Chemical Leasing

Application at Global Level

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Elements of the Presentation

- UNIDO’s Chemical Leasing Approach
- Global Forum Activities
- The Chemical Leasing Toolkit
- Case Studies
- Success factors
- Challenges
- Conclusions
UNIDO‘s Chemical Leasing Approach

**Global Forum activities** to promote and further develop the concept of ChL, including policy advice.

**Technical Cooperation activities** to implement ChL Business Models in industry and to build-up national ChL capacity in developing countries and countries with economies in transition. This is done in close cooperation with our National Cleaner Production Centres.
UNIDO‘s Global Forum Activities

- International ChL Working Group
- ChL Definition
- Public-Privat-Partnership
- ChL Homepage
- ChL book
- ChL Toolkit and video
International ChL Working Group

**Aim:** Further develop and promote the ChL concept taking into account the needs of the different stakeholders

**Members:**

- International Chemical Associations
- EU-DG Environment
- Austrian, German and Swiss Government
- UNEP (United Nations Environment Programme)
- Certification Bodies
- Industry
- Several Universities
- Consultants
UNIDO‘s ChL Definition

Chemical Leasing is a service-oriented business model that shifts the focus from increasing sales volume of chemicals towards a value-added approach. The producer mainly sells the functions performed by the chemical and functional units[1] are the main basis for payment.

Within Chemical Leasing business models the responsibility of the producer and service provider is extended and may include the management of the entire life cycle.

Chemical Leasing is a win-win situation. It aims at increasing the efficient use of chemicals while reducing the risks of chemicals and protecting human health. It improves the economic and environmental performance of participating companies and enhances their access to new markets. Key elements of successful Chemical Leasing business models are proper benefit sharing, high quality standards and mutual trust between participating companies.

[1] Functions performed by a chemical might include: number of pieces cleaned; amount of area coated, etc..
Private Public Partnership

Memorandum of Understanding to jointly promote ChL and CP and to support Cleaner Production Centres by providing specific technical expertise and ESTs
Chemical Leasing Homepage

www.chemicalleasing.com
Chemical Leasing Book

„Chemical Leasing Goes Global“

Joint book of UNIDO and Austrian Ministry of Environment
Chemical Leasing Toolkit and video

- ChL Database
- ChL Cost Benefit Analysis
- ChL Implementation Plan
- Elements of ChL letters of intent and contracts
- Guidelines to identify and convince partners for ChL
- Pool of presentation material
- ChL video
Practical Steps for ChL Implementation

• Identify the scope and objective of cooperation

• Initial cooperation agreement/letter of intend - Awareness Raising Seminar

• Detailed Implementation plan - Tasks, Responsibility and Timing are defined

• Technical audit of the production processes of the involved companies – Technical Report is available

• Process optimization and On-the-Job Training (OJB)- At Suppliers & Users

• Process Cost Benefit Analysis (cost analysis referred to unit of payment, e.g. painted m2 of final product) - Financial Report

• Chemical Leasing Model - Contract

• Monitoring of implementation – Monitoring Report
<table>
<thead>
<tr>
<th>Industry sectors/processes</th>
<th>Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture of electronic equipment</td>
<td>Powder coating</td>
</tr>
<tr>
<td>Car manufacture, food processing equipment/cleaning</td>
<td>Hydrocarbon solvents</td>
</tr>
<tr>
<td>Various industries/steel treatment</td>
<td>Galvanizing and phosphatating agents</td>
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<tr>
<td>Sugar mills</td>
<td>Lubricants</td>
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<tr>
<td>Waste water treatment</td>
<td>Water treatment chemicals</td>
</tr>
<tr>
<td>Textile industry- Pre-treatment and finishing</td>
<td>Textile chemicals</td>
</tr>
<tr>
<td>Brewery</td>
<td>Glues for labelling</td>
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<tr>
<td>Petrochemical industry</td>
<td>Catalysts</td>
</tr>
<tr>
<td>Printing Industry</td>
<td>Tin printing</td>
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</tbody>
</table>
| Surface treatment/ degreasing, phosphating, pickling, fluxing| Pre-treatment chemicals (e.g Hydrochloric Acid)
Case Studies:

