lebensministerium.at

International Conference

"Getting Fit for REACH Applying Chemical Leasing"

lebensministerium.at

INTERNATIONAL CONFERENCE

„Getting Fit For REACH Applying Chemical Leasing“

March 6th – 7th 2008

Balatonfüred, Hungary

Conference Report

With contribution of:

UNIDO BiPRO denkstatt sustainable thinking CORVINUS UNIVERSITY of BUDAPEST

IMPRINT

Publisher and Editor:
Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management

ISBN 3-902338-95-4
Co-ordination: Thomas Jakl, PhD, Head of Chemicals Unit (V/2),
Stubenbastei 5, 1010 Vienna

April 2008

lebensministerium.at

CONTENTS

lebensministerium.at

PROGRAMME

Wednesday, March 5th 2008

18:00 Reception from the Mayor of Balatonfüred, Mr. István Bóka

Thursday, March 6th 2008 ***Chair: Zoltán Szabó***

President of the IFCS (Intergovernmental Forum on Chemicals Safety)

09:00 Registration

10:00 Welcome: MEP Mrs Edit Herczog, Ambassador Mr. Mayrhofer-Grünbühel

10:15 REACH and Chemical Leasing: Two concepts and their synergies; *Thomas Jakl (Director, Austrian Fed. Ministry for the Environment)*

10:50 Chemical Leasing and outcomes of case studies; *Reinhard Joas (CEO Bipro, Munich)*

11:30 Coffee Break

11:45 REACH – a shift of paradigm and its consequences for stakeholders in Central Eastern Europe; *Gyula Körtvélyessy (Hungarian Chemical Society)*

12:30 Cleaner Production and Chemical Leasing – a win-win approach; *Petra Schwager (UNIDO)*

13:15 Film: "Chemical Leasing Business Models - A video on UNIDO Chemical Leasing Activities"

13:30 Lunch Break

14:30 Workgroups: specific parameters for different industries.

Workgroup 1: ***Automotive Industry;*** Chair: Hans-Norbert Adams (Dow Europe GmbH)

Workgroup 2: ***Colouring and Varnish Industry;*** Chair: Mark Reekie (Akzo Nobel Powder Coatings Ltd)

Contents: Basic conditions for the usability of the concept, identification of pilot projects and initiatives, necessary infrastructure and possible assistance

17:15 Presentations from working groups

18:00 Summary of the day

Supporting Programme in the Evening:

19:00 Departure to Veszprém (with busses)

19:30 Dinner (buffet)
Reception through comitat-president Jenö Lasztovicza in Veszprém with wine tasting and folklore music;

With contribution of Springer

Friday, March 7th 2008

Chair: Gyula Zilahy

CORVINUS University of Budapest,
Director of CPC Hungary

09:00 Presentation of the book „Chemical leasing goes global“,
Publishing house Springer - Vienna, New York
Conference participants will receive a free copy of the book on Friday morning!

09:30 Panel Discussion:
„Chemical leasing – a contribution to sustainable development?”

Participants: Reinhard Joas (Bipro), Klaus Günter Steinhäuser (Federal Environment Agency, Germany), Thomas Jakl (Austrian Fed. Ministry for the Environment), Mark Reekie (Akzo Nobel), Petra Schwager (UNIDO)

Chair: Gyula Zilahy (Corvinus University of Budapest)

11:30 Closure

12:00 Coffee lunch

Optional Supporting Programme in the Afternoon:

City Tour Veszprém

14:30 Departure (with busses)

Conference Venue:

Flamingo Wellness Hotel ****

H-8230 Balatonfüred, Széchenyi u. 16

Phone: +36 87/581-060, +36 87/688-100
Fax: +36 87/481-167, +36/ 87/688-167
E-mail: hotelfla@enternet.hu
Web: www.flamingohotel.hu

During the conference all lectures are translated simultaneously in Hungarian!

CONFERENCE SUMMARY

The first get together of the participants had already been on Wednesday evening at a small reception at the conference venue hosted by the Mayor of Balatonfüred, Mr. István Bóka., The participants had the chance to get to know each other and the first ideas and expectations in relation to Chemical Leasing had been exchanged.

Day 1 - March 6th 2008

The first conference day started with a welcoming session started off by Mr. Jakl, representing the host of the conference followed by MEP Mrs Herczog and the Austrian Ambassador Mr. Mayrhofer-Grünbühel. They stressed the importance of this conference and were pleased to welcome all participants in Veszprém. The whole day was chaired by Zoltán Szabó, President of the IFCS (Intergovernmental Forum on Chemicals Safety).

Starting with the block of theoretical inputs Mr. Thomas Jakl (Director of the Chemicals Policy Unit of the Austrian Federal Ministry for the Environment) showed in his presentation the synergies of the two concepts of REACH and Chemical Leasing (see page 13).

In the following presentation by Mr. Reinhard Joas (CEO of Bipro, Munich) several outcomes of different case studies had been shown. Furthermore he stressed the importance of the concept of Chemical Leasing as an opportunity for an optimised use of chemicals (see page 22).

The third presentation dealt with REACH itself. Mr. Gyula Körtvélyessy (Honorary Secretary General from the Hungarian Chemical Society) talked about the regulation and its consequences for stakeholders in Central Eastern Europe and highlighted important cross references and interlinkages between REACh and Chemical Leasing (see page 36).

To conclude the theoretical inputs Ms. Petra Schwager (Industrial Development Officer for Cleaner Production Program from UNIDO) showed how Cleaner Production and Chemical Leasing can be designed to be a win-win approach (see page 49).

After lunch a short film about UNIDO activities in the field of Chemical Leasing was shown. Several business models in relation with Chemical Leasing were picked out as central themes showing the experiences and illustrating benefits.

Afterwards the participants split into two workgroups where specific parameters for different industries had been dealt with. Basic conditions for the usability of the concept, identification of pilot projects and initiatives, necessary infrastructure and possible assistance were topics discussed in the workgroups.

Workgroup 1: *Automotive Industry*

Christian Plas (denkstatt) and two experts from the chemical industry, Hans-Norbert Adams (Dow Europe) and Markus Frank (Safechem Europe) were chairing the workgroup. After an input from Mr. Adams and Mr. Frank about the experiences of Dow/Safechem with Chemical Leasing (see appendix II) Mr. Plas and the experts discussed the pros and contras of Chemical Leasing in the automotive industry with the interested participants.

Benefits of the Chemical Leasing Model:

- Organisations which are facing quality problems are more likely to get involved in Chemical Leasing.
- Chemical Leasing is even possible with small volumina <1t/a.
- Strict legal (environmental) restrictions may motivate companies.

Drawbacks of the Chemical Leasing Model:

- There is already an optimised system in place.
- Existing laws are executed weakly.
- Economic legal restrictions may prevent companies to involve in Chemical Leasing.
- Confidential/secret processes are involved which may be difficult for companies concerned.

Workgroup 2: Colouring and Varnish Industry

The second workgroup was chaired by Zsombor Ferjancsik (denkstatt Hungary) and the expert Mark Reekie (Akzo Nobel Powder Coatings Ltd), who gave an initial presentation about the experiences of Akzo Nobel with Chemical Leasing (see appendix III). Afterwards they had a very lively discussion about several aspects related to Chemical Leasing in the specific industry as well as in general.

Chemical Leasing Aspects:

- Suppliers involved in training.
- Chemical Leasing involves intense discussion more than REACH demands.
- Chemical Leasing is to be made like a project.
- It is a matter of learning and can then be implemented at other places.
- Biggest challenge to change attitude and mind.
- Chemical Leasing is mostly not core business of the user, but core business of the supplier.
- It is important to build trust.

Economic Aspects of Chemical Leasing:

- Costs of improving process,
- Market driven,
- Price should include additional service,
- Tax reduction to support process.

Measures for Promotion of Chemical Leasing:

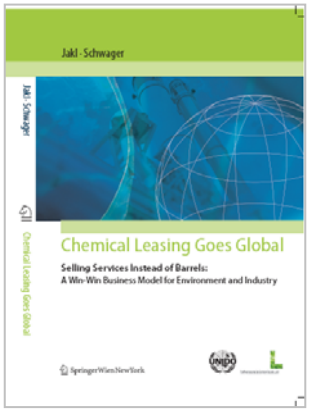
- CPC's cannot do it alone,
- Use good case studies,
- Industry involvement,
- Importers from outside of small countries do not have all the information => Support from suppliers for training etc.

Afterwards the outcomes of the workgroups were presented in the plenary. The day was closed with a short summary of the day by Mr. Jakl and Mr. Szabó.

Further opportunities and cooperation plans had the chance to arise at the supporting program in the evening, a reception through comitat-president Jenö Lasztovicza in Veszprém. .

Day 2, March 7th 2008

The second day started with the presentation of the recently published book „**Chemical leasing goes global** – Selling Services Instead of Barrels: A Win-Win Business Model for Environment and Industry“ (Publishing house Springer - Vienna, New York). The book collects the experience gained from pilot projects in Austria, Egypt, Russia and Mexico. It contains detailed descriptions and evaluations based on existing projects, as well as political and scientific interpretations and analyses. The editors, Mr. Thomas Jakl (Austrian Federal Ministry for the Environment) and Ms. Petra Schwager (UNIDO) also described the background and the origin of the book.



The second main point on that day was a **panel discussion** chaired by Gyula Zilahy, Corvinus University of Budapest. Klaus Günter Steinhäuser (Federal Environment Agency, Germany), Thomas Jakl (Austrian Federal Ministry for the Environment), Petra Schwager (UNIDO), Mark Reekie (Akzo Nobel) and Reinhard Joas (Bipro) discussed about „Chemical leasing – a contribution to sustainable development?”

Following topics were discussed:

- The benefits and constraints of the practical implementation of Chemical Leasing.
- What can governments do to promote Chemical Leasing: policy tools available?
- The role of CP centers in the promotion of Chemical Leasing.
- The importance of a mediator in Chemical Leasing projects.
- The relationship between Chemical Leasing and other environmental management tools – how can they strengthen each other?
- Tools for UNIDO, ministries and National Cleaner Production Centers to promote Chemical Leasing at the corporate level.

The following points resulted from the panel discussion:

Chemical Leasing is a promising new tool to be used by the chemical industry as well as those industries using significant quantities and toxic chemicals.

There are many examples of Chemical Leasing-like solutions, but environmental aspects are often not considered or have a smaller weight during the implementation. The environmental benefits often do not serve as only motivation factors for Chemical Leasing projects, but partners implement them for other (e.g. efficiency) reasons.

Furthermore, contracts based on service provided to customers (as opposed to the selling of chemicals) do exist in the industry, but are often not called “Chemical Leasing” and are not fully utilizing their environmental potentials.

One of the most important barriers to Chemical Leasing is the lack of trust between potential partners. Therefore the most important potential role of national CP centers in the field of Chemical Leasing is the role of a mediator: it seems that many projects may not reach implementation because of a lack of a good third party mediator, which can be trusted by both parties.

Chemical Leasing should stay a voluntary tool practiced by the corporate sector, but market based incentives should be provided to the companies. Certification may play a role in Chemical Leasing cooperations, but certification should be industry driven. A good tool would be the establishment via a Chemical Leasing Award by UNIDO, the Austrian Federal Ministry of the Environment and other partner organisations. These institutions will look into the possibilities to set up a Chemical Leasing Award in the next one or two years for those companies, which can demonstrate the successful implementation of Chemical Leasing projects, as well as significant environmental benefits resulting from them.

Main outcomes of the conference:

Cooperations for future acitivities:

Due to the great variety of nations participating at the conference several experiences from institutions and companies in countries already engaging in Chemical Leasing projects had been exchanged.. Additionally, possibilities for new cooperations had been discussed and established.

Framework needed for engaging in Chemical Leasing:

In order to motivate companies to engage in Chemical Leasing activities, several preconditions should be given. First of all the participation in Chemical Leasing should remain a voluntary decision although there is the demand for some market based incentives which should be provided. Certification has been discussed but is not seen as urgently necessary. Furthermore, a mediator should be involved in order to build up trust and confidence from the participating companies in the implementation of projects. The Cleaner Production Centers would be appropriate to this role.

For the promotion of Chemical Leasing good case studies should be used and industry should be broadly involved. Additionally, support from suppliers for trainings and other information are needed.

REACH was seen to a great extent as paving the way for Chemical Leasing approaches as it is going to establish a new quality of interaction between actors along the supply chain. The conference drew the conclusion that Chemical Leasing has the potential to make use – both economically and environmentally - of the information REACH will generate and of the communication paths it will establish.

Preparation of an Award for Chemical Leasing activities:

The award is planned to be established by UNIDO, the Austrian Federal Ministry for the Environment and other partner organisations. All companies, which can demonstrate the successful implementation of Chemical Leasing projects, as well as significant environmental benefits resulting from them, will be able to apply for the award. As a next step the possibilities to set up the award in the next one or two years are checked.

This conference was another contribution to the further establishment manifestation of Chemical Leasing. Although there were many points coming up during the conference there are still questions to be discussed:

- Legislation – assistance or obstacle?
- What is the role of trading companies?
- What motivates the companies to discuss issues that might be part of their intellectual property?

THANK YOU FOR YOUR ATTENDANCE!!

UNIDO Definition of Chemical Leasing

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 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.

www.unido.org

APPENDIX I – PRESENTATIONS

REACH and Chemical Leasing, *Thomas Jakl*

REACH and Chemical Leasing two concepts and their synergies

REACH has been devised specifically to meet the political challenges of Europe's environmental policy with regard to chemical products as they are contained in the EU's 6th Action Program for the Environment. **REACH** establishes a single, integrated system for Registration, Evaluation and Authorisation of CHemicals. It is requiring companies that produce and import chemicals to assess the risks arising from their use and to take the necessary measures to manage any risk they identify.

With the new conditions and the new circumstances, the REACH – System will establish, the conventional paradigm that chemicals are just sold by one side and purchased by the other without any further exchange of information, can not survive. The responsibilities are too interwoven and deep-seated so that the importance of the relationship between manufacturer and user of chemicals can no longer be judged by commercial indicators only.

REACH and **Chemical Leasing** are mutually supportive as they both stimulate the development of rules for „sharing". Within REACH costs of test will have to be shared among companies registering the same substance. Companies will have to share responsibility as to the documentation of the properties of a chemical substance as well as with regard to the risks that might occur during its application. This culture of sharing, which might be a new cultural element in the relationship of business partners, is also a prerequisite for success in service oriented business models as they equivalently depend on a high degree of openness and trust between the partners involved.

Both Approaches involve different stages of the supply chain - as producers and applicants are challenged – and both approaches are life cycle oriented either through their documentation requirements addressing phases of production, use or disposal or through their integration of the corresponding partners managing those life cycle stages within the business model. Chemicals are to be handled with care both in the REACH world as well as within applications of Chemicals Leasing. Care in that context in particular implies that Chemicals and their applications are not only monitored but also managed with maximum accuracy.

REACH represents the regulatory driver for this attitude aiming at protection for human health and the environment ("Duty of care" in the, Reach Regulation Recital 16, Art. 1 para 3; monitoring requirements Art 14.6. for manufacturers; Art 37.5. Down Stream users) whereas **Chemical Leasing** is additionally driving it economically as resource efficiency simply increases profit.

Chemical Leasing is the tool to demonstrate "adequate control" (Para 60), a set of parameters which have to be fulfilled in order to qualify for a use to become authorized. Experience shows that chemicals are managed excellently within Chemical Leasing applications and in case that in certain applications the use of "very high concern chemicals" is inevitable – adequate control will be achieved as an inherent principle within service oriented business models as "handling with care" is their core element.

Chemical Leasing is the ideal business environment to identify and apply the use and exposure category concept in particular within the Chemical Safety Report – jointly by suppliers and users. Specifying the relevant use and exposure category within the REACH system, together with qualifying the risks possibly arising will build upon the assessment already performed during the establishment of the specific Chemical Leasing model.

REACH is going to mandate along the supply chain Information exchange, Monitoring procedures, Patterns for Sharing and Co-operation as well as Documentation and assessment procedures. Chemical Leasing opens a window of opportunity for turning new obligations, new responsibilities and new flows of information into successful business strategies.

