



Alternatives assessment and substitution – Experience at EU-level

SESSION 1 History and Landscape of Alternatives Assessment and Informed Substitution

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Safety and health at work is everyone's concern. It's good for you. It's good for business.

Europa and the EU

Europe and the EU

EU
28 Member States
24 languages
26 m enterprises
240 m workforce
510 m population



First connection – drivers and questions

**Describe your first connection with alternatives assessment/
informed substitution – what was the driver(s), what were the
questions and challenges that alternatives assessment was being
asked to address?**

First connection – drivers and questions

- **SUBSPRINT: Replacement of highly volatile solvents by low volatile vegetable oil based esters in the printing industry, 1992-95**
One of the best monitored substitution developments in the last 20 years
<http://praevention-dp-bgetem.bg-kooperation.de/printing-machines-and-automatic-wash-up-systems>
- **SUMOVERA: Replacement of mineral oil based mould releases, 1996-98**
- **SPHERE+: Substitution Projects for Health and Environment, Studies in 12 EU Countries, 1998**
- **MetalVOC: Solvent free cleaning technologies for the metal industry in three EU countries**
- **Follow up: CLEANTOOL database for metal surface cleaning**
www.cleantool.org

First connection – drivers and questions

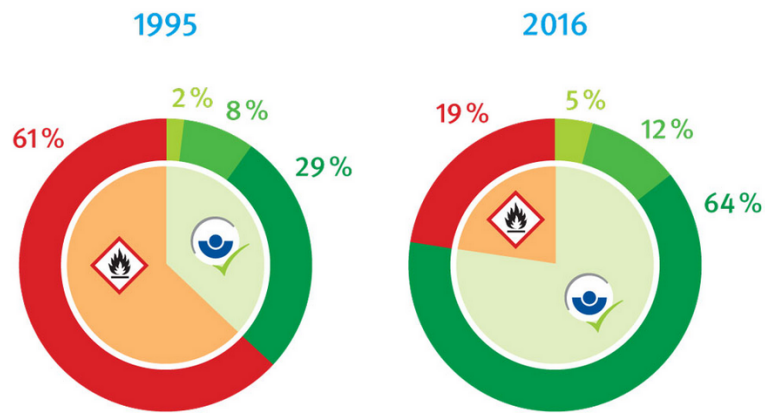
- **SubChem: *Options for the design of innovation systems for the successful substitution of hazardous substances, Germany, 2001-03***
- **EU-Substitution *Substitution of Hazardous Chemicals in Products and Processes, 10 larger case studies in Europa, DG ENV 2002-03***
- **German Regulations: *Summaries of the TRGS 600-619 (restrictions on use, substitutes and substitution of processes or technology)***
<https://www.baua.de/EN/Service/Legislative-texts-and-technical-rules/Rules/TRGS/TRGS-600-619.html>
- **SUBSPORT: Development of a case study based substitution portal 2010-13, www.subsport.eu**

First connection – drivers and questions

Development of the type of cleaning and washing agents in the offset printing industry

Main criteria:
Flashpoint
Exclusion of certain groups of chemicals

EINSATZ VON WASCH- UND REINIGUNGSMITTELN



Source of the graphic:
<https://www.bgetem.de/arbeitssicherheit-gesundheitsschutz/brancheninformationen1/druck-und-papierverarbeitung/offsetdruck/brancheninitiative-offsetdruck/die-brancheninitiative-offsetdruck-22-jahre-erfolgreich-gegen-loesemitteldaempfe>



weit über 100 °C
z. B. Reinigungs-
öle auf Pflanzen-



über 100 °C
z. B. hoch-
siedende Kohlen-
wasserstoffe



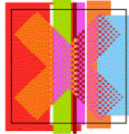
60–100 °C
z. B. Test-
benzin (AIII)



unter 60 °C
z. B. Testbenzin
(AII) & Spezial-
benzin (AI)

First connection – drivers and questions

Report compiled for the
Directorate General Environment, Nuclear Safety and Civil Protection of the
Commission of the European Communities
Contract No B3-4305/2000/293861/MAR/E1



SUBSTITUTION OF HAZARDOUS CHEMICALS IN PRODUCTS AND PROCESSES

Executive Summary

HAMBURG, APRIL 2003

“Substitution means the replacement or reduction of hazardous substances in products and processes by less hazardous or non-hazardous substances, or by achieving an equivalent functionality via technological or organisational measures”.

