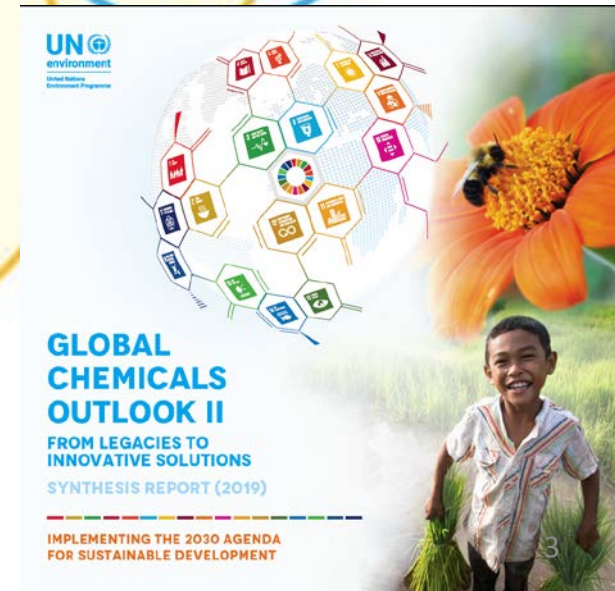


Substitution of Hazardous Chemicals: Lessons, Opportunities and Challenges from a Civil Society Organization's Perspective

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Greenpeace Research Laboratories

Substitution as an established international principle

- Under REACH for Substances of Very High Concern (and contribution to overarching EU objective for a ‘non-toxic environment’)
- Under regional seas conventions (esp. OSPAR, HELCOM, Barcelona)
- As a mechanism under the Stockholm Convention on POPs
- As a risk reduction objective (“Support for environmentally sound and safer alternatives”) under the UN Strategic Approach to International Chemicals Management (SAICM)...
 - clean production as a general approach
 - informed substitution of chemicals of particular concern
 - consideration of non-chemical alternatives in substitution decisions



Substitution: key aspects from an NGO perspective

- Transparency
- Open collaboration between stakeholders
- Hazard-based identification of substances requiring substitution
- Using a 'red flag' basis rather than score averaging
 - Compared to, e.g. **ZDHC** Framework for the Prioritisation of Hazardous Chemicals www.roadmaptozero.com/fileadmin/layout/media/downloads/en/FrameworkPrioritisationReportRev1.pdf
 - Risk based: Chemicals prioritized using volume, and use pattern, as well as hazard
 - 'score averaging': A chemical with a high priority can have low priority (if volume & use pattern are low priority)
- Consideration of non-chemical alternatives (material and functional substitution)
 - Eg replacing brominated flame retardants and PVC in electronics using more inherent fire resistant materials (such as aluminum and specialized polymers) or eliminating the need for wires through product redesign www.subsportplus.eu/case-stories/074-en
- Consistency of approach across different areas of activity / commodity / legislation

25th October 2004



Common position with regard to the authorisation of substances of very high concern within REACH

The Confederation of British Industry, the Chemical Industries Association and Greenpeace share the common position that substances requiring an authorisation within REACH according to Title VII, Article 54 of the Commission's proposal (i.e. substances of very high concern) should be replaced with less hazardous alternatives wherever and whenever practicable.

- Authorization & substitution has the potential to drive innovation to the benefit of business, human health and the environment.
- We therefore urge the Minister to press for substitution to be incorporated into REACH in such a way that the authorisation procedure is effective, but flexible, in progressively phasing-out substances of very high concern.

UK Chemicals Stakeholder Forum (2010)

A GUIDE TO SUBSTITUTION

AN INFORMATION NOTE FROM THE UK CHEMICALS STAKEHOLDER FORUM

This note provides an easily accessible introduction to the process of substitution. It has been produced in order to influence stakeholder behaviour both at a national and international level in all parts of the supply chain. It will be of value to all those who, like the Forum, wish to promote sustainable consumption and production

The organisations represented on the UK Chemicals Stakeholder Forum are as follows:

British Association for Chemical Specialties	Green Chemistry Network
British Coatings Federation	Greenpeace
British Plastics Federation	Intellect
British Retail Consortium	Non-Ferrous Alliance
British Union for the Abolition of Vivisection	Royal Society of Chemistry
CHEM Trust	Society of Chemical Industry
Chemical Business Association	Trades Union Congress
Chemical Industries Association	UK Cleaning Products Industry Association
Chemistry Innovation Knowledge Transfer Network	Wales Environment Link

Access to information (process)

SIN List by Chemsec: extending hazard assessments

- An example of an NGO building upon the work of ECHA to extend reach of REACH
- Uses SVHC criteria established & published under the EU REACH regulation
- Database currently lists 919 hazardous chemicals likely to be banned or restricted in the future under REACH (<https://chemsec.org/sin-list/>)
- SINilarity Tool: to help identify if a chemical is linked to any in the SIN List by group, structure, or both (<http://sinilarity.chemsec.org/>)
- The aim is to help avoid substituting one problematic chemical with another

Stay far ahead of regulation

Proposals for
Candidate lists

Candidate list
(Substances of very high
concern)

REACH Annex XIV
Authorization/Phase-out
list

- Chemicals meet criteria to be phased out & substituted
- Avoid regrettable alternatives

SINList
SUBSTITUTE IT NOW!