Presentation by:

Thomas JAKL

Director, Chemicals Policy Unit, V/2
Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management

lebensministerium.at

REACH and *Chemical Leasing*
Two concepts and their synergies;

Dr. Thomas Jakl

Austrian Ministry for the Environment
Head of Chemicals Policy Unit

"*Chemical Leasing*"
- the message in a nutshell

lebensministerium.at

- Chemical products provide a broad variety of services (cleaning, coating, greasing…)
- The focus of economic interests is currently on the volume of products rather than on services.
- Shifting the focus more toward the "service-part" stimulates **economically driven** "care"
- It is in the interest of all the parties involved to use the substances with maximum efficiency

The Austrian Experience

lebensministerium.at

- 4,000 Austrian companies (mainly SMEs) would basically qualify for the application of such models
- Cutting today's annual use of 153,000 tonnes of chemicals by one third - 53,000 tons per year that would not have to be used nor paid for, not result into emissions nor waste
- On average, the users of these new business models can expect cost savings of up to 15%
- Implementation projects covering a wide range of applications and technologies have been or are being implemented in Austria - many more through UNIDO's activities - sponsored by the Austrian Government

Seite 3 09.04.2008

OECD - Conference
"Experiences and Perspectives of Service-oriented Strategies in the Chemicals Industry and Related Areas"
Vienna, 12/13 November 2003,

lebensministerium.at

The conference concluded:

- "All these new service-oriented chemical business models require a close co-operation between the provider and the user of the chemical. Therefore, the potential of these business models has also to be seen in connection with the new EU Chemicals Policy (REACH), which will require a new relationship between provider and user and the conventional paradigm "supplier here - customer there" will hardly be crowned with commercial success."

Seite 4 09.04.2008

4 Key Questions

lebensministerium.at

- Does REACH pave the way for Chemical Leasing - and what are the indications?
- Does Chemical Leasing pave the way for REACH - Implementation - and what are the indications?
- Do the experiences gained from pilot projects give any indication about possible synergies?
- Is there a way to provide assistance for companies willing to move into that direction?

REACH and *Chemical Leasing* share the same philosophy

lebensministerium.at

- Mutually supportive in developing rules for „sharing“ (costs, responsibility, information)
- *Chemical Leasing* businesses involve different stages of the supply chain
- *Chemical Leasing* businesses are life cycle oriented
- Chemicals are handled with care (REACH: regulatory driven – *Chemical Leasing* : economically driven)
- Chemicals and their applications are monitored

lebensministerium.at

REACH and *Chemical Leasing* share the same philosophy II

lebensministerium.at

- *Chemical Leasing* secures compliance with the DUTY OF CARE (mandated by REACH Recital. 16, Art 1 para 3)
- *Chemical Leasing* is *the* tool to demonstrate "adequate control" (REACH Para 60)
- *Chemical Leasing* is the ideal business environment to identify and apply the use and exposure category concept in particular within the Ch. Safety Report – jointly by suppliers and users.
- Application of *Chemical Leasing* implies measures for monitoring the quality/condition of the chemical, their applications and emissions – identical measures will be required by REACH (Art 14.6. for manufacturers; Art 37.5. Down Steam Users)

REACH and *Chemical Leasing* share the same philosophy III

lebensministerium.at

REACH is going to mandate along the supply chain:

- Information exchange
- Monitoring procedures
- Patterns for Sharing and Co-operation
- Documentation and assessment procedures

Case studies result: Chemical Leasing is supportive to REACH implementation.

REACH and *Chemical Leasing* -

lebensministerium.at

Main Conclusion:

Chemical Leasing is making use of REACH structures and is turning them into economic advantages while at the same time catalysing REACH – compliance!

The issue of substitution

lebensministerium.at

- Continuous optimisation in economic and also ecologic terms is an inherent and integrated element of the *Chemical Leasing* concept.
- Resources efficiency as well as Substitution of Very High Concern Chemicals therefore are a logical and natural result of the optimisation process within *Chemical Leasing* applications.
- The application of (certified) *Chemical Leasing* might thus even be a precondition for a use of such a substance to be authorized.

lebensministerium.at

Synergies - Economic Experiences from Case Studies

lebensministerium.at

- Combines Know How gained in product design and process design of manufacturer and applicant (Example: joint venture of manufacturer of furniture/paints)
- Enables business partners to offer solutions on the market which would otherwise remain on the research and development stage - boost in competitiveness (Example: Metal cleaning for car industry)
- The enhanced interlinkages as to know how-exchange establish long term co-operation along the supply chain (Example: Paint stripping for furniture industry)

Means to boost further synergies

lebensministerium.at

Quality standards are being offered in order to :

- Provide a structure for setting up and running the business model
- Protect the business model to avoid „ecological abuse“
- Include a „REACH – compliance checked!“ chapter

Extending catalogue of case examples and their evaluation

lebensministerium.at

Chemical Leasing opens a window of opportunity for turning:

- REACH - obligations
- REACH responsibilities and
- REACH flows of information

into successful business strategies.

Seite 13 09.04.2008

Chemical Leasing Case Studies, *Reinhard Joas*

Chemical Leasing and outcomes of case studies

Basic principles of ChL

Traditionally, chemicals are sold to customers, who use them to fulfil certain functions. Their suppliers have a clear economic interest in increasing the amount of chemicals sold ("The more you sell, the more you earn"). Typically their earnings increase if they sell chemicals at higher prices or to larger amounts. Higher prices, however, are difficult to be achieved due to international competition. So a main focus is set on higher sales volumes. This is in many cases related to problematic releases to the environment and to negative consequence for the future availability of resources.

Chemical Leasing (ChL) inverts a supplier's commercial interest in higher consumption of chemicals. In a ChL business model the chemical supplier is paid for the service provided by the chemicals and not for the amount of chemicals provided. The chemical supplier becomes a service provider, and as such it is interested in keeping costs low while providing the service demanded to its customers. Reducing costs means reducing the consumption of chemicals which in a ChL business model has become an expense factor for the chemical supplier. Using its know-how regarding the substance, the chemical supplier will try to make the chemical application as efficient as possible. Efficiency may also result from an optimisation of the production process, adjusted to the specific chemical.

Case studies, involved players and their benefits

Several case studies have been successfully executed within the framework of UNIDO projects (e.g. use of powder coatings for coating of electrical equipment; use of solvents within painting of cars; lubrication in sugar mills). In all case studies, the result is a win-win-situation: There are economic benefits for the partners and there are environmental advantages due to reduced chemicals consumption.

The main players within the ChL models are typically the producer (supplier) of the chemicals and the user of the chemicals. The unit of payment is of high importance in Chemical Leasing. In contrast to traditional business models the basis of payment is not the amount of the chemical used (e.g. in $ per ton) but functional units like "m^2 coated surface".

Further advantages of ChL

ChL is additionally advantageous for chemical suppliers since they will be able to strengthen customer relationships. For customers on the other hand it is advantageous to concentrate on their core business and to cede responsibility for the management of chemicals. In addition sometimes the advantages of common Research&Development activities can be realised. Also, ChL has obvious environmental advantages. Process optimisation not only leads to a reduced chemical consumption but very often also to a reduction in the consumption of other resources like energy or water. As a result the waste load as well as air and water pollution will decrease, reducing the total environmental impact of the production process.

Presentation by:

Reinhard JOAS

CEO, BiPRO GmbH - Beratungsgesellschaft für integrierte Problemlösungen

Chemical Leasing and outcomes of case studies

Dr. Reinhard Joas
6th March 2008
Balatonfüred

BiPRO
Beratungsgesellschaft für integrierte Problemlösungen

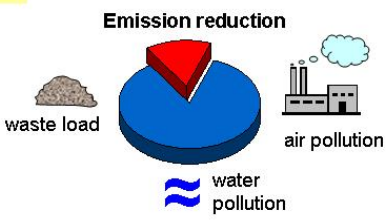
Objectives and Approach of Chemical Leasing

What is it: Chemical Leasing is a service oriented business model

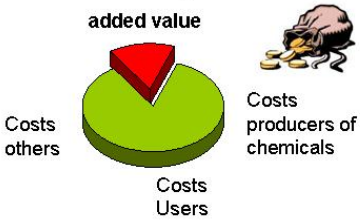
Players: producers of chemicals | users of chemicals | equipment supplier | recycling companies | authorities / int. institutions

Objectives:

Environment:



Economy:



Principle: Chemical Leasing suggests new forms of payments for chemicals that direct the economic interests of all partners towards process optimisation and reduction of chemicals consumption.

BiPRO

2

Payments on the benefits of chemicals

Chemical producer — provides chemicals to (no sales) — the user

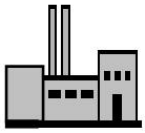
payment not for the chemical itself, but for the benefits of the chemical
(e.g. not for t of solvents used, but for number of tubes cleaned!)

amount of chemicals used will decline as chemicals volume turns from a factor for earnings ("*the more you sell the more you earn*") to a cost driver ("*less is more*")

BiPRO

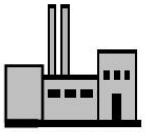
3

How to realise the added value: example



Chemical producer
With classical business

User needs cleaning of 2 million tubes



Chemical producer
With Chemical leasing

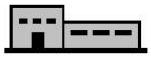
100 t solvents sold	= 100.000 $ turn over	Added value from process optimisation	
100 t production	= 80.000 $ var. costs	Only 60 t solvents needed	
	= 10.000 $ fix costs	Leasing rate 0,04$ per tube	
Result:	10.000 $ net profit	Leasing income	= 80.000 $ turn over
		60 t production	= 48.000 $ var. costs
			= 10.000 $ fix costs
		Result:	22.000 $ net profit

Added Value for the chemical producer: 12.000 $ net profit

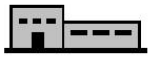
BiPRO

4

How to realise the added value: example



User needs cleaning of 2 million tubes



Chemical user
With classical business

Chemical user
With Chemical leasing

Costs to buy 100 t solvents = 100.000 $

Costs for leasing of 60 t solvents = 80.000 $

Added Value for the chemical user: 20.000 $

BiPRO

5

Service oriented business strategies: Basic ideas

user of a chemical

Does not pay to own a chemical,
but spends money for the benefits provided by a chemical

producer of a chemical

Sells the function of a chemical,

including know how on efficiency and risks,

adding services like
production management, logistics and process optimisation

6

Service oriented business strategies: Basic ideas

amount of produced chemicals ⇩

will decline

as chemicals volume turns from a factor for earnings

("*the more you sell the more you earn*")

to a cost driver

("*less is more*")

added value ⇧

can be shared

among the involved partners

7

Chemical leasing business models bundle motivations

Traditional business models:

Contradictory motivations

supplier — Delivery of goods — consumer

material (costs, volume)

"the more the better" ↑

"less is more" ↓

Chemical leasing models:

Bundled motivations

supplier — SERVICE & ADVICE — consumer

Life cycle costs (material, work, waste management)

"less is more" ↓

"less is more" ↓

8

CASE study: use of powder coatings for coating of electrical equipment

Powder coating

Classical business model: payment per t of powder coating

Chemical leasing: payment per m² of coated surface

9

CASE study: use solvents within painting of cars

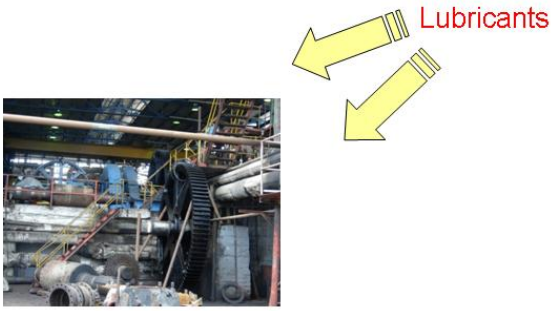
Solvents

Classical business model: payment per t of solvents

Chemical leasing: payment per car painted

10

CASE study: lubrication in sugar mills



Classical business model: payment per t of lubricants

Chemical leasing: payment per t of produced sugar or t of handled sugar cane

11

CASE study: water treatment

Classical business model: payment per t of chemicals for water treatment

Chemical leasing: payment per m³ of purified water

12

CASE study: paint application

Classical business concept: payment per kg of paint

Chemical leasing concept: payment per m^2 painted surface or payment per number of painted pieces

13

CASE study: optimisation of glues for labelling

Classical business model: payment per kg of glue

Chemical leasing: payment per labelled bottle

14

CASE study: optimisation of foams for caps

Classical business model: payment per kg of foam

Chemical leasing: payment per cap

15

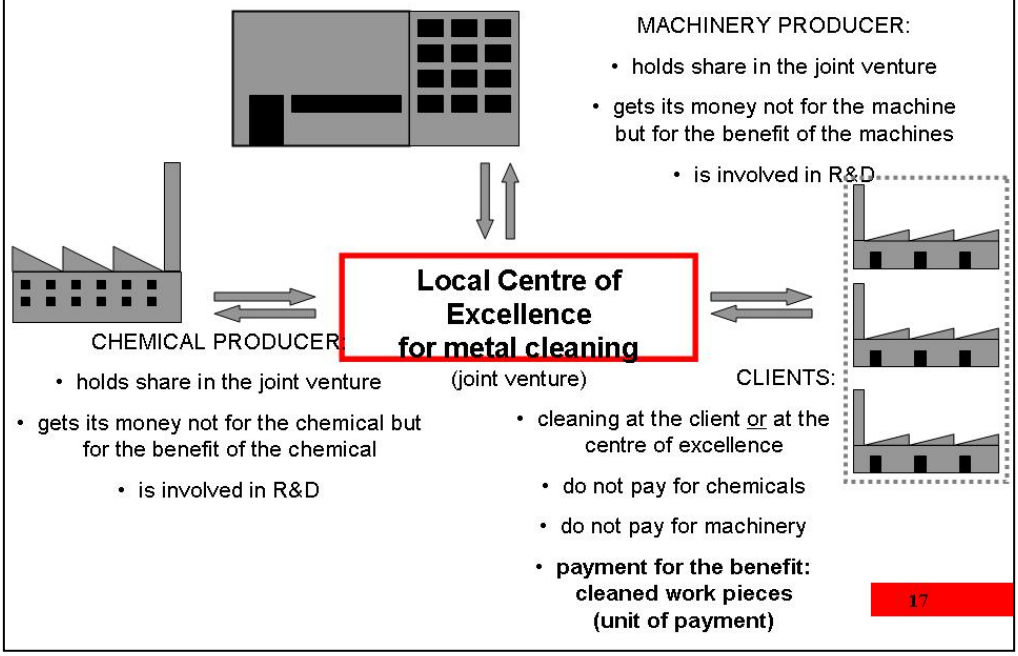
CASE study: optimisation of solvents for printing of sheets for tin production

Classical business model: payment per kg of solvents

Chemical leasing: payment per printed sheet

16

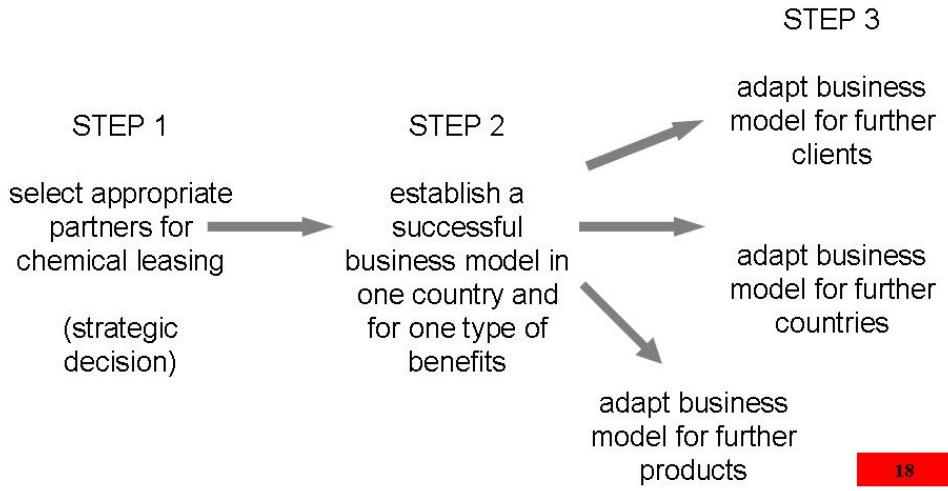
CASE study: use of solvents for surface cleaning of metals



Experience 1

Integrate ChL in marketing and network development strategies:

Company choices



Experience 2

Suppliers of equipment/machinery might be interesting further partners

individual efforts to realise potentials of chemicals is often difficult

individual efforts to optimise potentials of machinery is often difficult

Chances of chemical leasing

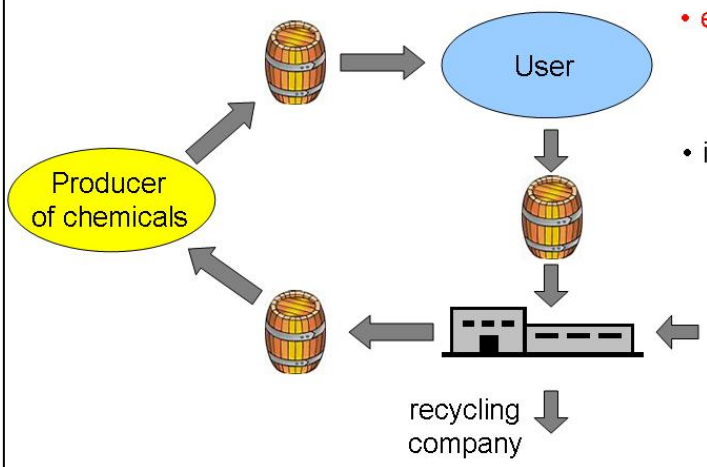
- better use of existing know-how
- more efficient research and development
- balance with respect to access to the client

Optimisation potentials of chemicals and machinery

19

Experience 3

Recycling companies often strengthen a Chemical Leasing concept



- ecological benefits of a recycling concept
- it is not the intention of chemical leasing to find an exclusion of waste law

20

Experience 4

Take care of know how protection
and don't neglect internal communication!

