as assistant trainers or trainers in the next program. They will do a very competent advising/teaching job in most parts of the program but may lack enough experience from some important elements. Partial backup in second program with one WCPS trainer especially for professional problem solving/option generation procedure would be beneficial. Partial quality control/examination/WCPS-certification should (as always in these programmes) be performed by WCPS until full local CP capacity is reached (after 3rd. OECD BPG program).*
- *Local competence for running financial engineering support program should be present in the local fund (FODEP) and in banks but they should preferably be trained in the special designed WCPS 2x2 days "do it yourself" workshop usually offered one year after basic program.*
- *Good local knowledge of policy instruments to secure sustainability and implementation of CP action programmes in companies is present. Local knowledge of the special WCPS policy workshop and follow up can easily be added.*
- *The local competence for running EMS support programmes is present. Additional training for ISO 14000 certification may be needed.*

- *Help to design a proper follow up system should be provided by UNIDO/UNEP or WCPS.*

Local competence for operating 3rd. And following basic programmes and support programmes:

- *Provided enough of the best PD-certified candidates from first programmes participate as assistant trainers in a complete second basic program , we regard the need for foreign support by WCPS to be reduced to partial quality control/examination/certification and some support by phone/fax/E-mail.*
- *There will probably be only minor needs for help with support programmes provided local financial institutions take part in the first financial engineering support program.*

6. Recommendation for future activities for the development of the NCPC concept and for local political follow up.

The need for further foreign expert support by WCPS and UNIDO is stated in the previous chapter.

The complete WCPS proposal for a full build up of local CP capacity (except administrative build up of CITET's CP department and local manuals etc) is described in the WCPS 2. draft National Plan for Capacity Building and Dissemination of CP in Tunisia. (Attached to this report). In the attached CITET draft is included their outline of needs for CITET administration and support materials etc. A 1.5 mill US dollar total budget for the entire 6 years program period should secure full CP capacity build up, as well as full dissemination of CP assessemnts/audits/action plans in all relevant industrial enterprises in Tunisia before the end of 2006. The following recommendations is based on this plan and on the experience from WCPS CP programmes in 9 countries in Europe, Asia and Africa.

- To secure in-company program sustainability and implementation also of the long term profitable options some governmental subsidies is regarded as essential. We strongly recommend the following to be decided by the Tunisian government as soon as possible:
 - Governmental grant (direct or via the environmental fund – FODEP) of US \$ 250 000 per year in a 6 year period starting from year 2000, for CITET to implement a National CP plan according to OECD Best Practice Guide structure with WCPS amendments. If this is granted the need for donor support from UNIDO/Norway can be limited to some special follow up and support functions.

- Governmental support including grants for a follow up program offered to industry to secure in-company dissemination, sustainability and implementation of in-company action plans. This should be offered to the companies after each company's first CP assessment/audit and approved reports and CP action plans. This support program shall as a minimum include:

A contract between the Ministries of Environment and Industry on the one side and each relevant company participating in the National CP plan and thus having completed the CITET/WCPS model program, on the other side. This contract which should refer to a local CP declaration should state the obligations of the government and the obligation of each enterprise in the follow up program:

- 20 per cent grants from FODEP (environmental fund) for any approved long term CP investment to companies participating in the National CP plan/follow up system.
- A system of yearly reporting on emissions- and waste reductions, investments and savings
- * Soft loans (low interest rates and long payback period) offered for all approved CP long term investment options in companies with satisfactory solidity (from business plans)

To further secure the sustainability and implementation of the in-company action plans and a good and continuous follow up of the results some additional important policy instruments must be considered. The preparation and analyses of a proper combinations of policy instruments should first be done in policy instrument workshops with participation both from relevant ministries (Environmental, Industry, Finance) and from industrial organisations as well as CITET/CP3. And then finalised in inter-ministerial committees with participation also from industry and with CITET as secretariat. Policy instrument options that should be among the ones to be considered may be:

The following list of possible policy instruments is selected both from developing countries, CEE-countries and OECD countries. The last listed instrument is only under consideration (marked «C»).

- *Legal requirements for CP audits and periodic reporting.*
- *A pollution charging system designed to stimulate CP/industrial development and profitability.*
- *Post-phone requirements of «end of pipe treatment» on conditions that stimulate CP/pollution prevention with profits*

- *Joint CP programmes with industry and municipalities.*
- *A certification of trainers- and prize/award system for companies.*
- *Require EMS and CP assessment/auditing to get loans and grants for any purposes. («C»)*

Oslo 1. July 1999

World Cleaner Production Society - Økoraad

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REPUBLIQUE TUNISIENNE

**MINISTERE DE L'ENVIRONNEMENT ET DE L'AMENAGEMENT
DU TERRITOIRE**

Centre des Technologies de l'Environnement de Tunis

(CITET)

**Programme de Développement des capacités nationales
en matière de Production Propre**

Juin 1999

Programme de Renforcement des Capacités Nationales en matière de Production Plus Propre

1. Introduction

Dans le cadre de ses activités de formation, le CITET a élaboré et mis en œuvre avec la collaboration technique de l'institut norvégien de production propre (WCPS) et le concours de l'ONUDI un programme intégré et pragmatique de production propre dans le but d'améliorer la performance économique et environnementale des entreprises tunisiennes par la minimisation des déchets et l'utilisation rationnelle et efficace des ressources.