1. Powder Coating - Egypt

2. Cleaning with Hydrocarbon Solvent - Egypt

3. Electroplating - Mexico

4. Water purification - Russia
# Powder Coating

<table>
<thead>
<tr>
<th><strong>Chemicals Supplier:</strong></th>
<th>AKZO NOBEL Powder Coating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chemicals User:</strong></td>
<td>ABB ARAB</td>
</tr>
<tr>
<td><strong>Industrial Process:</strong></td>
<td>Electrostatic Powder Coating</td>
</tr>
<tr>
<td><strong>Chemicals:</strong></td>
<td>Coating Powder</td>
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</tbody>
</table>

*Electrostatic Powder Coating Process at ABB ARAB*
Akzo Nobel sells tons of powder coating to ABB ARAB on a basis EGP/t with little involvement in optimizing the application process.

- High Powder Loss (more than 12%)
- High line maintenance (two times per month)
- Many rejects
- Environmental problems

High Cost per coated sqm = L.E 3.8
(1 kg makes 5 sqm of final product)
Under Chemical Leasing

Akzo Nobel Egypt sells to ABB ARAB (number) of coated square meters against a fixed fee-per coated square meter including defined responsibilities in a ChL contract of AKZO NOBEL, ABB and the ENCPC as an independent monitoring institution
Benefits I

Economic Benefits:

- Process optimization and more efficient process (1kg powder makes more than 6 sqm rather than 5sqm)
- Forecast direct savings are around US$ 68,000 per year for all the powder coating lines (US$ 1 = 5.40 Egyptian Pound)
- Less maintenance cost (one time instead of two times per month)
- Less energy consumption by reduction of pressure of the powder guns
- Recycling of fine powder waste at Akzo Nobel
- Long term business relationship based on a regularly monitored contract
- First Yield Pass of 100%
Benefits II

Environmental Benefits:

- Compliance with environmental regulations related to waste management at workplace environment
- Enhancement of supply chain management and other environmental management systems
- Reduction of chemicals, raw materials, energy, emissions and waste

Organizational and quality benefits:

- Capacity building of operation staff by sharing know-how
- High quality of final product
Case Study
Cleaning with Hydrocarbon Solvent

Supplier: Dr Badawi Chemical Work
User: GM Egypt
Industrial process: Cleaning of equipment with solvent
Chemicals: Hydrocarbon Solvent
Before Chemical Leasing

Badawi sells tons of hydrocarbon solvent for cleaning to GM Egypt for EGP/Liter with a minimised responsibility

- Solvent waste is a common problem in the automotive sector in Egypt
- Current practice is disposal of solvent waste (hazardous) in non-sanitary dumpsites
- High price of raw material (high petroleum price)
- More consumption leads to more VOCs in the workplace
- High disposal costs for solvent waste
Under Chemical Leasing

Dr Badawi sells to GM Egypt the service of cleaning with hydrocarbon solvent against a fixed fee-per-vehicle with defined responsibilities in a ChL contract of GM Egypt, Dr Badawi and the ENCPC

- Six months assessment phase (fixation of price per vehicle)
- Chemical Leasing contract for three years
- Recycling of solvent waste at Dr Badawi facility (Recycling Unit)
Benefits I

Economic Benefits:

- Cost reduction by 15% (saving of raw material with recycling)
- Reduction of solvent consumption from 1.5 L/vehicle to 0.85 L/vehicle which leads to significant reduction in VOCs
- Shared liability and benefits
- Long-term business relationship
Benefits II

Environmental Benefits:

- Recycling of solvent waste instead of disposal
- Better hazardous waste management in accordance with environmental regulations and international environmental corporate policy

Organizational and quality benefits:

- Higher efficiency in cleaning process with hydrocarbon solvent by applying batch cleaning
- Use of hydrocarbon solvent solely for the purposes of cleaning of equipment (rather than e.g. for washing worker hands, cloths etc)
- Capacity building and high awareness of staff
Case Study
Electroplating

Supplier: MARDI Inc. S.A. de C.V.
User: Cromadora Delgado S.A. de C.V.
Industrial process: Electroplating
Chemicals: Nickel, brighteners
Before Chemical Leasing

