



United Nations Industrial Development Organization
Vienna

***INTERREGIONAL PROMOTION AND IMPLEMENTATION OF
CLOSING-THE-LOOPS COOPERATION AND BUSINESS MODELS IN
THE CHEMICAL INDUSTRY***

ANNUAL REPORT 2008



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Content

Executive Summary	3
1. GLOBAL FORUM ACTIVITIES.....	4
2. DEVELOPMENT OF CHEMICAL LEASING TOOLS	9
3. INTERNATIONAL PROJECTS - PART 1 (EGYPT, MEXICO, RUSSIA)	10
3.1. Egypt.....	10
3.2. Mexico.....	16
3.3. Russia	22
4. INTERNATIONAL PROJECTS - PART 2 (COLOMBIA, MOROCCO, SERBIA, SRI LANKA)	31
4.1. Colombia.....	31
4.2. Morocco	42
4.3. Serbia.....	52
4.4. Sri Lanka.....	62
Annexes	74

Executive Summary

The present report provides an overview of Chemical Leasing project activities performed in 2008. Throughout the year, several international and national activities have been initiated for promotion and implementation of Chemical Leasing.

A multitude of Global Forum Activities was carried out including international training workshops and meetings of the International Working Group on Chemical Leasing. The concept of Chemical Leasing was discussed at international conferences and presented at Chemical Leasing side events. A first concept for a Global Chemical Leasing Award was developed.

The Chemical Leasing tool development included further additions to the Chemical Leasing toolbox and expansion of the international Chemical Leasing homepage.

The international projects in Egypt, Mexico and Russia have been continued and additional countries started Chemical Leasing initiatives.

In Egypt, Mexico and Russia a number of Chemical Leasing projects were carried out and new implementations accomplished in various industrial sectors. Colombia, Morocco, Serbia and Sri Lanka officially started and launched Chemical Leasing pilot activities. During Chemical Leasing missions to these countries workshop and company visits were organized and potential Chemical Leasing partners identified. Several letters of intent and Chemical Leasing contracts were signed throughout the year.

The Chemical Leasing UNIDO initiative currently involves seven National Cleaner Production Centres with approximately 14 national experts.

1. GLOBAL FORUM ACTIVITIES

International training workshop on Chemical Leasing for new NCPCs

An international training session took place at UNIDO headquarter in Vienna on March 3-5. International experts explained the concept and strategy for Chemical Leasing, work plans were established and approaches for company visits discussed. Representatives from the Cleaner Production Centres in Egypt, Mexico and Russia shared their experiences on implementation and continuation of Chemical Leasing projects. The entire materials of the training workshop can be found in the members-only area at www.chemicalleasing.com, the agenda of the workshop can be found in the annex.

International Conference – “Getting Fit for REACH – Applying Chemical Leasing”

The conference took place in Balatonfüred, Hungary on March 6-7. The meeting was initiated by the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management in cooperation with the Hungarian Government and UNIDO. The conference aimed at presenting Chemical Leasing as a promising approach towards REACH compliance and at identifying potential pilot projects. Approximately 80 representatives of the private and public sectors from more than 10 countries participated in the conference. At this event the book “Chemical Leasing goes global” was officially presented, which was jointly published by UNIDO and the Ministry of Environment of Austria. The program and a comprehensive report of the conference can be found at <http://www.chemicalleasing.com/conference.htm>.



Panel discussion on Chemical Leasing and REACH in Balatonfüred

Meetings of the International Working Group on Chemical Leasing

On March 7 a meeting (6th) of the International Working Group on Chemical Leasing took place in Balatonfüred, Hungary, subsequently to the REACH conference. The representatives from the NCPCs in Colombia, Morocco, Serbia and Sri Lanka gave a brief overview of activities and achievements in the field of Cleaner Production. Ideas were presented on potential sectors and companies which may be targeted for Chemical Leasing in the respective countries. A new German initiative on Chemical Leasing, initiated by the German Federal Environment Agency, was presented. The newly compiled Chemical Leasing toolbox was introduced as a continuation of the original toolkit. The agenda and the minutes of the International Working Group meeting are available on the Chemical Leasing homepage at <http://www.chemicalleasing.com/sub/workgroup.htm>.

The 7th meeting of the International Working Group on Chemical Leasing took place in Dakar, Senegal, on September 15, following the Chemical Leasing side-event. The current status of Chemical Leasing activities in Egypt, Mexico and Russia and the launch of Chemical Leasing projects in Colombia, Morocco, Serbia and Sri Lanka were discussed. Chemical Leasing was identified as a promising approach for management and handling of chemicals and therefore fits well under SAICM activities.

The next International Working Group meeting is scheduled to take place at the SAICM meeting (ICCM-2) in Geneva in May 2009.

First meeting of the steering committee for the German initiative “Chemikalienleasing als Modell zur nachhaltigen Entwicklung mit Prüfprozeduren und Qualitätskriterien anhand von Pilotprojekten in DeutsChemical Leasingand“

In January 2008 a new German project has been contracted by the German Federal Environmental Agency in order to establish Chemical Leasing pilot projects throughout multiple sectors of the German industry. The project is designed for a period of two years with three main project partners, namely BiPRO, the University of Göttingen and TÜV SÜD. The first meeting of the steering committee served to discuss project achievements to date and to determine future approaches. Minutes of the meeting, presentations and further project information are provided at <http://www.chemikalienleasing.de/>.

German SAICM conference “Strategischer Ansatz für ein internationales Chemikalienmanagement“

At the German SAICM event held in Berlin at the Bundespresseamt on June 6 the basic principles of Chemical Leasing were explained followed by discussions of the objectives and developments of the German Chemical Leasing initiative. The international context of Chemical Leasing and UNIDO projects were also briefly presented. Approximately 100 companies and associations participated in the event.

Rheinland-Pfalz 2008 conference on resource efficiency

The annual conference was organized by the Effizienznetz Rheinland-Pfalz and took place on December 1 in Mainz, Germany. The international expert on Chemical Leasing explained to more than 100 participating companies how the concept of Chemical Leasing contributes to more efficient use of energy, water and resources.

Side events on Chemical Leasing

A side event on Chemical Leasing was organised on September 15 in Dakar, Senegal, at the sixth session of the Intergovernmental Forum on Chemical Safety (<http://www.who.int/ifcs/en/>). The side event was jointly hosted by UNIDO and the governments of Austria and Germany.

At this event the UNIDO global approach to Chemical Leasing and Cleaner Production was introduced by showing examples of successful case studies conducted in the seven countries that are currently supported by UNIDO. Contributions of Chemical Leasing business models to the policy goals of sustainable chemicals management were also discussed. Current experiences on Chemical Leasing obtained from the German project were shared and options for quality criteria, certification systems and promotion tools for Chemical Leasing were presented. Furthermore the relation between Chemical Leasing and SAICM was highlighted and the time schedule for the international Chemical Leasing award explained. Representatives from ENPC and Egyptian companies presented practical details of successful pilot projects in Egypt. At the side event many countries (e.g. Thailand, Zimbabwe, and Slovenia) showed interest to participate in Chemical Leasing activities. The next Chemical Leasing side event is scheduled for May 13 at the ICCM 2 conference in Geneva.

Global Chemical Leasing Award

The Chemical Leasing Award aims at enhancing the visibility of Chemical Leasing and at rewarding coordinated and successful Chemical Leasing initiatives and implementation. The award will jointly be organized by UNIDO and the Austrian Federal Ministry for Agriculture, Forestry, Environment and Water Management. The award will be announced at an ICCM 2 side event in Geneva on May 13 2009. The final award ceremony will take place in 2010. At present the tender document is being prepared and the event organization is in progress.

Public-Private Partnership

Discussions and meetings were held with representatives from IKEA Trading India. The company enforced the concept of Chemical Leasing for its textile producers in India more than three year ago.

Policy developments

Chemical Leasing was explicitly mentioned in a new national policy draft for Sustainable Production and Consumption in Colombia (“....leasing de sustancias químicas....”).

In Austria service-oriented business models were included in the policy outline of the governmental coalition agreement.

SCORE Conference 2008: SCP - Framework for Action

A presentation on the concept of Chemical Leasing and Cleaner Production was given at the SCORE conference in Brussels on May 10 - 11 2008. SCORE (Sustainable Consumption Research Exchanges) is an EC-funded network project that supports the development of the UN's 10 Year Framework of Programmes on Sustainable Consumption and Production (SCP).

12th Annual Chemical Management Services (CMS) Conference - San Francisco

On November 12 to 14, industry, government, and business professionals came together at the 12th Annual Chemical Management Services (CMS) Conference. This unique forum featured progressive case studies, emerging international trends, and applicable dialogue about chemical management. UNIDO was represented by Ms. Petra Schwager who talked about the relations of International Regulatory Trends and Chemical Leasing in the plenary session and presented the Chemical Leasing application at Global Level in a working group.

The agenda, presentations of the conferences and further project information are provided at http://www.chemicalstrategies.org/workevents_conf08.htm.

Evaluation of Chemical Leasing activities

In summer 2008 an evaluation (self-assessment) of the Chemical Leasing activities from the three National Cleaner Production Centers in Mexico, Egypt and Russia was done. The self-assessment was intended to capture the main lessons from the center's perspective. The results of the evaluation are summarized in a report which will also help to further develop the program and to give (even better) support to the four new countries for their implementation of Chemical Leasing projects.

2. DEVELOPMENT OF CHEMICAL LEASING TOOLS

Chemical Leasing Toolbox

In 2007 a toolkit for a systematic approach to the implementation of Chemical Leasing at company level has been developed. The first version of the guidelines is discussed in detail in the book “Chemical Leasing goes global”. The toolkit covers main steps to ensure smooth and efficient application of Chemical Leasing to industries from different sectors and countries. Based on the experiences of the Centres in applying the toolkit and in cooperation with the national and international experts the toolkit has been further developed and revised. A second version of the toolkit, now called Chemical Leasing Toolbox, has been developed and includes guidelines (former toolkit), worksheets, presentations, the Chemical Leasing video and the Chemical Leasing book. The worksheets comprise templates for letters of intent, cooperation agreements, Chemical Leasing contracts as well as training and reporting guidelines for national experts.

The elements of the toolbox are provided on the Chemical Leasing webpage in the members-only area. The toolbox will be continuously updated and edited.

Chemical Leasing Webpage

The international Chemical Leasing homepage has been further developed and can now be accessed at www.chemicalleasing.com. It also offers an exchange forum by means of a common email address where staff of the Centres has the opportunity to post questions and share experiences.

3. INTERNATIONAL PROJECTS - PART 1 (EGYPT, MEXICO, RUSSIA)

3.1. Egypt

3.1.1. Overview of Chemical Leasing activities in Egypt

The Chemical Leasing project activities in Egypt in 2008 targeted the following main issues:

- Continuous monitoring of signed Chemical Leasing contracts from the first project phase in order to assess and analyze the lessons learnt from practical implementations
- Continuation of quick scans and site visits to define and select additional Chemical Leasing case studies
- Launch of new Chemical Leasing projects in four different industrial processes with a consortium of companies
- Follow-up on current project implementations
- Promotion of Chemical Leasing and its success stories
- Participation in trainings, missions and dissemination activities on national and international level

3.1.2. Summary of status and results of Chemical Leasing projects

The ENPC continued to monitor the signed contracts and to analyse the gathered data. The collected data provided a valuable guide for further development and improvement of Chemical Leasing projects and were also taken into consideration for new projects. Furthermore, additional site visits were carried out with companies from different sectors, including chemical suppliers, users of chemicals and equipment suppliers. A major objective throughout the year was to continue testing the application of Chemical Leasing in further industrial processes.

Contacts were established with international companies, such as IKEA, ABB, Huntsmann and Chemetall in order to promote Chemical Leasing. The results of the Chemical Leasing projects in Egypt were presented at international events, such as the Chemical Leasing side event in Dakar. Additionally, Chemical Leasing in Egypt was described as a tool for sustainable consumption and production in the study "Sustainable Consumption and

Production for Cairo City” which was prepared by the ENCPC in close cooperation with UNEP and the Egyptian Ministry of Environment.

3.1.3. Current potential and pipeline of Chemical Leasing projects

Ongoing Chemical Leasing projects

The following signed and ongoing Chemical Leasing contracts were closely monitored by the Centre throughout the year:

- *Cleaning of equipment with hydrocarbon solvents - GM Egypt and Dr. Badawi Chemical Work*

The Chemical Leasing project between General Motors Egypt and Dr Badawi was extended for another three years until 2011. According to the contract, the ENCPC will continue its role as third party independent monitoring body to ensure proper continuation and implementation of the project.

- *Electrostatic Powder Coating - Akzo Nobel and ABB ARAB*

The ENCPC signed a Chemical Leasing partnership agreement with ABB Egypt to continue the Chemical Leasing activities through the network of ABB worldwide.

New and in pipeline Chemical Leasing projects

- *Textile Sector - Huntsman Company, Nile Linen Company, IKEA and UNIDO-ENCPC*

Project partners:

- Huntsman Company- Supplier of chemicals
- Nile Linen Company- User of chemicals
- IKEA- International retailer- Supporting partner
- Egypt National Cleaner Production Centre

Targeted processes and chemicals:

- Pre-treatment of textiles - bleaching (hydrogen peroxide)
- Dying of textiles (dyes)
- Printing of linens (printing chemicals)

All parties have stated commitment to implement a joint Chemical Leasing project in the textile sector. It was agreed that in the initial project phase the focus would be placed on the pre-treatment process of textiles whereas it will later be extended to dyeing and printing of linens. First concrete implementation work is expected for the second half of January 2009.

- Pre-treatment and powder coating sector - UNION for Powder Coating and Chemicals, Link Misr Company, May Trade Company and UNIDO-ENCPC

Project partners:

- UNION Company for Chemical Industries - chemical supplier
- Maytrade Company - chemicals supplier (authorized agent for Henkel)
- Link Misr Company - storage areas manufacturer
- Egypt National Cleaner Production Centre

Targeted processes and chemicals:

- Degreasing (sodium hydroxide)
- Phosphating (iron phosphate)
- Cathodic Deposition Process (elbow chemicals)
- Powder coating (coating powder)

During quick scans at the sites of Link Misr Company and UNION Company several processes could be identified that are eligible for Chemical Leasing applications.

Meetings were held to discuss the scope of Chemical Leasing cooperations between UNION company as a supplier for powder coating chemicals, MayTrade Company as a supplier of metal surface pre-treatment chemicals and Link Misr Company as a user of pre-treatment chemicals (e.g. chemicals of degreasing and phosphating) and powder coatings.

Link Misr company has expressed high interest and full commitment to implement the Chemical Leasing approach with suppliers that meet the minimum qualification requirements in terms of capacities, technologies, laboratories and product quality. Link Misr expressed willingness to lease its whole production line to either the supplier of pre-treatment chemicals or of powder coating and furthermore indicated to extend the project to two of its daughter companies. Discussions on the implementation schedule, finalization of the agreement and the project kick off are planned for early 2009.

- Various processes - Akzo Nobel, Chemetall Italy, Olympic Group and ENCPC

Project partners:

- Akzo Nobel Powder Coating SAE in Egypt - chemical supplier

- Chemetall Italy Company - chemicals supplier
- Delta Electrical Appliances (DEA) Company of Olympic (part of Egyptian Olympic Group) – user of chemicals
- Egypt National Cleaner Production Centre

Targeted processes and chemicals:

- Pre-treatment (degreasing, phosphate)
- Cathodic Deposition Process
- Electrostatic powder coating

After drafting of the project implementation plan and finalisation of the cooperation agreement the Chemical Leasing project was kicked off by a visit of representatives from Akzo Nobel and Chemetall to Egypt. DEA Company has also expressed interest to work with DOW Company in order to apply Chemical Leasing in foaming processes.

