

# Chemical leasing training

## Quantification of benefits

### *IAMC Toolkit*

*Innovative Approaches for the Sound Management of  
Chemicals and Chemical Waste*



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



# Overview of the presentation

- I - The sustainability criteria and their indicators**
- II - A concrete example of monitoring**
- III - The Global Chemical Leasing Award**
- IV - The major overall benefits**



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# The Sustainability Criteria and their Indicators



# I- The Sustainability criteria and their indicators



1. Reduction of adverse impacts for environment, health, energy and resource consumption caused by chemicals and their application and production processes
2. Improved handling and storage of chemicals to prevent and minimize risks
3. No substitution of chemicals by substances with a higher risk
4. Economic and social benefits are generated; a contract should contain the objective of continuous improvements and should enable a fair and transparent sharing of the benefits between the partners
5. Monitoring of the improvements needs to be possible

# I- The Sustainability criteria and their indicators

Chemical Leasing is not yet a mainstream model and sufficient quantification is sometimes lacking

Need for support to companies in the implementation, fulfilment, documentation and quantification of the sustainability criteria

Necessity of development of a standardised method to help evaluating ChL applications and to verify adherence of the criteria

**Chemical Leasing**  
**SMART5**

a German Environment Agency project

# I- The Sustainability criteria and their indicators

## CONCRETE PROJECT CONTENT



Development of sub-criteria and indicators for each Sustainability Criterion

Development of an indicator checklist to screen a Chemical Leasing project

Development of the SMART 5 tool

Facilitate the implementation of Chemical Leasing in companies

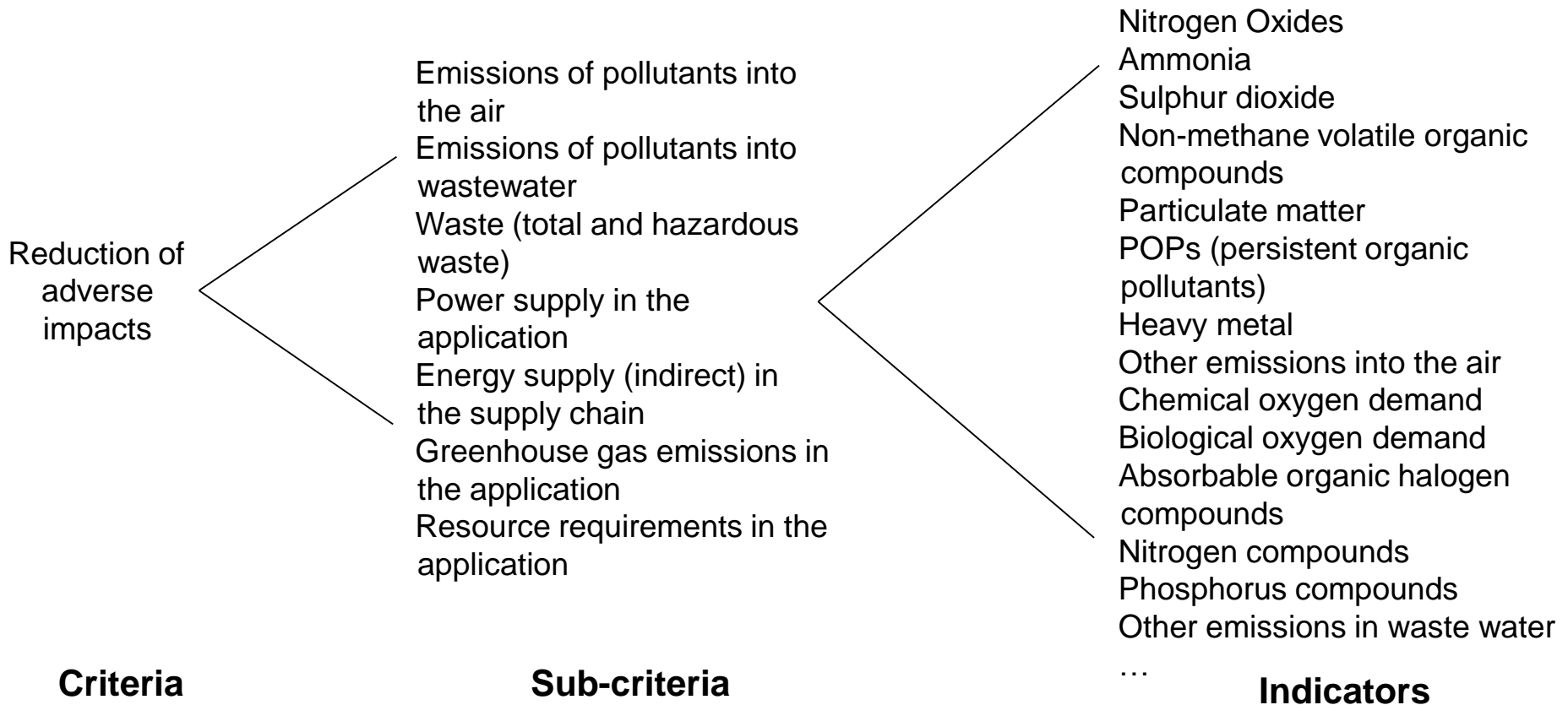
Support the companies in their data collection efforts