First connection – drivers and questions

CASES IN THE EU-DG ENV STUDY

<i>Case study [by application]</i>	<i>Problematic Substance(s)</i>
1 Metal parts cleaning	Organohalogen solvents
2 Cleaning of façades	Strong acids, alkalis, solvents and detergents
3 Textile dry-cleaning	Perchloroethylene
4 Marine anti-fouling	Organotin compounds
5 Wood preservation	PCP and lindane
6 Flame retardants in circuit boards	Brominated flame retardants
7 Loss lubrication in inland water ships and locks	Lubricants derived from mineral oil
8 Mould-release agents	Mineral-oil based agents
9 Rechargeable batteries	NiCd accumulators
10 Plasticisers in toys	Phthalates in PVC

First connection – drivers and questions

Category	Case study									
	1	2	3	4	5	6	7	8	9	10
ECONOMY										
– Costs	–	–	–	–	0	--	–	–	–	–
– Liability	–	0	–	–	0	0	–	–	0	0
– Resources	0	0	0	0	0	0	0	0	++	0
– Competition	0	0	0	–	0	0	0	0	+/-	0
TECHNICAL FUNCTION										
– Performance	++	0	--	–	–	0	+	+	+	+
– Process integration and product quality	–	–	0	–	+	--	+	–	+	0
SOCIAL FACTORS										
– Awareness (public)	+	0	+	++	++	+	–	--	+	++
– Communication (B2B)	+	–	0	0	+	--	+	0	0	0
RISK INFORMATION										
– Risk information of chemical or product	++	0	+	++	++	+	+	0	++	+
– Risk information of alternative	–	+	–	–	–	–	+	+	+	0
– Shift of risks	–	–	+	–	–	–	+	0	+	0
REGULATIVE FRAME										
– Legislation / Regulation	+	+	0	++	++	+	0	+	++	+
– Standardisation	0	0	0	+	–	--	–	0	0	0

Note: The relevant factors influencing substitution are characterised as promoting (+), neutral (0) or hindering (–) effect towards substitution. The most relevant factors are highlighted with dark grey shading.

- 1 = Metal parts cleaning
- 2 = Cleaning of façades
- 3 = Textiles cleaning in laundries
- 4 = Marine anti-fouling coatings
- 5 = Wood preservation

- 6 = Flame retardants
- 7 = Loss lubrication in Inland Water
- 8 = Mould release agents
- 9 = Rechargeable batteries
- 10 = Plasticisers / Phthalates in toys

First connection – drivers and questions

Substitution Type 1
Replace hazardous by a less hazardous substance while maintaining technology / product functionality

Substitution Type 2
Use a less hazardous or non-chemical solution by changing the technology / product functionality

Substitution Type 3
Use a less hazardous or non-chemical solution by changing the work organisation / product use pattern

Current 'Alternative Assessment' is focused on Type 1

Main missing information:

- *Long term technical performance*
- *Non chemical solutions*
- *Shift of risks*
- *Functional alternatives*

Lowell introduced the concept of 'Functional substitution'

First connection – drivers and questions

Very optimistic regulation in the EU Chemical Agents Directive:

- Dangerous substances and processes should be completely eliminated from workplaces (e.g. designing new work processes)
- If elimination is not possible, the risk must be managed based on a hierarchy of prevention measures — the STOP principle:

Substitution (safe or less harmful alternatives)

Technological measures (encasing, exhaust)

Organisational measures (qualified employees for specified work)

Personal protection (wearing PPE)



First connection – drivers and questions

.....Response	Greatest Significance N, %	Respondent							EU15	
		Public Administration	Employers' representatives	Employees' representatives	OSH practitioners	Accident Insurance	Academics / researchers	Other	EU 15	Accession states
Avoiding hazardous chemicals	15 %	19 %	36 %	5 %	6 %	0 %	27 %	0 %	16 %	13 %
Substitution	2 %	0 %	9 %	5 %	3 %	0 %	0 %	0 %	2 %	4 %
Technical measures	16 %	19 %	0 %	5 %	17 %	33 %	33 %	0 %	20 %	13 %
Organisational measures	9 %	10 %	0 %	11 %	14 %	0 %	7 %	0 %	3 %	16 %
Personal protective equipment (PPE)	57 %	52 %	55 %	74 %	61 %	67 %	33 %	100 %	59 %	55 %
Other (e.g. technical innovation)	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
Total	117, 100	31, 100 %	11, 100 %	19, 100%	36, 100%	3, 100%	15, 100%	2, 100%	61, 100%	56, 100%