1.2 Liste des entreprises participantes au programme

Dénomination de l'entreprise	Secteur d'activité
AMS	Mécanique/traitement de surface
BACOTIM	Textile/ teinturerie
CAPA	Fabrication de pâte
GFCO	Confiserie (Halwa Chamia)
Groupe TTI-TSI	Electrique/Injection plastique
Imprimerie Officielle	Impression offset
Etablissements Slama Frères	Raffinage des huiles
SITEX	Textile/finissage
EL MAZRAA	Abattage de volaille
SOFITEX	Textile/ teinture et impression

2. Objectifs du projet :

2.1 Objectif général :

- développement des capacités nationales en matière de production plus propre

2.2 Objectifs spécifiques :

- former les cadres techniques
- développer les capacités technologiques
- démontrer dans la pratique les avantages économiques et environnementaux
- disséminer les résultats du projet

3. Concept et avantages comparatifs de la Production Propre

3.1 Définition

La production propre est l'application continue d'une stratégie environnementale préventive intégrée aux *processus, produits et services* afin d'améliorer leur efficacité écologique et réduire les risques pour les humains et l'environnement.

Processus de production:

- Conservation de la matière premières et de l'énergie
- Elimination de la matière première toxique
- Réduction de la quantité et la toxicité de toutes les émissions et déchets à la source

Produits :

Réduction des impacts négatifs tout le long du cycle de vie du produit, à partir de sa conception jusqu'à son ultime mise en décharge

Services :

Intégration des considérations environnementales dans la conception et la fourniture des services

3.2. Avantages potentiels de la Production Plus Propre au niveau de l'entreprise

Avantages économiques :

- Réduit les coût de production (économie d'énergie, d'eau, de vapeur, de matière première)
- Moins de pénalités pour infraction environnementale
- Réduit le coût de gestion des déchets (traitement, transport)
- Réduit l'investissement et les charges d'exploitation des équipements de dépollution
- Améliore l'efficacité des procédés
- Améliore la qualité du produit

Avantages écologiques :

- Moins de déchets générés et de pollution
- Meilleures conditions de travail et de sécurité
- Moins de risque environnemental (responsabilité)

Avantages Additionnels :

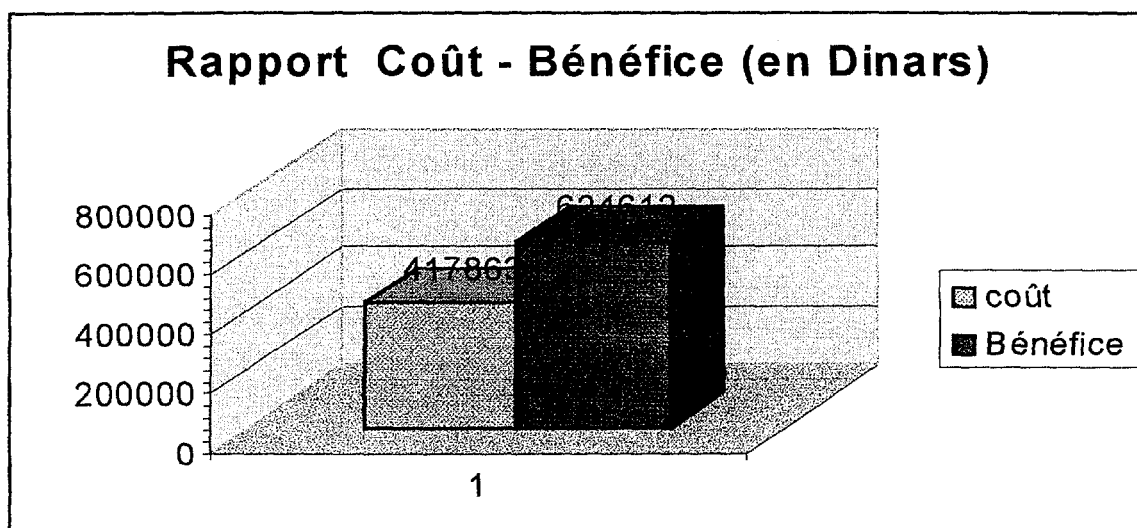
- Améliore la compétitivité
- Améliore l'image de marque de l'entreprise