- Cleaning with hydrocarbon solvent – Dr Badawi, AMVITEC and ENCPC

Project partners:

- Dr Badawi for Chemical Work - Egypt
- AMVITEC – Greece, equipment provider
- Egypt National Cleaner Production Centre

Targeted processes and chemicals:

- Cleaning of metal parts using hydrocarbon solvents

The project with AMVITEC targets SMEs which use solvents for cleaning of metal parts. After having proved compliance of technology with European legislations, AMVITEC was accepted as a Chemical Leasing service provider and its contact details were included on the UNIDO Chemical Leasing website. It was agreed to establish a joint Egyptian-Greek company which will apply the Chemical Leasing concept for services of equipment cleaning in Egypt. A joint meeting between the partners will be organized early in 2009 in order to finalize the legal issues of the contract between Dr Badawi and AMVITEC.

3.1.4. Promotion of Chemical Leasing

- The Egypt National Cleaner Production Centre organized a workshop on Chemical Leasing in Egypt in close cooperation with the Federation of Egyptian Industries (FEI) - Chemical Chamber. The event was held on Tuesday January 22, 2008 at the FEI premises with approximately 80 companies participating. The workshop aimed at presenting the UNIDO concept of Chemical Leasing to Egyptian chemical companies and presenting the Chemical Leasing implementation success stories.
- The Chemical Leasing activities and projects were mentioned in the newsletter of the UNIDO Office in Cairo.
- Briefings were given to the Egyptian Media (TV) on the Chemical Leasing concept and the current activities of Chemical Leasing projects in Egypt. The Egyptian newspaper covered the national workshop on Chemical Leasing in January 2008.
- Several copies of updated Chemical Leasing brochures were distributed among the different stakeholders in Egypt at different events to promote the concept of Chemical Leasing.
- The Chemical Leasing success stories were presented to local stakeholders at different events (e.g. on environment day, Egyptian Pollution Abatement project event, Swiss-Egyptian Business Association).
- At the national REACH workshop in Cairo on August 26 Chemical Leasing was presented as part of the chemicals management services of the ENCPC. More than 300 companies attended the event.
- The Chemical Leasing concept was presented in seminars at the chemical chamber, the cosmetic chamber and the pulp and paper chamber.

Capacity building activities - Trainings and workshops

National experts from ENCPC attended the following workshops and trainings:

- Training workshop and International Working Group on Chemical Leasing, UNIDO, HQ, Vienna, and Hungary, March 2008
- Sustainable Plastics from Agro Food Industrial Waste, ENCPC in close cooperation with ICS- UNIDO, Cairo, April 2008

- First meeting of the steering committee for the German Chemical Leasing project, Umweltbundesamt (UBA), Berlin, Germany, June 2008
- Impact of the new European legislation on Registration, Evaluation, Authorization of Chemicals (REACH) on Egyptian Industry, ENCPC in close cooperation with Chemical & Fertilizers Export Council, European Chemical Agency (ECHA), Cairo, Egypt, August 2008
- Side event on Chemical Leasing and International Working Group in Dakar, Senegal, September 2008

Chemical Leasing side event and International Working Group

During the Intergovernmental Forum on Chemical Safety in Dakar (12-17 September 2008) the ENCPC took part in and contributed to a side event on Chemical Leasing. Mr. Ali Abo Sena from ENCPC and Mr. Atef Darwish from ABB Company jointly presented the practical details of a successful Egyptian pilot project in the field of electrostatic powder coating. The different roles of the partners and the experiences with implementation were explained. The ENCPC also participated in the International Working Group on Chemical Leasing where the status of Chemical Leasing projects in Egypt was presented and discussed, amongst other topics.

3.1.5. UNIDO Chemical Leasing Missions to Egypt

During 2008 three Chemical Leasing missions to Cairo have been carried out by the international expert, namely in January (19-24), April (26-29) and December (15-17). During the missions discussions were held with partners of ongoing Chemical Leasing projects and promising candidates for pilot projects. Several company visits and monitoring scans were conducted at plant level. In order to support international experience exchanges, Mr. Ali Abo Sena from the ENCPC participated in the mission to Morocco in September 2008. Companies in Casablanca, El Gadida and Tangier were visited by the international experts and representatives from the Moroccan Cleaner Production Centre and potential pilot projects were identified.

3.1.6. Steps to be taken in the upcoming project phase

- Capacity building of Chemical Leasing national experts with specific international trainings on chemicals management services
- Contributions to the continuous improvement of the Chemical Leasing toolbox
- Preparation of additional national promotion events in Egypt
- Up-scaling of the Chemical Leasing business models in the sectors of success stories (e.g. in electrostatic powder coating)
- Start of new Chemical Leasing pilot projects in different sectors
- Continuous monitoring of ongoing Chemical Leasing projects
- Documentation of lesson learnt and experiences gained

3.2. Mexico

3.2.1. Overview of Chemical Leasing activities in Mexico

Major objectives for the year of 2008 included:

- Assessment and monitoring of the signed Chemical Leasing contracts from the first project phase
- Preparation of additional Chemical Leasing pilot projects in new sectors
- Quick scans and site visits to define and select new and potential Chemical Leasing case studies
- Nationwide promotion of Chemical Leasing business models

Based on experiences from previous periods the focus of collaboration was placed on companies from the private sector. Private medium to large-sized companies were in particular targeted to ensure a higher implementation rate, faster agreements and to avoid bidding.

To date more than 92 companies have been contacted and visited, ranging from micro-companies to multinationals like Coca Cola, Bimbo and Grupo Modelo. Sectors covered include petrochemicals, galvanoplasty, sugar mills and lubricants. On average 3 companies per month have been visited throughout 2008. The following table presents the list of activities that have been undertaken in 2008.

Table 1: List of activities in Mexico in 2008

Activities	2008
Companies contacted	33
Phone calls with companies (consulting, follow-up)	125
E-mail to companies (first contact)	92
Presentations on Chemical Leasing	28
Meetings and workshops	22
Company visits	33
Newly signed letters of intent	3
Newly signed contracts, visits for implementation	in progress

3.2.2. Summary of status and results of the Chemical Leasing projects

The Mexican National Cleaner Production Centre held meetings and personal visits at production plants of several companies from diverse industrial sectors, including breweries, food and beverage industries, specialty chemicals and water treatment companies. The meetings with directors and chief staff aimed at explaining the background and competitive advantage of the model. Opportunities and potential for the implementation of Chemical Leasing were discussed. Table 3 gives an overview of contacts established with various industries.

Table 2: Overview on contacts

Company	Chemical Leasing Opportunities
Crown Envases de México	Metallic container labeling
Comercial Roshfrans	Filters and lubricants
Qualamex	Pasteurization treatment
Graficas la Prensa	Cleaning of plates with solvents
Helvex	Cutting oil
Grupo Bimbo	Cleaning of bottles
Grupo Modelo	Beer factory, water treatment
FEMSA Coca-Cola	Bottle cleaning
Henkel de Mexico	Painting products
Akzo Nobel	Paint, coatings and speciality chemicals
DOW Chemical	Supplier of chemical products applied in several industrial sectors
BASF	Supplier of chemical products applied in several industrial sectors
QUIMIC	Supplier for chemical products applied in tire production
ALKEMIN	Supplier for chemical products applied in mining industry
Minera Autlan	Mining industry, water treatment
EUROCHEM	Supplier of chemical products for diverse sectors
C&T Technology	Integral water treatment

PEPSI Bottling Group	Water treatment, Cleaner Production for bottles
NESTLE	Food industry, water treatment
JUMEX	Juice factory, water treatment
BACARDI	Cleaning of containers and water treatment
AKIM	Supplier of chemical products for galvanoplasty and disincrustant
ICROMA	Electroplating, products applied in tanks
ROTOPLAS	Chemicals used in the manufacture of tanks and cisterns
PLATAFORMA PEMEX	Disincrustants for handling seawater in toilets, reverse osmosis plants
HIDROMEX	Painted trucks and safes
OWENS CORNING	Adhesive applied to fiberglass in the preparation of thermal insulation
MARÍTIMA DE ECOLOGÍA	Corrosion inhibitor for crude processing lines
FIRESTONE	Chemicals for rubber manufacture
ALIMENTOS EFA	Chemical products in boilers
LOREAL	Chemical products used in cosmetics manufacture

In addition, the Centre worked with industrial groups, the academic community, governmental offices and associations in order to create synergies and promote and disseminate Chemical Leasing. Presentations and discussions were held at the National Association of Chemical Engineers (ANIQ-initials in Spanish), the Instituto Politecnico Nacional Administration (IPN-initials in Spanish), the Chemical Engineering and Extracting Industries College of IPN (ESIQIE-initials in Spanish) and the Federal Environmental Protection Agency Industrial Department (PROFEPA-initials in Spanish).

In the discussions some country-specific challenges were identified which have to be overcome for Chemical Leasing implementation, including

- several plants do not have the autonomy to choose suppliers
- a fixed strategic and future agenda is often set up already for several years, in particular in large companies, which might delay implementation of Chemical Leasing
- limited access to prime decision makers
- lack of trust between involved parties

3.2.3. Current potential and pipeline of Chemical Leasing clients

The companies Owens Corning Mexico and Marecsa as well as the Secretary of the Environment and Natural Resources (SEMARNAT) have expressed strong interest in the application of Chemical Leasing and signed letters of intent. The agreement with the

company Hydromex is in pipeline and expected to be signed after another visit. In the following, the status of the Chemical Leasing activities at plant level is discussed in more detail for the relevant companies and industries.

- Owens Corning Mexico

The company “Owens Corning Mexico” produces glass fibers for insulation, roofing and manufactured stone veneer used in residential, commercial and industrial applications.

One of the most important product applications in Mexico are veils and specialty non-wovens for acoustical and thermal insulation paneled ceilings. Adhesive are applied on fiber glass in order to produce sheets.



Site visit to Owens Corning Mexico

The company was visited three times by representatives of the Centre and potential applications for Chemical Leasing were identified and discussed. Large potential for process optimization and Chemical Leasing was found for the application techniques of adhesives, specifically for the use of lubricants for conveyor belts in industrial curing ovens. The adhesives are currently supplied by National Starch and Chemicals and National Adhesives. Negotiations with supplier and user are in progress to arrive at a cooperation agreement and to define an appropriate unit of payment.

- Hydromex

Hydromex is a manufacturer of dump truck chassis and hydraulic equipment, armored units for transfer of valuables and safes, as well as public transport units (minibuses). Optimization and Chemical Leasing potentials were identified for the painting process, in particular for the re-engineering of painting booths and the qualities of solvents used. Discussions are underway with the supplier of paint chemicals, namely Sherwin Williams Company, and the signing of letters of intent is within close reach.



Potential Chemical Leasing applications for companies Hydromex and Marecsa

- Marecsa

The company Marcesa provides services of design, conversion and operation of dynamically positioned Floating Production, Storage and Offloading vessel which provide fluid reception, processing and disposal during well completion and repair, well simulation and well test on superficial wells. Implementation of Chemical Leasing is envisaged for the use of specific chemicals that serve to extract products from the oil wells. Discussions are under way for the participation of Química APOLO Company, the supplier of chemical products.

- SEMARNAT

The Secretary of the Environment and Natural Resources (SEMARNAT) is committed to the implementation of Chemical Leasing with companies from the state of Guanajuato. Shoe and leather production are prominent sectors in this region with a high consumption of chemicals. FLEXI and EMICO companies (both shoe manufacturers) will be the first companies in the region to apply the Chemical Leasing model for the applications of glues which are provided by Henkel. In addition, a forum will be organized with the national tannery industry (CANALCUR) in order to inform companies in this sector about Chemical Leasing and its benefits for the environment.

3.2.4. Promotion of Chemical Leasing

- The materials for the Chemical Leasing training have been revised and completed with specific success stories and the UNIDO video.
- A total of four discussion fora were held in 2008 with representative from academia, industry and government in order to disseminate the Chemical Leasing business model. The business model has also been presented to several associations such as the ANIPAC (National Plastic Enterprises Association), ANIQ (National Chemical

Industry Association), IPN (National Polytechnic Institute) and PROFEPA (Federal Environmental Protection Agency).

- “Eurochem” develops, manufactures and distributes chemicals, machinery and accessories for the industrial cleaning and maintenance sector. In 2007 Eurochem signed an agreement letter in order to continue the cooperation and to implement Chemical Leasing in different sectors. Three training sessions on Chemical Leasing were given for the sales staff of Eurochem, with more than twenty company representatives participating in each training.

3.2.5. UNIDO Chemical Leasing Missions to Mexico

The international expert’s mission to Mexico took place on August 17-19. The mission included discussions with the team of the Mexican Cleaner Production Centre on strategic approaches for Chemical Leasing implementations as well as several plant visits. Letters of intent were signed during discussions with Semarnat and site visits to Hidromex and Owens.

3.2.6. Steps to be taken in the upcoming project phase

The following strategy will be pursued for the upcoming year:

- Chemical Leasing implementation with the companies Marecsa, Hidromex, Owens Corning and Semarnat
- Development of standards and parameters for Chemical Leasing monitoring
- Follow up and reminders with all companies, associations and organisations ever contacted
- Negotiation with companies that stated interest in the business model
- All diagnostics of Cleaner Production and energy efficiency offered by the Centre will include Chemical Leasing
- Strong focus will be put on medium-sized private companies, but in parallel meetings with large co-operations will be continued
- Dissemination of information and organization of training events for national industry and other stakeholders
- Revision of training materials, more details on step-by-step procedures and project implementation
- Organisation of a first regional conference on Cleaner Production in Mexico
- Promotion of Chemical Leasing on national and international level

3.3 Russia

3.3.1 Overview of Chemical Leasing activities in Russia

For the project period of reference the centre has concentrated its work on these main goals:

- Organization of information and awareness raising events on the Chemical Leasing concept for national industry, government and other stakeholders;
- Finalization of on-going Chemical Leasing and Cleaner Production projects and start-up of a minimum of five new projects, involving 10 additional companies;
- Preparation of PR material illustrating the results achieved during the implementation and monitoring of Chemical Leasing and CP projects in Russian companies;
- Preparation of training material on the integrated approach of Chemical Leasing and CP;
- Contribution to the further development of UNIDO's Chemical Leasing toolkit and other training material.