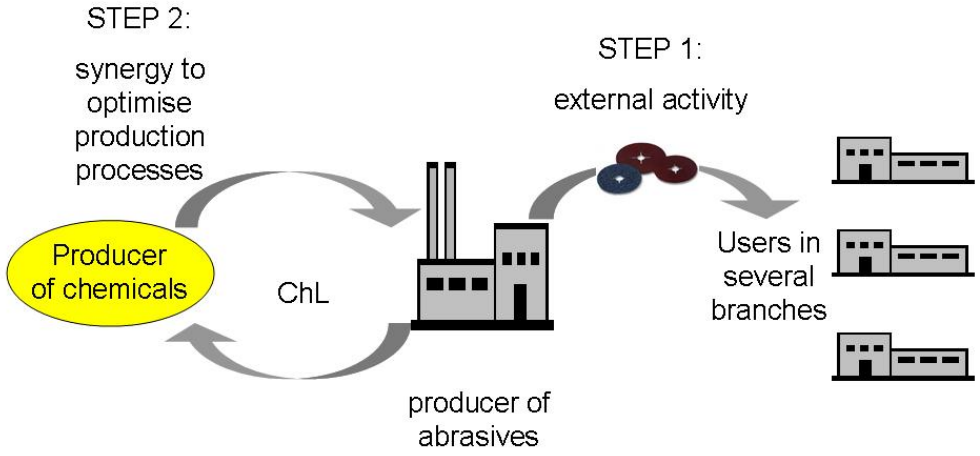
⇒ Communicate the business model to your staff.
In many cases they are afraid to give away their competence and to loose their job (what is neither the intention nor the consequence of chemical leasing concepts).

⇒ Establish clear contracts with your partners on intellectual property rights. Try to find a good balance between necessary protections and communication of know-how.

21

Experience 5

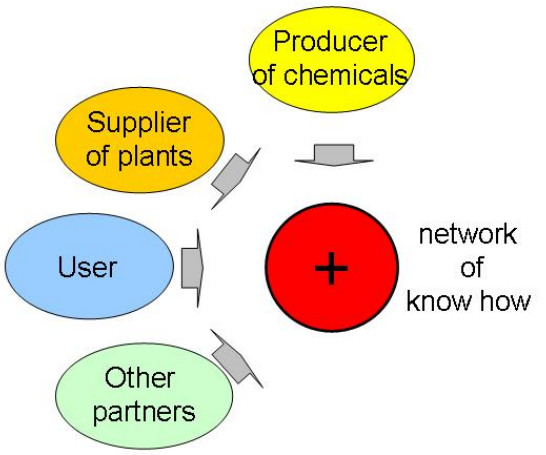
Don't stick too close to chemicals!
Use synergies between internal and external Chemical Leasing!



22

Experience 6

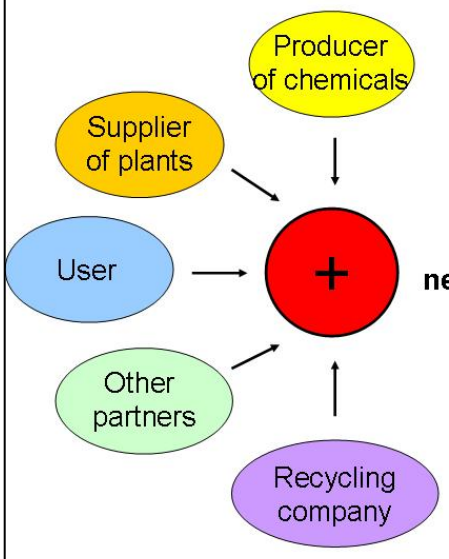
Chemical Leasing can be an opportunity for joint research activities



- better products and technologies
- new concepts
- environmental advantages
- sustainable development

23

Need for co-operation defines chances and obstacles



chances:

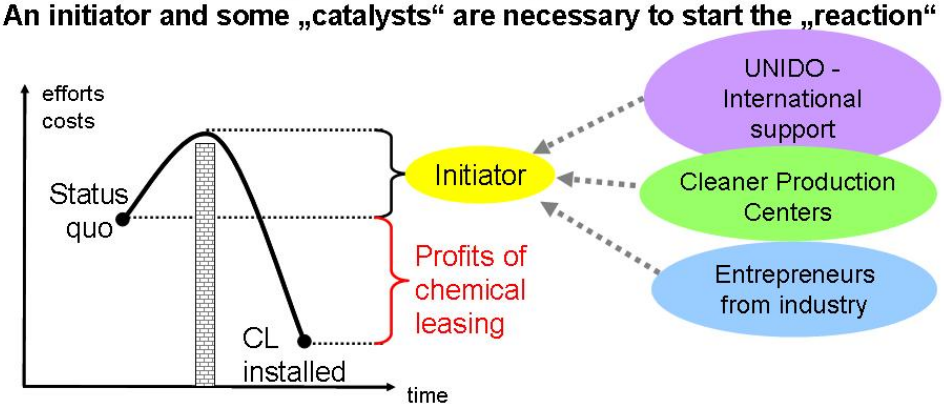
- better products and technologies
- combined know-how as a specific resource
- environmental advantages
- sustainable development

obstacles:

- cost of business reorganisation
- confidentiality
- establishment of quality standards
- finding ways of fair allocation of benefits

24

Chemical leasing concepts are no „self running“ processes! An initiator and some „catalysts“ are necessary to start the „reaction“



Problems to be solved:

- → Find right partners
- → Confidence between partners
- → Quality assurance
- → Fair contracts that meet expectations

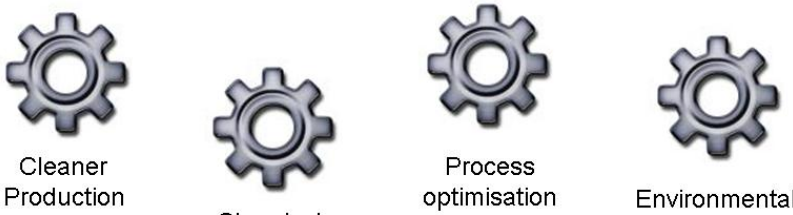
Multi stakeholder open working group has been installed to exchange experiences

BiPRO

25

Conclusions

1. Chemical Leasing is a new approach for a win-win situation for economy and environment
2. First pilot projects in Austria, Mexico, Egypt and Russia proof applicability and potentials of the model
3. An open multi stakeholders working group helps to exchange experiences and solve principal problems
4. Chemical Leasing can also be used as a policy tool for know how transfer, risk reduction and environmental objectives of risk reduction. In this function it should be supported by the international community



Cleaner Production Projects

Chemical Leasing Projects

Process optimisation

Environmental and Economic benefits

BiPRO

26

REACH, *Gyula Körtvèlyessy*

REACH – a shift of paradigm and its consequences for stakeholders in Central Eastern Europe

Hungary – very similarly to other countries joining the EU in 2004 and 2007 – has his own but very short history for chemical safety. Hungary adopted the first Governmental Decree on the subject only in the nineties. The first Act called Chemical Safety Act was issued on 2000 together many connected Decrees. Even though each was based on 67/548 and other EC directive as adopted, there was much dissimilarity mainly because Hungary was not a member of the EU yet. Therefore, the system was centralized based on a new institution, the National Center of Public Health, named Fodor József. Even now, there are four authorities enforcing chemical safety regulations in Hungary which makes life difficult for companies. On the other hand, control of the chemical safety has been formal partly because of the authorities, partly because of the very bad quality of SDSs at companies, independently from the suppliers (eastern or western companies alike).

Because REACH, the new regulation of Europe for chemical safety was adopted at the same period when CEE countries joined EU, they were very active in the process. Not only authorities, but association, societies, ministries, companies, NGOs took part in the long debate reaching to REACH. This deep involvement resulted in the well-know and highly appreciated OSOR principle, the British-Hungarian amendment idea for One Substance One Registration.

In the past, not only the quality of the SDS received was obsolete, but users could receive very limited technical information of how to use chemicals environmental friendly. CEE countries should purchase large parts of chemicals they needed from western companies.

One of the main aims of REACH is to push manufacturers of chemicals to inform users about the safe use of chemicals. It is less comprehensive than the aim of Chemical leasing but REACH is a legal tool which definitely will increase the involvement of the manufacturers to consider the whole life cycle of their chemicals. Instead of simple transferring the products to the customers, REACH requires manufacturers to collect information about all uses of the chemicals on their own, in preparations and even in articles, and to give – legally more binding - advices about their safe use in the new attachment to safety data sheet, the exposure scenario. This new exchange of information between manufacturers and users must help in introducing the business model of Chemical leasing. If this model can decrease the amount of chemicals used it means not only less human health and environmental impact, but also a preferred option in REACH regulation. However, two problems should be considered: leasing chemicals into the EU or recovering chemicals inside the EU are both equal to manufacturing them even though wastes are outside the scope of REACH. But in both cases, registration, authorization and notification requirements should be applied.

Presentation by:

Gyula KÖRTVÉLYESSY

Honorary Secretary General

Hungarian Chemical Society

REACH – a shift of paradigm and its consequences for stakeholders in Central Eastern Europe

Dr. Gyula Körtvélyessy
Honorary Secretary General
Hungarian Chemical Society

Stakeholders in Hungary

- Industry: deeply involved ⇔ what is it all about?
  - **Chemical industry ⇔ processing industry**
- Federations (MAVESZ: Hungarian Chemical Manufacturers Association), Society (MKE: Hungarian Chemical Society): very active
- Trade unions: actively involved
- Owners (shareholders):
  - **Pushing to gain compliance**
  - **Import problems for companies (Japan, USA)**
- Authorities:
  - **ANTSZ: National Public Health and Medical Officer Service**
  - **OKBI: National Institute of Chemical Safety**
  - **Fodor József National Center for Public Health**
  - **OMMF Hungarian Labour Inspectorate**
  - **OKTVF National Inspectorate for Environment, Nature and Water**
  - **OKF The National Directorate General for Disaster Management, Ministry of the Interior**
- NGOs

lebensministerium.at

History of Chemical Safety in HU

- Nineties: first decrees on poisons
- 2000: New Act, XXV.
  - based on EC directives and regulations
  - Some similarities to REACH
    - Reporting EINECS substances but without tests (to Nat.Auth.)
  - Some dissimilarities to REACH
    - Reporting preparations
    - Attaching SDS for acceptance
- 2007
  - In June a new decree: first reference to REACH for SDS
- 2008
  - Updating Act XXV: everything remains the same

Present practice in chemical safety

- Possible information attached to chemical products
  - Safety: SDS
  - Quality: specification and/or test report and/or conformance certificate
  - Use: Technical data sheet
    - instruction of use
    - Training on the spot
- Main points for authorities: SDS and labeling
  - Is there any?
  - Language?
  - Where?
  - Is there any reference to Hungarian law?
  - Are there enough chapters?

Specification

Additive

Date of issue:	2007-09-15
Material number:	467344

Test parameter	Specification
Phosphoric Acid	75 %
Copper, as Cu 3	3 %
Appearance	Liquid
Colour	Clear, dark - blue
Odour	No odor
Boiling point range	135 °C - 158 °C
Freezing point	- 17,5 °C
PH	1-1.5
Specific Gravity	1,6 at 25°C/15.5°C

IP CONDITIONER is a highly effective liquid non-chromated a
or aluminum prior to Bright Dip. NOVA BRIGHT DIP CONDITION
and produces smut free surface ready for Bright Dip.

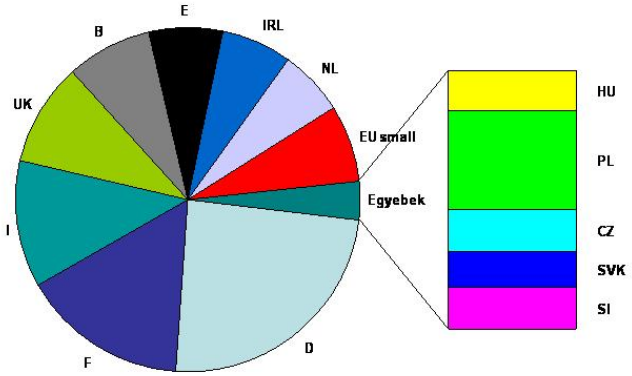
ACTERISTICS:

IP CONDITIONER is strongly acidic. Contact with the skin o
ion or burns. The same safety precautions should be observe
products. Personnel should wear eye protection, NIOSH appr
gloves and apron or other protective clothing when working
NDITIONER. Tanks used for NOVA BRIGHT DIP CONDITIONER shoul
ate exhaust system to protect workers against irritating or
aminants. Material Safety Data Sheets are available upon r
e Technologies.