Measure and quantifiable the benefits

Verify if the sustainability criteria are met

# I- The Sustainability criteria and their indicators

## DEVELOPMENT OF SUB-CRITERIA AND INDICATORS EXAMPLE WITH THE FIRST CRITERIA



# I- The Sustainability criteria and their indicators

## DEVELOPMENT OF THE INDICATOR CHECKLIST

### EXAMPLE OF THE FIRST CRITERIA

Sustainability Criteria	Sub-criteria	Indicator for Chemical Leasing	Screening	Comment
1 Reduction of adverse impacts for environment, health, energy and resource consumption caused by chemicals and their application and production processes	Pollutants emitted into the air	Nitrogen oxides (NO <sub>x</sub> )	<input type="checkbox"/> decreased <input type="checkbox"/> equal <input type="checkbox"/> increased	
		Ammonia (NH <sub>3</sub> )	<input type="checkbox"/> decreased <input type="checkbox"/> equal <input type="checkbox"/> increased	
		Sulphur dioxide (SO <sub>2</sub> )	<input type="checkbox"/> decreased <input type="checkbox"/> equal <input type="checkbox"/> increased	
		Non-methane volatile organic compounds (NMVOC)	<input type="checkbox"/> decreased <input type="checkbox"/> equal <input type="checkbox"/> increased	
		Particulate matter (PM2.5/PM10)	<input type="checkbox"/> decreased <input type="checkbox"/> equal <input type="checkbox"/> increased	
		POPs (persistent organic pollutants)	<input type="checkbox"/> decreased <input type="checkbox"/> equal <input type="checkbox"/> increased	
		Heavy metals	<input type="checkbox"/> decreased <input type="checkbox"/> equal <input type="checkbox"/> increased	
		Other emissions into the air .....	<input type="checkbox"/> decreased <input type="checkbox"/> equal <input type="checkbox"/> increased	





# I- The Sustainability criteria and their indicators

## DEVELOPMENT OF THE SMART 5 TOOL



Based on a comparative approach (old/new)

Automatic calculation of the progress

Colour coding for benefits

**Reduction of adverse impacts for environment, health, energy and resource consumption**

ÖD19

Reduction of adverse impacts for environment, health, energy and resource consumption caused by chemicals and their applications and production processes.

**1 Pollutants emitted into the air**

★ Please indicate which emissions are measured. If you have data for more than three pollutants, please extend the lines by pressing the plus sign (see green arrow).

	old	new	Unit	difference [absol.]	difference [%]	degree of change
No 1: e.g. Nitrogen oxides (NO <sub>x</sub> )	300	50	please select	-250	-83%	significant decrease
No 2: e.g. Ammonia (NH <sub>3</sub> )	200	10	please select	-190	-95%	significant decrease
No 3: e.g. Sulphur dioxide (SO <sub>2</sub> )	10	30	please select	20	200%	significant increase

←

**2 Pollutants emitted in waste water**

**3 Volume of waste (total and hazardous waste)**

**4 Energy demand during the application**

**5 Energy demand (indirect) in the supply chain**

**6 Greenhouse gas emissions during the application**

**7 Resource demand during the application**

# I- The Sustainability criteria and their indicators

## **CONCLUSION**

**To monitor your Chemical Leasing project, use the SMART 5 tool and its indicators**

**Remember to do a regular and serious monitoring**

**This will give more credibility to your Chemical Leasing project and support your application for the Chemical Leasing Award**