3.3.2 Summary of status and results of the Chemical Leasing projects

After the demonstration of the Chemical Leasing (Chemical Leasing) Business Model advantages to the authorities of selected enterprises in St. Petersburg during seminars, workshops, company visits and bilateral meetings in 2007 the main goals of the project were set forth as follows:

- Further promotion and development of Chemical Leasing based relations between the participating companies towards the conclusion of Chemical Leasing contracts. The main efforts towards the implementation of Chemical Leasing concept and business were focused on the cooperation with enterprises relating to the following branches:
 - Water purification and preparation
 - Paints production and application
 - Perfumery productions
- Monitoring of the current situation at postponed and suspended Chemical Leasing projects (Henkel-Era, Admiralteiskie Verfi, Fuel Systems).
- Search for new sectors and companies for Chemical Leasing projects

- Establishment of contacts between NWICPC and the potential new participants in order to promote a Chemical Leasing implementation:
 - Arrangement of workshops to explain the ideas and advantages of Chemical Leasing Business Model to companies' representatives;
 - Visits to selected companies and meetings with their CEOs to get more detailed information about the fields and activities promising for involvement into Chemical Leasing projects, further promotion of Chemical Leasing advantages;
 - Organization of bilateral contacts between the selected chemical producers/suppliers and users to promote the establishment of Chemical Leasing based business relations;
- Close cooperation with the international expert on Chemical Leasing:
 - Exchange of information about the current progress on the project;
 - Assistance to the international expert during his visits to Russia;
- Close cooperation with UNIDO
 - Participation in the workshops on Chemical Leasing Business Model implementation;
 - Submission of the information about the progress on the project to UNIDO including current data, intermediate activity reports and final report.
- ERG - Henkel-ERA cooperation on waste water purification

After the agreement on the performance of a demonstration project on Chemical Leasing has been set, the contacts with Henkel-Era plant were continued. Two meetings took place in the first half of 2008 with the participation of:

- A. Sharonov, chief engineer, Henkel-Era
- R. Tjapkina, the head of waste water treatment facilities,
- W. Burger, industrial glues workshop chief,
- A. Startsev, General Director, NWICPC,
- A. Romanychev, expert, NWICPC

The questions of possibly involving waste water facilities in Chemical Leasing project were discussed at the first meeting with chief engineer of Henkel-Era and the head of the waste water treatment facilities. The chemicals used for waste water treatment are supplied by several firms; therefore calculations based on natural performances are difficult in this case. Technological process optimization is possible only with the implementation of more effective and cheap coagulants and flocculants. However, modernization of the equipment is only planned for medium-term.

The issues of industrial glues workshop waste water treatment were discussed with the industrial glues workshop chief. The main problem still is that an additional payment would have to be paid for the industrial glue waste water treatment. Unfortunately, no compromise could be reached between the two units of the plant.

According to request of industrial glue workshop manager experts of the NWICPC Centre helped in launching of local waste water treatment line (March 2008), but further work of this line was suspended.

- Cooperation with Federal State Unitary Enterprise Admiralteiskie Verfi and RIVT, Ltd.

The object of the agreement between Admiralteiskie Verfi and RIVT companies (November, 30, 2007) is the reduction of the chemical impact on the environment. It was agreed to use waste-less and environmentally safe reagent solutions for the degreasing and pickling of aluminum parts, and first tests showed high effectiveness. At the beginning of the year, however, the project was suspended because of technical problems with regard to substitution of degreasing baths. The project continuation was planned for July 2008 on the basis of the following approaches:

- Reduction of aluminum parts degreasing/pickling application of alkali solutions
- Implementation of waste-less and environmentally safe BOK-2 reagent solutions for aluminum parts degreasing/pickling;
- Assessment of overall effect achieved due to the application of new chemicals according to natural criteria based on the number, weight or surface square of the degreased or cleaned metal parts or products.

The work on evaluation washing solution consumption was started and Chemical Leasing process was successfully continued.

- Cooperation with the State Unitary Enterprise St. Petersburg Vodokanal and Aquatechservice, Ltd.

A Chemical Leasing agreement between State Unitary Enterprise (SUE) St. Petersburg Vodokanal, Aquatechservice, Ltd and NWICPC was signed on February 29, 2008. Vodokanal of St. Petersburg is one of the largest water supply companies in Russia and consumes a large amount of chemical reagents for water treatment. The Chemical Leasing project is based on substitution of toxic chlorine by environmentally safe reactants (0.8% sodium hypochlorite solution) and reduction of reagent (NaCl) and energy consumption. The service company (Aquatechservice) produces these reactants for the subsequent application by Vodokanal in the water preparation processes. Meetings with specialists and managers of Vodokanal and Aquatechservice took place in February and May and the unit of payment is currently under discussion. Two managers of St. Petersburg Vodokanal participated in the training seminar on Chemical Leasing at UNIDO's headquarters in Vienna in March.

Thanks to the Chemical Leasing application the following results could be achieved:

- Safe and retained disinfecting properties;
- Stop of transportation and application of chlorine gas in the territory of the city;
- 100% decontamination of water with harmless 0.8% solution hypochlorite sodium instead of poisonous liquid chlorine;
- 100% burning of slit sediment (60 tons per day) in 3 plants instead of deposition and pollution of environment;
- Reduction of volume of chemical reagents thanks to resource savings and optimized implementation of UV-irradiation treatment;
- Risks of chemical accidents were reduced;
- Reduction of costs from 13.3 USD/t to 8.9 USD/t (about 33%);
- Total economic benefit of EURO 1.7 millions / year.

The positive experience of Chemical Leasing project may be implemented by other water supply companies in Russia and in other countries.



Water treatment plants in Russia

- Cooperation with Fuel Systems Ltd. and Neftechem-Service on the building of a new sparge water purification line CP and CP'+.

After completion of the preparatory activities including coordination of all the legal, technical and economic issues, Fuel Systems Ltd., Neftechem-Service Company and NWICPC (as a coordinator) concluded an agreement on the performance of a demonstration project on Chemical Leasing in October 2008. Under Chemical Leasing the following results could be achieved:

- 20% water savings per day due to its return into the circulation water supply system;
- Expected direct savings due to the water consumption reduction of 300.000 rubles per year (11.100\$);
- Optimization and efficiency enhancement of the process (oil savings make are about 0,5 ton per yearnum, that can be applied for cooling or other purposes);
- Cost cutting for maintenance and personnel;
- Savings on fines and pollution charges are about 500 \$ per month;
- Annual savings on fines for toxic agents excess are about 20% (150.000 \$) per year;
- Reduction of load on disposal facility;
- Reduction of chemical, raw materials, energy consumption as well as the volume of emissions and wastes;
- Long-term business relations on the basis of the monitoring contract;
- Guarantees for high quality of the final products;
- Investments – 1 800 000 rubles (about US\$ 65 000);

- Project payback – less than 2 years.

It is likely that an agreement for Chemical Leasing will be signed where the unit of payment is the “natural index” payment (1m³ of purified water).

3.3.3 Current potential and pipeline of Chemical Leasing clients

Among the ongoing and upcoming projects the following should be outlined in particular:

- Service company POLICHIM and car wash stations of PTK (St. Petersburg Fuel Company)

The service company POLICHIM supplies modified activated carbon to several car wash sites for water cleaning from organic pollutions. This company has more than 20 car wash sites in St. Petersburg; therefore the possibilities for Chemical Leasing project implementation are very attractive.

POLICHIM signed the cooperation agreement with NWICPC on Chemical Leasing in March. The signing of a Chemical Leasing contract is currently under discussion.

- Palitra, Ltd. and Tikkurila Powder Paints, Ltd. (former name - Ochtinsky plant of powder paints)

Palitra is a service company for the painting of metal constructions and a user of powder paints. In the reporting period the Center experts held three meetings with Palitra and one with Tikkurila Powder Paints. Both companies are interested in a pilot Chemical Leasing project and intend to sign the Chemical Leasing agreement, which is currently being prepared.

- InterGrim, perfumery firm, and RIVT, Ltd.

The detergent solutions (produced by RIVT Company) were successfully tested for degreasing cream production reactors on the InterGrim perfumery plant. Meetings with Intergrim took place in January and May. NWICPC experts are currently coordinating the signing of Chemical Leasing agreement between the companies.

- LOTOS, dry-cleaners association, and POLICHIM, Ltd.

Meetings were held in March and June. At the moment, several tests with modified active carbon sorbent of Polichim firm are carried out. If the tests results are positive, the agreement between LOTOS and Polichim may be signed on the local waste water cleaning systems production and their service by Polichim on the base of Chemical Leasing.

*

In the reporting period NWICPC experts also organized meetings with Ecros, Ltd. and Notech, Ltd. and informed specialists and managers of these companies about Chemical Leasing business models. The possibilities of Chemical Leasing implementations in these companies are now under analysis.

The Centre together with the environmental control agency (Rostekhnadsor) and St. Petersburg Vodokanal initiated and established a pilot group of waste water treatment plants in April. The group aims at reducing the amount of harmful sewage water, at establishing new methods of communications between environmental control organizations and industrial plants and at supporting the plants in solving ecological issues. To date fifteen companies have stated interest in the collaboration.

Some new possibilities for Chemical Leasing implementation were revealed by the Chemical Leasing expert for carburetor parts produced at Fuel Systems plant. At present, the company is not able to purify industrial effluents sufficiently so that they not contaminate the water collector. In order to address this problem the implementation of Chemical Leasing is suggested. New degreasing technology of metal parts by safe and reusable washing reagent BOK-5 is introduced as well as a new washing machine is purchased, installed and put into operation.



New degreasing and washing machine



New drying chamber

In addition to that, the NWICPC had meetings with St. Petersburg Newspaper Complex (January 2008), with Ecros, Ltd. (May 2008), with Notech, Ltd., chemical producer and supplier (June 2008). The specialists and managers of these companies were informed about Chemical Leasing business models. The possibilities of Chemical Leasing application in these companies are now under analysis.

3.3.4 Promotion of Chemical Leasing

Awareness raising and dissemination activities

- NWICPC experts and one international UNIDO specialists participated in the international Conference “Responsible Care: Business – Innovative technologies – Social responsibility” (22 May 2008, St. Petersburg). Presentations were given on UNIDO’s Chemical Leasing projects and the REACH program. In the scope of the event two meetings were organized with managers from Aquatechservice and St.Petersburg Vodokanal.
- Trainings for managers of Vodokanal were conducted on February 27. Topics under discussion were amongst others the unit of payment for water disinfection services and the evaluation of economic benefits of water treatment optimization under Chemical Leasing.
- NWICPC experts and St. Petersburg Vodokanal specialists participated in organization of International Conference “Responsible Care: Business – Innovative technologies – Social responsibility” (May 22, 2008, St. Petersburg).

- NWICPC experts and specialists accompanied Sonja Bayer, BiPRO Director, during her visit in St. Petersburg (May, 21-25, 2008). In that time, two meetings took place with Managers of Aquatechservice and St. Petersburg Vodokanal on the topic of Chemical Leasing.
- NWICPC initiated the work on Chemical Leasing on State level. The Federal Service on ecological, technological and atomic control (Rostekhnadzor) decided to organize a first meeting in May 2008 (participants: Rostekhnadzor, St. Petersburg Vodokanal, UNIDO NWICPC, ecological funds and industrial plants). The goal was to work out economic and administrative actions for reducing the chemical impact on water treatment plants. The implementation of Chemical Leasing is taken into account. The idea was to prepare a seminar on Chemical Leasing for representatives of these plants, about 15 plants were interested in collaboration.

Capacity building activities

- NWICPC General Director A. Startsev, project coordinator V. Smirnov and two Managers of St.Petersburg Vodokanal participated in the training seminar on Chemical Leasing (March 4-6, 2008, Austria, Vienna, UNIDO HQ).
- NWICPC specialists also participated in the work of International Conference “Getting Fit for REACH Applying Chemical Leasing” (Balatonfüred, Hungary, March 6-7, 2008).

3.3.5 Steps to be taken in the upcoming project phase

- Monitoring of the Chemical Leasing projects at SUE St.Petersburg Vodokanal and FSUE Admiralteiskie Verfi
- Preparation and implementation of new Chemical Leasing projects with potential candidates such as Polichim-PTK, Palitra-Tikkurila Powder Paints and Intergrim-RIVT
- Study and practical application of Chemical Leasing methodological innovations developed by UNIDO.
- Search of new candidate for Chemical Leasing implementation

4. INTERNATIONAL PROJECTS - PART 2 (COLOMBIA, MOROCCO, SERBIA, SRI LANKA)

New pilot countries

In the beginning of 2008 additional Chemical Leasing projects were started in Colombia, Morocco, Serbia and Sri Lanka. During the Chemical Leasing training in Vienna in March 2008 the respective Centres prepared detailed annual work plans according to the guidelines of the Chemical Leasing toolbox and based on previously gained experiences.

4.1 Colombia

4.4.1 Overview of Chemical Leasing activities in Colombia

The following issues were the main focus of the Chemical Leasing activities in Colombia during 2008:

- Nationwide distribution of information on Chemical Leasing to local enterprises, public and private institutions and organizations (per email, more than 15.000 contacts)
- Dissemination of Chemical Leasing business models and promotion of international Chemical Leasing success stories
- Coordination and organization of meetings, academic conferences, workshops and the first mission of the international expert
- Industrial sector analysis and identification of potentials for Chemical Leasing projects
- Visits to companies with potential to apply the business model in Medellín, Bogota, Cali and Pereira
- Visits and follow-ups to signatory companies in Medellín, Bogota, Cali and Pereira
- Specific plant analysis and quick scans
- Signing of first agreements (letters of intent and contracts) for Chemical Leasing between suppliers and users
- Establishment of a Chemical Leasing link on the Centre's web page and regular updates of the site with national Chemical Leasing developments
- Design and drafting of a Spanish brochure on Chemical Leasing
- Spanish synchronization of the Chemical Leasing video

- Elaboration of annual work plans and financial calculations for 2009

4.4.2 Summary of status and results of the Chemical Leasing projects

In total nine companies have committed to letters of intent and another few have expressed interest in signing. A general contract draft for Chemical Leasing has been developed in Spanish which serves as a basis for contract signings in Colombia. Chemical Leasing contracts have already been signed between Armalco (user company) and Bycsa (supplier company) and several more are in pipeline.

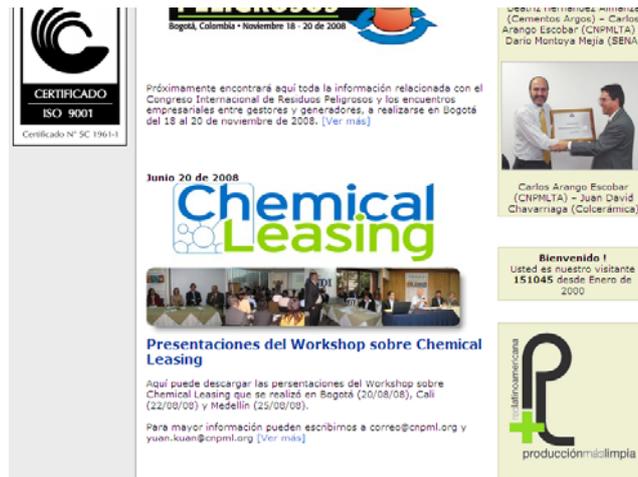
Besides projects in the initial fields, such as chemicals, electroplating, textile, environmental and metal molding, additional Chemical Leasing opportunities were identified for the sectors of flower growing, sugarcane production and petrochemicals. The various sectors have been qualitatively evaluated with respect to their potential for Chemical Leasing based on technical information obtained during site visits and discussions held with the respective companies. Most promising seem the applications of Chemical Leasing in the fields of chemicals, electroplating, analytical labs, agrochemicals and water treatment.

Multiple workshops have been organized for local companies and representatives from academia to inform about the Chemical Leasing model and its advantages over classic business models. Furthermore representatives from environmental ministries, Area Metropolitana, Cornare, Corantioquia, CVC, CAR, Dagma and DAMA are involved in and support the dissemination activities of the Centre.

The Colombian Centre has established contacts and strategic alliances for potential case studies with the Chemical Engineering Society, the galvanic team in Bogota (formed by 86 companies) and Red Agua (consisting of 8 labs).

The NCPCC Colombia has developed success indicators in the areas of dissemination, consulting and training and continuously evaluates the Chemical Leasing progress.

