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**Egypt National
Cleaner Production Center**

**Chemical Leasing Project in Egypt
(Final Report)**



**Prepared by
ENCPC**

**Period of Reference:
April 2008 – June 2010**



Ministry of Trade and Industry





1- Introduction

The ENCPC (Egypt National Cleaner Production Centre) has signed a sub-contact with the United Nations Industrial Development Organization (UNIDO) in April 2008 on promotion and implementation of Closing the Loops Cooperation and Business Models in the Chemical Industry (Chemical Leasing Business Model) (UNIDO Contract no 16001555) with total amount of 19,700 EURO

The scope of the assignment is to continue the activities of UNIDO to test the application of Chemical Leasing business model in the Egyptian industry. In this context the assignment included according to the proposal submitted by the ENCPC and the TOR of the assignment the following outputs:

1. Dissemination of the Chemical Leasing concept
2. Finalization of on-going Chemical Leasing and Cleaner Production projects and start up of minimum 5 new projects
3. PR and training material preparation
4. Chemical Leasing toolkit development

However the assignment included providing technical assistance for other piloting countries specially focusing on capacity building and full assessment for Chemical Leasing projects (e.g support to the Moroccan National Cleaner Production Centre in the launching and capacity building of Chemical Leasing projects in the country. Additionally the ENCPC has participated in different promotion events of Chemical Leasing and has contributed effectively in the evaluation of Chemical Leasing model and also contribution to putting the main structure for Chemical Leasing toolkit based on the Egyptian experience. This included also support the Egyptian companies to apply for Chemical Leasing award

2- Summary of assignment results

A- Main Results:

The following is summarizing the results of accomplishment of assignment as follows:

1- Dissemination of the Chemical Leasing concept

The ENCPC has participated in different national and international events to promote the application of Chemical Leasing in the industry (10 events as stated in the report).



2- Finalization of on-going Chemical Leasing and cleaner production projects and start up of minimum 5 new projects

2.1 Finalization of on-going projects

During the assignment the ENCPC has finished successfully the first phase of the project with two success stories on Chemical Leasing (especially with Akzo Nobel and ABB ARAB and also GM Egypt and Dr Badawi) with full documentation of final results which included recommendations to be taken for replication.

2.2 Accomplishment of more than 8 Chemical Leasing full assessments

The ENCPC has carried out full assessments for Chemical Leasing projects with the following companies:

- 1- Akzo Nobel in Egypt, Chemetall Italy, Delta Electric Appliances (DEA), Olympic Group Egypt (three companies) (one Chemical Leasing full assessment carried out)
- 2- UNION company for chemicals and Delta Electric Appliances (DEA), Olympic Group Egypt (two companies) (one full Chemical Leasing assessment was carried out)
- 3- Huntsman company and Nile Linen company for textile in close cooperation with IKEA (three companies) (one full assessment Chemical Leasing assessment was carried out)
- 4- Dr Badawi Chemical Work jointly with Super Clean Company with more than 50 small workshops for car maintenance applying the Chemical Leasing business model on cleaning metal parts with hydrocarbon solvent (at least 5 full assessments was carried out)

In this context, more than eight Chemical Leasing and cleaner production assessment were carried out in Egypt.

2.3 Accomplishment of three chemical leasing assessment in Morocco

In addition, the local capacity building for local experts and companies in Morocco, the following are the main full chemical leasing assessments carried out:

- 1- Chemical Leasing on fresh water purification or pre-treatment of metal surface by Sulphuric acid (Pickling) - SCE company
- 2- Chemical Leasing on printing process of linen -ITEX company, Morocco
- 3- Chemical leasing on dyeing process - Mohammadia tannery



- 4- Other Chemical Leasing assessments: (Chemical leasing on the process on concentrating of Cobalt- Managem Company)

The full reports of these assessments have been sent jointly by the Moroccan Cleaner Production Centre to the project manager

3- PR and training material preparation

The ENCPC has printed and promoted the Chemical Leasing through printing out and distribution of different brochures and hand out on ENCPC and its activities related to chemical leasing in addition to the display of the chemical leasing video in ENCPC events.