4. Résultats du projet :

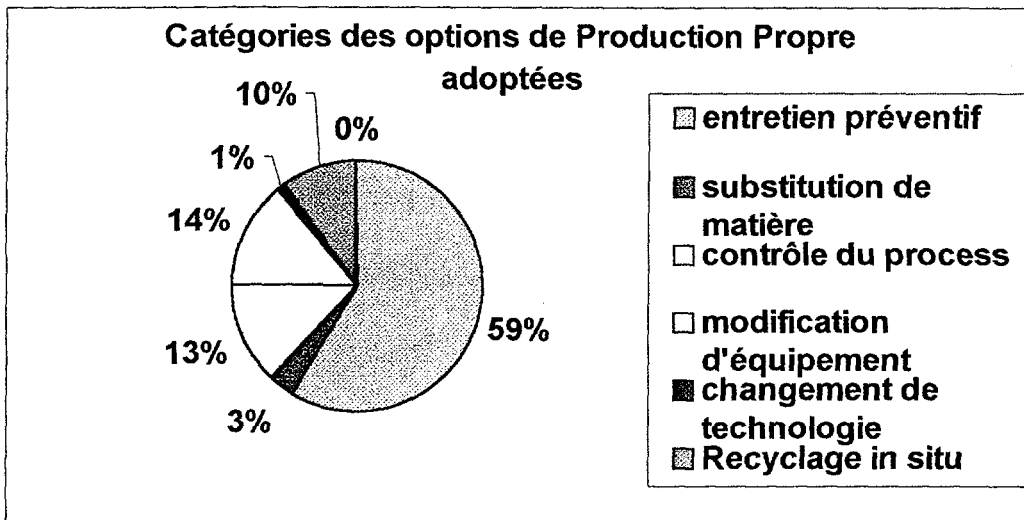
Les résultats du projet en chiffres :

- ⇒ 119 options de production plus propre identifiées dans 10 entreprises
- ⇒ 40% des options mise en œuvre dans la première année
- ⇒ gains économiques estimés à 624 612,000 Dinars
- ⇒ réduction des déchets estimés à 25% des quantités générées et des économies substantielles dans la consommation d'eau et d'énergie
- ⇒ investissement estimé à 417 863,000 Dinars
- ⇒ temps de retour de l'investissement : < 1 an

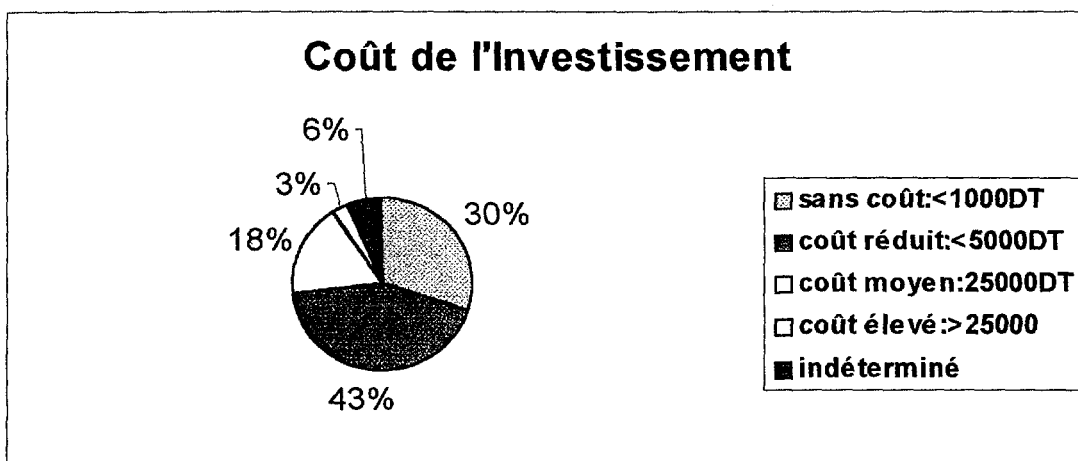
5. Analyse des résultats :



Les bénéfices générés par la mise en œuvre des options de production plus propre sont évalués à 624 612,000 Dinars par an, contre des investissements estimés à 417 063,000 Dinars en une seule fois. Ainsi le temps de retour de l'investissement est inférieur à un an.



Le projet de démonstration a permis l'identification de 119 options de production plus propre identifiées dans 10 entreprises. 59% des options identifiées porte sur les améliorations de gestion de la production en renforçant l'entretien préventif, le monitoring, le contrôle efficace de l'inventaire et les mesures d'économie d'eau et d'énergie. Ces options sont souvent faciles à mettre en œuvre et d'un coût minime. Les modifications technologiques des procédés représentent environ 17% des options et sont souvent les plus onéreuses et plus complexes à mettre en œuvre.



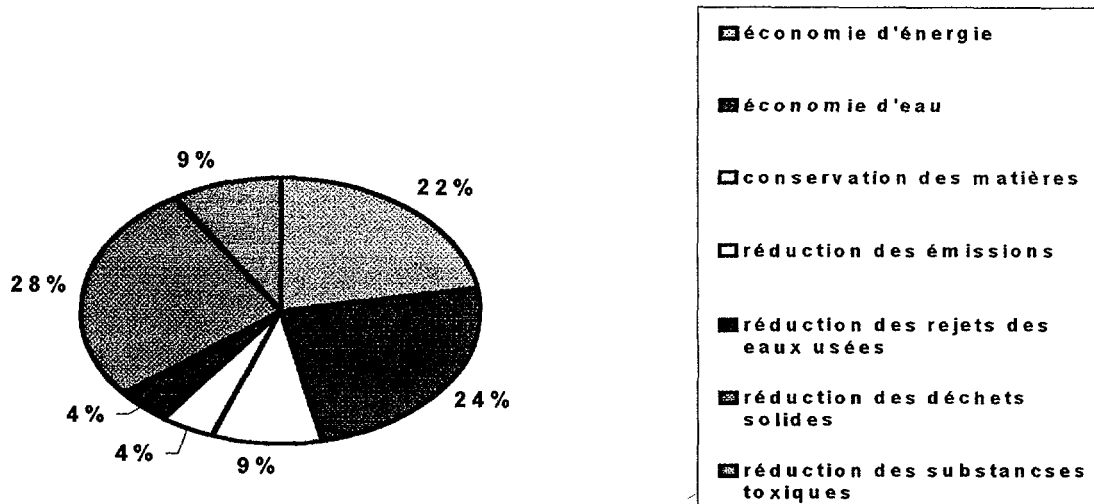
Le coût des investissements portant sur la minimisation des déchets et l'utilisation plus efficace des ressources est souvent réduits. Environ 70% des options identifiées ont un coût inférieur à 5000 Dinars.