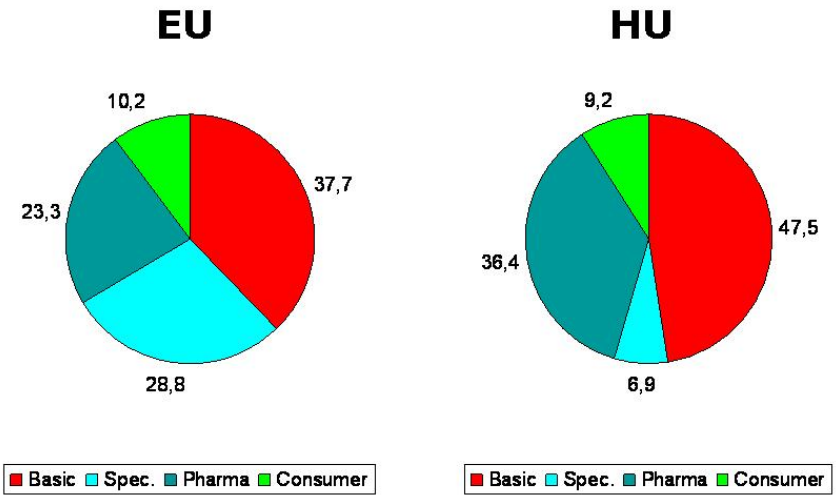
OMMENDATIONS:

ting equipment for NOVA BRIGHT DIP CONDITIONER should be co
ies stainless steel, rigid polyethylene, polypropylene or p
d steel tanks. Racks and other related equipment should be
aterials. The rinse tank following the NOVA BRIGHT DIP CON
ricated of the same material as the NOVA BRIGHT DIP CONDITI

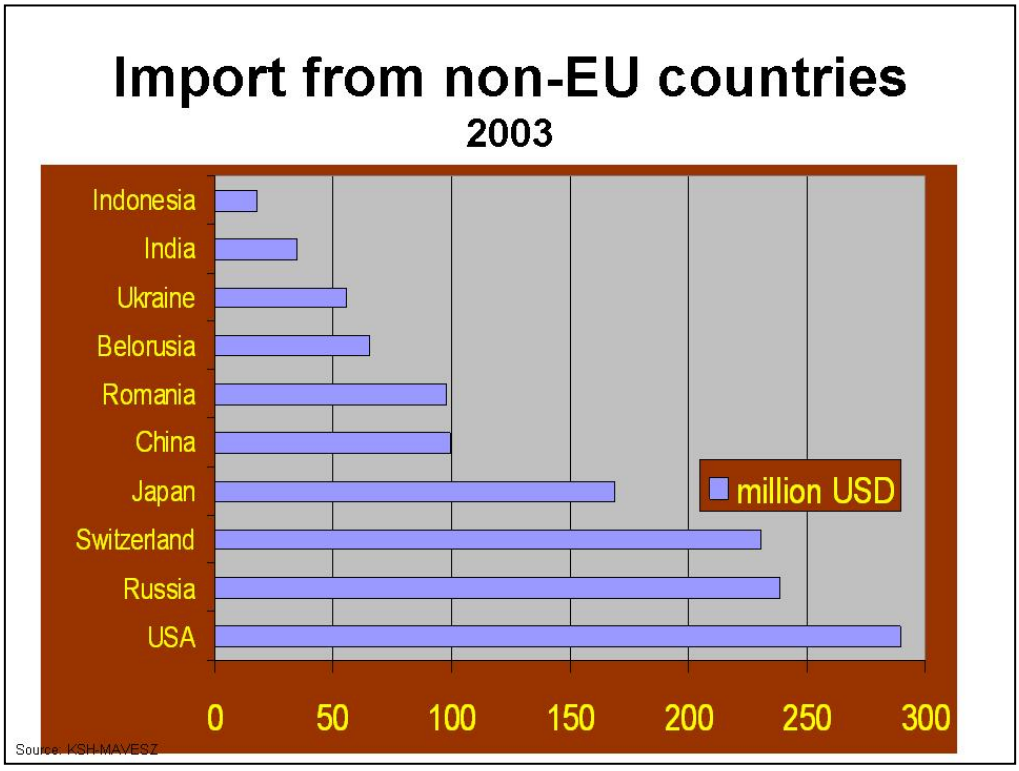
Hungarian chemical industry in the EU

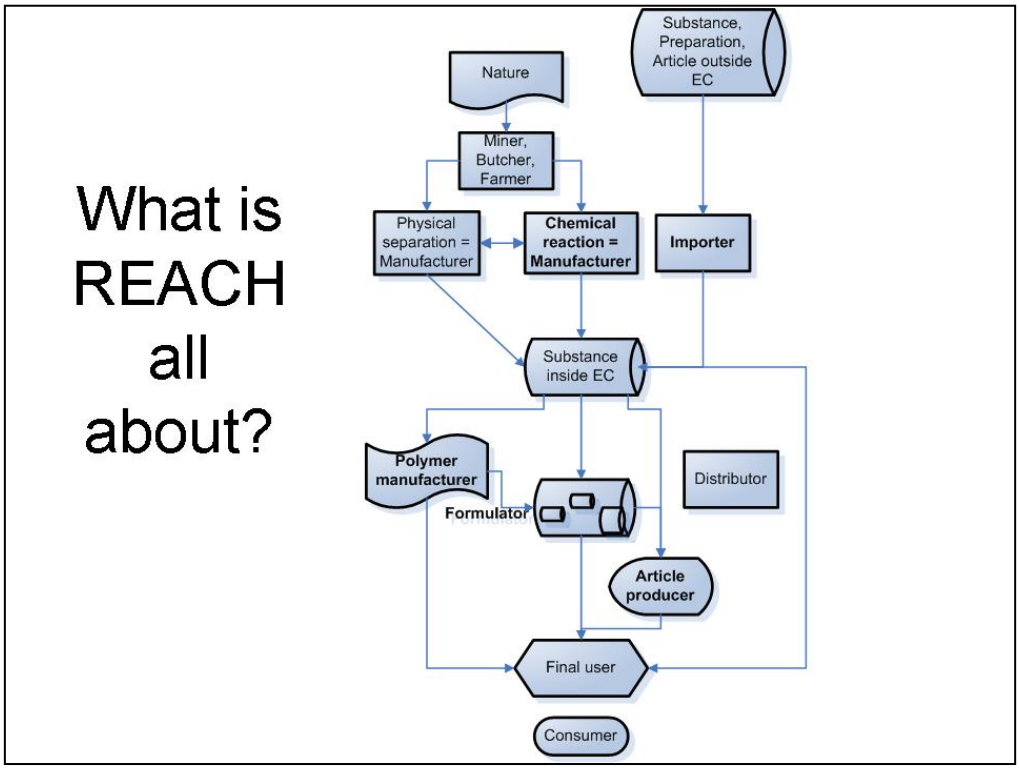


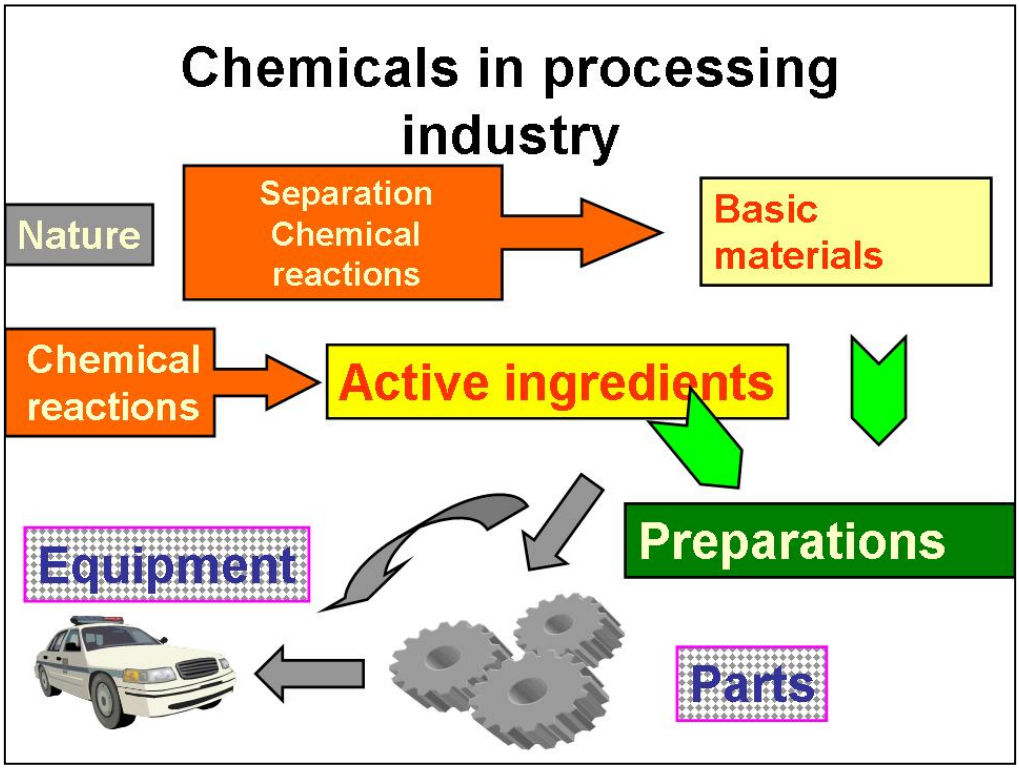
Comparison of structures

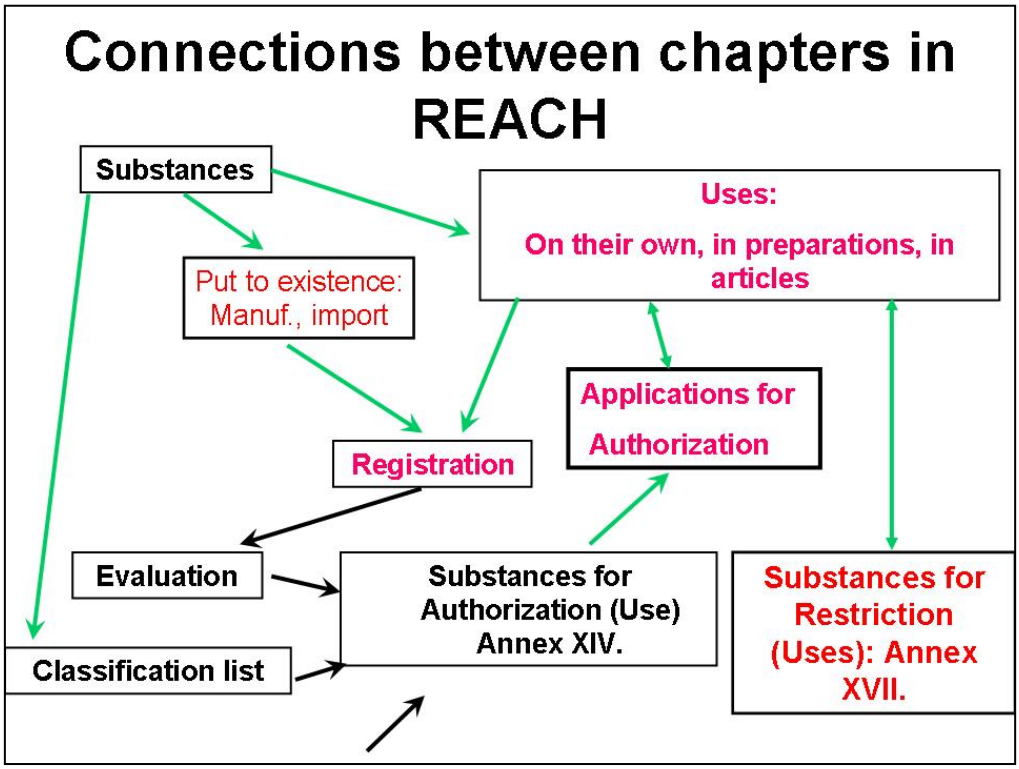


Source: CEFIC-MAVESZ


Import from non-EU countries
2003
Indonesia
India
Ukraine
Belorusia
Romania
China
Japan
Switzerland
Russia
USA
million USD
0
50
100
150
200
250
300
Source: KSH-MAVESZ

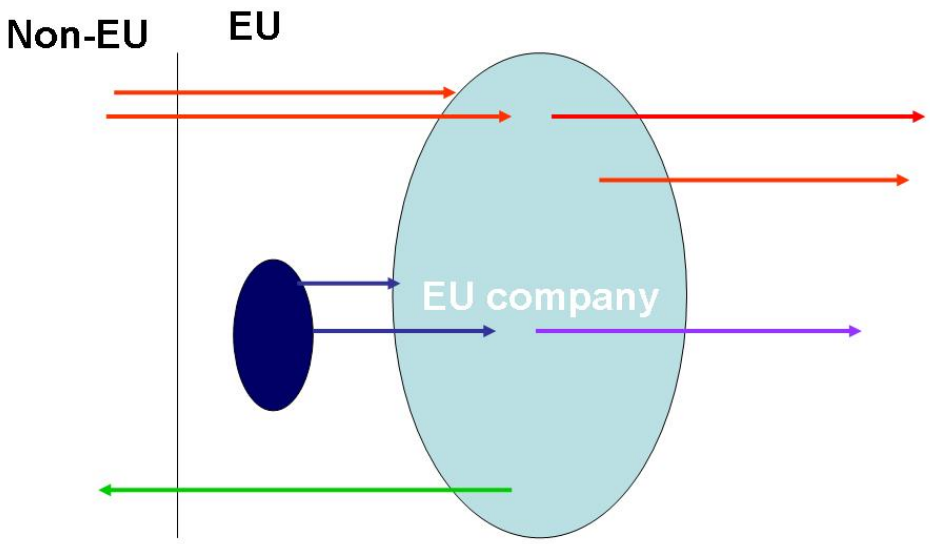

What is REACH all about?
Substance, Preparation, Article outside EC
Nature
Miner, Butcher, Farmer
Physical separation = Manufacturer
Chemical reaction = Manufacturer
Importer
Substance inside EC
Polymer manufacturer
Formulator
Distributor
Article producer
Final user
Consumer


Chemicals in processing industry
Nature
Separation Chemical reactions
Basic materials
Chemical reactions
Active ingredients
Preparations
Equipment
Parts


Connections between chapters in REACH
Substances
Uses:
On their own, in preparations, in articles
Put to existence: Manuf., import
Applications for Authorization
Registration
Evaluation
Substances for Authorization (Use) Annex XIV.
Substances for Restriction (Uses): Annex XVII.
Classification list