4 - Chemical Leasing Toolkit Development

The ENCPC has initiated the drafting of Chemical Leasing toolkit based on the lessons learnt from implementation of Chemical Leasing projects in Egypt

B- Obstacles of implementation of assignment

The implementation for assignment was successfully implemented as planned however the implementation of final contacts of Chemical Leasing encountered some obstacles and challenges as follows:

- Intensive use of staff and resources in different and replicated visits due the fact that there are more than one partner in each Chemical Leasing project (at least two companies)
- Lack of financial support due to the lower-estimation of budget of project as the assignment was in need to assign more short-term or sectorial experts to support the implementation
- Economic recession which has affected strongly on signing final Chemical Leasing contracts and led to decrease the interest of suppliers to have any risk and additional cost for their products.
- Change of ENCPC strategy with focusing more on national projects for technology transfer and innovation and incubation



3- Activities carried out during the assignment

3.1 Finalization of completed projects

Two projects on Chemical Leasing are completed: the project on Electrostatic Powder Coating between Akzo Nobel and ABB ARAB and the project on Cleaning of Equipment with Hydrocarbon Solvent (Dr. Badawi Chemical Work and General Motors Egypt).

3.2 Chemical Leasing full assessments carried and on-going projects:

3.2.1 Chemical Leasing project on integrated process of Washing Machine Painting

- **Suppliers:** Akzo Nobel in Egypt, Chemetall Italy,
- **User:** Delta Electric Appliances (DEA), Olympic Group Egypt
- **Process:** Integrated Process (Pre-treatment processes, Electrical Deposition (ED) and Powder Coating) of washing machines
- **Chemicals:** Degreasing and conditioning chemicals, Phosphating Chemicals, Pre-coating Chemicals and Powder Coating chemicals

Activities carried out according to the implementation plan:

- Awareness Raising Seminar on Chemical Leasing;
- Comprehensive Technical Audit and Cost Analysis;
- On-the-Job Training on Chemical Leasing and other supportive Chemicals Management tools;
- Optimization Plan and Benchmark Identification;
- Starting negotiation for designing a Chemical Leasing model.
- Agreed on the basis for payment to be L.E per washing machine

The following table summarizes the obtained results:

Item	Before Chemical Leasing Model	Under Proposed Chemical Leasing Model
Total computation of chemical per unit (washing machine)	From current high consumption due to high thickness of coating and non-optimized processes	Reduction by 15- 20 % for pre-treatment chemicals and 50 % for powder coating
Cost per Washing	From current high cost	Total reduction of 15-20 % under



Machine		proposed Chemical Leasing
Re-work percentage and rejects	9%	1.5 % (Bench mark)
Annual Losses	2.5% (due to annual troubleshooting)	1 %
Environmental Conditions: Fine powder waste Sludge waste and wastewater Dust & heat stress at workplace Health and Safety Measures / Equipments	The amount of sludge wastes from phosphating process is (0.021 per unit) (about 6 tons in 2008) which go for the nearby dumpsite and wastewater of 30 m3 per day and fine powder waste is 10 % which goes for dumping	Eliminate sludge waste by using environmentally friendly pre-treatment process (e.g non-cyanide and free-Nickel phosphating technologies) and re-use of wastewater, recycling of waste
Compliance with REACH & ROHS requirements and Free TIGC powder coating	No full compliance with REACH or RoHs	Comply with the requirements of REACH and ROHs for DEA
Capacity Building and Raising Awareness on Chemicals Management Principles	Limited information available for workers on chemicals management and its risk management	On Job Training and Capacity Building for Workers on Chemicals Management including Chemicals Risk.

Final situation and recommendation for future:

Follow up the signing of chemical leasing contract

3.2.3 Chemical Leasing project on pre-treatment and powder coating of storage equipment

- **Supplier:** UNION Company for chemicals as a supplier for electrostatic powder in collaboration with Henkel/May Trade as a supplier for pre-treatment chemicals
- **User:** Link Misr
- **Process:** Degreasing, Phosphating and Powder processes
- **Chemicals:** Degreasing chemicals, Phosphating Chemicals and Powder Coating chemicals)

Activities carried out and current situation:

- Signing of Chemical Leasing Cooperation Agreement in June;
- Selection of steering committee for the project;
- Kick off Seminar;
- Design of implementation Plan.