Temps de retour de l'investissement

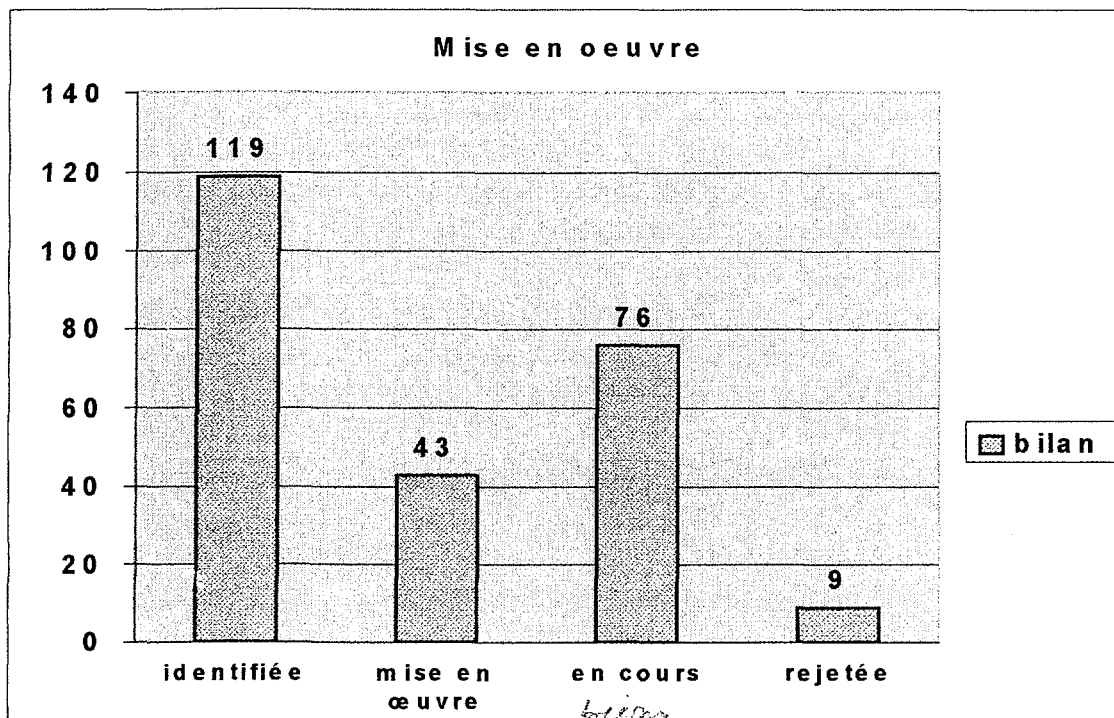


Le temps de retour du capital investi est souvent court (inférieur à 6 mois) lorsqu'il s'agit d'investir dans les bonnes pratiques de gestion de la production en évitant le gaspillage et en renforçant l'efficacité d'utilisation des ressources. Ainsi plus de 60% des options identifiées sont amorties dans une période entre 1 et 6 mois.

Avantages Environnementaux



Les avantages environnementaux du projet de production propre sont traduits en termes de réduction des déchets solides, des rejets hydriques et des économies d'énergie et d'eau.



Environ 40% des options de production propre identifiées ont été mise en œuvre au cours de la première année du projet dans la mesure où elles sont faciles à réaliser et d'un coût réduit. Les options nécessitant des investissements relativement importants ont fait l'objet d'analyses de faisabilité plus approfondies et intégrées dans le plan de mise à niveau de ces entreprises.

5. Conclusions

- formation d'un noyau de cadres techniques (15) en production propre
- réduction des coûts de production et des coûts associés à la gestion des déchets
- des obstacles persistants (attitude, organisation, technique, manque d'incitation)

6. Recommandations

- développer des guides techniques sectoriels
- développer les cercles de minimisation de déchets
- promouvoir l'audit de production plus propre dans l'industrie
- multiplier les projets de démonstration par secteur industriel

Appendix 2 to final
report to UNIDO

**NATIONAL PLAN FOR
CAPACITY BUILDING AND DISSEMINATION
OF CLEANER PRODUCTION IN TUNISIA**

SUMMARY DRAFT PROPOSAL TO CITET, TUNIS

FROM

**WORLD CLEANER PRODUCTION SOCIETY/ØKORAAD
NORWAY**

Report No. 99/06/1/Økoraad/Nedenes

Draft 2 June 21st. 1999

WCPS

DRAFT EXECUTIVE SUMMARY

(Only revision from draft 1 is concerning local organisation.)