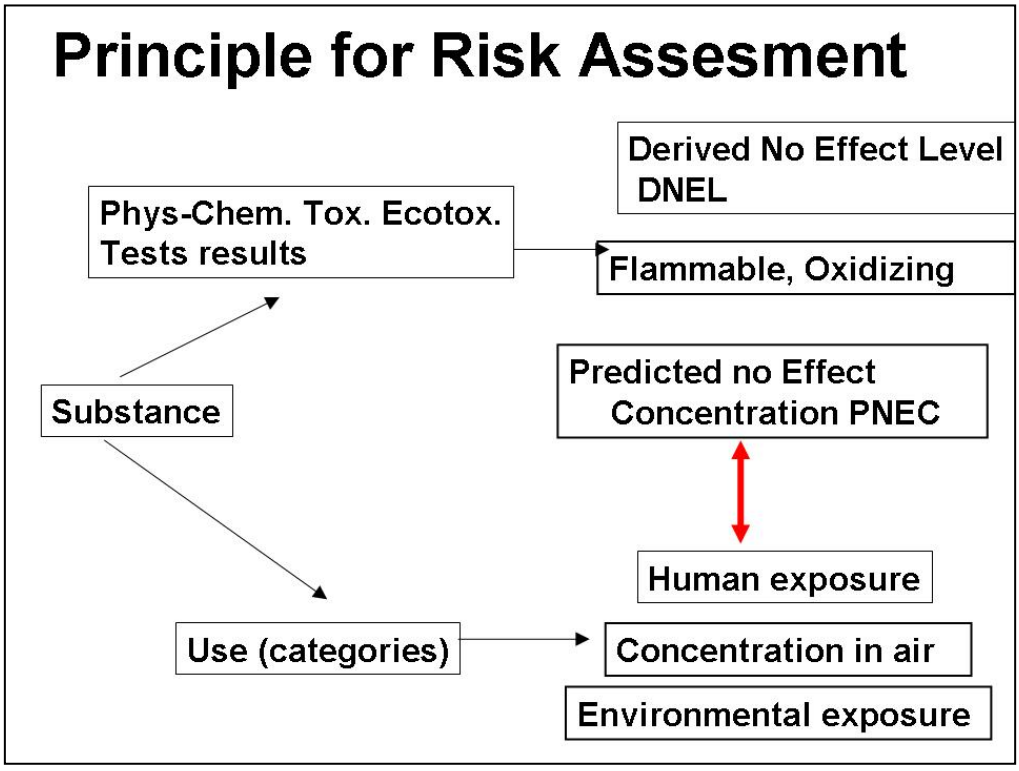
lebensministerium.at

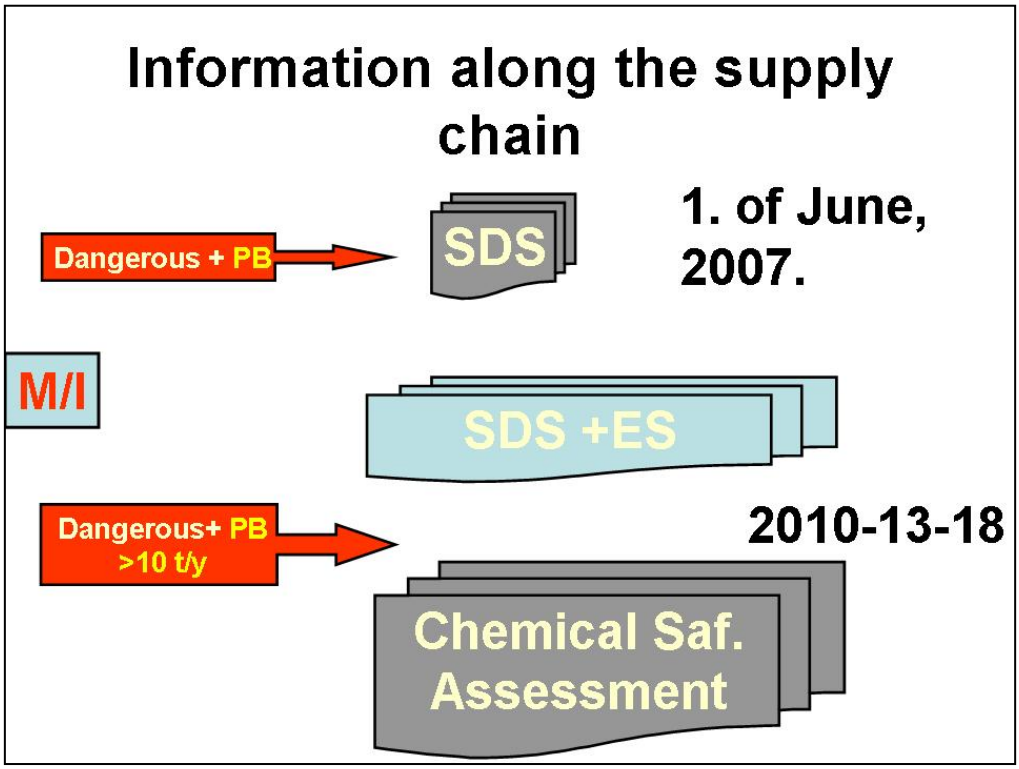
Possible Movements of Products



Chemical Leasing and REACH

- **Two main questions ➔ operation models of CL**
- **Who owns the chemicals?**
  - If supplier (as in all cases): supplier is responsible for any REACH compliance
    - **Clear statements are needed in the service contract**
  - If user (as in sales models):
    - **Supplier remains responsible for safe use**
    - **User shall follow instructions (in SDS)**
- **Where does the operation take place?**
  - If in the EU ⇨clear situation
  - If crossing EU border ⇨Import = manufacture


Principle for Risk Assesment
Derived No Effect Level
DNEL
Phys-Chem. Tox. Ecotox.
Tests results
Flammable, Oxidizing
Substance
Predicted no Effect
Concentration PNEC
Human exposure
Use (categories)
Concentration in air
Environmental exposure


Information along the supply chain
Dangerous + PB
SDS
1. of June, 2007.
M/I
SDS +ES
Dangerous+ PB
>10 t/y
2010-13-18
Chemical Saf. Assessment

Exposure scenario ES

- **Part of the chemical safety assessment CSA**
  - **For dangerous, PBT, vPvB chemicals and substances on the potential list**
  - **>10 t/year manufacture or import**
- **For each identified use of each customer**
- **If user does not meet the conditions in ES he**
  - **Shall prepare his own CSA**
  - **Report the case to the Agency**
  - **Shall stop using chemicals**

Preliminary example of exposure scenario to annex to the SDS NicePaint (a decorative paint)	
1. Short title of Exposure Scenario	General public domain (SU22) Coatings and Paints, Fillers, Putties, Thinners (PC9) Roller application or brushing of adhesive and other coating professional (PROC10)
2. Description of activities/process(es) covered in the Exposure Scenario	• Preparation of paint: stirring of the paint, possibly addition of water • Manual application of paint in-door with brush or roller • Cleaning of the equipment by rinsing water
Operational Conditions	
3. Duration and frequency of use for which the ES ensures control of risk	**Workers (professional)** 8 hrs/day, 5 workdays/week **Consumers** Product is not intended for consumer use **Environment** Up to 365 days per year
4.1 Physical form of substance or preparation	The product is a liquid. It does not form aerosols on application.
4.2 Concentration of substance in preparation or article	Concentrations of **classified** substances in supplied formulation are: E (solvent): 10% F (solvent): 2% G (solvent):5%
4.3 Amount used per time or per activity for which the RMMs, in combination with other operational conditions of use ensure control of risk	**Workers (professional)** 8 kg/day **Consumers** Product is not intended for consumer use **Environment** -
5. Other Operational Conditions determining exposure	**Worker (professional)** Temperature: room temperature, i.e. 20°C (relevant for inhalation). May however vary between 10 and 30°C **Consumer** Product is not intended for consumer use **Environment** Emission factor to waste water: 10% If waste water is not discharged via public sewer system, then the capacity of the receiving environment should be at least 12 m^3/d.

Risk Management Measures that, in combination with the Operational Conditions of use, ensure adequate control of risk related to the different target groups	
6.1.1 Occupational measures	No measures required
6.1.2 Consumer related measures	Product is not intended for consumer use
6.2.3 Environment related measures	Preferably discharge waste water into sewer. Do not discharge waste water into small waters
7. Waste related measures	Residual paints and empty cans should be disposed off via municipal collection system. No waste related measures required.
References related to exposure prediction and guidance on how the downstream user can evaluate whether he works within or outside the conditions set in this exposure scenario	
8. Prediction of exposure resulting from the conditions described above (entries 3-6)	**Worker exposure** ***Inhalation – calculated by StoffenManager[90]*** Concentration in air: 154 mg/m^3 of substance "E". The concentration of "F" and "G": 2.3 respectively 0.1 mg/m^3. Total RCR (E+F+G): 0.6. ***Dermal – calculated by BPD[91]*** 4.4 mg/kg bw/day of substance "F" (critical component). Total RCR (E+F+G):0.8 **Consumer exposure** - **Environmental exposure** Not relevant to inform upon
9. Guidance how the DU can evaluate whether he operates within the conditions set in the exposure scenario	**Worker** - **Consumer** - ***Environment:*** Preferably discharge cleaning water into sewer system. Do not discharge cleaning water directly into small waters.

Waste in REACH

- **Wastes are not substances, preparations and articles**
- **Waste are NOT exempted from REACH**
  - **Registration shall cover the whole life cycle of chemicals incl. waste phase**
    - **Get to know the amount of waste of substances**
    - **Shall evaluate waste phase in chemical safety report**
  - **SDS shall cover waste phase**
    - **Not „according to the local regulations"**
    - **PNEC Predicted no effect concentration**
    - **Environmental control measure**

lebensministerium.at

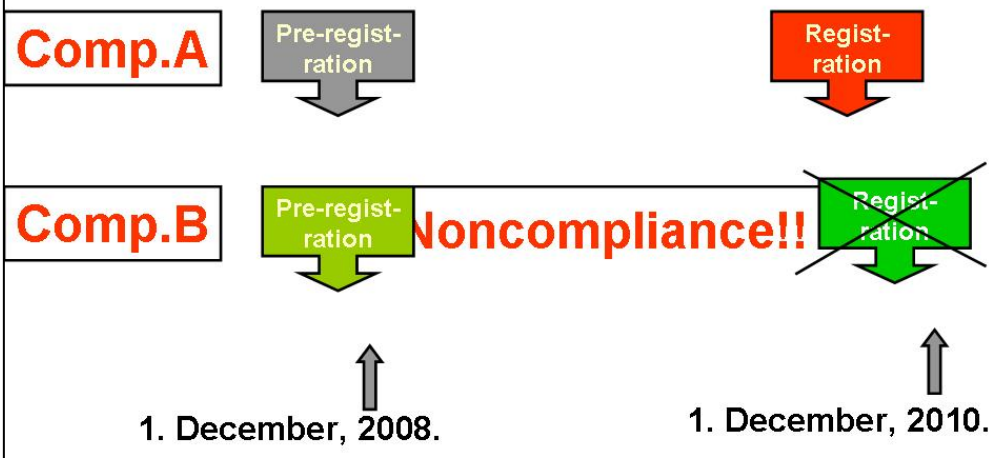
Recovery in REACH

- **Very important activity in CL**
- **Company which recovers a product shall register any substance in the product except**
  - **If the substance has been registered**
  - **And the recovered substance is the same as the substance that has been registered**

Exemption: if substance has been registered

Comp. A: manufactures toluene

Comp. B: recovers toluene

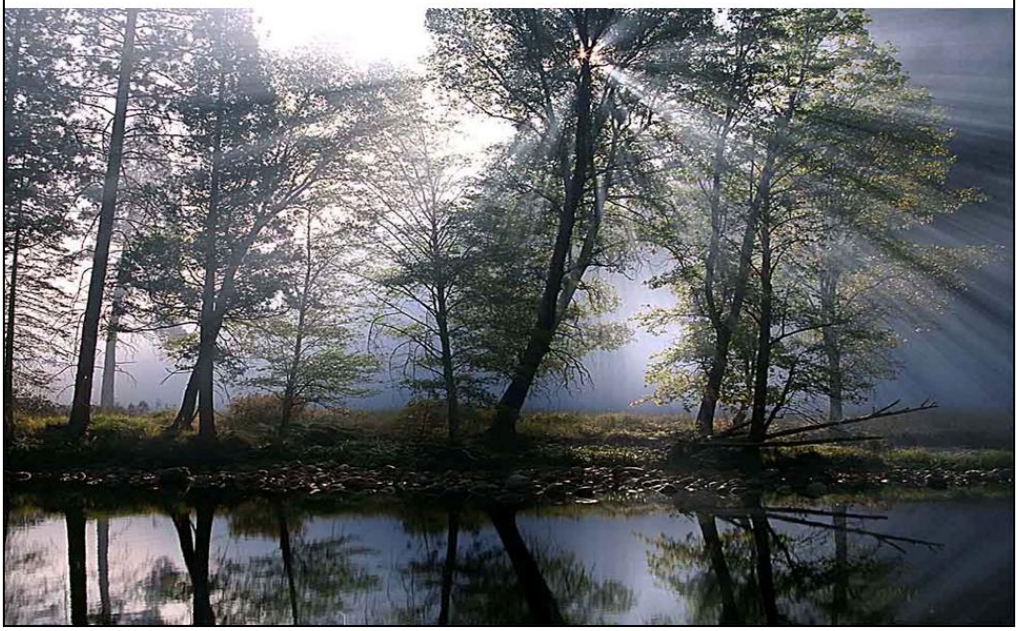


Involvement of CEECs in REACH

- Started in 2002, Chemleg-Chemfed program
- Covered Chemical Manufacturer Federations in CEECs
- Active lobbying for CEEC SMEs: OSOR

- Trainings, books, papers
- Webpage: www.reachcentrum.hu
- www.kortvelyessy.hu

Thank you for your kind attention!



Cleaner Production and Chemical Leasing, *Petra Schwager*

Cleaner Production and Chemical Leasing: a win-win approach

To address the challenges of the new global context and to enhance economy wide productivity in a sustainable manner, the United Nations Industrial Development Organization (UNIDO) focuses its activities on three thematic priorities: poverty reduction through productive activities, trade capacity building and environment and energy.

The organization's worldwide Cleaner Production Programme is an important tool to bridge these three priorities and plays a fundamental role in promoting sustainable industrial development and sound chemicals management in developing countries and countries with economies in transition.

A critical element of Cleaner Production is that it results in a "win-win" scenario for industry and the environment as it implies striving for continuous resource efficiency to create economic savings for the company. In this way it enhances the competitiveness of industry, promoting sustained social advancement in a way which is compatible with environmental protection. In 2002 UNIDO launched the holistic CP approach that emphasizes the company and sectoral level and takes into account the whole product cycle.

The concept of Chemical Leasing is based on the preventive idea of Cleaner Production. It is a shift from the traditional business concept that focuses on a constant increase in sales volume towards a more service and value-added approach. Chemical Leasing business models provide concrete solutions to the effective management of chemicals and to negative releases to the environment.

These approaches have been implemented in Egypt, Mexico and the Russian Federation in close cooperation with the respective National Cleaner Production Centres. The key elements of successful Chemical Leasing implementation involve process optimization as a consequence of more intensive cooperation of supplier and users of chemicals, enhanced environmentally sound technology development and transfer, greening of the supply chain and capacity building, and clearly result in sound chemicals management at plant level.

Combining Cleaner Production and Chemical Leasing has proven to be a win-win approach for the economy and the environment with synergetic potential for energy savings, continuous process optimization, future-oriented solutions and long-lasting cooperations.

Presentation by:

Petra SCHWAGER

Industrial Development Officer, Cleaner Production Programme

UNIDO

Cleaner Production and Chemical Leasing – a win-win approach

Petra Schwager
March 6, 2008, Balatonfüred

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

www.unido.org

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Elements of the presentation

- UNIDO and its global Cleaner Production Programme (CPC)
- Chemical Leasing and synergies with CP
- Experiences in applying Chemical Leasing and CP at plant level
- Lessons learnt

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO Background

UNIDO was set up in 1966 and became a specialized agency of the United Nations in 1985.

As part of the United Nations common system, UNIDO has responsibility for promoting sustainable industrial development throughout the developing world, in cooperation with its 171 Member States.

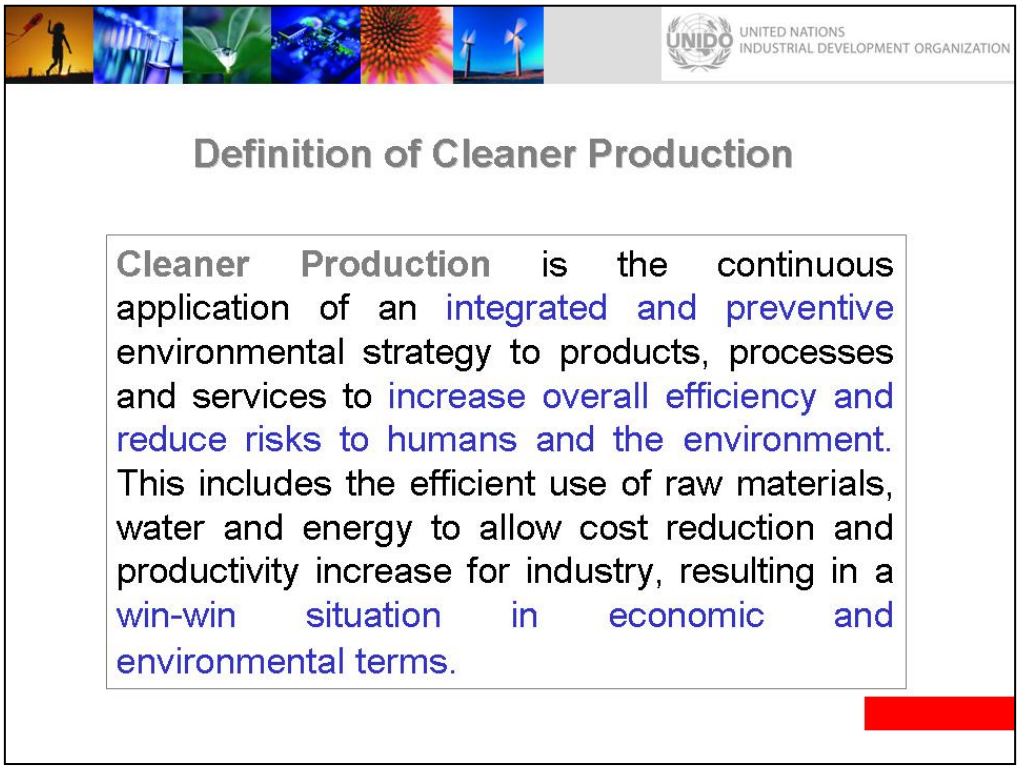
Its headquarters are in Vienna, and it is represented in 35 developing countries.