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# A Concrete Example of Monitoring



## II- A concrete example of monitoring

### Oil dehydration and water purification in Colombia



#### Unit of payment

Before Chemical Leasing: USD per gallons or kilos of chemicals purchased

With Chemical Leasing: USD per kilo barrels of oil of specified quality



## II- A concrete example of monitoring

Reduction in chemicals consumption : 113 t/y

### Economic benefits

- Decrease of oil and grease used in the cooling towers
- Cost savings due to the recovery of oil in the stabilization pools and lower costs for maintenance of the pools and cooling towers
- Reduction of the costs of the treatment process by almost 20%
- Reduction of drums used for the transport and storage of the chemicals

### Energy savings

#### Before Chemical Leasing

Total energy consumption per year:  
approx. 3,400 MWh

- direct via electricity: approx. 50 MWh
- indirect via materials: approx. 3,350 MWh

#### After Chemical Leasing (reduction in chemicals consumption of 113 t/y)

Total energy savings per year:  
approx. 500 MWh (indirect energy savings)

→ Reduction of 15 %

Direct energy consumption (approx. 50 MWh) remains more or less equal under Chemical Leasing

### Financial savings

#### For Nalco

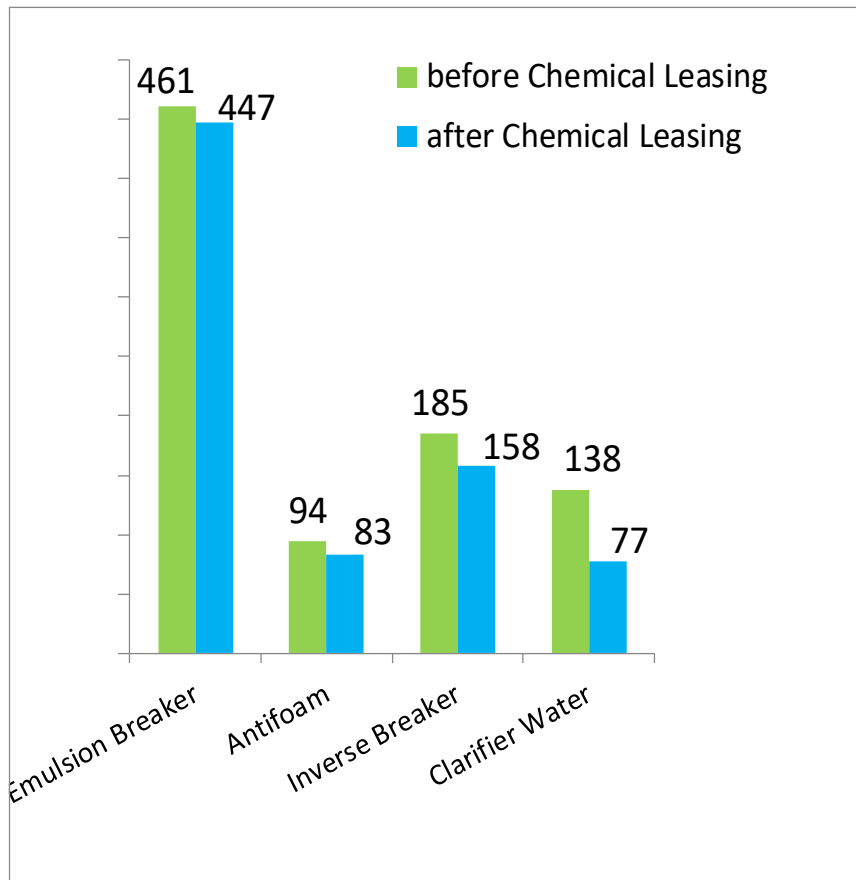
USD 164,630 in 2008 and  
USD 249,418 in 2009