Information on Chemical Leasing, upcoming workshops and pilot projects has been included on the webpage of the Colombian Centre at <http://www.cnpml.org/> and regular updates on the national project status are uploaded on the international Chemical Leasing homepage.



Screen shot of the NCPCL Colombia homepage

4.4.3 Current potential and pipeline of Chemical Leasing clients

A questionnaire was developed and adopted for each company in order to identify potential application fields for Chemical Leasing. Several plant visits and quick scans were carried out to evaluate the conditions and settings at plant level for Chemical Leasing pilot projects.

Table 3: Services to companies by the Colombian NCPC

Services to Companies							
Output- Level				Outcome Level			
Description	Unit	Planned	Achieved	Description	Unit	Planned	Achieved
Quick Scans Completed	Number of companies per year	10	19	Companies that further investigate CP/ChL/CSR	% of companies requesting further assistance within 6 months	50%	90%
Short Assessments Completed	Number of companies per year	5	7	Companies that further investigate CP/ChL/CSR	% of companies requesting further assistance within 6 months	8-42 %	10-52 %
Full CP/ChL/CSR Assessments completed	Number of companies/yr	15	26	Implementation status of recommendations (full assessment)	% of companies having implemented >50% of no/low cost options within 6 months		5%

A comprehensive database was elaborated with companies visited and prospective company coupling partners. The Colombian NCPC furthermore developed strategies for successful implementation and coupling of enterprises. The most promising user and supplier cases are listed in the following table. The asterisk denotes companies that have already signed letters of intent. The companies Grival electroplating, Grival waste water treatment, Mazdel and Recublast are within reach of signing Chemical Leasing contracts and to date most advanced on the way to the implementation of pilot projects. Chemical Leasing contacts have already been signed between the user company Armalco and the supplier company Bycsa for electroplating processes. The largest company in Colombia, namely Ecopetrol, is close to signing a contract for applications of petrochemicals. The technical details are partly laid down in the signed agreements and will be refined along the implementation.

Table 4: Promising users and suppliers for Chemical Leasing Projects in Colombia

User Company	Provider/Supplier Company	Sector
Colorquimica	Conquímica	Chemicals, Coatings
Gestec*	Interquim Akzo Nobel*	Waste water treatment
Armalco**	Bycsa**	Electroplating, Metal finishing
Roy Alpha*	Plastigalco*	Electroplating, Anodizing

		Public Illumination
Grival – Corona*	Recublast*	Electroplating, galvanic process
Grival	Teca	Waste water treatment
Mazdel*	Bycsa*	Electroplating, Galvanic process
Ecopetrol (close to signing)	Nalco	Petrochemicals
Propal SA	Nopco Colombiana	Chemicals, textile additives
Asocolflores America Flor*	To be establish	Flower fields, flowers fertilizers
Cenicaña	To be establish	Sugar fields, sugarcane
Mazdel	Quimicos y pesticidas	Waste water treatment
Plastigoma	To be established	Rubber
Zuzuki; Yamaha	To be established	Coatings
Saint Gobain	To be established	Glass
To be established	Comercializadora de quimicos y siliconas	Chemical additives
Red Agua	To be established	Analytical labs
Universidad Pedagogica y Tecnologica de Colombia	To be established	Environmental
Genfar	To be established	Pharma

After initial meetings the focus was placed on gathering technical information for process optimization and on the definition of a unit of payment. Some technical details for selected companies are listed in the below table. The Colombian NCPC consistently follows up on the agreements reached with users and supplier companies and monitors development and progress of the Chemical Leasing projects in various sectors.

Table 5: Technical details for selected companies

Company	Role	Chemicals	Technology / Sector
Roy Alpha	User	NaOH; H ₃ PO ₄ ; H ₂ SO ₄ ; Ni ⁺² ; Cr ⁺⁶ ; Al ⁺³	Anodizing/ Electroplating
Plastigalco	Provider	Technology	Automatic equipments / Electroplating
Interquim	User	Formaldehyde Resins	Continuous and batch reactors / Chemicals
Conquimica	Provider	Commodities	Distributor / Chemicals
America Flor - Asocolflores	User	Fertilizers	Flower fields / Agrochemicals
Gestec	Provider	Cl ₂	Advanced oxidative processes / Water treatment chemicals
Armalco	User	NaOH; H ₃ PO ₄ ; H ₂ SO ₄ ; Al ⁺³	Continue process / Electroplating
Grival	User	NaOH; Polymers	Continue process / Water treatment chemicals
Grival	User	NaOH; H ₃ PO ₄ ; H ₂ SO ₄ ; Ni ⁺² ; Cr ⁺⁶	Baths and continue systems / Electroplating
Mazdel	User	NaOH; H ₃ PO ₄ ; H ₂ SO ₄ ; Ni ⁺² ; Cr ⁺⁶	Baths and batch systems / Electroplating
Recublast	Provider	NaOH; H ₃ PO ₄ ; H ₂ SO ₄ ; Ni ⁺² ; Cr ⁺⁶	Electroplating
Nopco	Provider	Naphtalene	Batch reactors /Chemical
Cenicaña	User	H ₂ SO ₄ ; NaOH	Continue reactors / Sugarcane
Ecopetrol	User	Petrochemicals	Distillation towers / Petrochemicals

Industrial analyses have been carried out in Bogota, Cali, Medellin, Manizales, Armenia and Pereira and strategies were developed for various industrial sectors and specific regions. The pilot projects have up to now mainly been concentrated in Medellin and Bogota. So far the electroplating and chemical sectors are most promising with pilot projects close to

implementation. Further Chemical Leasing projects are in close realizations in the areas of agrochemicals, petrochemicals and waste water treatments.

4.4.4 Promotion of Chemical Leasing

Awareness raising and dissemination activities

A total of 11 national events on Chemical Leasing were held in 2008 in major Colombian cities. The events targeted different interest groups from public and private sectors of various industries. The following listing briefly discusses selected workshops and other prime dissemination events:

- March 2008, Medellin: on the premises of Corantioquia, the leading regional environmental authority. More than one hundred institutions and companies participated in this event.
- April 2008, Medellin: at the NCPC facilities, with the academic community being the major target group. The event aimed at establishing adequate links between enterprises and the university and at ensuring a strong fundamental basis for Chemical Leasing.
- Several presentations and workshops on Chemical Leasing were designed for various contexts and diverse audiences, such as a presentation for students in Yopal “Chemical Leasing - Environmental Aspects for the Industry” or discussions held on Chemical Leasing for pollution and waste prevention with enterprises in Monteria and Cali.
- August 2008: workshops in Bogota, Cali and Medellin, as part of the UNIDO Chemical Leasing mission
- September 2008, Pereira City: The Chemical Leasing concept was presented at the Universidad Tecnologica de Pereira (UTP) to fifty representatives from industry and to university students.
- September 2008, Santuario: dissemination event at the environmental authority CORNARE. Local enterprises, as well as public and private organizations of the region were among the participants.
- October 2008, Medellin: meeting at the Universidad de Antioquia. Participants of the workshop included the work team “Red Agua” which comprises eight analytical labs, including private and public institutions, environmental authorities and universities.

- November, December 2008, Medellin, Bogota: Presentation of the Chemical Leasing model at CEO (Corporacion Empresarial del Oriente), Asociación de Administradores Ambientales and Colnodo (professional guild of web and information tools in Colombia).

The following overview summarizes the outcomes of the national awareness raising and dissemination activities conducted by the NCPC Colombia team in 2008:

Table 6: Outcomes of national awareness raising and dissemination activities

Awareness and Information Dissemination							
Output- Level				Outcome Level			
Description	Unit	Planned	Achieved	Description	Unit	Planned	Achieved
Number of information materials produced	Number of new publications per year	2	2	Information requests received, incl. unique visits to webpage	Number per year	5	5
Number of information and awareness raising events organized	Number of events per year	5	11	Number of participants	Participants per year	235	548

Trainings

The training program of the NCPC Colombia is categorized into three parts, namely in internal trainings, external trainings and pilot company trainings.

Internal trainings are directed towards NCPC members (team and local experts) and involve lectures and technical information on the web for national capacity building. *External trainings* focus on companies, institutions and environmental authorities and are carried out by the NCPC team and local experts. *Pilot company trainings* are conducted for enterprises which signed letters of intent. The trainings involve aspects of technology, process optimization and establishment of units of payment, based on information gathered from the companies by the Centre.

An overview on the entire trainings held in 2008 is shown in the table below:

Table 7: Trainings held in Colombia

Training							
Output- Level				Outcome Level			
Description	Unit	Planned	Achieved	Description	Unit	Planned	Achieved
Number of training events for educators	Events per year	5	11	Number of educators trained in CP/ChL/CSR	Persons per year	70	110
Number of training events for other target groups	Events per year	3	6	Number of persons trained	Persons per year	141	299
Number of Training Packages (or Units)	Number of packages per year	3	6	Number of users of training packages	Users/yr	125	345

The NCPC Colombia has added Spanish subtitles to the Chemical Leasing video and will synchronize it in Spanish for even more effective awareness raising in Colombia. Furthermore the Centre is preparing a brochure on Chemical Leasing with national and international success stories.

Policy advice and implementation

Chemical Leasing is explicitly mentioned in a new national policy draft for Sustainable Production and Consumption in Colombia (“...leasing de sustancias químicas...”). The success factors for overall policy consulting in 2008 are summarized in the table below:

Table 8: Success factors

Policy Advice											
Output-Level				Outcome Level				TOTAL Impact Level			
Description	Unit	Planned	Achieved	Description	Unit	Planned	Achieved	Description	Unit	Planned	Achieved
Number of CP/ChL/CSR policies	Number per year	2	2	Implementation of policy submissions	% of policy submissions implemented by government	0	0				
				Government requests	Number of government requests received that have been responded to/yr	1	3				
Policy information events organized	Number of events per year	5	11	Number of participants	Participants per year	235	548	Number of participants requesting the services	Number per year	15	35

4.4.5 UNIDO Chemical Leasing Missions to Colombia

The first Chemical Leasing mission to Colombia took place from August 19-27 and marked the official launch of the Chemical Leasing initiatives in this country. The mission was conducted by Mr. Joas (international expert on Chemical Leasing) and Mr. Jorge Perez (director of the NCPM Mexico) to efficiently transfer know-how from Mexico to Colombia. The objectives of the mission involved to hold workshops, visit companies interested in the Chemical Leasing projects, assist the Centre in the selection of additional Chemical Leasing pilot projects and to establish new Chemical Leasing agreements and contracts. The mission workshops, awareness raising and company visits were conducted in three different cities, namely Bogotá, Cali and Medellín.

During the mission extensive discussions were held with the Chemical Leasing team in Medellín on acquisition strategies for companies and sustainable approaches for future implementations.

Three workshops were held with approximately 160 participants in Bogotá, Cali and Medellín. The workshops were supported by the ANDI (National Enterprises Association). Invitations were directed towards general managers, commercial and production managers, project managers and staff from sales departments of different enterprises. Special invitations were extended to local and national environmental authorities. The main objective of these events was to give a general overview on this innovative way of making chemical business, to present pilot cases developed around the world and to discuss the economic and environmental advantages of Chemical Leasing.



Workshops in Bogota, Cali and Medellin

Multiple site visits were conducted to companies from different sectors and letters of intent were signed by several companies. The following enterprises were visited during the mission:

- Corona (user of galvanising chemicals and water treatment chemicals)
- Mazdel (user of waste water treatment chemicals)
- General Motors Colombia (phosphating, cleaning and painting lines)
- Roy Alpha (manufacturer of public lamps and electric circuits)
- Akzo (producer of formaldehyde)
- Ecopetrol (petrochemicals, biggest company in the country)



Company visits at GM Colombia and Roy Alpha.

4.4.6 Steps to be taken in the upcoming project phase

- Start of Chemical Leasing implementations at Armalco, Bycsa and Ecopetrol
- Close and continuous monitoring of Chemical Leasing implementations
- Establish additional Chemical Leasing pilot projects with companies of various sectors
- Development and distribution of Chemical Leasing brochures and information material
- Information workshops and training seminars for the staff of NCPC Colombia, potential companies and environmental authorities
- Dissemination of Chemical Leasing
- Regular updates of web page
- Strengthening of cooperation with local stakeholders by organizing joint trainings and workshops on Chemical Leasing
- Strengthening cooperation and coordination with other pilot countries
- Development of a Chemical Leasing strategy for Colombia and regular adjustments of the work plans
- Publications on Chemical Leasing with reference to success stories
- Further development of success indicators and environmental impact standard
- Trainings

4.2 Morocco

4.2.1 Overview of Chemical Leasing activities in Morocco

The following Chemical Leasing activities were carried out in the period of reference:

- Dissemination and promotion of the Chemical Leasing concept
- Translation of all Chemical Leasing documents, brochures and presentations into French
- Establishing and strengthening co-operations with the Ministry of Environment, Ministry of Industry, Professional Associations and Federations
- Communication of the Chemical Leasing concept in national news paper, CMPP news, CMPP web site, CGEM news, FENELEC news, newspapers, TV (2M)...

- Workshop preparation and organisation and official launch of Chemical Leasing activities and projects

Nouveau projet sur le « Chemical Leasing »

Les produits chimiques jouent un rôle clé dans de nombreux secteurs économiques et constituent une partie importante du commerce international. Cependant, l'utilisation de ces produits ou de leurs dérivés peut avoir des conséquences néfastes sur la santé et l'environnement. La gestion rationnelle de ces produits est devenue un véritable défi dû par le devoir de protéger la santé des populations et l'environnement.

C'est dans ce contexte que la communauté internationale s'est investie à réfléchir sur des nouvelles alternatives, permettant d'utiliser ces produits de manière efficace et rationnelle, sans pour autant nuire à la santé et l'environnement. Parmi les modèles de gestion proposés figure le « Chemical Leasing ».

Fondé à l'initiative du Ministère de l'Environnement Autrichien, ce concept est basé sur l'idée préventive de la production plus propre et représente un aspect important de l'approche de la Gestion Durable des Ressources Industrielles Initiée par l'Organisation des Nations Unies pour le développement Industriel (ONU/DI).

Les expériences qui ont été réalisées à l'échelle internationale (en Egypte, au Mexique et en Russie) dans le cadre de la mise en place du Chemical Leasing ont été fructueuses, ce qui a encouragé le CMPP à présenter sa candidature à l'ONU/DI pour introduire ce concept au niveau du Maroc.

A cet effet, le Maroc a été sélectionné avec trois autres pays (la Colombie, la Serbie et le Sri Lanka) pour la mise en place de ce nouveau projet.



Dans ce cadre le CMPP a participé à la session de formation organisée du 3 au 5 mars 2008 au siège de l'ONU/DI à Vienne, et qui avait pour objectif l'introduction sur ce nouveau concept, ses principes, ses objectifs, les expériences internationales ainsi que les outils pour sa mise en œuvre dans l'industrie.

Conférence internationale sur le « Chemical Leasing »

REACH est un règlement instituant une politique européenne en matière de substances chimiques.

REACH signifie : EnRégistrement, Autorisation des substances CHimiques.

Ce règlement a pour but principal l'acquisition des propriétés intrinsèques des substances chimiques et des risques liés à leur utilisation. Ce projet intègre dans un même cadre les substances existantes et progressivement les nouvelles substances et progressivement les substances existantes. La mise en œuvre du règlement renforcera la relation entre les producteurs et les utilisateurs de produits chimiques.

