Petra Schwager

Petra studied Economics at the Vienna University of Business Administration and Social Sciences and Environmental Management at the University of London. She has extensive experience in developing and managing industrial resource efficiency and cleaner production programmes in developing countries and economies in transition, cooperating with governments, private sector, NGOs and academia in advancing sustainable production patterns and policies.

In 2004, she initiated UNIDO’s global activities for the promotion of Chemical Leasing, an innovative circular economy business model that shifts the focus from increasing the sales volume of chemicals to the function of a chemical. Petra is the co-author of the book “Chemical Leasing goes global”.

Chemical Leasing
Innovative business model for resource efficiency

Kigali Amendment - Vienna Talks

14 June 2017
Introduction
Chemical Production Growth Forecast 2030

Sales 2014 (€3.2 trillion)  
Sales 2030 (€6.3 trillion)

• Long-term analysis shows that overall growth of chemicals demand and production is to continue in the future
• World chemicals sales are expected to reach €6.3 trillion in 2030
• The global production, trade and use of chemicals are increasing (esp. in developing countries and countries with economies in transition)

Source: Cefic Chemdata International (2017)
*Rest of Europe covers Switzerland, Norway, Turkey and Russia
** North America Free Trade Agreement
*** Asia excluding China and Japan
Global production of the four main HFCs

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Best estimate for Global HFC production in 2015 (ktonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HFC-32</td>
<td>94</td>
</tr>
<tr>
<td>HFC-125</td>
<td>130</td>
</tr>
<tr>
<td>HFC-134a</td>
<td>273</td>
</tr>
<tr>
<td>HFC-143a</td>
<td>28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>525</strong></td>
</tr>
</tbody>
</table>

Over the period **2015-2050**, the BAU scenario shows for the four main HFCs

- 250% growth in the demand in tonnes and in tonnes CO2-eq. in non-Article 5 Parties
- 700% growth in tonnes and a 800% growth in tonnes CO2-eq. in Article 5 Parties

Source: TEAP (September 2016), Montreal Protocol
Chemical Leasing - Innovative Business Model for Resource Efficiency
Resource Efficient and Cleaner Production

- The continuous application of **preventive environmental strategies** to processes, products and services to increase efficiency and reduce risks to humans and the environment.

- RECP addresses **three sustainability dimensions** individually and synergistically:
  
  **PRODUCTION EFFICIENCY**
  
  Improve productive use of natural resources

  **ENVIRONMENTAL PROTECTION**
  
  Minimize the impact on nature

  **SOCIAL ENHANCEMENT**
  
  Support communities and reduce risks

**RECP services help to:**

- Increase productivity
- Reduce emissions and the use of natural resources
- Improve the well-being of workers and communities
From a product to a performance based model

Product orientation

Performance orientation
Chemical Leasing Essentials

PERFORMANCE-ORIENTED BUSINESS MODEL

Business as usual

Supplier  
Volume Increase  
Price Decrease  
Wants Increase  
versus

Buyer  
Wants Decrease

Chemical Leasing

Supplier with  
Performance Increase  
Efficiency Increase  
Buyer

Basis for Payment is the performance/service of a Chemicals
Wide Applicability in various industry sectors

Successful Chemical Leasing examples for the following applications

<table>
<thead>
<tr>
<th>Industry sectors/processes</th>
<th>Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture of electronic equipment</td>
<td>Coating powder</td>
</tr>
<tr>
<td>Car manufacture</td>
<td>Hydrocarbon solvents for cleaning</td>
</tr>
<tr>
<td>Various industries/steel treatment</td>
<td>Galvanizing and phosphating agents</td>
</tr>
<tr>
<td>Waste water and drinking water treatment</td>
<td>Water treatment chemicals</td>
</tr>
<tr>
<td>Hotel and service sector</td>
<td>Cleaning &amp; disinfectants chemicals</td>
</tr>
<tr>
<td>Beverage and food production</td>
<td>Adhesives for labelling</td>
</tr>
<tr>
<td></td>
<td>Lubricants for packaging conveyers</td>
</tr>
<tr>
<td></td>
<td>Cleaning agents for pipes and vessels</td>
</tr>
<tr>
<td>Petrochemical industry</td>
<td>Catalysts and water treatment chemicals</td>
</tr>
<tr>
<td>Agriculture</td>
<td>Pesticides and fertilizers</td>
</tr>
<tr>
<td>Printing Industry</td>
<td>Ink, printing chemicals</td>
</tr>
</tbody>
</table>
Chemical Leasing in Practice
Example – Powder Coating