#### For Ecopetrol

USD 2,500,000 in 2008 and  
2009



## II- A concrete example of monitoring



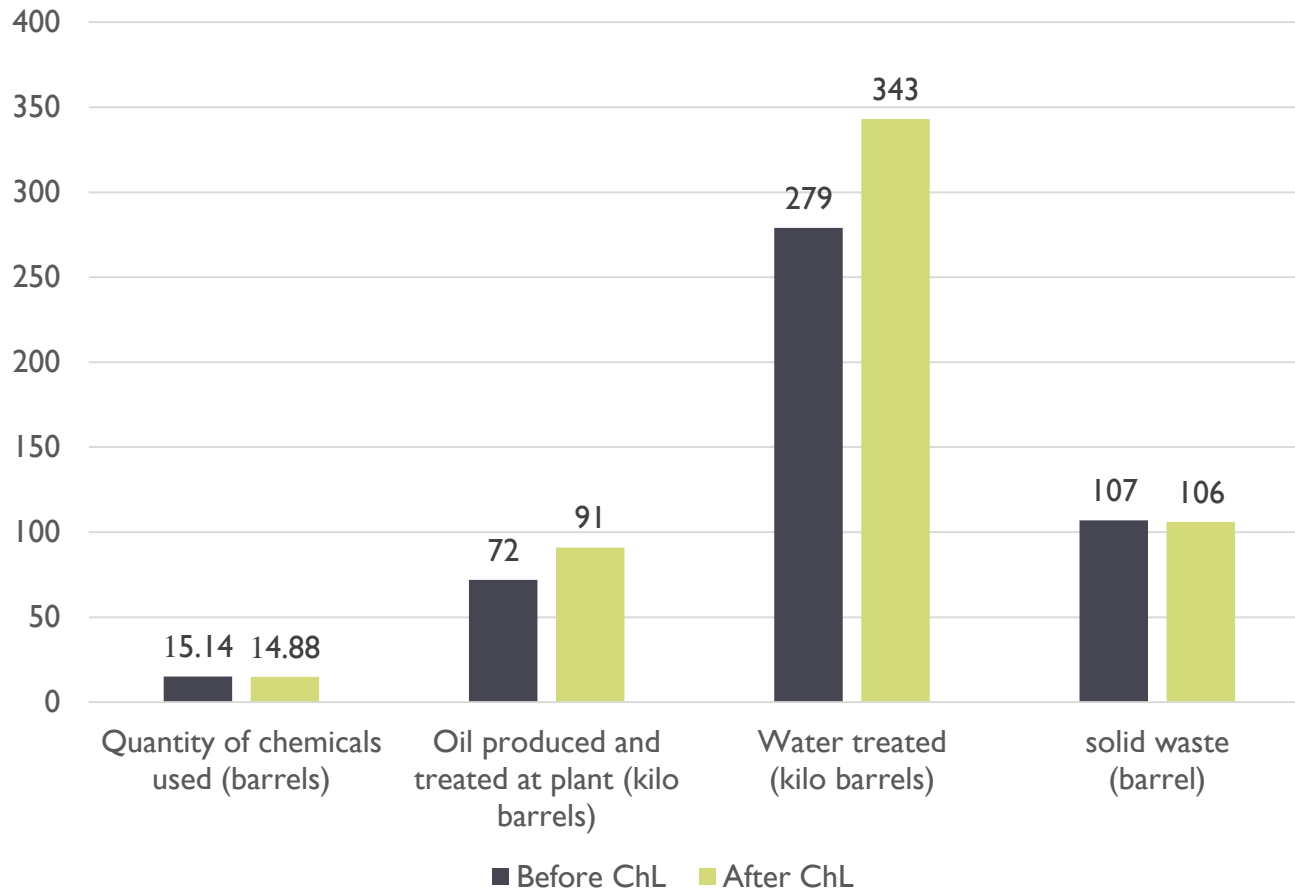
### Environmental benefits:

- Removal of 99% of the oil and suspended solids from wastewater
- Reduction in polymer consumption
- Reduction of the environmental impact of treated water
- Energy savings
- No sub-products in the chemicals production process due to a new methodology used by Nalco

### Social benefits:

- Creation of jobs (in laboratories)
- Long-term commercial relationship with continuous process improvement
- Risk reduction and better working conditions