Le Chemical Leasing:

Le « Chemical Leasing » modifie le concept traditionnel d'affaire basé sur l'augmentation des bénéfices en augmentant les volumes de ventes, et propose une approche orientée services et à forte valeur ajoutée. Ce nouveau modèle favorise des solutions concrètes pour la gestion efficace et rationnelle des produits chimiques permettant d'assurer un développement économique en harmonie avec le respect de l'environnement.

Acteurs du projet:

Le Centre Marocain de Production Propre (CMPP) est le principal acteur du projet, soutenu par le Ministère de l'Environnement et de l'Énergie, le Ministère de l'Industrie et du Commerce, et l'Organisation des Nations Unies pour le Développement Industriel (ONU/DI).

Resultats attendus:

- Optimiser la productivité et la qualité.
- Réduire la consommation de produits chimiques.
- Réduire la quantité des déchets générés.

Edito LA FENELEC

N° 13
Octobre 2008

Monsieur Houcine GABI
Directeur Général
du Centre
Marocain de
Production Propre

En marge des efforts internationaux sur la gestion effective des produits chimiques, des prestations innovantes, intégrées et respectueuses de l'environnement, le Gouvernement Autrichien et l'Organisation des Nations Unies pour le Développement Industriel (ONU/DI), ont initié un nouveau projet le Chemical Leasing (ChL).

Dans ce cadre et afin de créer une synergie entre REACH et le « Chemical Leasing », le Ministère de l'Environnement Autrichien en coopération avec l'Organisation des Nations Unies pour le Développement Industriel (ONU/DI) ont organisé le 7 et 8 mars 2008 à Balatonfüred en Hongrie, une conférence internationale sur le thème : « se préparer pour REACH en appliquant le Chemical Leasing ».

Le CMPP a pris part aux travaux de cette conférence ainsi qu'à la réunion du groupe international sur le « Chemical Leasing » qui a été organisée en marge de cet événement. Ce groupe qui regroupe des représentants des organisations internationales, gouvernements, consultants et grands groupes industriels chimiques.

Lors de cette réunion le CMPP a présenté le bilan de ses activités ainsi que sa stratégie pour la mise en place du projet « Chemical Leasing » au Maroc.

Promotion material for Chemical Leasing in Morocco

4.2.2 Summary of status and results of the Chemical Leasing projects

The official launch of Chemical Leasing activities took place on May 8 in Casablanca in an opening ceremony in combination with a workshop. Participants included chemical users and suppliers (Maghreb steel, Cosumar, RAM, Lydec, etc.), authorities (Ministry of Environment and Energy, Ministry of Industry and Commerce, etc), recycling companies, professional associations and national federations (REME, IZDIHAR, GTZ, AMIP, etc), academia (ENSA Tanger, ESITH, etc), UNIDO representatives and the media. Chemical Leasing was presented as a tool for sustainable chemicals management and presentations involved basic concepts and definitions, methodology, international success stories, steps towards implementation and technical assistance for Moroccan companies. The workshop closed with a session of questions and discussion to engage new project partners.



Announcement for the 1st Workshop on Chemical Leasing in Morocco

4.2.3 Current potential and Chemical Leasing project in pipeline

The following industrial sectors and processes in Morocco were evaluated with regard to Chemical Leasing suitability: metallurgy (pickling), fertilizers (phosphating), textile (dyeing), tannery (dyeing) and painting.

Table 9: Promising Sectors and processes for Chemical Leasing in Morocco

Process	Industrial sector
Pickling	Metallurgy
Fertilisation	Fertilizer producer
Dyeing	Textile
Dyeing	Tannery
Painting	Paint
Cleaning	Food industry
Lubrication	All industry
Galvanisation	Metallurgy
Bleaching	Textile
Printing	Ink, tin, paper
Powder coating	Cars, TV, air conditions,
Sterilisation / disinfection	Food industry, pharmaceutical industry
Glue	Leather, shoes
Degreasing	Metallurgy
Water purification	Water treatment

The sectors of textile and tannery were found to offer large potential for the implementation of Chemical Leasing because there are several companies working in these sectors in Morocco which consume a big amount of chemicals, raw materials, water and energy and produce a lot of liquid and solid waste.

For promoting Chemical Leasing in Morocco meetings were organized with different partners:

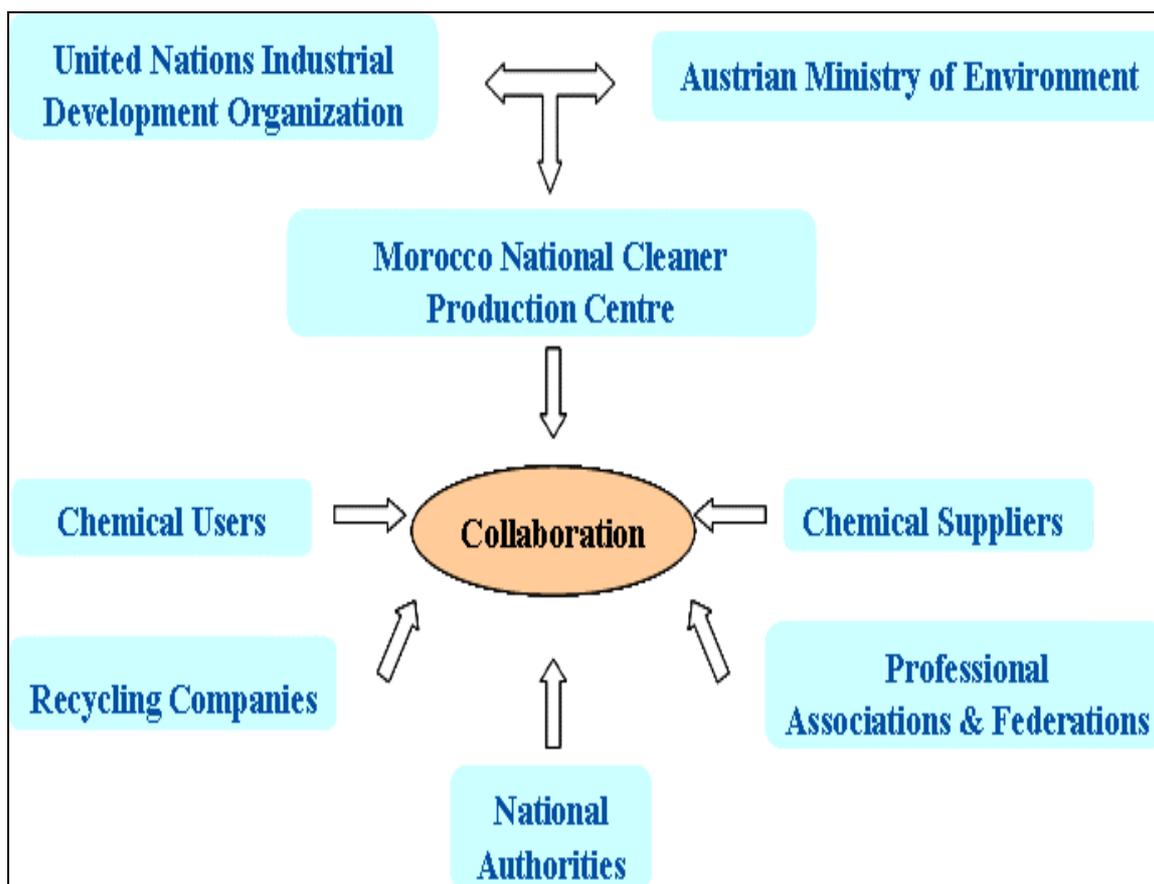
Table 10: Chemical Leasing Partners

N°	Partner's Name
1	Ministry of Environment
2	Ministry of Commerce and Industry
3	AMP: Moroccan Association of Plastics
4	FCP: Chemical and Para chemical Federation
5	REME: Network of Maghreb Enterprises for the Environment
6	CETIA: Technical Centre for Food Industry
7	FENAGRI: National Federation of Food
8	AMICA: Moroccan Association for Cars
9	CTTH: Technical Centre of Textile
10	FEDIC: Federation of Leather
11	CMTC: Moroccan Centre of Leather
12	FENELEC: National Federation For Electronic
13	ANPME: National Agency for Small & Medium Enterprise
14	AMIP: Moroccan Association for Pharmaceutical Industry

During the meeting with the director of FENELEC (N° 12), it was decided to follow 3 main steps:

- Awareness raising and dissemination of information about the Chemical Leasing (see:<http://www.fenelec.com/pvs/doc/fenelecechos/FENELEC%20INFO%20N13.pdf>),
- Identify the potential applications for the implementation of Chemical Leasing in the electrical and electronics sector (lubrication, painting of electric boxes, etc.),

- Select companies and start pilot projects in this sector.



Structure of Partners

The following companies have been contacted during the period of March to December 2008.

Table 11: Contacts with companies in Morocco

N°	Name of company	Sector	Date
1	Maghreb steel	Surface treatment	08/05/2008
2	OCP	Phosphate / fertilizers	09/08/2008
3	COLORADO	Paint	06/06/2008
4	ITEX	Textile	18/09/2008
5	AKZO NOBEL	Paint	18/09/2008
6	SCE	Chemicals producer	17/09/2008
7	SNEP	Chemicals producer	–

8	SD FRERES	Tannery	17/07/2008
9	Unilever Maghreb	Detergents producer	09/07/2008
10	CLARIANT	Chemicals producer	16/10/2008
11	FERTIMA/CHARAF	Fertilizers	17/09/2008
12	C.H.I EL HAITE	Tannery	09/10/2008
13	TANNERIES MOHAMMEDIA	Tannery	09/10/2008
14	BOSTIK	Glue producer	09/10/2008
15	Master Leather	Tannery	09/10/2008
16	Nouvelle SOMATAM	Tannery	09/10/2008
17	TANNERIES SD FRERES	Tannery	09/10/2008
18	MARIDIOR	Punch	09/10/2008
19	TANNERIES BERRADA	Tannery	09/10/2008
20	PROTEFEL	Chemicals	15/10/2008
21	SYNERGIZER	Recycling of plastic bags	12/05/2008
22	Zintex	Textile	02/06/2008

The first step was to evaluate the current situation, then to identify the process for Chemical Leasing implementation and to define the process optimization requirements. Quick scans have been conducted in several companies:

- Maghreb Steel

Maghreb Steel uses paint to cover their product with a paint film for protection but also for esthetical reasons. BECKER INDUSTRIE as a possible supplier is an international industry group focused on the design, manufacture and sale of liquid and powder industrial paints for metal, plastic and wooden substrates. Chemical Leasing could be an option for process optimization.

Another process where Chemical Leasing could be implemented is the process of pickling with hydrochloronic acid which is a pre-treatment for steel. (supplier: COELMA).

It was decided to first implement the new business model in the process of painting and maybe later on pickling.

- Société Chérienne des Engrais (SCE)

The company produces and sells aluminum sulfate which is used in water treatment plants to purify waste water. SCE company imports the catalyst (V_2O_5) used in the production process from a supplier located in Italy. SCE has a problem with the exhausted or spent catalyst which is considered a highly hazardous substance. Both, aluminum sulfate as a coagulant for water purification as well as Vanadium Oxide used as a catalyst in the production process are suitable for a joint project on Chemical Leasing.

- Itex

The aim is to implement Chemical Leasing in the process of bleaching of textile by H_2O_2 (Hydrogen Peroxide) between ITEX as a user and chemical industry as a supplier. The bleaching process is a pre-treatment before dyeing and printing of textiles.

- FERTIMA/CHARAF

The use of fertilizers in agriculture is very important to ensure high yields. The use of these chemicals should be more efficient to reduce the impacts on human health and the environment. It was suggested to propose the Chemical Leasing Business Model in the use of fertilizers between FERTMA/CHARAF (as a supplier) and the agriculture company Farm (as user).

It was agreed that in this company the process of fertilization present a potential for the implementation of Chemical Leasing in two ways:

- The fixed and variable costs of CHARAF are covered by a payment of the farmers on a basis Dh/kg fertilizer. This price is below the current market price as no (or only a very small) profit for CHARAF is calculated in the price.
- CHARAF receives an additional payment based on the increase of yield achieved. The unit of payment is Dh/t additional yield. In this way CHARAF benefits from the

optimization of the fertilizers application and a partial Chemical Leasing approach is fulfilled. All the benefits as described in the objectives can be achieved.

- UNILEVER MAGHREB

During the meeting with Unilever Maghreb, a few options for the implementation of Chemical Leasing have been discussed. The company is producing food products by mixing different ingredients. The site visit revealed that neither the use of hot water for the cleaning of food processing equipment nor the use of sulfonic acid in detergent production are applicable for the implementation of a Chemical Leasing business model.

- CLARIANT

In this company, Chemical Leasing could be applied on the process of using raw materials used in paint manufacturing between CLARIANT as a supplier and AKZO NOBEL as a user.

- TANNERIE AL AHD ALJADID (=SD FRERE) and TANNERIE LACHGAR

The aim of this visit was to identify the potential for the implementation of Chemical Leasing in the two tanneries; both tanneries have no potential for Chemical Leasing.

- Tannery Nouvelle SOMATAM

The company is specialized on the fabrication and sale of leather, 95% of their products are exported, particularly to Europe. The aim of this visit was to identify the potential for the implementation of Chemical Leasing. Several opportunities for the implementation of Chemical Leasing could be detected as chemicals are used in various processes (cleaning, tanning, etc.). The director agreed to sign a letter of intent.

- PROTEFEL & TANNERIES MOHAMMEDIA

PROTEFEL is a company specialized on the fabrication of pigment and dye products for leather, TANNERIES MOHAMMEDIA is specialized on the fabrication and sale of leather, the majority of the products are exported, particularly to Europe.

A meeting with the top management of both companies was arranged during the International Leather Exhibition in Casablanca. The aim of the meeting was to present the concept of Chemical Leasing and to identify the potential for the implementation.

- BOSTIK

BOSTIK is specialized on the fabrication of glue and adhesive used in the manufacturing of shoes. A meeting was organized with the environmental engineer during the International Leather Exhibition in Casablanca. The aim of the meeting was to present the Chemical Leasing concept and to identify the potential for implementation.

4.2.4 Promotion of Chemical Leasing activities

In addition the Chemical Leasing concept was presented at meetings with government and industries, such as the Ministry of Environment, the Ministry of Commerce and Industry, the Moroccan Association of Plastics and the Chemical and Para-Chemical Federation. Furthermore in June Chemical Leasing was discussed in seminars on pollution prevention in the textile sector, on seminars on regional industrial pollution and CO₂ emissions and in the scope of the Abatement Project for Arab Countries (RIPECAP).

The Centre's webpage at <http://cmpp.ma/> is continuously being updated and completed with information on Chemical Leasing activities.

Events:

Table 12: Events conducted in 2008

Event	Name	Date
Work shop	Pollution prevention in textile sector	05/06/2008
Seminary	Regional Industrial Pollution and CO ₂ Emission Abatement Project for Arab Countries (RIPECAP)	06/06/2008
Exhibition	International Leather Exhibition	09-11/10/2008

4.2.5 UNIDO Chemical Leasing Missions to Morocco

First Chemical Leasing mission, May 5 -9

The objectives of this first mission were to officially launch the Chemical Leasing activities, organize an international workshop on Chemical Leasing, visit the selected companies and provide assistance and training to the staff of the NCP Morocco.

Two company visits were conducted during the mission, one to Maghreb Steel and the other to OCP. While Maghreb Steel is a user of chemicals, OCP can act as user as well as producer within the Chemical Leasing business models.