Classical business model: payment per t of powder coating

Chemical Leasing: payment per m² of coated surface
Example – Food and beverage industry

Solvents, Cleaning agents

Classical business model: payment per t of solvents

Chemical Leasing: payment per outcome of the process, e.g. hl soft drinks
Case study in Metal Cleaning - Safechem

A case study for *industrial surface cleaning*

Legislative approach

Supplier approach

Service model - Chemical Leasing

Reduced environmental impact
Different constellations of the Chemical Leasing Business Model

Model A
- Two partners: supplier and user of chemicals
- The user pays for the benefit of the chemical
- Both partners optimize chemicals use
- Material flow is closed

Model B
- Chemicals supplier and equipment producer cooperate to improve efficiency of products
- The user pays for the complete solution and further optimizes it together with the two other partners

Model C
- A joint venture bundles all interests of partners and generates synergies
- The user has one responsible partner and pays for the complete solution
Case study in Metal Cleaning – SAFECHECM and PERO

- Provided machines that are best qualified for the model
- Provided room and material logistics
- Provided the necessary human resources
- Provided the solvent for the cleaning process
- Monitored the quality of solvents
- Provided the waste management of the used chemicals
- Provided stabilizers

Results after 2 years

- Energy: reduced by 50.1%
- Spare parts and services: reduced by 66.4%
- Solvents: reduced by 71.7%
- Stabilizers: reduced by 76.9%

Chemical Leasing: payment per m² cleaned surface or per number of cleaned parts in car manufacturing
UNIDO´s Chemical Leasing Programme

- Global Programme established by UNIDO in 2004
- Supported by the Governments of Germany, Austria and Switzerland
- Chemical Leasing Website: [www.chemicalleasing.org](http://www.chemicalleasing.org)
- Chemical Leasing Online Toolkit: [www.chemicalleasing-toolkit.org](http://www.chemicalleasing-toolkit.org)
- The Declaration was signed by the partners from Austria, Germany, Switzerland and UNIDO on 21 November 2016 during the UNIDO 50th Anniversary
Potential areas for Chemical Leasing with the Montreal Protocol activities

• Application of Chemical Leasing - Cooling systems
  • Renting of cooling containers/cooling space in i.e. supermarkets/hospitals/airport for food storage etc.
  • Cooling systems in containers provide extremely low temperatures down to -45°C and cooling capacity range of up to 500kW per unit
  • Basis of Payment: Monthly fee based on performance

• Application of Chemical Leasing – Solvents (Substitution)
  • Methyl chloroform; CTC; and CFC-113 – are damaging the ozone layer, and several solvents are also powerful Volatile Organic Compounds (VOC) used in i.e. metal processing, printing industry, cleaning
  • Basis of Payment: Cleaned pieces, etc..
  • Substitution with new solvents
Outlook & Conclusion
Conclusion

• Chemical Leasing
  • UNIDO promotes the model in developing and transition economies
  • It is a performance-based business model shifting sales focus from volume to performance
  • Payment/profit decoupled from consumption of chemicals

• Impact / Outlook
  • Reduction of resource use, emissions, waste
  • Lower risks, health hazards from chemical handling
  • Reduced costs, improved competitiveness
  • Insulation from global chemical policy shifts
  • Better qualification of workers
  • Strengthened, longer-term business partnerships
A SMART business and policy model

Sound chemicals management
Monetary benefits
Additional safety & health
Resource efficiency
Technology innovation

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