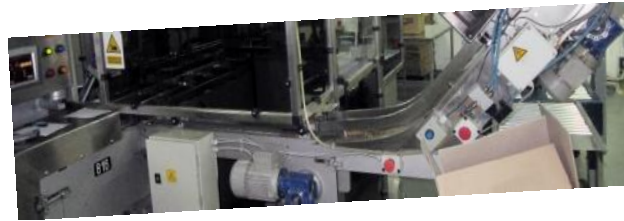
## II- A concrete example of monitoring



***More oil and water is treated while the consumption of certain chemicals is reduced (emulsion breaker, water purifier) and less solid waste was generated.***

## II- A concrete example of monitoring

### Results of case studies of SMART 5 applications



#### 1<sup>st</sup> criterion: Reduction of adverse impacts

	<b>Bonding of boxes Bambi and Henkel</b>	<b>Cleaning of Hotel rooms Hotel Windsor in Rio</b>
Waste	- 30%	Reduced packaging waste
Energy	Direct : - 53%	No data
Resources	Chemicals : - 30%	Chemicals : - 80%





## II- A concrete example of monitoring

### Results of case studies of SMART 5 applications

#### 2<sup>nd</sup> criterion: Improved handling and storage

	<b>Bonding of boxes Bambi and Henkel</b>	<b>Cleaning of Hotel rooms Hotel Windsor in Rio</b>
SDB	Available	Available

#### 3<sup>rd</sup> criterion: No substitution of chemicals by substances with a higher risk

	<b>Bonding of boxes Bambi and Henkel</b>	<b>Cleaning of Hotel rooms Hotel Windsor in Rio</b>
Substitution	Yes, with a more efficient adhesive (not classified)	No substitution
Risk	Reduction due to reduced temperatures and pressures and automatic dosing with new adhesive	Reduced due to decrease in direct contact



## II- A concrete example of monitoring

### Results of case studies of SMART 5 applications

#### 4<sup>th</sup> criterion: Economic and social benefits are generated

	<b>Bonding of boxes Bambi and Henkel</b>	<b>Cleaning of Hotel rooms Hotel Windsor in Rio</b>
Costs user	Chemicals: -13%, Maintenance etc.: -72%	-76%
Business opportunities	After ChL, same supplier for all machines	Environmental label

#### 5<sup>th</sup> criterion: Monitoring of the improvements needs to be possible

	<b>Bonding of boxes Bambi and Henkel</b>	<b>Cleaning of Hotel rooms Hotel Windsor in Rio</b>
Monitoring of the indicators	Yes	Yes

Source: based on UN GHS, 2013



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# The Global Chemical Leasing Award



# III- The global chemical leasing award



Award 2014:  
51 applications  
from more than  
20 countries



MINISTERIUM  
FÜR EIN  
LEBENSWERTES  
ÖSTERREICH



Federal Ministry for the  
Environment, Nature Conservation  
and Nuclear Safety



# III- The global chemical leasing award

1

Case studies  
(companies)

2

Consulting  
services

3

Scientific  
publications

4

Public relations

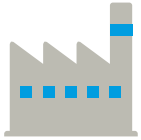


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# Major Overall Benefits



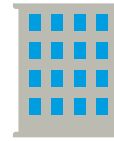
# IV- The major overall benefits



## For the suppliers



- Better competitiveness and differentiation
- Enlargement of market shares
- Higher profits
- Good relationships with clients
- Greater facility in complying with international legislation
- Improved environmental profile



## For the users



- Increased resource efficiency
- Improved handling and storage of chemicals
- Lower operational costs
- Lower maintenance costs
- Elimination of downtime
- Better productivity
- Better health and safety
- Lower environmental impact
- Continuous improvement
- Reduced liability for chemicals management
- Precise calculation of activity-related costs
- Compliance with international regulations
- Improved image as an innovative company



# IV- The major overall benefits

For the consultants



Development of a service portfolio with additional services



Higher competitiveness on the consultancy market



Provision of innovative and effective business and technical solutions



Extension of know-how and of the professional network



Improved image



# Lessons learnt

- I - **The SMART 5 tool** has been developed to help you evaluate the ChL projects and check their obedience to the sustainability criteria
- II - This contributes to a **good monitoring** of the projects with a precise and standardized methodology
- III - Which gives you better chance to apply and win the **Global Chemical Leasing Award**
- IV - Which highlights all the **overall benefits** for the chemicals suppliers, users and for the consultants



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