OCP is one of the biggest companies in Morocco with a production focus on phosphoric rock and phosphoric derivatives such as fertilizers and phosphoric acid. Maghreb Steel and OCP will provide a chemicals inventory to the Moroccan CPC in order to identify further potential for their roles as supplier and user.



Launch of Chemical Leasing activities in Morocco

4.2.6 Steps to be taken in the upcoming project phase

- Continuation of company visit
- Establishment of Chemical Leasing contracts for OCP group and Maghreb steel
- Identification of additional companies and processes for Chemical Leasing
- Strengthening of cooperation with local stakeholders by organizing joint trainings and workshops on Chemical Leasing
- Design and implementation of a promotion and marketing strategy for Chemical Leasing in Morocco
- Strengthening cooperation and coordination with other piloting countries
- Publication of scientific articles on Chemical Leasing with reference to success stories

4.3 Serbia

4.3.1 Overview of Chemical Leasing activities in Serbia

During the period of reference, the main Chemical Leasing activities in Serbia involved:

- Dissemination and promotion of the Chemical Leasing concept
- Translation and preparation of promotion material
- Establishment of NCPD homepage with information on Chemical Leasing
- Creation of a database of companies interested in Chemical Leasing
- Analyses of sectors with potential for Chemical Leasing
- Identification and contact of users and suppliers of chemicals
- Organization of first workshops on Chemical Leasing for companies
- Organization of the first mission of UNIDO's International Expert
- Company visits and design of cooperation agreements for companies
- Signing of first letters of intent and start of first projects

4.3.2 Summary of status and results of the Chemical Leasing projects

A strong focus was put on dissemination activities for Chemical Leasing. The UNIDO Chemical Leasing video was synchronized in Serbian, brochures on Chemical Leasing were designed and printed in Serbian language and the Centre webpage was set up with additional information on the Chemical Leasing business model (www.cpc-serbia.org). For further promotion of Chemical Leasing several presentations on the business model were held. A TV show on Chemical Leasing was broadcasted on a national TV channel (Euro net). Another focus was put on the analysis of sectors and the contact with companies. During the first mission of the international expert letters of intent for Chemical Leasing projects were signed by eight interested companies and additional statements and agreements are in preparation.

4.3.3 Current potential and pipeline of Chemical Leasing clients

An industrial sector analysis in Serbia showed medium to high suitability for Chemical Leasing in the following sectors:

- Metalworking industry (powder coating, galvanizing, foundries)
- Mining (ore floatation)
- Pharmaceutical and food processing (cosmetics, users of disinfection materials)

Possible process for Chemical Leasing projects which were investigated in more detail are:

Powder coating application

- ✓ Suitability of this process is high;
- ✓ Multiplication factor is also high, as there are many users of this kind of paint;
- ✓ The process could be economically relevant.

Galvanizing (hot deep zink, electroplating)

- ✓ Suitability of this kind of processes is high;
- ✓ Multiplication factor is also high;
- ✓ The process is environmentally and economically relevant.

The problem could be the fact that there are no recycling companies, so far but cooperations could be initiated through Chemical Leasing.

Foundries

- ✓ Suitability of this kind of processes is medium;
- ✓ Multiplication factor is high;
- ✓ The process is environmentally and economically relevant.

Mining (ore flotation)

- ✓ Model could be applied on lubrication of mining machines;
- ✓ Multiplication factor is not very high.

Pharmaceutical and food processing (cosmetics, users of disinfection materials)

- ✓ Suitability of this kind of processes is medium;
- ✓ Multiplication factor is high;
- ✓ The process is environmentally and economically relevant.

Beverage industry

- ✓ This kind of industry is suitable for projects on disinfection especially in big production like in breweries. Eco Lab in Serbia cooperates with one of their customers according to this model.
- ✓ There is also a possibility to apply the Chemical Leasing model on packaging – especially on lubricants.
- ✓ Multiplication factor is high.
- ✓ The process is environmentally and economically relevant.

Dairies

Processes in dairies were investigated in order to find a possibility of applying Chemical Leasing business model especially for disinfection. As they use the same lines for different production and every product requires different type of disinfection this kind of industry is not suitable for a Chemical Leasing project.

Sugar mills

As cases in Mexico show there is a possibility for Chemical Leasing projects in sugar mills, but this kind of industry is quite difficult in Serbia. Some sugar mills are privatized and owned by Italian, Greek or German companies and some have economic problems. Therefore, none of these companies was visited so far.

Contacts

Contacted companies (by phone, e-mail):

- Ekonom – Usce (powder coatings),

- Cini – Cacak (powder coatings),
- Kecman – Backa Palanka (powder coatings),
- Univerzal – Novi Banovci (powder coatings),
- Surtec – Cacak (producer of chemicals for galvanisation),
- Mi – Beograd (representative for chemicals for galvanisation, ore flotation and chemicals for foundries)
- BASF representative office in Belgrade,
- Metal – Cuprija (hot deep zinc galvanisation),
- Unipromet – Cacak (hot deep zinc galvanisation),
- Amiga – Kraljevo (hot deep zinc galvanisation),
- Stark – Beograd (food processing),
- SAMAGO – Beograd (chemical trading company),
- Beograf – Beograd (flexo and rotogravure printing)
- Livar – Topola (foundry),
- D.A. Stuart (industrial oils producer - Germany),
- Fadip Becej – galvanisation equipment producer
- EKO SIP – Ruma – recycling company
- AGROSAVA – Beograd – Production of agrochemicals
- CARLSBERG – Celarevo, beer producer
- Solventa – Pancevo, Dairy
- Beodusek - Beograd
- Dallas – Tutin

Visited companies

- Jugoterm - Merosina,
- DCP Hemigal - Leskovac,
- Metalac – Gornji Milanovac,
- Duga - Beograd,
- DES – Beograd (galvanisation),
- BASF (representative office) - Beograd,
- FAM – Krusevac,
- Contango – Gornji Milanovac,
- Papirprint – Gornji Milanovac,
- Beograf – Beograd,
- Mi – Beograd,
- SAMAGO – Beograd,
- Delta Agrar – Zrenjanin

- FSK – Elemir - Zrenjanin
- Mining Basin - Kolubara
- Tego – Beckers SRI (Italy) representative office – Beograd
- Chemmetal representative office - Beograd
- Altis – Beograd
- Eco Lab – Beograd
- Mitex – Arilje
- Tetragon – Cacak
- Beodusek – Beograd
- Zvezda – Helios
- Hipol - Odzaci
- Torda – Zvezda – Gornji Milanovac
- Altis Chemicals - Vrcin

In the following the companies which showed interest in Chemical Leasing and their activities are described in brief.

- *Duga – paints and resins producer – Beograd*

The company was interested to participate in a project as supplier for Jugoterm – Merosina (user of powder coatings) but due to reorganization in the Helios Group they are not in charge of powder coatings any more. Contact will be established again in January 2009. A letter of intent has been signed.

<http://www.dugaibl.com/en/main.asp?main=korporacija>

- *Jugoterm – Merosina*

Jugoterm d.o.o. Merošina, having 156 employees, produces heating devices and solar collectors, mostly for the domestic market in Serbia. The total annual production capacity of the company is around 650.000 m² of heating surfaces. The most important products of the Company are steel panel radiators. The company performs a complete process of radiator production, which includes sheet pressing, welding of parts, painting, packaging and transport. In 2006, the earnings of Jugoterm were about 4.27 million EU.

Jugoterm agreed to participate in a Chemical Leasing model implementation as they see it as opportunity to cut their costs; a letter of intent has been signed. The starting point for optimization will be the thickness of coating on the radiators which is 120 µm now compared to the coating thickness of the competitor's radiators which is 60 µm.

The company was privatized in 2008 and therefore was not able to start with the project immediately. As the key persons remained at their positions (General and Technical Manager) it is expected that talks will be continued in 2009.

- DCP Hemigal – Leskovac

DCP Hemigal is a private cosmetics producer and was involved in a CP pilot project in 2006. With the company Stockmeier, an expert in cleaning and disinfection of bins/containers and tubes in the manufacturing of foods, pharmaceuticals and cosmetic products, DCP Hemigal was thinking of implementing Chemical Leasing for process optimization. A letter of intent was signed. However, they assume that their technique is rather to be applied in bigger plants (range: consumption of more than 20 tons of cleaning agents per year) and that their processes are not suitable for a Chemical Leasing implementation.

<http://www.dcp-hemigal.co.yu/>

- DES – Beograd

DES has nickel, chrome (decor), copper (alkaline and acid process) and zinc (alkaline process) electroplating on the site. Chemical Leasing could be most probably implemented on the nickel electroplating process. Different producers of galvanic chemicals (Antony and Atochem) were contacted, but there was no reply so far. A letter of intent was signed by DES.

- Papirprint – Gornji Milanovac

Papirprint is a private company for flexible ambalage printing. They use more than 200 tones of printing inks per year. Suppliers are Torda – Zvezda and Sun Chemical. Contacts with these companies have been established already, a meeting will take place in January 2009 in order to analyze possibilities of improvement. A letter of intent was signed.

<http://www.papirprint.co.yu>

- Torda – Zvezda – Gornji Milanovac

Torda – Zvezda is a producer of printing ink and supplier for „Papirprint“. They produce flexo and rotogravure printing inks, but they don't want to participate in a Chemical Leasing project as a supplier. Nevertheless they agreed on participating in the analyzing process for optimization in Papirprint and therefore signed a letter of intent.

www.tordazvezda.co.yu/Flash/homeEng.html

- *Metalac – Gornji Milanovac*

Metalac is a producer of cookware and water heater where they use powder coatings. They are participating in a current CP project. Possible processes for Chemical Leasing are lubricating and chemical pre-treatment (industrial detergents). As Henkel Serbia will stop their detergent production in Serbia, there is a possibility to get on board Chemmetal (participating in a Chemical Leasing project in Egypt). Metalac is willing to do some testing and to negotiate with Chemmetal; a letter of intent should be signed soon.

<http://www.metalac.com/pgs/en/home/>

- *Contango – Rudnik*

Contango is a zinc and lead mine, a possible process for Chemical Leasing in this case could be ore flotation. They were interested in a project and were visited during the international expert's mission to Serbia and expressed their interest for participating. They also signed a letter of intent, but resigned later.

http://www.contangorudnik.co.yu/Index_Rudnik_en.htm

- *HIPOL – Odzaci*

HIPOL is a producer of polypropylene and participates in a current CP project. They use two types of propylene; with one there are no problems, but for the other one, the yield is quite low. They are having negotiation with Engelhard, a catalyst supplier to introduce a purification process using the Chemical Leasing model. Due to discrepancies with prices of raw material (polypropilene) and final products, production has been stopped. It is expected that the production will be continued in January or February 2009, and then they will be contacted again.

http://www.hipol.com/about_us.html

- *FAM – Krusevac*

FAM is a producer of motor and industrial oils, leader on the Serbian market. The NCPC suggested starting a Chemical Leasing project and they established contact to US Steel Serbia on lubricants, introducing the Chemical Leasing model to them.

<http://www.fam.co.yu/english/viewpage.php>

- *Tego Beckers SRI*

Tego Beckers produces coil coatings and would like to start co-operations with companies in Serbia. A representative of the company in Serbia was contacted and the Chemical Leasing business model was presented. He informed their partner from Italy and they are interested in a joint project. They plan to visit the Centre in January.

<http://www.beckers-bic.com/BIC/bicweb.nsf/key/Italy>

- *Miteks – Arilje*

Miteks dyes textile for sports wear. The company was visited during the mission of Mirko Lesnjak in Serbia. Their suppliers of chemicals are Bezema (Switzerland) and Ciba. Miteks is very keen on starting a project on Chemical Leasing; they are waiting for an approval from Bezema. <http://www.miteks.biz/>

- *Tetragon – Cacak*

Tetragon is a producer of glues. The idea is to replace the commonly used, solvent-based glue for sponge by a more environmentally friendly, water-based glue which would also reduce the amount of glue needed. The companies „Dallas“ – Tutin and Beodusek – Beograd have been contacted as possible partners, but so far there was no decision from their side. Tetragon is definitely willing to start a Chemical Leasing project.

- *Ecolab*

Ecolab is a producer of disinfection agents for various purposes. They already implemented the Chemical Leasing model in one of the breweries in Serbia with very good results (30% savings). The idea is to start Chemical Leasing at the disinfection in the company Prolom (mineral water) but also the special lubricants needed for beverage packaging could be a possible starting point. They are waiting for written approval from their Manager to start.

<http://www.ecolab.com/Directory/Country.asp?c=RS>

4.3.4 Promotion of Chemical Leasing

The main activities on Chemical Leasing promotion were on brochure design, presentations, preparation and participation at seminars, web site preparation and workshop preparation in cooperation with the Serbian Chamber of Commerce.

The activities of NCPC Serbia and the Chemical Leasing approach form part of a document „National Profile for Sound Chemicals Management”, which will be published by the Ministry of Environmental Protection. More details can be found on the Centre’s webpage: <http://www.cpc-serbia.org/>

The Centre is also recognized as a focal point in SAICM.

The results of a CP project with Metalac and their intention to start a Chemical Leasing project was shown on national TV.

Table 13: Summary of Events where the Chemical Leasing model was presented

Event	Presentation	Place/date
Seminar on SAICM	About Chemical Leasing Project in Serbia	S.Chamber of Comm./ March
Seminar Ecoistina	Chemical Leasing – an Innovative Business Model	Soko Banja/June
Awareness rising seminar for inspectors	Concept of Chemical Leasing	Belgrade/May
Seminar on Implementation of Law on IPPC and Bref documents in industry	Cleaner Production and Chemical Leasing and Law on IPPC	Belgrade, The Faculty of Mechanical engineering in Belgrade/May
Seminar on REACH	Chemical Leasing and REACH	S.Chamber of Comm./June
Serbian Chamber of Commerce - Committee on Environmental Protection and Sustainable Development	Chemical Leasing	Municipality of Veliko Gradiste/ June
Congress of plastic and rubber industry (Association of plastic and rubber industry)	Business model Chemical Leasing	Hotel Vojvodina – Zrenjanin October
Presentation of Chemical	Business model Chemical	Ministry of Environmental and

Leasing model to companies included into UNDP Project “Hotspot remediation Veliki Backi kanal”	Leasing	Spatial Planning/ November
Awareness raising seminar	Business model Chemical Leasing	Reg Chamber of Commerce, Zrenjanin/November

4.3.5 UNIDO Chemical Leasing Missions to Serbia

First Chemical Leasing mission, Beograd, June 30 – July 4

The objectives of this first mission were to hold an international workshop on Chemical Leasing, to visit the selected companies, to establish cooperation agreements and provide assistance to the NCP. More than 100 company representatives participated in the workshop.



Company visit to Metalac production site



Workshop on Chemical Leasing

The workshop was organized in cooperation with the Serbian Chamber of Commerce and took place in the office of the Chamber of Commerce in Belgrade. The slides were translated and simultaneously translation of the presentations into Serbian was provided.

During the Mission eight companies were visited: Duga – Beograd, FAM – Krusevac, Jugoterm – Merosina, Contango – Rudnik, Metalac – Gornji Milanovac, Torda-Zvezda – Gornji Milanovac, Papirprint – Gornji Milanovac and DES – Beograd.

As first results, 6 letters of intent were signed (Duga – Beograd, DES – Beograd, Jugoterm – Merosina, DCP – Hemigal, Papirprint – Gornji Milanovac and Torda-Zvezda – Gornji Milanovac).