- Three practical trails have been carried out to assess the current situation (Technical audits)
- Preparing a technical report with recommendation for improvement (Technical audit report and optimization plan)
- Collect all the required financial data
- Identification of basis for payment per m2 of final report
- Start implementation of optimization plan
- Finalization of technical and financial report

Final situation and recommendation for future:

- Follow up signing of Chemical Leasing project

3.2.4 Chemical Leasing Company in Egypt- SUPER CLEAN Company

Background

In close cooperation and coordination with the Egypt National Cleaner Production Centre , Clean surface company was established in Egypt as a highly specialized company in Chemical Leasing and serving the different industrial sectors with the activity of cleaning of metal parts with hydrocarbon solvent. The company is a joint venture between Dr Badawi Chemical Work in Egypt and a Greek company which has a long out-standing experience in applying this activity in Greece for almost 20 years since 1985 which were serving more than 5 000 workshops.

Target Sectors

The company is targeting at its first phase of operation in the Egyptian market, the small maintenance workshops affiliated to the automotive companies in Egypt. The Chemical Leasing will be applied as follows: Dr Badawi is providing a machine for cleaning for free, which contains a solvent to enable one month of cleaning metal parts. Dr.Badawi will be collecting the spent solvent to be recycled at Dr Badawi premises.

Chemical Leasing Model

Super Clean Company has created its own model for safe and environmentally sound system of metal parts cleaning in the automotive and truck services and maintenance shops. The model is mainly based on the following:

- 1- Replacing gasoline in parts washing with less aggressive solvent which is formulated by Dr Badawi.
- 2- Providing a machine for free that re-circulates a certain amount of cleaning liquid (30 liters) with stringent safety measures for workers and collection system.



3- Collecting and removing the solvent waste from working place for recycling and supplying fresh solvent on an agreed time schedule.

4- Computerized distribution system with specialized software from Super Clean Company with regular site visits and technical support.

5- Fixed Leasing fee (Egyptian Pound) per washing machine used for cleaning of metal parts of equipment per month.

Final situation:

The ENCPC is currently preparing the final report for market demand study for potential sectors and companies that can apply this model for its process for cleaning with hydrocarbon solvent with full assessments reports.

3.2.4 Chemical Leasing project on pre-treatment in textile sector

- **Supplier:** Huntsman
- **User:** Nile Linen
- **Associate partner :** IKEA
- **Process:** pre-treatment of textile
- **Chemicals:** Degreasing chemicals, Phosphating Chemicals and Powder Coating chemicals)

Activities carried out and current situation:

- Several site visits and contacts ;
- Data collection for current situation
- Plan for cooperation ;
- Sampling and testing
- Three practical trails have been carried out to assess the current situation (Technical audits) by huntsman
- Design of cooperation agreement
- Preparing a technical report with recommendation for improvement (Technical audit report and optimization plan) by huntsman

Final situation and recommendation for future:

The project was stopped as Huntsman was not able to continue due to lack of human resources and also for the effect of the economic recession.



Future recommendation: Based on his own expertise, the ENCPC can investigate the opportunity to find new supplier.