Goals and objectives

The overall objective of this report is to prepare a draft Cleaner Production Capacity Building (CPCB) and Dissemination program covering all relevant production industry in Tunisia.

The overall objective of the proposed CPCB program in Tunisia is to establish Basic Capacity Level (BCL) *) within 1 1/2 year from start-up of the second CP training of trainers and demonstration program in Tunisia. The final goal to be reached by the end of 2006 is that this, based on local resources/capacity, will result in CP dissemination to 1300 industrial enterprises (believed to cover more than 90 per cent of the pollution emission from industry in Tunisia)

Organisation (revised from the draft 1 version after consultation with CITET)

It is proposed that the National CP centre (NCPC) at CITET use CP3 for the operational co-ordination on behalf of CITET, until Basic Capacity Level (BCL) is reached. As soon as possible CITET should aim at a model of responsibility and management for local operation that is partly decentralised. The National Cleaner Production Centre at CITET will continue to have a control and overall administrative responsibility, but the objective should be fast up building of local capacity in 1-2 industrial cities besides Tunis for operation and implementation of the training and advise. CITET's local CP – co-ordinator should preferably be organised on contract for part time service and the co-ordinator should be selected by CITET from the best trainers from the first three CP trainer certification programmes. CP3 is a natural co-ordinator for the Greater Tunis Area and will be operational before BCL is reached. These local CITET co-ordinators shall submit regular progress reports to CITET which have the authority to contract a new local co-ordinator when required. The local co-ordinators may be located in a relevant local NGO or a local University or research institution that can provide necessary administrative support etc. A close follow up / quality control should be organised by the Ministry of Environment as an independent task outside the National or local CP centres. A good option for organisation of the independent quality control is to use an NGO not connected to any pollution control functions.

*) OECD definition of Basic Capacity Level is:

The Basic Capacity Level is the level which is needed for further dissemination of the CP concept and principles throughout industry and society by the host country. Specifically, it involves creating:

- *an active core of CP advisors and trainers*
- *a set of CP case studies, demonstration project and model business plans*
- *a functioning CP centre or Centres*
- *training material in the local language*
- *cleaner production principles, included in university course curriculum, such as business administration, engineering and economics, and*
- *a monitoring framework and quality assurance*

The program

The proposal is that the second CP certification of trainers and demonstration program also shall be open to all branches with large waste problems. All experience shows that the results from such programmes are just as good or better than branch programmes.

After exam of the second certification of trainers and demonstration program the output shall be min 15 part time highly qualified trainers willing to work part time in the national dissemination program. This number shall be raised to 30 by the end of the third CP certification of trainers program. The number of good demonstration or Case companies shall at this stage be min. 50.

The main and basic part of the BCL-program proposed is the *combined program for training the trainers and establishing of demonstration projects*. This is the main activity to establish BCL in Tunisia. It includes an option for up to 1/3 of the companies to take only first part of a full program (short version) A *separate* short version of this program aiming only at in-company CP assessments and establishing of action plans will be started during the second year of the program proposed. This short program will after BCL be the core of a full low cost dissemination of CP to all relevant companies in the province.

A mixture of branch programmes and all-branch programmes will be offered as soon as the demand for CP programmes is well established.

Costs

The cost per company for this main dissemination program is estimated to US \$ 950-1250 .(cost for training relevant in-company leaders but not including in-company cost and not including CP centre overhead and marketing). This also includes the cost of a financial engineering support program to be offered separate after 2-3 short programs. This will include business plan for the entire company and set up of professional application for loans to local banks.

The long term budget needed for CITET's cleaner production capacity building and for the national and the local CP co-ordinators dissemination of CP dissemination to all relevant industry in Tunisia is as follows: (CITET administration and overhead cost not included)

*1999/2000: US \$ 135 500 * 2001: US \$ 138 000 * 2002: US \$ 120 000
 *2003: US \$ 190 000 * 2004: US \$ 285 000 * 2005: US \$ 330 000

Sustainability and follow up

A lay-out of main factors in a plan for institutional and economic sustainability will be included in the detailed plan to be drafted and some crucial actions to help build up this sustainability is included in the project proposal. The up building and safeguarding of institutional as well as economic sustainability will be dependent on some legal and economic instruments or financial support from local government. In the project proposal a special support program for high officials from government is included. Concerning the question of full self financing from industry we expect after BCL is reached, that the program cost for *short programmes* to be financed partly by fees from the companies, (provided the necessary policy instruments are established), and partly by support from the government. A possibility to get support from local

banks and/or intermediates of international banks is not yet investigated. (The Nordic Investment Bank and EBRD is expected to use this program as a cost-effective mechanism for identifying projects for loans).

The external follow up program, including monitoring and reporting on achieved results etc., will after BCL, pending the strength of the policy instruments, be financed by local government.