By the end of 2008, 30 potential Chemical Leasing experts are listed in a data base and two new companies which are interested in Chemical Leasing project could be detected.

4.3.6 Steps to be taken in the upcoming project phase

- Visits to selected and interested companies to define processes and establish cooperation and contract agreements with users and suppliers
- Further promotion of Chemical Leasing at seminars, workshops for Cleaner Production, in media, TV and newspapers

4.4 Sri Lanka

4.4.1 Overview of Chemical Leasing activities in Sri Lanka

During the period of reference, the Chemical Leasing project activities in Sri Lanka were focused in parallel on the following main issues:

- Introduction of the Chemical Leasing concept to the Central Environmental Authority and university lecturers who are involved in industry
- Conduction of a literature survey to develop a database for chemical suppliers and chemical users in Sri Lanka
- Identification of main chemical suppliers and chemical users
- Identification of chemicals used in Sri Lankan industry and sectors with potential for Chemical Leasing

4.4.2 Summary of status and results of the Chemical Leasing projects

The profiles of all large chemical users and suppliers were collected and discussions held with the Central Environmental Authority on potential Chemical Leasing cooperations.

A methodology was developed for preliminary screening and evaluation of companies for a short listing of Chemical Leasing candidates.

Fifty industrial companies were selected and invited to participate in the first Chemical Leasing awareness event. The workshop was conducted on May 15 in Colombo. The basic concept of Chemical Leasing was introduced along with the advantages upon applying this model. Ten companies stated particular interest in Chemical Leasing pilot projects.

Meetings are being held and scheduled with chemical suppliers and users.

The clear focus of the activities in the time of reference was to get “letters of intent” from companies. Three letters of intent could be received, two are pending.

Four chemical user companies and their suppliers were met and discussions were held extensively on the way forward for the implementation of Chemical Leasing projects. Accordingly it was decided to start with the following sectors/companies to facilitate the initial phase of Chemical Leasing:

- *New paper printing Industry*

Wijaya Newspapers Ltd is ready to start a Chemical Leasing pilot project with an ink manufacturing company. Two suppliers were selected, DIC pvt Ltd and General Ink Ltd but they both had to clarify things with their head offices before taking further steps.

- *Fertilizer and Pesticide company*

Watawala Plantation is one of Sri Lanka’s leading tea plantations. The company agreed to start Chemical Leasing activities with a fertilizer company. Discussions were started between the Chemical Leasing team, the international expert and the following fertilizer companies to find a suitable fertilizer supplier for Watawala Plantation: Lankem Ceylon Ltd, Harisson Chemicals (Pvt) Ltd and Hayleys Agro Chemicals.

- *Water purification*

Puritas Ltd (water purification equipment manufacture/supplier) is ready to start Chemical Leasing activities with a suitable company. Two users that have been selected have stopped their production due to international finance crisis, now discussions were started with another two waste water treatment plants.

- Textile Industry

Ventex Ltd (textile dye supplying company) is ready to start Chemical Leasing activities and discussions were started with the textile companies Hayleys MGT and Sigiri Garments.

The problems that were faced in general were that

- The new secretary of the Ministry of Industrial Development is not very supportive as he feels that the strategy will be not effective in Sri Lanka due to the non-availability of chemical manufacturers. This will become a problem in getting support at policy maker's level.
- The chemical suppliers in the country are reluctant due to the reduction of their revenue. The new strategy now is to contact their principals/manufacturers. UNIDO's support for this phase of work will be needed.
- There are still some open questions concerning Chemical Leasing, especially concerning the unit of payment. The support from international Chemical Leasing experts for that type of calculations will be needed.

4.4.3 Current potential and Chemical Leasing projects in pipeline

The first phase of the awareness training program and workshops indicated the main prospects and obstacles of a Chemical Leasing implementation in the Sri Lankan chemical industry. According to the company visits and individual discussions conducted in the reference period, it was obvious that chemical users are enthusiastic to apply Chemical Leasing for their business. The main obstacles for an effective implementation of Chemical Leasing in Sri Lanka is the non-availability of chemical manufacturers in the country, the lack of support from authorities, gaps in environmental regulation, insufficient awareness of the companies' authorities about this innovative concept and a lack of motivation for structural changes of their business activity.

According to the country chemical profile and as a result of discussion with industrial experts, the most promising area for the development of Chemical Leasing based business relations is found to be related to the supply of chemicals, equipment and know-how for plantations and waste water purification processes. The following industrial sectors are recommended as most fitting sectors to start Chemical Leasing pilot projects in the country:

- Textile Sector & Dye suppliers
- Newspaper Industry and Ink Manufactures
- Agro chemicals and fertilizer

- Waste water treatment plant operating companies & chemical suppliers
- Waste recycling companies
- Metal finishing
- Paint industry

The following companies are interested to apply Chemical Leasing for their business activities:

- Wijeya Newspaper Industry
- Watawala Plantation PLC
- Puritas Ltd
- Nippon Nature Foams International (Pvt) Ltd
- Ventex Ltd
- DIC Lanka
- Geocycle (Holcim Lanka Ltd)
- General Ink Limited
- Hayleys MGT

NCPCSL so far has received Chemical Leasing ‘letter of intents” from the companies Watawala Plantation PLC, Wijeya Newspaper Industry and Puritas Ltd, the following companies have agreed to sign “letter of intent” as soon as possible: General Ink Limited, Nippon Nature Forms International (Pvt) Ltd, Ventex Ltd. The following table lists the contact to different companies.

Table 14: Company contacts in Sri Lanka

Company name	Sector	Date	Scope of visit
ChemaneX Adhesives (Pvt) Ltd	Chemical	May 22, 2008	Start a pilot project
Wijeya Newspapers Ltd	Printing	June 5, 2008	Start a pilot project
General Inks Limited	Ink	June 5, 2008	Start a pilot project
Harrisons Chemicals (Pvt) Ltd	Fertilizer	July 15, 2008	Start a pilot project
Lanka Transformers Ltd	Metal	July 15, 2008	Start a pilot project
Daya Group of Companies	Sugar Industry	July 16, 2008	Start a pilot project
Hidaramani Mercury Apparel (Pvt) Ltd	Garment washing	August 4, 2008	Start a pilot project
Watawala Plantation	Tea Plantation	August 7, 2008	Start a pilot project
Holcim- Geocycle	Cement Industry	August 8, 2008	Start a pilot project
Puritas Ltd	Water treatment	August 8, 2008	Start a pilot project
Nippon Nature Foams International (Pvt) Ltd	Rubber	August 28, 2008	Start a pilot project
DIC Lanka	Ink	September 10, 2008	Start a pilot project
Lankem Ceylon Ltd	Fertilizer	October 21, 2008	Start a pilot project
Hayleys Agro	Fertilizer	November 18, 2008	Start a pilot project
Uni Power Sri Lanka	Fertilizer	November 19, 2008	Start a pilot project
Hayleys MGT	Fabric dyeing	November 20, 2008	Start a pilot project
Ventex Ltd	Dye Supplier	November 20, 2008	Start a pilot project
A.Baur & Company	Fertilizer	November 26, 2008	Start a pilot project
Sigiri Garment (Pvt) Ltd	Garment washing	November 29, 008	Start a pilot project

Several Quick Scans have been conducted as well:

Table 15: Quick Scans in Sri Lanka

Name of Company	Sector	Date
Wijeya Newspapers Ltd	Printing	June 5, 2008
General Inks Limited	Ink	June 5, 2008
Puritas Ltd	Water treatment	August 8, 2008
Nippon Nature Foams International (Pvt) Ltd	Rubber	August 28, 2008
Watawala Plantation	Tea Plantation	August 7, 2008
DIC Lanka	Ink	September 10, 2008

Potential projects that could be identified are listed in the table below:

Table 16: Potential projects in Sri Lanka

Sector	Name of Company	Supplier	First Step
Newspaper Industry	Wijeya Newspapers Ltd	User	Start phase I
Ink Manufacturing	General Ink Ltd	Supplier	Start phase I
Water Purification	Puritas Ltd	Supplier	Signed letter of intent
Plantation	Watawala Plantation	User	Signed letter of intent
Textile Sector	Ventex Ltd	Supplier	Signed letter of intent
Rubber Sector	Nippon Nature Foams International(Pvt) Ltd	User	Interesting company
Textile Sector	Hayles MGT	User	Interesting company

During the mission of the international Chemical Leasing expert, four companies were visited. At all meetings, the concept of Chemical Leasing was explained by the international expert, Mr. Reinhard Joas who also presented success stories from Egypt, Russia and Mexico. In every meeting, a short presentation of the respective company's activities in their business field was given as well.

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Hirdaramani Washing Plant

The process of Hirdaramani Washing Plant is the washing of the finished garment, using many chemicals which are interdependent. The company has a range of local suppliers from whom they buy their chemicals. The company's specific modification of the purchased chemicals related to the required washing properties takes place internally as the used chemicals and the specific recipes are strictly confidential. The Technical Director, Mr. Saman Premasiri stated that he is very sceptical about implementing Chemical Leasing for the washing activities. Furthermore he is convinced that there are no further optimization potentials related to the washing process which could be realized by an external expert. In his opinion Chemical Leasing seems not to be practically applicable in the washing process. An option could be to implement this concept only at their waste water treatment plant. The waste water treatment plant was optimized by the NCPC and therefore the performance and the process parameters are already well known. Mr. Joas explained how the Chemical Leasing concept would work for the waste water treatment plant and it was agreed to apply Chemical Leasing to the waste water treatment plant on a trial basis. A proposal from NCPC with full details about the Chemical Leasing approach will be elaborated and sent to the Top Management for approval.

Current status of the Project:

No letter of intent was signed so far; more information on the Chemical Leasing approach in the waste water treatment plant was sent to the company. It is planned to start the project with Nalco chemicals as a supplier, the Sri Lankan agent for Nalco chemicals will be contacted by the National Cleaner Production Centre.

Next steps:

Further try to contact chemical suppliers for water treatment plants

- Puritas Ltd

The potential of applying Chemical Leasing for water treatment processes and how to apply Chemical Leasing in this process were discussed with the company. Puritas would make a Chemical Leasing contract with a company (e.g. with a unit of payment of LKR/m³ of cleaned water) and would be responsible for the compliance with the national waste water limits. In addition Puritas would optimize the treatment process to reduce the amount of chemicals for

the treatment process by bringing in its specific know-how related to the water treatment process.

Puritas Ltd & Holcim (Lanka) Ltd agreed to work together with the National Cleaner Production Centre and to commence a pilot project.

Current status of the Project:

A letter of intent has been signed, Puritas Ltd agreed to commence a pilot project with Nippon Nature Foams International (Pvt) Ltd.

Next steps:

To continue to identify potential for applying Chemical Leasing

- *Kenilworth Estate, Ginigathena*

A central supply unit in Colombo organizes the Watawala plantation company. All chemicals (pesticides) needed for the plantation are ordered by the central purchase unit. The pesticides that are allowed for the tea plantation are determined by the Sri Lankan Tea Board. Ms. Schwager informed that there are no experiences for Chemical Leasing in the field of plantation and agriculture yet. Therefore UNIDO is very interested to start a new pilot project in this field which would be of high interest for many other countries as well. In this case possible Chemical Leasing partners would be the supplier of the chemicals/pesticides and Watawala. In addition it might be necessary to involve the National Tea Board or further external pesticides/agricultural experts to bring in the specific know how with respect to the optimized use of pesticides.

Current status of the Project:

A letter of intent has been signed by Kenilworth Estate, Harrison Chemical (Pvt) Ltd (supplier) did not sign because they did not get approval from their top management so far. So another fertilizer company for a Chemical Leasing pilot project has to be selected, two companies would be suitable: Lankem Ltd and CIC Fertilizer Ltd.

Next steps:

Identification of appropriate chemicals, processes and partners for the implementation of Chemical Leasing

- Wijeya Newspapers Ltd

At the end of 2007 a new high-speed printing machine from India was bought by the company. In the first three months the recommended Indian ink was used. During the three month testing phase and supervision by the equipment supplier the high-speed printing machine worked without any problems. After these three months the Wijeya Newspapers Ltd changed the ink supplier and now purchases the ink from a Sri Lankan supplier which causes major problems as the ink does not adhere perfectly on the paper and therefore ink dust is emitted during the printing process which condenses all around the production hall. This thin ink film has to be removed everyday with solvents by hand. It was suggested to start a Chemical Leasing project with the intention to optimize the printing process together with the ink supplier and thus to reduce the consumption of ink. The ink supplier already signaled interest in working together with the printing company and to start a Chemical Leasing pilot project. Therefore, the supplier should be asked for material safety data sheets (MSDS) of the ink and other ink specific data and samples from the Indian ink suppliers who delivered the recommended ink to identify the chemical composition of the ink. The NCPC offered to help in testing and analysing the samples.

Current status of the Project:

A letter of intent has been signed; DIC Lanka (Pvt) Ltd is the ink supplier for Wijeya Newspaper Ltd.

Next steps:

To continue to identify appropriate chemicals, processes and optimization potential

4.4.4 Promotion of Chemical Leasing projects

Awareness raising and dissemination activities

The activities during the year 2008 were focused on popularizing the Chemical Leasing concept among industrialists. Therefore, several awareness and training programs were conducted by the NCPC covering academic staff of universities, environmental organizations, chemical supplying agencies, chemical users, recycling companies and other equipment supplying companies around the country.

- The first workshop for Chemical Leasing was held by NCPC on May 15, 2008 at JAIC Hilton Residencies, Colombo. The main objective of the workshop was to popularize the

Chemical Leasing concept among industrialists and realize potential industries for starting Chemical Leasing pilot projects. The basic concept of Chemical Leasing was explained and the advantages of adopting this concept were discussed in detail at the workshop by the National Cleaner Production Centre staff. Several industries which are particularly interested about the concept could be identified.

After the workshop, for further explanation, information leaflets, presentations and case studies were prepared for different industrial sectors. Currently individual discussions with each and every filtered industry are carried out and the potential of applying Chemical Leasing to those industries has been analysed. Another important aspect of the concept is to identify the added value of relevant products. Therefore the parameters which are required for calculating added value have being collecting.

- The second awareness raising workshop was conducted on August 6, 2008 at JAIC Hilton residencies, Colombo for potential chemical industries including the above identified industries. Companies participating were:
 - Wijeya Newspapers Ltd & General Inks Limited
 - Puritas Ltd & Nippon Nature Foams International (Pvt) Ltd
 - Holcim- Geocycle & Puritas Ltd
 - DIC Lanka (Pvt) Ltd & Wijeya Newspapers Ltd

In Table 18 awareness raising activities are listed:

Table 17: Awareness raising activities

Topic	Date/Duration	No. of Participants	Place
Awareness Program - Chemical Leasing	May 15, 2008	50	JAIC Hilton, Colombo
Awareness Program - Chemical Leasing	August 6, 2008	70	JAIC Hilton, Colombo
Awareness Program - Chemical Leasing	August 8, 2008	20	Puritas Ltd
Awareness Program - Chemical Leasing	August 28, 2008	15	Nippon Nature Foams International (Pvt) Ltd
Awareness Program - Chemical Leasing	September 10, 2008	15	DIC Lanka (Pvt) Ltd

In addition to that, the Chemical Leasing concept is being promoted in all National Cleaner Production Centre seminars and other training programs; a special seminar for university academic staff members has been conducted.