4. Promotion and Raising Awareness of Chemical Leasing

4.1 Main Raising Awareness' Activities

Topic	Date/Duration	With whom (type of participants, e.g. companies, government, etc.)
Chemical Leasing Concept and Success Stories	Half day training on Chemical Leasing in collaboration with Egyptian Environmental Affairs Agency (EEAA), April 2009	Technical Staff of Chemicals For Modern Buidling Group (13 companies) in Wadi El Natroon, Alexandria Desert Road, Alexandria
Chemical Leasing Concept and Success Stories in Galvanization Sector	One day organized by QSP-Trust Fund Project on Cleaner Production for Cynide Altarantives in Galvanization Industry in Egypt , April 2009	50 participants from industrial enterpises and competent governemental non-governmental organizations
Chemical Leasing Training	1 day in 8th April 2009	- Morocco Industry from different sectors (Textile, Chemicals, Mining, Sugar, recycling companies, testing companies) - Number of participants (8) from CMPP and companies representatives
Chemical Leasing Training for Moroccan Industry	1day, 9th April 2009	Capacity building of the Moroccan national experts on Chemical Leasing business models. Participants : 11 national experts have been trained on Chemical Leasing practical implementation
Chemical Leasing Training for ITEX company in Morocco	1 day	For Staff of ITEX Company for textile in Morocco . The Target groups are: Operation Staff at ITEX. Number of experts (6) from ITEX in addition to two exeperts from CMPP
European Chemials Agency	27th May 2008	More than 600 participants from all over the



(ECHA) Stakhoders Day		world (international chemical suppliers, international chemical distributors, chemical associations, government officials, consultants, NGOs etc.)
Chemicals Management Forum	28th -29th May 2009, Helsinki, Finland	International Chemical Companies, Government Officials
Chemical Leasing Training for Moroccan Industry	1 day, 8th July 2009	Capacity building of the Moroccan Industry on Chemical Leasing business models. Participants : 11 national experts for 11 companies have been trained on Chemical Leasing practical implementation
Chemical Leasing : an innovative Model for Industrial Waste Minimization in Dubai	8-9 November 2009	Training program for practitioners from Gulf countries

4.2 Other Promotion Activities

Topic	Date/Duration	With whom
Presenting in a call conference the Chemical Leasing concept and Chemical Management Services and case studies in Egypt to the American Companies from Aerospace and Engineering and Electronics Industry	July 2009	In close cooperation with Chemical Strategies Partnership in United States of America (USA)
Presenting of Chemical Leasing as an innovative Model for Industrial Waste Minimization in an international training program on industrial waste management in Dubai, UAE	8-9 November 2009	UAE – Ministry of Environment (number of trainees were 40)
Assessment and Capacity Building on Chemicals and Chemicals Waste Management in Egypt – SAICM Quick Start Project	6th May 2010	150 participants from industrial enterprises (chemical sector) and competent governmental and non-governmental organizations
Workshop and Training on Chemical Leasing in SRI Lanka	9th -13th June 2010	Participants from Asian-Pacific Roundtable on Sustainable Consumption and Production (governmental, non-governmental and industry companies)



5- Chemical Leasing Missions:

5.1 ENCPC Chemical Leasing Missions:

Topic	Date/Duration	With whom
Mission on Chemical Leasing to Morocco	April 5-15, 2009	Moroccan Cleaner Production Centre, CMPP Director
International Expert's Training in Serbia	April 20-24, 2009	UNIDO and Serbian National Cleaner Production Centre
Mission on Chemical Leasing to Morocco	5-15 July 2009	UNIDO - Moroccan Cleaner Production Centre, CMPP Director

5.2 UNIDO Chemical Leasing Missions to Egypt

Topic	Date/Duration	Visited Companies
Mission of Dr Reinhard Joas during another mission to ENCPC	One day on 6th May 2009	DEA company- Olympic Group and Link Misr company

6. Conclusion and recommendations for next steps

The ENCPC has worked effectively in promotion of Chemical Leasing concept through this assignment despite the unforeseen obstacles faced during implementation.

Within the new strategy of ENCPC, it would be highly recommended that the ENCPC can continue its contribution and support for the global promotion of the Chemical Leasing concept in close coordination with UNIDO through the following:

- Contribution for promotion and awareness raising of Chemical Leasing on national and global level;
- Continuation of contributions for the update of the Chemical Leasing toolkit and preparing a guiding manual
- Support continuous evaluation and monitoring of Chemical Leasing projects worldwide
- Technical assistance and support for other piloting countries
- Attending of International Working Group on Chemical Leasing
- Follow up with its national capacity on on-going projects and report to UNIDO