Enterprises and inspecting authorities cannot implement the STOP-principle

First connection – drivers and questions

- **Most enterprises do not follow the most simple rules:**
„All in all it can be assumed that around 70% of commercial users of hazardous substances do not (or cannot) observe the statutory requirements of employee protection.“ (Federal Institute for Occupational Safety and Health in Germany)
- **HSE UK:** „In approximately 1.3 million British companies chemicals are handled. When questioned, only 16% of these companies were able to state the applicable law for handling chemicals or the limit values for these substances at the workplace.“

Changes over time

How has the field or our organization's use of alternatives assessment changed/evolved over time? Any key event/convening that spurred this evolution. Any changes in acceptance/resistance to the field over time?

Changes over time

- Much more information offers from authorities and business associations have been improved - practical support for the application is scarce
- Commercial and non-profit chemical management tools are available for ever size ant type of enterprise
- AA tools have become more comprehensive and flexible to the needs (see OECD toolbox)
- REACH and other legislation puts a certain pressure on the enterprises

- But also substitution avoiding strategies have been very successful, such as:
 - Technical:** Dilution, mixtures of many substances, non functional filler materials
 - Workforce:** Move work with hazardous substances in the informal sector or locate it somewhere else in the global supply chain
- Even the **control** of banned or restricted substance has become more difficult (internet orders, open borders, very limited enforcement capacities)

Changes over time

3.6 tons of dangerous substances ('hälsosofarliga kemiska produkter') were used per citizen in Sweden in 2015. Slight increase since 1996.

År	Bränslen	Hälsosofarligt utom bränslen
1996	3,8	3
1997	4,1	3,1
1998	3,8	3,1
1999	3,4	3
2000	3,5	3,4
2001	3,7	3,4
2002	3	3,2
2003	3,2	3,4
2004	3,6	3,7
2005	3,5	3,7
2006	4,1	3,6
2007	4,1	3,5
2008	2,7	3,6
2009	3,2	3,3
2010	3,5	3,6
2011	3,4	3,7
2012	3,4	4
2013	2,9	3,4
2014	3,4	3,7
2015	3,2	3,6

<http://www.miljomal.se/Miljomalen/Alla-indikatorer/Indikatorsida/Dataunderlag-for-indikator/?iid=69&p1=1&t=Land&l=SE>

Needs/opportunities

What are the needs/opportunities that you see to “build the field” (the theme of this year’s symposium)?

Needs/opportunities

Efforts depend on the type of the substitution problem	Regulatory Option	Intended result at technological / enterprise level
1. Open innovative and demanding technological questions	R&D Support, incentives, research	Development of a new preparation or of a completely redesigned process
2. Adaptation of existing technologies necessary	DEVELOPMENT Mixtures of incentives and command-and-control	Adaptation of processes Medium-Term implementation
3. Implementation of already widely spread reference processes	INFORMATION AND OBLIGATION Substitution has to be applied – exceptions only for certain applications	Introduction of already practically tested solutions

Needs/opportunities

Knowledge and networks

Better knowledge and data on chemicals essential - but not enough for success

Exchange platforms based on case studies (ECHA, OECD, SubsPORT, Chemsec Market Place, EU-OSHA) contribute

Sector and technology based incentives – research and financing and pilot application

Authorities

Substitution information and guidance to users, e.g. REACH help desks might in future do more work like this

Implementing authorities left alone with resistance of enterprises who do not want to change a 'running process'

To develop legally effective substitution criteria for every sector, process and work task is a too large task for any EU-Institution

Needs/opportunities

Enterprises

The vast majority of user enterprises is by far overcharged with substitution based on AA

Trust in producers and formulators of chemical products replaces own assessment

Amount of bad practice unknown – tendency to publish only good practice

AA

AA has been improved regarding applicability, flexibility and user friendliness

The health aspect plays still a much larger role than the safety aspect. For enterprises it is often the other way round.

The impact of AA is limited for most user enterprises if alternative assessment is not combined with assessment of the context: the technical function and performance, the costs and liability, and the shift of risk questions.