Trainings:

Several trainings for companies and NCPC staff have been conducted:

Table 18: List of trainings

Training	Topic	Date	Participants
1 st Awareness Program	Chemical Leasing	May 15, 2008	Companies
2 nd Awareness Program	Chemical Leasing	August 6, 2008	Companies
Training on Chemical Leasing	Chemical Leasing	October 6, 2008	NCPC Staff

Website:

The content of the Centre's webpage <http://www.ncpcsrilanka.org/> is continuously updated and completed with information on Chemical Leasing.

4.4.5 UNIDO Chemical Leasing Missions to Sri Lanka

The official launch of the Chemical Leasing activities and the first visit of the international expert to Sri Lanka took place on August 4-8. The mission aimed at conducting a workshop in Colombo, visiting companies and supporting the Centre in establishing first Chemical Leasing agreements.

During the mission four companies have been visited: Hirdaramani Washing Plant, Puritas Ltd, Kenilworth Estate, Ginigathena and Wijeya Newspapers Ltd. (for further information please see chapter 4.4.3)



Company visit to garment production site



Workshop on Chemical Leasing

4.4.6 Steps to be taken in the upcoming project phase

- Preparation of additional explanations, information leaflets and presentations on Chemical Leasing
- Targeting of different industrial sectors
- Conducting of individual discussions and company visits with interested and selected companies
- Identification and calculation of added value for relevant products when applying Chemical Leasing

Annexes

Annex 1: Agenda of the Training Workshop on Chemical Leasing

Date	Time	Topic	Presenter
3/3/2008			
	8.30-9.45	Welcome and introduction	Ms. Schwager
	9.45-11.00	Introduction to the concept of Chemical Leasing (Chemical Leasing) Definition and differentiation towards other business models	Mr. Joas
	11.00-11.15	Coffee Break	
	11.15-12.45	Overview on Case Studies – Video Practical experience in introducing Chemical Leasing to industry – the expert’s view	Mr. Joas, Mr. Schott
	12.45-13.45	Lunch	
	13.45-14.45	Introduction to the UNIDO Chemical Leasing tool kit – Guidelines, worksheets and other materials	Ms. Kaltenecker
	14.45-16.15	Identification of Chemical Leasing partners and training of first approach (telephone, site visit, discussion with the management)	Mr. Joas, Mr. Schott
	16.15-16.30	Coffee Break	
	16.30-17.30	Development of Work Plan – first steps	Ms. Schwager

	17.30-18.00	Discussion, open questions and feedback on the day	Ms. Schwager
4/3/2008			
	8.30 – 10.45	<p>Presentation of Chemical Leasing experiences and lessons learned in Egypt, Mexico and Russia with focus on:</p> <p>Identification of potential partners</p> <p>Success factors and obstacles</p> <p>Discussion</p>	NPCs
	10.45-11.00	Coffee Break	
	11.00- 12.45	Training of argumentation on obstacles, doubts and promotion factors	Mr. Joas with staff of NPCCs of Egypt, Mexico and Russia
	12.45-13.45	Lunch	
	13.45 – 14.30	<p>Preparatory Phase: Getting an overview:</p> <p>Quick Scan surveys in companies</p> <p>Information workshops in companies, Chemical Leasing Cooperation Agreement</p>	M Mr. Joas, Mr. Schott
	14.30-15.30	Identification of unit of payment Contractual and legal aspects	Mr. Joas, Mr. Schott
	15.30-16.00	Coffee Break	
	16.00-17.30	Process Optimisation Phase – Chemical Leasing and CP	Mr. Joas, Mr. Schott

		Implementation of Chemical Leasing	
	17:30 18:00	Open questions and short feedback on the day	Ms. Schwager
5/3/2008			
	8.30-9.00	Chemical Leasing in the political context (national, international, SAICM, IWG, etc.)	UNIDO
	9.00-10.30	Bi-lateral meetings for country specific work planning	NCPCs/Internat.Experts
	10.30-11.00	Coffee Break	
	11.00-13.00	Finalisation of Work Plans	Ms.Schwager
	13.00	Lunch and Departure for Hungary	

Annex 2: Agenda and minutes of the 6th Meeting of the International Working Group on ChL

Participants

Abo Sena Ali, *NCPC Egypt*

Cadavid Carlos, *CMPC Colombia*

Dunjić Branko, *NCPC Serbia*

Hanzaz Hanan, *CMPP Morocco*

Jakl Thomas, *Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austria*

Joas Reinhard, *BiPRO, Germany*

Kaltenegger Ingrid, *Joanneum Research, Austria*

Kuan Duque Yuan Constantino, *CMPC Colombia*

Lesnjak Mirko, *LIVEO, Slovenia*

Lilane Hanan, *CMPP, Morocco*

Loku-Gamage Lakmini, *NCPC Sri Lanka*

Madsen Kaj, *UNEP, Switzerland*

Peiris Sena, *NCPC Sri Lanka*

Perez Jorge, *NCPC Mexico*

Raab Christina, *UNIDO, Austria*

Reekie Mark, *Akzo Nobel Powder Coating, UK*

Richter Steffi, *Federal Environment Agency, Germany*

Satric Vojislavka, *NCPC Serbia*

Schmehl Meike, *University of Göttingen, Germany*

Schwager Petra, *UNIDO, Austria*

Smirnov Viacheslav, *Institute of Toxicology, Russia*

Steinhäuser Klaus Günter, *Federal Environment Agency, Germany*

Stiehl Christine, *BASF, Germany*

Zilahy Gulya, *Corvinus University of Budapest, CPC Hungary*

Agenda

12:00 Welcome

12:15 New international UNIDO initiatives in Colombia, Morocco, Serbia and Sri Lanka

12:45 New German initiative: background, objectives, first results

13:45 UNIDO's Chemical Leasing Toolkit

14:00 Discussion of other issues

14:30 Closure

1. Welcome notes by Mrs. Schwager, UNIDO

2. New international UNIDO initiatives in Colombia, Morocco, Serbia and Sri Lanka

The representatives from the NCPCs in Colombia, Morocco, Serbia and Sri Lanka gave a brief overview of activities and achievements to date in the field of Cleaner Production. Ideas were presented on potential sectors and companies which may be targeted for Chemical Leasing in the respective countries. Successful outcomes may be expected in the areas of agriculture, waste water management, metal and electrochemical treatments, coatings, textile and paper processing.

3. New German initiative: background, objectives, first results – Mr. Joas, BiPRO

Mr. Joas started his presentation by comparing different business models related to Chemical Leasing and chemical management services, such as outsourcing and single-source supply management. He pointed out that some elements of Chemical Leasing are already present in these models, but they do not fully comply with the definition of Chemical Leasing. Mr. Joas stressed the importance of quality criteria between users and suppliers in accord with UNIDO's definition of Chemical Leasing.

Mr. Joas continued by presenting a new German initiative on Chemical Leasing, initiated by the German Federal Environment Agency. The project has the goal to further develop and establish Chemical Leasing as a business model for sustainable chemical practices in Germany, to define quality criteria and standards and to elaborate pilot projects with various industries in Germany. In addition to sectors such as the automotive industry, service-

oriented sectors (e.g. hospitals) will also be targeted, as they might be able to implement the service-based Chemical Leasing model relatively quickly and easily.

The German initiative will rely on existing experience and will have a design similar to the UNIDO projects. A steering group will meet on a regular basis during the next two years with participants from German industry, consulting, academia, ministries and non-profit organizations.

This initiative comprises three main partners, BiPRO, the University of Göttingen and TÜV SÜD, which have been contracted by the German Federal Environmental Agency. Mr. Joas stressed the importance of bridging the scientific world with the Chemical Leasing business model. The University of Göttingen will share expertise on resolving contradictions between business model criteria.

It was emphasized that no political or legal pressure will be applied to the participating companies. The involvement of the ministry will facilitate the publication of relevant information; the team at BiPRO will support the companies in the form of consultancy services and mediation. The German initiative does not, however, have the intent to serve as a model for other countries where the approach must be adjusted to take local conditions and circumstances into account.

4. UNIDO's Chemical Leasing Toolkit – Mrs. Kaltenecker, Joanneum Research

Mrs. Kaltenecker explained that the first version of UNIDO's Chemical Leasing toolkit can be found in the book "Chemical Leasing goes global", and should be seen as a set of guidelines rather than a complete toolkit. A second version of the toolkit, now called Chemical Leasing Toolbox, is in preparation and will include the guidelines (former toolkit), worksheets, presentations, the Chemical Leasing video and the Chemical Leasing book.

The worksheets will comprise a template for success stories as well as suggestions for the cooperation agreement, the contract, the implementation plan and training guidelines for national experts.

Some elements of the toolbox will be provided on the Chemical Leasing webpage.

5. Discussion of other issues

Promotion of Chemical Leasing

Mr. Perez stated that local governments, businesses and industry associations should be invited to take part in dissemination activities for Chemical Leasing from the very beginning. Mr. Jakl pointed out the importance to carefully consider which specific ministry to invite. Mr.

Abo Sena suggested that a precise outline of events and invitations be included in the work plan of the Centres. Mrs. Stiehl from BASF expressed the opinion that every political institution should have a chance to participate in discussions.

The question of the manner of approaching companies was raised as well and discussed. Mrs. Stiehl stressed the crucial importance of explaining potential benefits in persuading companies to adopt the business model. Mr. Reekie from Akzo Nobel mentioned that his company publishes regular reports (“Reviews”), which are distributed throughout the whole organization and to costumers, which include articles on topics such as Chemical Leasing.

Additional venues for promoting Chemical Leasing were identified to be places for potential side events at conferences, summits and meetings, where many (chemical) companies are present. The following international events were named: ACHEMA (May 2009, Frankfurt/Main), ICCM (SAICM event, May 2009, Geneva), SETAC (May 2008, Warsaw) and IUPAC meeting (on Green Chemistry, September 2008, Moscow).

Mr. Joas suggested the creation of a poster with an overall summary of Chemical Leasing to be presented at various conferences, and which could be readily translated into the various national languages. The poster and a smaller format (flyer) could be available as download from the Chemical Leasing homepage.

Chemical Leasing Award

Mr. Jakl suggested establishing a global Chemical Leasing award in order to increase the visibility of Chemical Leasing. Mrs. Schwager proposed to organise the award along the lines of the Cleaner Production award scheme, an idea which was welcomed by the participants. The launch of the first Chemical Leasing award is planned for May 2009 as a side event of the SAICM meeting.

Chemical Leasing Webpage Changes

Mr. Abo Sena stressed the importance of creating an international Chemical Leasing network to exchange experiences and to provide support for questions and challenges. For this purpose a common email platform should be established. Furthermore, he suggested certification of Chemical Leasing experts along the lines of the Cleaner Production Programme.

It was agreed that a link will be established on the webpage where postings and regular updates on upcoming international events of interest can be found.

Mrs. Schwager stated that the entire Chemical Leasing webpage will undergo adjustments to turn it more interactive with room for posting success stories and presentations.

The next meeting of the International Working Group on Chemical Leasing will take place by the end of 2008, most likely during a side event for Chemical Leasing.

Annex 3: Agenda and minutes of the 7th Meeting of the International Working Group on ChL

Participants

Abo Sena Ali, NCPC Egypt

Darwish Atef, ABB ARAB, Egypt

Joas Reinhard, BiPRO, Germany

Madsen Kaj, UNEP, Switzerland

Perez Jorge, NCPC Mexico

Schwager Petra, UNIDO, Austria

Wittmann Michael, Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austria

Agenda

Time	Topic
	Welcome
15.00 – 15.05	
15.05 – 16.15	Current status of Chemical Leasing activities in Egypt, Mexico and Russia; Launch of Chemical Leasing projects in Colombia, Morocco, Serbia and Sri Lanka: Experiences and first results
16.15 – 16.45	Break
16.45 – 17.15	Pilot projects in Germany Experiences and first results including quality criteria
17.15 – 17.30	Global Chemical Leasing Award
17.30 – 18.00	Public Relation, Training, Other issues

1. Welcome

Ms. Petra Schwager (UNIDO) welcomed the participants to the 7th meeting of the International Working Group on Chemical Leasing.

2. Current Status of Chemical Leasing Activities in Egypt, Mexico and Russia / Launch of Chemical Leasing Projects in Colombia, Morocco, Serbia and Sri Lanka

Egypt: Chemical Leasing continues to be a success story. The projects ABB-AKZO and GM-Dr. Badawi are prolonged, new projects e.g. with AKZO, Chemetall and Olympic Group or AMVITEC/Dr. Badawi have been launched. The AMVITEC project is targeted at many SMEs which have to clean metal pieces with solvents. It was highlighted that the project is welcomed, but legal compliance of the technology offered (e.g. to European Legislation) has to be guaranteed.

Mexico: The situation of Chemical Leasing in Mexico is difficult. Several projects were launched but did not continue due to various reasons. The CMPL has performed a very careful analysis of obstacles and problems. As a consequence of this analysis new improved approaches will be undertaken. The concept of a "letter of intent" will be applied as it has shown good acceptance in the other countries.

Russia: The situation in Russia has not changed significantly. The pilot project with VODOKANAL is ongoing, several projects are in the pipeline but no significant progress has been reported so far.

Colombia: The Chemical Leasing initiative has been launched with three workshops in Bogota, Medellin and Cali. Several companies showed interest and letters of intent were signed. A particular challenge will be a pilot project for the use of fertilizers for flower production. Several pilot projects will start in the field of galvanization.

Morocco: The Chemical Leasing initiative has been launched with a workshop in Casablanca and several publications in newspapers and journals. Pilot projects will be started in the field of metal treatment, fertilizers, paint application and water treatment.

Serbia: There was a large interest in the kick-off workshop for the Chemical Leasing initiative in Belgrade. Several letters of intent have been received, already existing Chemical Leasing activities in Serbia could be identified (cleaning of tanks in a brewery).

Sri Lanka: The Chemical Leasing initiative was started with a workshop in Colombo. Three major areas of activity were identified so far, most challenging will be the use of pesticides/fertilizers in the plantation of tea.

An additional topic of discussion was the need to intensify the collaboration between the cleaner production centres on chemical leasing and the advantages of weekly exchanges

between the international experts and national experts at the centres. A common training for all experts was announced for 2009.

An intensive discussion took place related to new countries. It became clear that UNIDO can currently not extend the scope of countries without significantly more resources. On the other hand SAICM quick start funds might offer opportunities for at least some new countries to join chemical leasing. Here the enabling character of the support for companies should be highlighted.

This issue was a particular highlighted by Mr. Madsen who gave to the group information on the character of the SAICM quick start program, the currently existing difficulties and the opportunities for countries to participate. Mr. Madsen welcomed the chemical leasing approach and explained that this initiative fits excellent under the SAICM activities as it provides practical improvements for the management, handling and consumption of chemicals.

3. Pilot Projects in Germany

This topic was not addressed again in the working group as it was already introduced and discussed during the IFCS side event (see presentation in annex 2).

4. Global Chemical Leasing Award

This topic was not addressed again in the working group as it was already introduced and discussed during the IFCS side event (see presentation in annex 3).

5. Public Relation, Training, Other issues

The book on Chemical Leasing and the video were regarded as excellent PR Tools for promotion of the concept. The tool kit still needs to be updated and further elaborated, a printed version will not be produced until the end of the year, because further experiences of the “new countries” should be considered.

A date for a common training of all national and international experts will be communicated until the end of the year.

The next meeting of the international working group is scheduled to take place in Switzerland; the date will be coordinated with the next SAICM meeting.