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO Vision

To improve the living conditions of people and promote global prosperity through offering tailor-made solutions for the **sustainable industrial development** of developing countries and countries with economies in transition.


UNIDO
UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION
Cleaner and Sustainable Industrial Development
Productivity Enhancement for Social Advance
Competitive Economy
Productive Employment
Sound Environment


UNIDO
UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION
Definition of Cleaner Production
Cleaner Production is the continuous application of an integrated and preventive environmental strategy to products, processes and services to increase overall efficiency and reduce risks to humans and the environment. This includes the efficient use of raw materials, water and energy to allow cost reduction and productivity increase for industry, resulting in a win-win situation in economic and environmental terms.

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

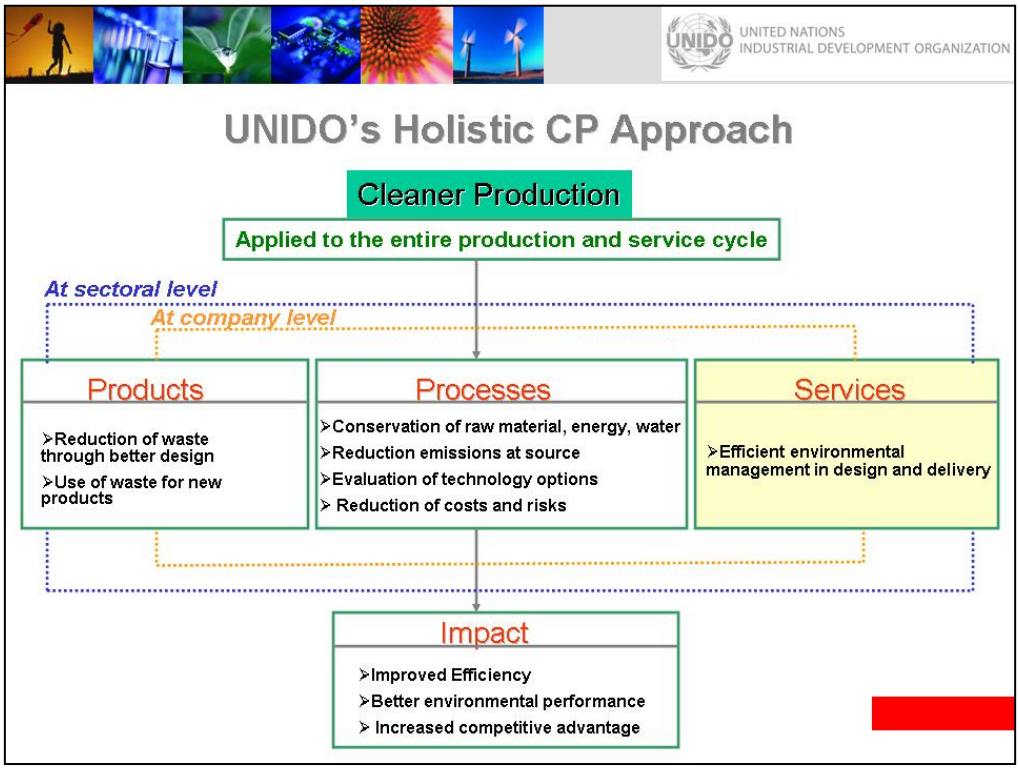
UNIDO's Worldwide CP Programme

Since 1994: In close cooperation with UNEP, establishment and management of National Cleaner Production Centres (NCPCs) and Programmes (NCPPs) in 38 countries.

The aim is to enhance the competitiveness and productivity of industry, especially SMEs in a way compatible with environmental protection.

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION


UNIDO
UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION
National Cleaner Production Centres and Programmes
Set up with the support of existing local institutions to deliver:
• Awareness-raising on the benefits of CP
• Training of experts on CP and related issues
• Technical assistance to companies
• Assistance in development of CP and EST (Environmentally Sound Technology) investment projects
• Policy advice to national and local governments


UNIDO
UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO's Holistic CP Approach
Cleaner Production
Applied to the entire production and service cycle
At sectoral level
At company level
Products
➢Reduction of waste through better design
➢Use of waste for new products
Processes
➢Conservation of raw material, energy, water
➢Reduction emissions at source
➢Evaluation of technology options
➢ Reduction of costs and risks
Services
➢Efficient environmental management in design and delivery
Impact
➢Improved Efficiency
➢Better environmental performance
➢ Increased competitive advantage

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

A Service-Oriented Business Model

- ✓ Closing-the-loops in selected industrial sectors
- ✓ Change in the relation between manufacturer and user, where manufacturers shift from selling products to supplying services
- ✓ Win-win situation for the economy and the environment

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Cleaner Production and Chemical Leasing

Cleaner Production ⇒ efficient use of resources (water, energy, raw materials) to allow cost reduction and productivity increase

Chemical Leasing combined with Cleaner Production further increases environmental and economic benefits and continuous improvement through the active involvement of additional stakeholders of the production/ supply chain

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

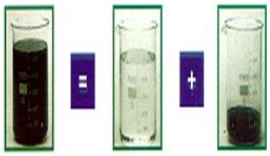
Benefits of combining CP and ChL

- Energy savings and continuous process optimisation (CP → CP+) due to additional know-how of chemical suppliers
- Easier access to additional CP technologies and investments due to co-operations
- Future-oriented solutions due to improved research and development and long-lasting co-operations

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

ChL Case Study
Cleaning with Hydrocarbon Solvent

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



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

ChL Case Study
Before Chemical Leasing

Dr 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)
- 70-80% of solvent waste is considered as raw material
- More consumption leads to more VOCs in the workplace
- High disposal costs for solvent waste

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

ChL Case Study
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
between GM Egypt, Dr Badawi and the ENCPC

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

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

ChL Case Study
Economic Benefits

- ✓ Cost reduction by 15% (saving of raw material with recycling)
- ✓ Reduction of solvent consumption from 1.5 L/vehicle to 1 L/ vehicle which leads to significant reduction in VOCs
- ✓ Shared liability and benefits
- ✓ Long-term business relationship based on long-term contract

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

ChL Case Study
Environmental Benefits

- ✓ Recycling of solvent waste instead of disposal (Closing the Loop)
- ✓ Better hazardous waste management in accordance with environmental regulations and international environmental corporate policy

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

ChL Case Study
Organizational and Management 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 operation staff

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

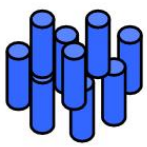
Case Study
Synergies of ChL and CP

Starting point: Change chemical business to Chemical Leasing

Supplier sells more than 100.000 small plastic containers with organic per-oxides

User produces polymers and needs per-oxides as starters of the reaction

Non optimised process due to non optimised collaboration



Hazardous waste: 100.000 plastic containers

Waste water form cleaning of containers

huge costs for handling, cleaning, disposal

Non optimised production process due to delivery of chemicals

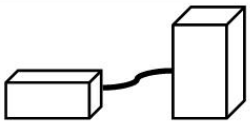
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Case Study
Synergies of ChL and CP

Basic idea: supplier is paid on the basis of produced polymers and is required to provide proper per-oxides → process optimisation

No containers but

Cooled storage tanks with per-oxide on site of user



Automatic delivery of chemicals

Common developed risk management

→ Cleaner production – approach realised

- (nearly) no waste
- no waste water
- optimised and stable production process

} success

But: partners could not agree on a changed unit of payments

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Demonstration project in Egypt

Industry sectors	Chemicals
Manufacture of electronic equipment	Powder coating
Car manufacture	Solvents
Steel industry	Galvanizing agents
Manufacture of caps and cans	Solvents
Manufacture of refrigerators and washing machines	Phosphatating agent
Textile industry	Textile chemicals
Brewery	Glues for labelling

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Demonstration projects in Mexico and Russia

Industry sector	Chemicals
Mexico	
Sugar mill	Lubricants, biocides, process chemicals
Electro plating industry	brightener
Petrochemical industry	catalysts
Food industry	Process chemicals
Russia	
Glue production	Waste water treatment chemicals
Disposal site	Waste water treatment chemicals
Surface treatment	Solvents

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Lessons learnt

- Concept sells easily but implementation takes time
- ChL is a new approach for a win-win situation for economy and environment, key issue is the definition of the unit of payment
- An open multi-stakeholders working group helps to exchange experiences and solve problems

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Lessons learnt

- Intensive involvement of NCPCs is necessary to ensure proper implementation and monitoring
- Trust and willingness for cooperation of the partners is essential
- Mediation and moderation of NCPCs for resolving conflicts is often required
- Mutual benefits between ChL and CP; ChL enhances the impact of CP

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Thank you for your attention

Petra Schwager

UNIDO- Cleaner Production Unit

www.unido.org/cp

Email: p.schwager@unido.org

Getting Fit For REACH Applying Chemical Leasing

Experiences of Dow/SAFECHEM

Dr. Hans-Norbert Adams, Dr. Markus Frank
Balatonfüred, March 6, 2008

SAFECHEM be responsible

REACH

The REACH regulation should ensure a high level of protection of human health and the environment as well as the free movement of substances, on their own, in preparations and in articles, while enhancing competitiveness and innovation.

A high level of human health and environmental protection should be ensured in the approximation of legislation on substances, with the goal of achieving sustainable development.

SAFECHEM be responsible

REACH

- Is a new single regulatory system for chemicals management in the European Union (EU), in force since 1. June, 2007
- Objective is to ensure the safe use of chemicals providing a high level of protection of human health & the environment whilst improving innovation and enhancing the competitiveness of the European industry.
- Puts responsibility on all members of the value chain to
  - enhance the protection of human health and the environment,
  - increase the knowledge base on
    - Hazards
    - Uses and
    - Risks of chemical substances

Intense communication along supply chain

SAFECHEM be responsible

REACH and Dow's 2015 goals

- The REACH objectives are fully aligned to Dow's commitment to sustainability and Dow's 2015 goals.

SAFECHEM be responsible

Dow's 2015 Sustainability Goals

- Dow's commitment to Sustainable Chemistry:

  *"We will **innovate** to improve confidence that our products are managed safely throughout their lifecycle and develop products that will make a lasting, positive improvement on the world."*

- 2015 Product Safety Commitment:

  "By 2015, Dow will make publicly accessible safety assessments for its products globally, and in doing so will address relevant gaps in hazard and exposure information. It will continue to take appropriate action based on the assessments to protect human health and the environment throughout the life cycle."

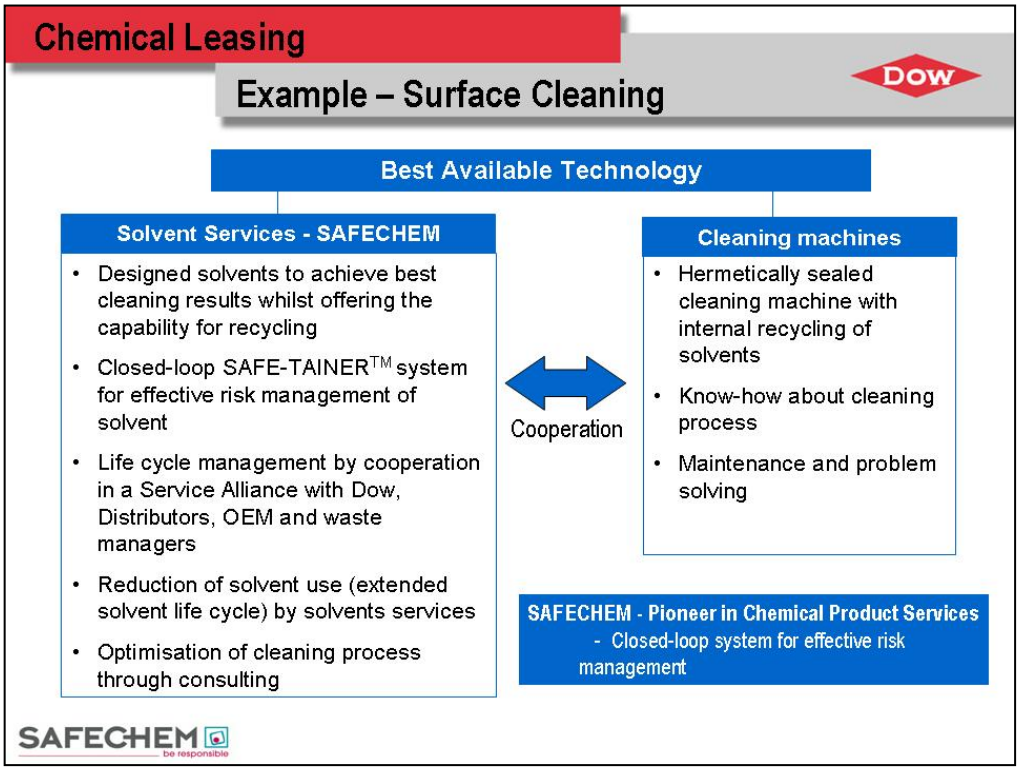
SAFECHEM be responsible

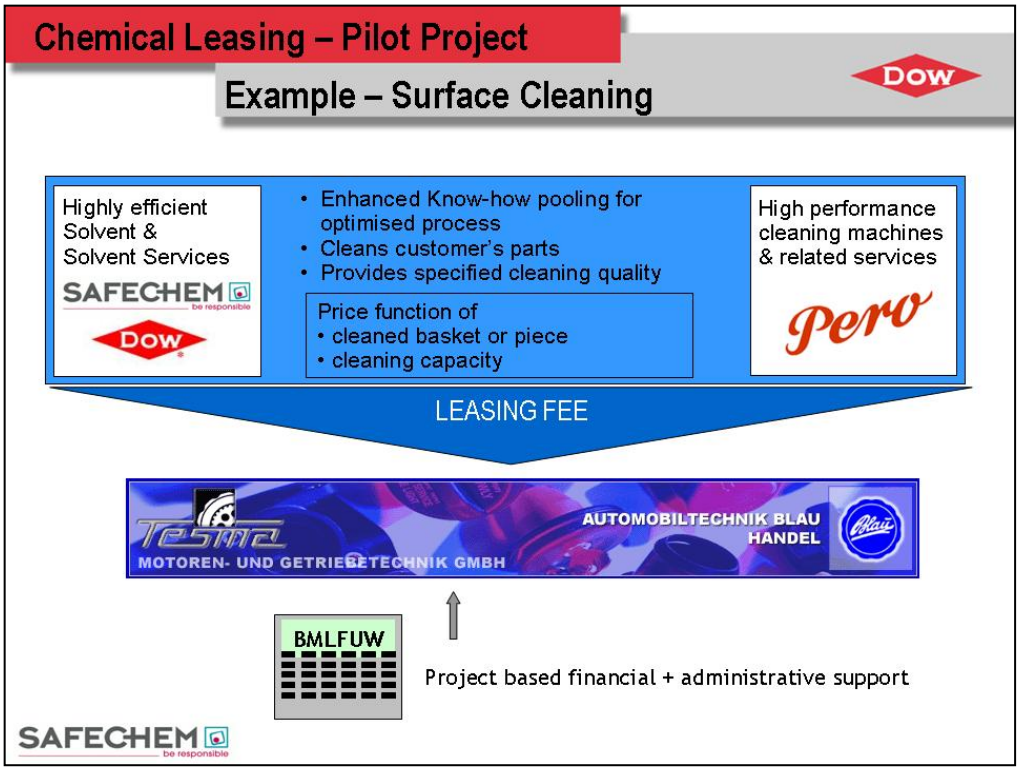
Sustainability – Surface Cleaning

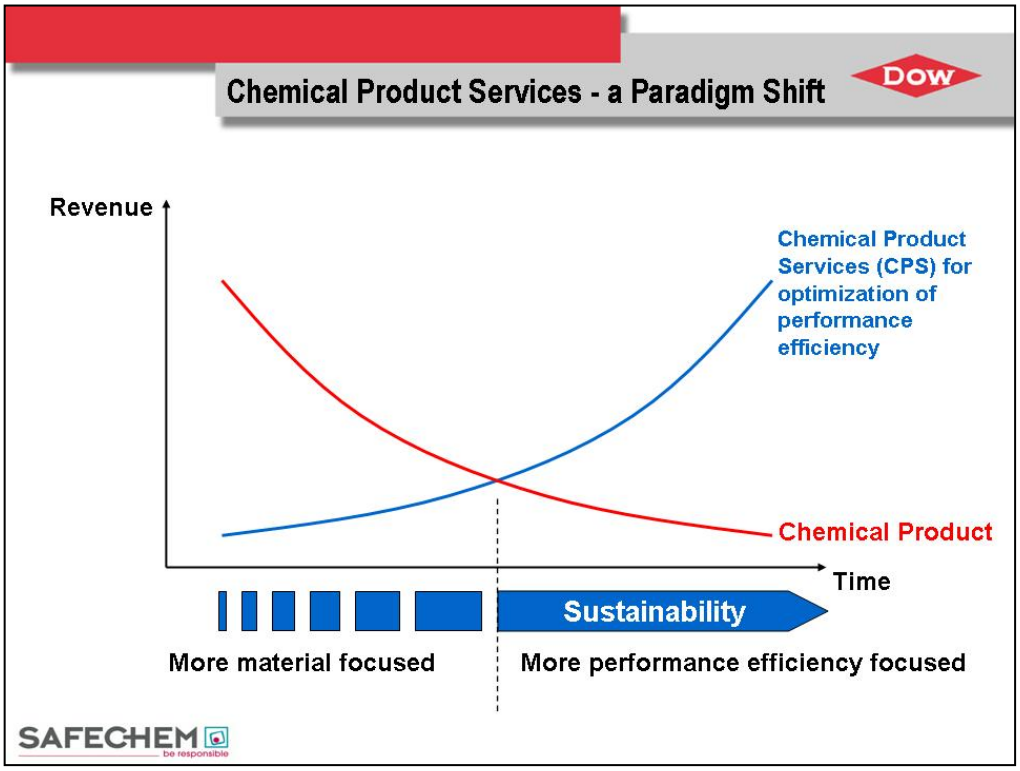
Achieving the goal of sustainability means for surface cleaning