ANNEX

EU data and information sources

- ECHA has based on its 89,000 registration dossiers detailed data about the uses of a substance
Example: <https://echa.europa.eu/registration-dossier/-/registered-dossier/15538/9>
(but unfortunately no data about the amounts per use or the number of exposed workers in the EU)
- PRODCOM has exact production and import/export figures but only for ca. 200 chemicals. Country figures are often confidential. <http://ec.europa.eu/eurostat/web/prodcom/data/database>

EU data and information sources

- **SPIN: Has quite detailed use figures but only for the Nordic countries. Storage or larger imports significantly influence the annual data**
<http://spin2000.net/>
- **EUROSTAT Structural Business Statistics provide employment figures in sectors and subsectors but not the number of workers in certain occupations (ISCO)**
<http://ec.europa.eu/eurostat/web/structural-business-statistics>
- **EWCS (European Working Conditions Survey) has data on exposure in sectors and countries (self-assessment)**
Three questions: Are you exposed to breathing in smoke, fumes, powder or dust? Are you exposed to breathing in vapours? Are you exposed to chemical products or substances?
<https://www.eurofound.europa.eu/surveys/european-working-conditions-surveys>

HWC 18-19 Campaign - Campaign resources

Legislative framework on dangerous substances in workplaces

Key Points

- There is a comprehensive legislative framework in the European Union to protect workers from the risks of dangerous substances in workplaces.
- The most relevant pieces of legislation at the EU level are the OSH Framework Directive, the Chemical Agents Directive and the Carcinogens and Mutagens Directive. These directives and their transposition into national law aim to reduce the exposure of workers to dangerous substances in workplaces.
- Legislation in other policy areas contributes to the reduction of risks from dangerous substances in workplaces, such as EU legislation on chemical substances and mixtures and also specific EU and international legislation on waste, storage and transport.
- Achieving a high level of implementation of the legislation in practice is a key challenge, including following the principle of preferentially applying the most effective preventive measures.

Healthy Workplaces Manage Dangerous Substances

The European Agency for Safety and Health at Work (EU-OSHA) is running a Europe-wide campaign from 2018 to 2019 to promote the prevention of risks from dangerous substances in workplaces. The aim is to reduce the presence of and exposure to dangerous substances in workplaces by raising awareness of the risks and of effective ways of preventing them.

Substitution of dangerous substances in the workplace

Key Points

- Exposure to dangerous substances in the workplace continues to be a major safety and health issue. The health effects can be life changing and even fatal.
- The best way to reduce the risks is elimination or substitution — removing the substance by changing the process or product in which it is used or replacing it with a less dangerous one.
- Substitution is a stepwise process — a complete risk assessment is a key step in the process.
- By working together, management and workers can build a strong risk prevention culture in which substitution is part of prevention and protection routines.

All info sheets and other campaign materials are available to download from EU-OSHA's Healthy Workplaces Campaign website (<https://healthy-workplaces.eu>).

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Annex: HWC 18-19 Campaign - Campaign resources

- Resource database with guidance docs and audio-visual info
- Ca. 700 entries from Member States, EU and international sources
- Case studies of good practice examples
- Video IKEA France – Container check
<https://www.youtube.com/watch?v=48HHnYIfDVY>



Annex: HWC 18-19 Campaign - e-tool Dangerous substances

- For laymen
- Short and long questionnaire
- Tailored good practice recommendations based on the responses
- EU-OSHA offers master version as platform
- Member States create their language version and adapt it to the national legislation

(Next page: Screenshot)

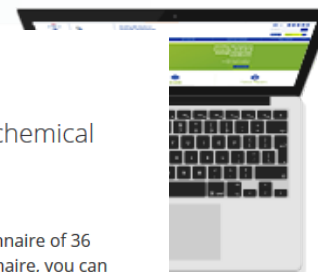


Annex HWC 18-19 Campaign - e-tool Dangerous substances

Dangerous Substances e-tool

Find and reduce the safety and health hazards associated with dangerous substances and chemical products in workplaces within your company.

You can either start with a very short (Quick Start) questionnaire with seven questions or immediately start with a more detailed questionnaire of 36 questions. If you use the long questionnaire, you can save your answers and continue later. Once you have completed the long questionnaire, you can print a report, 'My Chemical Guide' that includes your answers, a to-do checklist and recommendations for good practices and measures.



7 Questions



Quick start

MY CHEMICAL GUIDE — QUICK
START

Up to 36 Questions



Quick start

MY CHEMICAL GUIDE — LONG
QUESTIONNAIRE

Annex: HWC 18-19 Campaign - Further information

- Learn more at the campaign website:
www.healthy-workplaces.eu
- Subscribe to our campaign newsletter:
<https://healthy-workplaces.eu/en/healthy-workplaces-newsletter>

- Keep up to date with activities and events through social media:



- Find out about events in your country from your focal point:
www.healthy-workplaces.eu/fops