Expected outputs

Expected output of the second combined purpose CP capacity building program at time of exam or within one year after exam.

- 20 CP assessment Case studies implemented and approved in participating production companies.
- 20 CP action plans for the next 2 years approved. Most of these will 1-2 years after exam be incorporated into business plans for the companies (financial engineering support programme)
- 25 trained and PD-certified local assistant trainers from industry, universities, branch organisations and consultants. (The best of these assistant instructors will be certified as full trainers after experience from 1-3 additional programmes and the most qualified managers will be offered to lead provincial CP centres) 15 of these certified assistant trainers shall be highly qualified as future trainers and willing to work part time in the national dissemination program.
- Ca. 10 additional diploma candidates able to lead the assessment in own company (taking only 1st. plenary + a follow up one day seminar and no exam)-equivalent to short program.
- Significant environmental improvements from housekeeping and low investment actions implemented at time of exam.
- Yearly economic savings from implemented housekeeping and short term investment are average min. 2 times the investments.

Expected output of the third combined purpose CP capacity building program at time of exam or within one year after exam.

- 25 CP assessment Case studies implemented and approved in participating production companies.
- 25 CP action plans for the next 2 years approved. Most of these will 1-2 years after exam be incorporated into business plans for the companies (financial engineering support programme)
- 30 trained and PD-certified local assistant trainers from industry, universities, branch organisations and consultants. (The best of these assistant instructors will be certified as full trainers after experience from 1-3 additional programmes and the most qualified managers will be offered to lead provincial CP centres) 15 of these certified assistant trainers shall be highly qualified as future trainers and willing to work part time in the national dissemination program.
- Ca. 10 additional diploma candidates able to lead the assessment in own company (taking only 1st. plenary + a follow up one day seminar and no exam)-equivalent to short program.
- Significant environmental improvements from housekeeping and low investment actions implemented at time of exam.

- Yearly economic savings from implemented housekeeping and short term investment are average min. 2 times the investments.
- The capability of the local National Cleaner Production Centre at CITET has been strengthened and the provincial centre are gradually prepared to take over the responsibility for operating the short version CP program which is the core of the further dissemination of CP locally.

Total expected output latest at time of reaching basic capacity level.

Basic capacity level (BCL) is expected to be reached max. 1 ½ years after the second CP certification of trainers program exam. Three WCPS/OECD model CP capacity building programmes have been implemented at time of BCL. (The first was finished in 1998) 3-5 *separate* short CP program have been implemented the second year.

- 2-3 local CP co-ordinators with enough highly qualified willing CP trainers on full or part time basis (> 20 out of > 70 certified candidates) to secure continuation of the dissemination of CP assessments to all relevant industry in Tunisia. A minor governmental part financing or financing from financial intermediates of the African development bank or other financial intermediates, of the training and industrial CP assessment program (short programmes) is under negotiation or secured, if needed in addition to stimulating policy instruments.
- Min. 40 approved CP case projects in min. 50 case production companies implemented. More than 20 demonstration plants with model business plans and complete CP action plans for all production lines, with both short term and long term CP investments, are implemented.
- 50 additional companies having taken separate short program, have done CP assessments in at least one production line, and prepared action plans with housekeeping actions implemented, and with short- and long term investments planned.
- Reported implementation of CP options in the case companies have resulted in more than 40 per cent average reductions of emissions and waste in the production lines assessed, after 1 1/2 years of repeated assessments.
- Yearly savings from implemented housekeeping and short term investments in the case companies are average min. 2 times the investments. The medium and long term investments show good profit (normal pay-back period < 5 years)
- Cleaner production principles is under planning or included in university curriculum.
- Appropriate financial mechanism aimed at stimulating and supporting Cleaner Production activities including long term investments, have been established or are under consideration/planning.
- The local CP co-ordinators is ready to do project identification for financing through the ordinary WCPS/NCPC CP program and financial engineering support program.
- An external system of periodic reports to NCPC are in operation, and followed up by WCPS.
- More than half of the companies having participated in the 1st. and 2nd. WCPS/NCPC program have established a satisfactory Environmental or CP Management System not later than 1 1/2 year after the exam.
- New combinations of policy instruments to support the dissemination and the sustainability of CP programmes have been considered, or are under consideration, by high /decision makers officials from the National or provincial government.

- The local CP co-ordinators have the operational responsibility for further dissemination of CP to all relevant industry in the local province and is running short CP programmes. WCPS will, pending financing, still give necessary support on critical tasks to be done.
- A local CP declaration have been signed or have been considered, by the Environmental and the Industrial ministries of Tunisia. A system of voluntary letter of intents, signed by the Tunisian Environmental and industrial minister and general manager of industrial enterprises having participated in the provincial CP program, have been considered by local Ministry and Local Industrial Associations.

Expected output of the national dissemination program at end of program period 31.dec.2005

Shortly after reaching BCL a minimum 100 production companies have all ready completed CP assessments in at least one production line and have established action plans and implemented low and medium term CP investments and for some also long term investments.