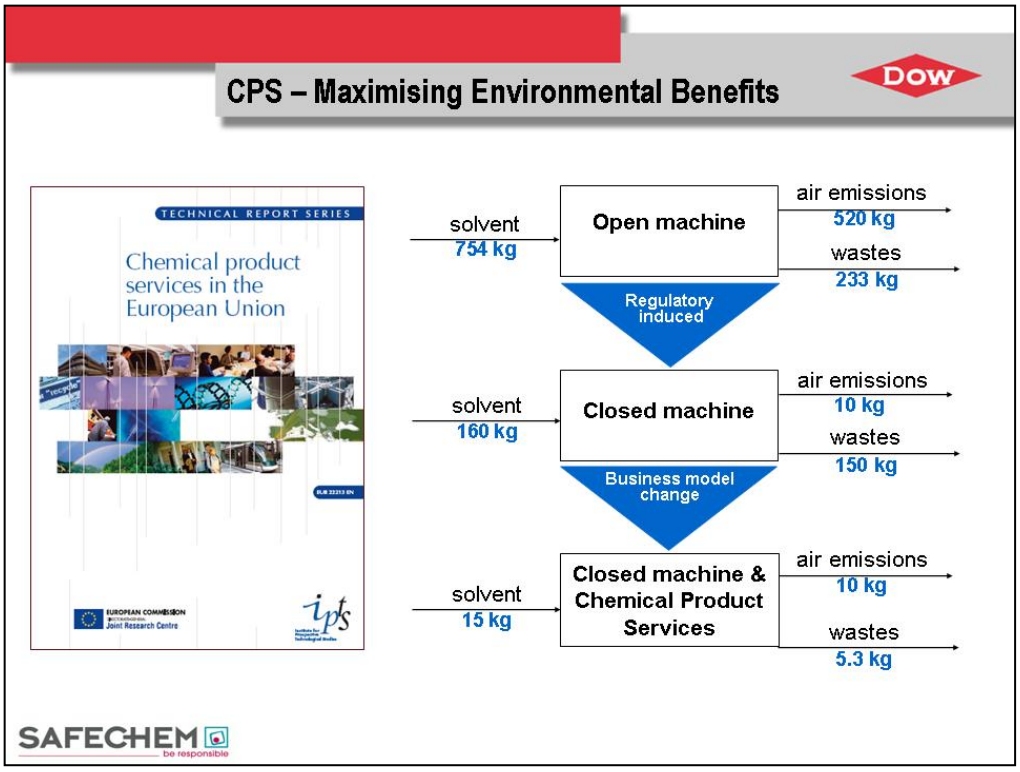
- Use the best available technology and the most effective chemicals for a certain application in terms of
  - energy consumption
  - raw material consumption
  - material life cycle prolongation
  - material recycling
  - toxic emissions into air, water and soil
  - potential misuse
- Control the entire life cycle of a product
- Manage the risk of a product
- Develop a win-win situation with our customers to create economic value

SAFECHEM be responsible


Chemical Leasing
Example – Surface Cleaning
DOW
Best Available Technology
Solvent Services - SAFECHEM
• Designed solvents to achieve best cleaning results whilst offering the capability for recycling
• Closed-loop SAFE-TAINER™ system for effective risk management of solvent
• Life cycle management by cooperation in a Service Alliance with Dow, Distributors, OEM and waste managers
• Reduction of solvent use (extended solvent life cycle) by solvents services
• Optimisation of cleaning process through consulting
Cooperation
Cleaning machines
• Hermetically sealed cleaning machine with internal recycling of solvents
• Know-how about cleaning process
• Maintenance and problem solving
SAFECHEM - Pioneer in Chemical Product Services
- Closed-loop system for effective risk management
SAFECHEM


Chemical Leasing – Pilot Project
Example – Surface Cleaning
DOW
Highly efficient Solvent & Solvent Services
SAFECHEM
DOW
• Enhanced Know-how pooling for optimised process
• Cleans customer's parts
• Provides specified cleaning quality
Price function of
• cleaned basket or piece
• cleaning capacity
High performance cleaning machines & related services
Pero
LEASING FEE
Tesma
MOTOREN- UND GETRIEBETECHNIK GMBH
AUTOMOBILTECHNIK BLAU HANDEL
BMLFUW
Project based financial + administrative support
SAFECHEM


Chemical Product Services - a Paradigm Shift
DOW
Revenue
Chemical Product Services (CPS) for optimization of performance efficiency
Chemical Product
Time
Sustainability
More material focused
More performance efficiency focused
SAFECHEM
be responsible


CPS – Maximising Environmental Benefits
DOW
TECHNICAL REPORT SERIES
Chemical product services in the European Union
EUROPEAN COMMISSION
Joint Research Centre
ipts
solvent
754 kg
Open machine
air emissions
520 kg
wastes
233 kg
Regulatory induced
solvent
160 kg
Closed machine
air emissions
10 kg
wastes
150 kg
Business model change
solvent
15 kg
Closed machine & Chemical Product Services
air emissions
10 kg
wastes
5.3 kg
SAFECHEM
be responsible

Austrian Pilot – Results & Experiences

DOW

Results are encouraging …

- **Economic feasibility**:
  Shift in value generation is possible
- **Environmental benefit**:
  Solvent life extension by factor 4 to 8
- **Knowledge pooling**:
  Product efficiency optimization through cooperation with OEM
- **Customer benefit:**
  Profits from the best cleaning solution for his needs
- **Adequate Risk Control:**
  Hermetically sealed machines and close loop solvent handling

… when boundary conditions are met

SAFECHEM be responsible

Adequate Risk Management

DOW

CPS/Chemical Leasing business models achieve overall risk reduction in surface cleaning

- Enable minimize chemical consumption, minimized exposure and emissions
- Enable simple, direct and transparent information flow to assure safe use
- enhance product stewardship responsibility over chemical's product lifecycle.

SAFECHEM be responsible

Advantages for REACH compliance

DOW

REACH Requirement	Responsibility	Advantage Chem. Leasing
Hazard knowledge	To be established by Producer.	• **Simplified building of ES, CSA and CSR.** Since Hazard knowledge & use and exposure knowledge combined in one hand (licensor)
Use and exposure data	Best known by Downstream User (DU). DU needs to communicate details if data needed for ES and CSA unknown to Producer.	
Exposure Scenario (ES) Chem. Safety Assessment (CSA) Chem. Safety Report (CSR)	• To be established by producer. • To be checked by DU if ES covers use. • Own CSA/CSR by DU if producer not covering his use	• **DU is assured that his use is properly covered** • **Minimum REACH knowledge and REACH admin. efforts required from DU**
communication of conditions for Safe use down the supply chain	Producer. He has to communicate in e-SDS. Changes in DU process require DU to assess if ES, CSR communicated in e-SDS still valid.	

Chemical Leasing: Excellent fit with REACH requirements

SAFECHEM be responsible

DU = Downstream User / ES = Exposure Scenario / CSA = Chemical Safety Assessment / CSR = Chemical Safety Report
e-SDS = extended Safety Datasheet

Extended sustainability focus

DOW

High Sustainability level

Chemical Leasing (where applicable)
❖ **Allows easy compliance with REACH**
- Excellent knowledge about all risk determining parameters
❖**extended sustainability focus compared to REACH**
- Adds additional sustainability criteria not in focus of REACH
(like resource conservation, energy reduction, etc)

high level of protection of human health & the environment through adequate control of risks

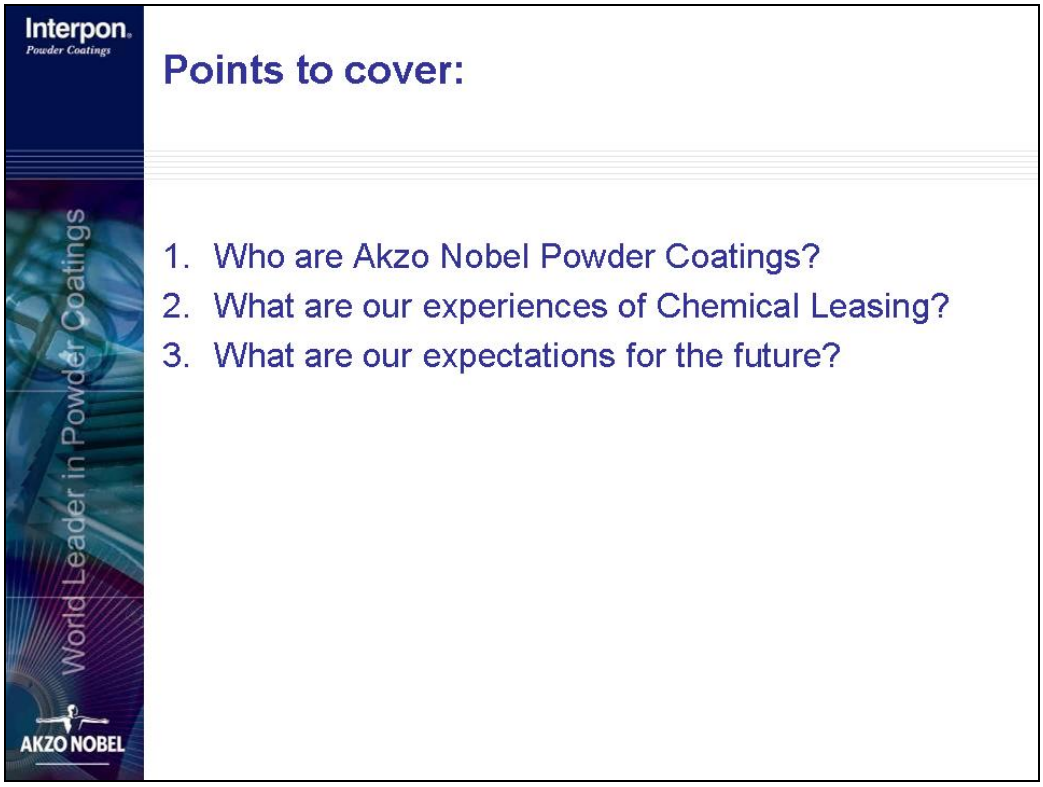
REACH
Sets the regulatory Chemical Management frame
-Extended Hazards knowledge
-specific use based Risk Assessment
- Communication of Risk management measures
- Regulates use of specific substances of very high concern

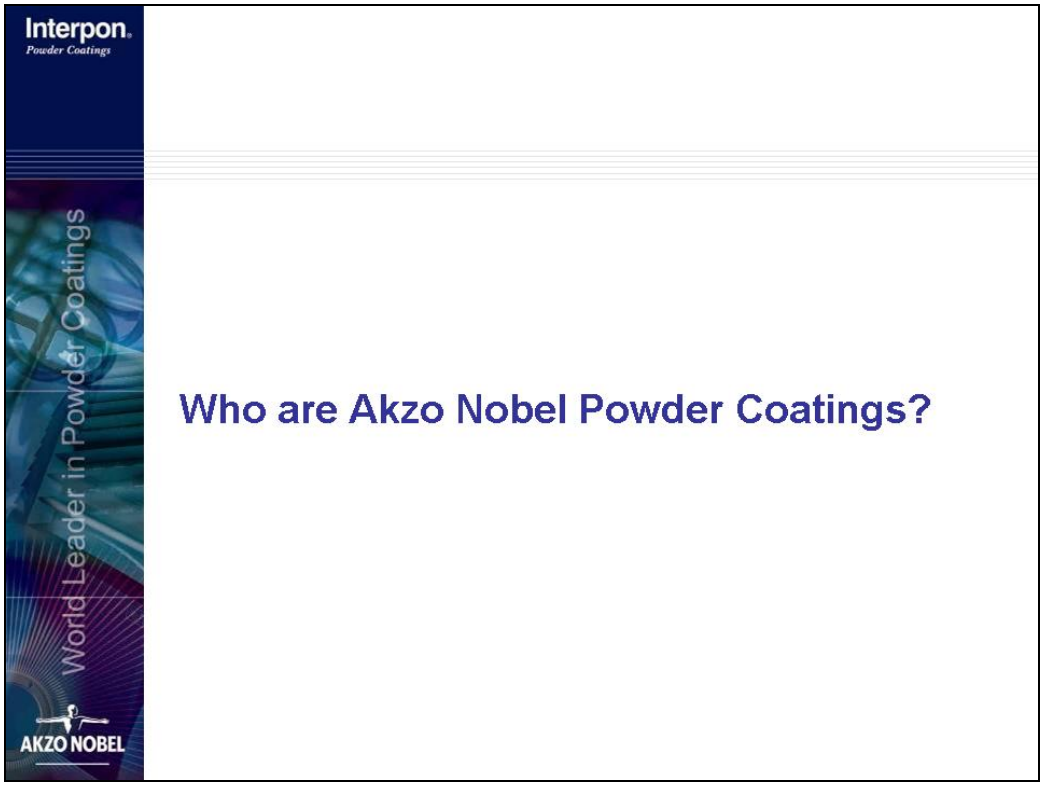
SAFECHEM be responsible


DOW
DOW
Thank you for your attention !
SAFECHEM
be responsible


Interpon
Powder Coatings
World Leader in Powder Coatings
AKZO NOBEL
UNIDO Conference
"Getting fit for Reach"
Balatonfüred, Hungary
6 – 7th March 2008


Interpon
Powder Coatings
World Leader in Powder Coatings
AKZO NOBEL
Chemical Leasing:
Experiences and expectations
Mark Reekie
Business Service Manager – Europe
Akzo Nobel Powder Coatings


Interpon
Powder Coatings
World Leader in Powder Coatings
AKZO NOBEL
Points to cover:
1. Who are Akzo Nobel Powder Coatings?
2. What are our experiences of Chemical Leasing?
3. What are our expectations for the future?


Interpon
Powder Coatings
World Leader in Powder Coatings
AKZO NOBEL
Who are Akzo Nobel Powder Coatings?