Cromadora Delgado buys chemicals for the electroplating process

- Emissions of the electroplating industry like residual waters from rinsing of pieces are high
- Muds that are obtained in the process of treatment of residual water are of toxic nature
Under Chemical Leasing

MARDI Inc. provides the service of electroplating to Cromadora Delgado against a fixed price per Ampere-hour

The process offered by the service provider allows a similar quality with advantages in several aspects in the finished pieces with respect to the conventional nickel plate process, as long as the bath is stabilized, operating under optimal conditions and using the polishers developed by the service provider.
Benefits I

Economic Benefits:

- Consumption of nickel reduced by 22% from 585 kg/year to 420 kg/year.
- Savings of around 10,000 USD/year, which depend highly on the price of nickel are increasing.
Benefits II

Environmental Benefits:

- Less brighteners used
- Better hazardous waste management in accordance with environmental regulations and international environmental corporate policy

Organizational and quality benefits:
- Increased quality of final product
- Control of chemicals (raw materials)
- Better relationship
# Case Study

## Water Purification

<table>
<thead>
<tr>
<th>Supplier:</th>
<th>ERG</th>
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<tbody>
<tr>
<td>User:</td>
<td>Henkel - ERA</td>
</tr>
<tr>
<td>Industrial process:</td>
<td>Water purification</td>
</tr>
<tr>
<td>Chemicals:</td>
<td>Glues</td>
</tr>
</tbody>
</table>
Before Chemical Leasing

ERG supplies chemicals and materials (iron chloride, sodium hydroxide, filter packs) for wastewater purification

- Level of water decontamination was insufficient in view of the glue production
  - Increasing cost of central water treatment unit
  - New products leading to higher and different contamination of water
  - Very tight limit values set by authorities
Under Chemical Leasing

ERG does the water treatment for Henkel – ERA on the payment basis of *volume of treated water*

- Service company engineered and delivered treatment equipment for new production
- Chemicals and filter material, pumps and other equipment were installed
- Water purification process was optimized (by the ERG, partner of NWICPC)
- Payment is based on the volume of treated water
Benefits I

Economic Benefits:

- Reduction from 880 RUB (about 35 USD) to 554.5$ (about 22.8 USD) per cubic meter

- Long-term business relationship
Benefits II

Environmental Benefits:

- Amount of environmentally hazardous chemicals used for wastewater treatment is significantly reduced

Organizational and quality benefits:

- Added value (= saved cost) shared by HENKEL-ERA and ERG
Success Factors

+ Change of management behavior and improvement of internal communication.
+ Enhancement of the supply chain management of chemicals management
+ Improved process efficiency
+ Know how exchange between supplier and users of chemicals and involvement of technology suppliers
+ Capacity building of operation staff (e.g. production technicians)
+ Improvement of the health and safety of workers by improving the workplace conditions
+ Using the chemical leasing as a bidding tool for chemicals management especially for user (e.g. ABB)
+ Very valuable technical and cost benefit analysis reports
Challenge Factors

► Supplier and User Limitation
► Trust and Credibility Issue
► Liability issues
► Implementation of model (design to monitoring) is complex
► Ensure sustainability
► Documentation of benefits and benefit shares
► Very limited expertise at global level
► Lack of credible information especially economical information
► Not sufficient data on the industrial processes qualified for chemical leasing processes
► Chemicals are a small percentage of overall operating costs
► Lack of management support
Conclusions I

1. Chemical Leasing is a new approach for a win-win situation for economy and environment.

2. Concept sells easily at the beginning but implementation takes time.

3. Combining Chemical Leasing and Cleaner Production enhances the positive environmental and economic impact.
Conclusions II

4. Intensive involvement of NCPCs as independent institutions is necessary to ensure proper implementation, mediation and monitoring

5. First pilot projects in Austria, Mexico, Egypt and Russia proof applicability and potentials of the model

6. Trust and willingness for cooperation of the partners is essential

7. The multi stakeholders working group helps to exchange experiences and further develop the concept.

8. Chemical Leasing is a policy tool for know how transfer and risk reduction. In this function it should be supported by the international community
Thank you for your attention

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