In the next 4 1/2 years the rest of the relevant production enterprises shall have participated in the National CP dissemination Plan. This means that by the end of 2005 all relevant production enterprises have participated in the Short Version CP program (see fig. Appendix 1) and have completed CP assessment in minimum one production line and have completed action plans. Minimum half of the companies have participated in a financial engineering support program within two years after the first completed action plan. These companies have completed a business plan and have applied for loans for long term CP investments in local banks or other financial mechanism (revolving CP funds or environmental funds etc) Most of these companies shall have received loans and implemented also considerable long term CP investments.

A condition for successful full participation by the remaining 1200 companies (after BCL) that we consider relevant for CP assessment in Tunisia, is that the government has established the necessary policy instruments and financial support. We expect that the following is in operation latest 2 years after established BCL.:

- New combinations of policy instruments to support the dissemination and the sustainability of CP programmes have been approved by the Tunisian government. These instruments are securing the following:
 - All relevant companies will join the national program either due to economic incentives or due to legal requirements or both.
 - All relevant companies will monitor waste streams and emissions and give reports to provincial CP centres and NCPC on environmental results and in-company economic savings etc.
 - The real cost of pollution emissions is reflected by pollution charges or other mechanism.
- Appropriate financial mechanism aimed at stimulating and supporting Cleaner Production activities including long term investments, have been established. These mechanism are securing the following:

- Loans are available on favourable conditions and with simple lending procedures.
- Grants are available to stimulate high risk development of new CP solutions.

Long term budget for CITET/NCPC and local CP centres CP capacity building and dissemination to all relevant industries in Tunisia.

<i>Activity</i>	<i>1999 & 2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>
<i>1.1 Pre-project 2nd ..pr.</i>	<i>10 000</i>					
<i>2.1 2nd.. CP certificat.</i>	<i>50 000</i>					
<i>1.2 Pre- project 3rd ..pr.</i>		<i>10 000</i>				
<i>2.2 3rd..CP certificat.</i>		<i>50 000</i>				
<i>3.1 Policy workshop</i>	<i>5 000</i>	<i>3 000</i>				
<i>3.2 Financial Eng.</i>		<i>18 000</i>	<i>10 000</i>	<i>10 000 x 5</i>	<i>10 000x10</i>	<i>10 000x10</i>
<i>3.3 EMS</i>		<i>10 000</i>	<i>4 000 x 2</i>	<i>4 000 x 8</i>	<i>4 000x12</i>	<i>4 000x15</i>
<i>3.4 Follow up system</i>	<i>12 000</i>	<i>10 000</i>	<i>15 000</i>	<i>18 000</i>	<i>25 000</i>	<i>25 000</i>
<i>3.5 Dissemination</i>	<i>2 000</i>	<i>2 000</i>				
<i>4.0 Short programmes</i>		<i>12 500 x 2</i>	<i>12 500 x 8</i>	<i>12 500 x10</i>	<i>12 500x14</i>	<i>12 500x14</i>
<i>5.1 Info exchange w.sh</i>		<i>9 000</i>	<i>9 000</i>	<i>9 000</i>	<i>9 000</i>	<i>9 000</i>
<i>5.2 Various activities</i>		<i>2 000</i>	<i>2 000</i>	<i>2 000</i>	<i>2 000</i>	<i>2 000</i>
<i>5.3 Final assessm. Data</i>						<i>35 000</i>
<i>6.0 WCPS support and quality control</i>	<i>6 000</i>	<i>3 000</i>	<i>3 000</i>	<i>3 000</i>	<i>3 000</i>	<i>3 000</i>
<i>7.0 Contingency</i>	<i>15 000</i>	<i>13 000</i>	<i>13 000</i>	<i>16 000</i>	<i>23 000</i>	<i>31000</i>
	<i>1999 & 2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>	<i>2005</i>
<i>TOTAL:</i>	<i>140 000</i>	<i>155 000</i>	<i>160 000</i>	<i>255 000</i>	<i>385 000</i>	<i>440 000</i>
<i>- participation fee</i>	<i>4 500</i>	<i>17 000</i>	<i>40 000</i>	<i>65 000</i>	<i>100 000</i>	<i>100 000</i>
<i>CITET budget support:</i>	<i>135 500</i>	<i>138 000</i>	<i>120 000</i>	<i>190 000</i>	<i>285 000</i>	<i>330 000</i>

The TOTAL budget figures listed above is total cost figures excluding administrative support from CITET and overhead CITET budget support is the total cost minus the assumed participation fee of 100 US \$ for both CP trainer certification program and the short version program, and 50 US \$ for financial engineering support program and 25 US \$ for EMS program.

Oslo 21 June 1999

World Cleaner Production Society - Økoraad

Olav S. Nedenes

Appendix 3

to

Final report to UNIDO

from

WCPS – OEKORAAD

on

CP- Capacity building in Tunisia

Unité de Production Propre (UPP)

1. Introduction

Mission

Promouvoir le concept et les pratiques de PP à l'échelle nationale (auprès du secteur industriel, public et privé, des universités, bureaux d'études et ONG....)

Contribuer à la mise à niveau environnementale des entreprises par l'adoption de stratégie préventive qui concilie entre l'économique et l'écologique dans un but de renforcer la compétitivité des entreprises tunisiennes..