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

million €	2006	2005	⇧%
Revenues	13,737	13,000	6
Operating income before nonrecurring items	1,462	1,486	
Net income	1,153	961	20
Number of employees (year end)	61,880	61,340	

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

AKZO NOBEL PHARMACEUTICAL

PHARMA

3 Business Units:

- ORGANON
- INTERVET
- NOBILON

AKZO NOBEL CHEMICALS

CHEMICALS

7 Business Units

- PULP & PAPER CHEMICALS
- FUNCTIONAL CHEMICALS
- SURFACE CHEMISTRY
- POLYMER CHEMICALS
- BASE CHEMICALS
- SALT
- ENERGY

AKZO NOBEL COATINGS

COATINGS

5 Business Units

- POWDER COATINGS
- DECORATIVE COATINGS
- INDUSTRIAL FINISHES
- MARINE & PROTECTIVE COATINGS
- CAR REFINISHES

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

DECORATIVE COATINGS

- Major force in home improvement
- Products used by professionals and do- it- yourself enthusiasts
- Produces international brands (e.g. Sikkens®,Sadolin®, Levis ®), as regional favourites (e.g. Crown ®, Flexa ®, Trimetal ®, Nordsjo ®, Herbol ®)


Interpon Powder Coatings

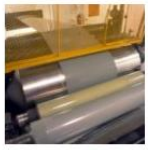
World Leader in Powder Coatings

AKZO NOBEL

INDUSTRIAL FINISHES

- Leaders in wood and coil coatings; important position in speciality plastic coatings and adhesives
- Wood coatings used on flooring and furniture, oil coatings on domestic appliances and metal building products
- Speciality plastics on e.g. consumer electronics and cosmetic packaging
- Adhesives and resin systems used by the woodworking industry for furniture, panels, parquet flooring and laminated beams



Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

MARINE & PROTECTIVE COATINGS

- Market leaders in paints, antifouling and foul- release coatings for ships and yachts with the international® brand

International.

- Protective Coatings for high value infrastructure, oil and chemical processing industry, and for airlines and aircraft manufacturers
- Makes products that offer reduced environmental impact



Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

CAR REFINISHES

- One of the world's leading suppliers of paint, services and software for the car repair, commercial vehicles and transportation markets
- Innovators in product and color technology and state – of- the – art customer service
- Manufacturers of the global brands Sikkens® and Lesonal®
- Top player in coating solutions for interior and exterior automotive plastic components



Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

POWDER COATINGS

- Largest global manufacturer of Powder Coatings and world leader in Powder Coatings
- Two global brands, Interpon® for the architectural, automotive, domestic appliance, industrial, IT, furniture and general trade coater segments, and Resicoat® for functional markets
- Producer of non- stick coatings for use on cookware and industrial equipment

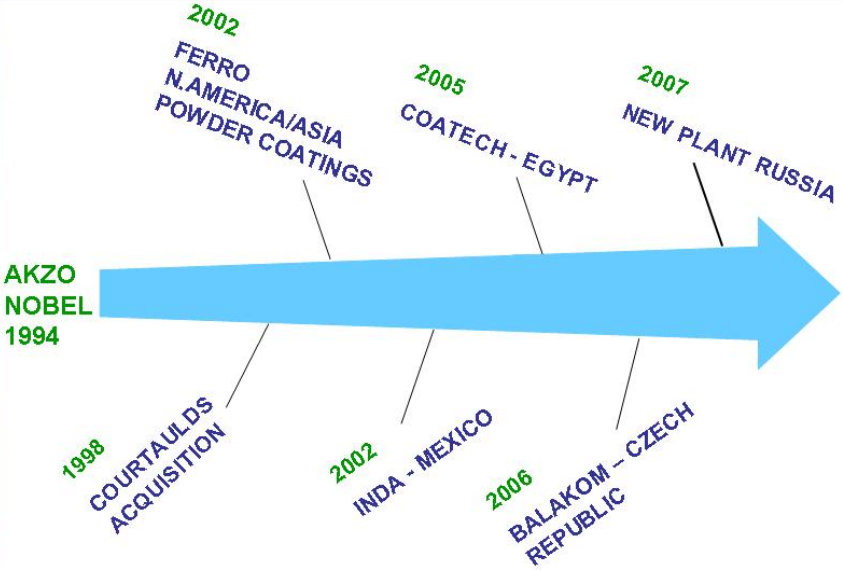


Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

SIGNIFICANT EVENTS FOR POWDER IN RECENT COMPANY HISTORY



Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

ARCHITECTURAL

- Colours and finishes to suit every setting

- Durability to suit every climate
- Anti – corrosion primers
- Textured and smooth, gloss and matt

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

AUTOMOTIVE

- Electrocoat and liquid coatings to support some market segments
- Manufacturing sites throughout the world
- Technical centers of expertise and certified testing laboratories
- Local experienced sales and technical service support
- Organization dedicated to automotive industry

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

APPLIANCE

- A full range of coatings exclusive to this sector, liquid and powder.
- Coatings for plastics
- Creating novel colors and finishes
- A stock range of contemporary colors, and special requirements matched at our regional centers of expertise



Interpon Powder Coatings

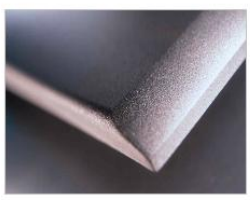
World Leader in Powder Coatings

AKZO NOBEL

FURNITURE

- Includes products for both engineered wood (E.g. MDF) and metal
- Advanced products available for special requirements such as anti – graffiti and scratch resistance





Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

FUNCTIONAL

- Resicoat R4 Series for valves and fittings
  - Approvals for drinking water in many major markets (Europe, USA, China……)
  - Members of GSK – European quality association for heavy duty corrosion

- Resicoat R series for pipeline coatings
- Approx. 30 years track record
- Approvals from major oil and gas companies

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

What are our Experiences of Chemical Leasing?

- ABB Arab - Egypt

Other related experiences

- Interpon Extra
- Partnership Programmes

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Akzo Nobel – ABB Arab - ENCPC

What was the situation before?

- Akzo Nobel was looking for not only customer satisfaction but also for customer "delight"
- Akzo Nobel was looking for a way to be ahead in the market
- Competition is very tough
- More services = More cost = prices increase!!!!
- Competitors can do the same

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Akzo Nobel – ABB Arab - ENCPC

ABB ARAB

- Has good line BUT!!
  - High consumption
  - High losses (12%)
  - High spare parts consumption
  - High cost for painting process per painted m^2

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Akzo Nobel – ABB Arab - ENCPC

Akzo Nobel Offer

- Re design the formulation
  - improve the transfer efficiency
  - More powder on work piece
    = less losses
- Customise the particle size of the powder
  = less losses
- Recycle the powder lost by:
  - Spraying the internal parts
  - Reprocess again during the powder manufacturing
- Establishing Chemical Leasing project in collaboration with ABB ARAB and the Egypt National Cleaner Production Center

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Akzo Nobel – ABB Arab - ENCPC

ABB Arab offer

- Re-adjust and fix the operating parameters for its powder coating line
- Nominate skilled operation staff to be supervised by Akzo Nobel
- Proper collection of fine powder waste
- Proper reporting system
- 100% of its electrostatic powder supply from Akzo Nobel

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Akzo Nobel – ABB Arab - ENCPC

Situation Now:

- Chemical Leasing Contract for one year is in place between Akzo Nobel, ABB ARAB and the ENCPC
- Basis for payment per m^2 of article coated.
- The contract includes all the technical, economical, management and environmental related issues.
- Monitoring phase in collaboration with the UNIDO- ENCPC (process losses below 5%)
- Partnership with UNIDO for promotion of Chemical Leasing and Cleaner Production

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Akzo Nobel – ABB Arab - ENCPC

- Applied cost reduction for painting process for ABB (per m^2)
- The chance for A/N to increase the relative price (per kg) of powder
- Waste ➡ Reduced ➡ Re-used ➡ Reprocessed
- SHARING THE PROFIT reducing the IMPACT

Win Win Win situation

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Benefits

Economical
- ✓ Forecast savings is around US$ 60 000 per year
- ✓ Cost reduction per painted m^2
- ✓ Cost reduction in equipment maintenance

Environmental
- ✓ Closing the loop of solid waste
- ✓ Improvement of workplace environment and workers safety
- ✓ Reduction in the overall paint usage

Organisational and Quality
- ✓ Building skills of operation staff
- ✓ Better quality of final product
- ✓ Better intra-organization coordination (between different departments)
- ✓ Better competitiveness

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

What are our other Experiences of "Chemical Leasing"?

- Interpon Extra
  - Reduction in powder consumption via cost/m^2 agreements
    - Electrolux – Hungary – 1997
    - Caradon – Benelux - 1997
- Partnership Programmes
  - Reduction in overall cost of painting via plant optimisation
  - Utilities and material savings
    - Bosch – UK – 2006/7
    - Esmena – Spain – 2006/7
    - Eldon – Spain – 2006/7

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Conclusion

- Chemical Leasing is a win-win-win situation between the supplier and user of chemicals and the environment.
- The results of the current projects are the first and valuable step for further development of the concept.
- Support from international chemicals suppliers is crucial
- Further ChL pilot projects worldwide to disseminate the results are required.
- An effective tool for more competition and innovation.

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

What are our expectations for the future?

- Why is UN Cleaner Production Programme important to us at Akzo Nobel?

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

CORPORATE SOCIAL RESPONSIBILTY

Dow Jones Sustainability Indexes

"Conducting business in ways that produce social, environmental and economic benefits for the communities in which we operate in order to maintain our license to operate"

FTSE4Good

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Management of CSR / QHSE

in Powder Coatings

Quality,
Health,
Safety &
Environment

Product Stewardship programmes

- Reduction of hazardous materials
- Working with customers to improve HSE aspects

Adherence to Business Principles Specifications

- Human rights, Fair competition, Business integrity, Community activities and Compliance

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

What are our expectations for the future?

- Experience of potential “pit-falls”.
- Develop concept further within UNIDO model in new markets.

Interpon Powder Coatings

World Leader in Powder Coatings

AKZO NOBEL

Points to covered:

1. Who are Akzo Nobel Powder Coatings?
2. What are our experiences of Chemical Leasing?
3. What are our expectations for the future?

Thank You

APPENDIX IV – PICTURES

Get together on Wednesday evening

City tour in Veszprém.

APPENDIX V – ATTENDANCE LIST

Abo Sena Ali (Egypt)
Egypt National Cleaner Production Center

Adams Hans-Norbert (Switzerland)
Dow Europe GmbH

Andras Bezegh (Hungary)
Corvinus University of Budapest

Athanassoff Ibolya (Hungary)
Veszprém County Council / Veszprém Megyei Önkormányzat

Bial Margit (Hungary)
Viriditas 3000

Bihari Gyula (Hungary)
Borsodchem Znt

Cadavid Carlos (Colombia)
Colombian Cleaner Production and Environmental Technologies Centre

Csernus Eva (Hungary)
ÁNTSZ Budapest IV.-XV. kerületi Intézet

Csima György (Hungary)
Veszprém County Council / Veszprém Megyei Önkormányzat

Csordás András (Hungary)
Materiál Vegyipari Szövetkezet

Czaun János (Hungary)
City of Veszprém

Deloff-Bialek Anna (Poland)
Bureau for Chemical Substances and Preparations

Dunjić Branko (Serbia)
Center for Cleaner production of Servia

Farag Ference (Hungary)
Grundfos Hungary Manufacturing Ltd.

Fehri Yasser (Morocco)
Morocco, Maghrebail

Ferjanzsik Zsombor (Hungary)
DENKSTATT Hungary Környezettechnológiai és -management Tanácsadó Kft

Fesu Gabriella (Hungary)
DENSO Manufacturing Hungary Ltd

Fótyi Mária (Slovakia)
Duslo, a.s. Šaľa

Fulop Istvan (Hungary)

Akzo Nobel Powder Coatings Ltd

Frank Markus (Germany)
SAFECHEM Europe GmbH

Gálffy István (Austria)
Austrian Consulate / Osztrák Konzulátus

Hahn Maria (Austria)
Austrian Consulate / Osztrák Konzulátus

Háhn Péter (Hungary)
Middle-Transdanubian Regional Development Agency

Hanzaz Hanan (Morocco)
Moroccan Cleaner Production Centre (CMPP) / UNIDO

Herzcog Edit (Hungary)
Member of the European Parliament

Jadczyk Patrycja (Poland)
Bureau for Chemical Substances and Preparations

Jakl Thomas (Austria)
Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management

Joas Reinhard (Germany)
BiPRO GmbH

Kaltenegger Ingrid (Austria)
JOANNEUM RESEARCH, Institute for Sustainable Techniques and Systems

Kanizsay Zsolt (Hungary)
Grundfos Hungary Manufacturing Ltd.

Katona Àgnes (Hungary)
Kromberg & Schubert Kft

Keresztes Katalin (Hungary)
Brenntag Hungaria Kft.

Kovács Csaba (Hungary)
MAL Zrt.

Kovacs Erika

Kovács-Dunai András (Hungary)
Rába Automotive Components Manufacturing Ltd.

Kovats Nora (Hungary)
University of Pannonia, Institute of Environmental Engineering

Kozak Kristof (Hungary)
Min. Environment and Water

Körtvelyessy Gyula (Hungary)
Hungarian Chemical Society

Kuan Duque Yuan Constantino (Colombia)
NCPC FROM COLOMBIA

Lasztovicza Jenő (Hungary)
Veszprém County Council General Assembly

László Tamaska (Hungary)
KM-Projekt Ltd.

Lesnjak Mirko (Slovenia)
LIVEO

Lilane Hanan (Morocco)
Moroccan Cleaner Production Centre (CMPP) / UNIDO

Loku-Gamage Lakmini (Sri Lanka)
National Cleaner Production Centre, Sri Lanka

Madsen Kaj (Switzerland)
United Nations Environment Programme, Division for Technology, Industry and Economics, Chemicals Branch

Marscheider-Weidemann Frank (Germany)
Fraunhofer-Institut für System- und Innovationsforschung

Mayrhofer-Grünbühel Ferdinand (Austria)
Austrian Ambassador in Hungary

McWhir Andrew (United Kingdom)
Department for Environment, Food and Rural Affairs

Mitra Swati (India)
c/o IKEA TRADING INDIA Pvt. Ltd.

Muranyi Istvan (Hungary)
KOZMOS (Hungarian Cosmetic and Home Care Association)

Németh Bernadett
MAPLÓ

Patel Mamta (United Kingtom)
Chemicalwatch

Peiris Sena (Sri Lanka)
National Cleaner Production Centre, Sri Lanka

Perez Jorge (Mexico)
Centro Mexicano para la Produccion mas Limpia

Plas Christian (Austria)
Denkstatt GmbH

Priyadarshi Anurag (India)
Ikea Trading India Pvt., Ltd.

Pusch Eveline (Austria)
Denkstatt GmbH

Raab Christina (Austria)
UNIDO

Rafal Brykowski (Poland)
Bureau for Chemical Substances and Preparations

Reekie Mark (United Kingdom)
Akzo Nobel Powder Coatings Ltd

Richter Steffi (Germany)
Umweltbundesamt / Federal Environment Agency

Satric Vojka (Serbia)
CPC Serbia

Schmehl Meike (Germany)
University of Göttingen

Schott Rudolf
AFC-Consultig (Austria)

Schwager Petra (Austria)
UNIDO

Smirnov Viacheslav (Russia)
UNIDO North-Western International Cleaner Production Centre

Startsev Alexander (Russia)
UNIDO North-Western International Cleaner Production Centre

Steinhäuser Klaus Günter (Germany)
Umweltbundesamt / Federal Environment Agency

Stiehl Christine (Germany)
BASF SE

Szabo Zoltan (Hungary)
Intergovernmental Forum on Chemical Safety (IFCS), National Inst. Of Environmental Health

Széchy Anna (Hungary)
Corvinus University of Budapest, Department of Environmental Economics and Technology

Szegheó István (Hungary)
EMERSON PROCESS MANAGEMENT MAGYARORSZÁG Kft.

Tancsiscnè Horváth Àgnes (Hungary)
Kromberg & Schubert Kft

Tatar Carmen (Romania)
Ministry of Economy and Finance

Volk Marion (Germany)
TÜV SÜD Management Service GmbH

Zilahy Gulya (Hungary)

Corvinus University of Budapest

Zsolt Bodnar (Hungary)
Hunest Biorefinery Kft

lebensministerium.at