Objectifs

- Développer et Renforcer les capacités nationales en matière de PP
- Promouvoir et encourager l'intégration de la PP dans les activités industrielles
- Inciter les décideurs à adopter en priorité les mesures de prévention de la pollution par opposition aux mesures conventionnelles de traitement de la pollution

Stratégie

Pour créer les conditions propices d'une stratégie basée sur la demande, le CNPP concentrera ses efforts sur :

- La stimulation de la demande pour la PP

- La promotion des approches préventives comme complément ou substitut aux solutions conventionnelles

La stratégie de CNPP sera articulée autour des axes suivants :

- campagnes de sensibilisation
- projets de démonstration
- ateliers de formation
- diffusion d'information
- expertise et conseil

Services

Les services majeures de CNPP peuvent être classés dans les quatre catégories suivantes :

- Assistance technique pour la réalisation des audits de PP et la mise en œuvre de systèmes de gestion environnementaux dans les entreprises industrielles.
- Formation en matière de PP (techniques et technologies propres, méthodologie de l'audit, mise en œuvre...)
- Diffusion de l'information sur les nouvelles technologies de PP pour les différents secteurs de l'industrie
- Conseil pour la promotion de la PP

Diffusion d'informations

- fonds de documentation technique, bases de données et autres sources d'information directement accessibles
- bulletins d'information et brochures
- guides sectoriels
- séminaires et journées de sensibilisation

Formation

- Programmes de formation technique au profit des différents opérateurs à savoir entreprises, universités, associations professionnelles et ONG
- Ateliers de formation par alternance à l'attention des responsables de production
- Programmes de formation de formateurs en vue de bénéficier de l'effet multiplicateur et propager le concept de Production Propre

Il s'agit d'une formation pratique par alternance basée sur le concept de « DO IT YOURSELF » et du guide des bonnes pratiques environnementales de l'OCDE

Audit Environnemental

En collaboration avec le personnel des entreprises, les ingénieurs du CITET réalisent des évaluations qui permettent d'identifier les procédés générateurs de déchets et de proposer des solutions rentables. Les entreprises mettent ensuite en place, avec l'aide du Centre, des mesures de production plus propre spécialement adaptées à leurs besoins.

Expertise et Conseil

Le CITET fournit des conseils d'experts aux établissements industriels public et privé pour le choix des stratégies environnementales appropriées et la mise en œuvre des éco-technologies.

Le tableau suivant présente la distribution des services de PP par population concernée:

<i>Service de PP</i>	<i>Secteur</i>	<i>Output</i>
- Diffusion de l'information - Séminaires - Publication	Industries Gouvernement ONG Universités	Séminaire Manuels
Formation en matière de PP : Modules techniques	Industries Centres techniques Consultants Ecoles d'ingénieurs	- ateliers de formation - formation de cadres techniques - études de cas - formation de formateurs
Audit de PP	Industries	Audit de PP

	Service/tourisme	
Conseil, stratégie de PP	Gouvernement	Etudes stratégiques sur la PP

Clients

Les clients potentiels du CNPP sont :

- Entreprises industrielles
- Bureaux d'études dans le domaine de l'environnement
- Ecoles d'ingénieurs
- Les utilisateurs de l'information sur la PP (l'industrie, l'Administration, l'Université et les ONG...)
- Les client du service conseil/stratégie sont les organismes publics et les structures qui appuient le développement de la PP à l'échelle nationale, i.e. le Ministère de l'Environnement et de l'Aménagement du Territoire, le Ministère de l'Industrie, et le Ministère de l'Emploi et de la Formation Professionnelle.

Avantages comparatifs du CITET

- infrastructure moderne et adéquate pour l'adaptation et le transfert des technologies de l'environnement (laboratoires, parc technologique, salles de formation...)
- plate-forme favorable au partenariat entre les entreprises, l'Université, et les institutions de recherches pour concevoir et mettre en œuvre les technologies environnementales
- alliances stratégiques avec les divers partenaires de développement
- point focal national et régional pour le développement et la diffusion de nouvelles technologies environnementales
- des compétences techniques de haut niveau

Partenaires

CNPP dispose d'un réseau de partenaires à l'échelle nationale et internationale connus pour leurs expertises sectorielles et compétence technique ou par leur autorité pour la promotion des nouvelles approches dont notamment :

- UTICA
- ANPE
- Centres techniques sectoriels
- B M N
- Universités (ENIT, ENIG, ENIM, ENIS)
- API
- ONG
- UNEP
- ONUDI
- WCPS
- GTZ

12. Indicateurs de performance

Les indicateurs de performance concernent aussi bien la formation dans le domaine de la PP que les expertises et audits de PP dans les entreprises. Le résultat du programme de PP sera évalué en terme de :

- Nombre de sessions de formation en PP : 3 ateliers par an
- Nombre d'entreprises ciblées : 25 par ateliers
- Nombre d'expertises et audits en matière de PP : 20 audits par cycle de formation
- Réduction de la pollution en quantité : estimé entre 15 et 25%
- Economies réalisées suite à la mise en œuvre des programmes de PP : réduction de 10 à 15% des pertes en ligne de production.