SEARCH THE SIN LIST

Search your chemicals and we can identify if they are on the SIN List. If not, the SINimilarity tool can tell you if they are similar to the SIN listed chemicals

2018.04.19

Enter the CAS/EC Number or Chemical name...

SEARCH

FILTER the SIN LIST

Health & Environmental concerns

Uses

REACH Status

Appearance (date on list)

Production volume

SIN Groups

Producers

FILTER

Your filtered results gave **913** hits

ECHA: “The vast majority of the substances in the SIN list are already (or in the process of being) regulated or under scrutiny by authorities, suggesting that SIN list is a valuable tool for industry to predict action by authorities”

28.05.19

Information availability / assessing chemicals

GreenScreen® for Safer Chemicals (Clean Production Action)

- Clear and consistent methodology
- Fully transparent
- Applicable across different sectors
- Provides clear *scores and indications*
 - *BM1 (Avoid)*
 - *BM2 (Use, seek substitute),*
 - *BM3 (Use, continuous improvement),*
 - *BM4 (Prefer)*
- GreenScreen® *List Translator, an initial screening tool based on existing lists*

<https://www.greenscreenchemicals.org/>

SETAC, Helsinki

Information availability / assessing chemicals

GreenScreen® for Safer Chemicals (Clean Production Action)

Confidentiality

- Same transparent process
- Disclose Benchmark scores
- Chemical name/CAS redacted

GreenScreen® Hazard Summary Table for Tri-o-cresyl Phosphate

Group I Human					Group II and II* Human								Ecotox		Fate		Physical		
C	M	R	D	E	ST		N		SnS*	SnR*	IrS	IrE	AA	CA	P	B	Rx	F	
single	repeated*	single	repeated*																
L	M	H	L	M	vH	vH	H	vH	H	M	DG	L	L	vH	vH	vL	M	L	L

Example: Klean Coat Case Study

<https://www.cleanproduction.org/resources/entry/klean-kanteen-greenscreen>

Abbreviations:
 C = Carcinogenicity, M = Mutagenicity, R = Reproductive toxicity, D = Developmental Toxicity, E = Endocrine Activity, AT = Acute Toxicity, ST = Systemic Toxicity, SnR = Respiratory, S = Acute Toxicity, R* = Systemic Toxicity, S = Neurotoxicity, R* = Neurotoxicity, SNS* = Skin Sensitization*, SNR* = Respiratory Sensitization*, IrS = Skin Irritation, IrE = Eye Irritation, AA = Acute aquatic toxicity, CA = Chronic aquatic toxicity, P = Persistence, B = Bioaccumulation

Substance Name	CAS#	HM/LT Score	% by wt	Group I Human					Group II and II* Human								Ecotox		Fate		Physical		Multiple	
				C	M	R	D	E	Acute Toxicity	Systemic Toxicity	Neurotoxicity	Skin Sensitization*	Respiratory Sensitization*	Skin Irritation	Eye Irritation	Acute Aquatic Toxicity	Chronic Aquatic Toxicity	Persistence	Bioaccumulation	Reactivity	Flammability			
									S	R*	S	R*	SNS*	SNR*	IrS	IrE	AA	CA	P	B	Rx	F		
Substance A	xxxxxx-xx-x	-UNK	60											H-M										
Substance B	xxx-xx-x	BH-2	20	L	L	DG	M	DG	M	DG	L	DG	DG	L	DG	M	H	M	L	vL	vL	L	M	
Substance C	xxx-xx-x	LT-UNK	8						M		M		M	H		vH	vH							U
Substance D	xxxxxx-xx-x	LT-P1	8																			H		U
Substance E	xxxx-xx-x	M-3	4	L	L	L	L	DG	L	L	Dg	DG	L	L	DG	L	M	L	M	vH	L	L	L	

Access to information (regulation & monitoring)

NGO work enabled by transparent output from ECHA (and elsewhere in EU)

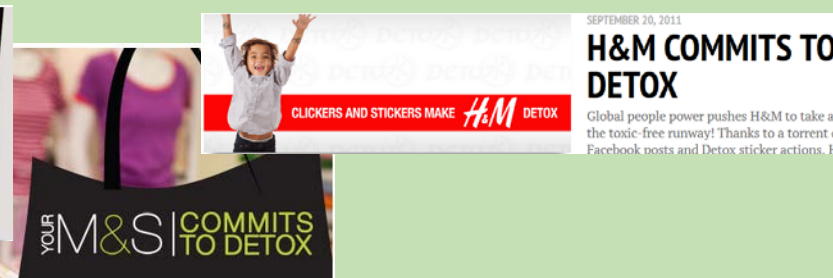
Greenpeace 'Detox' campaign (textiles and fashion): focused on **11 priority groups of chemicals**

- Chemicals relevant to the textile sector
- Chemical groups with examples listed on international or regional (eg EU) regulations / conventions that require restriction and/or elimination
 - OSPAR List of Chemicals for Priority Action
 - STOCKHOLM convention
 - HELCOM – substances for priority action and substances of concern under Baltic Sea Action Plan
 - EU Water Framework Directive list of priority hazardous substances
 - REACH SVHCs
 - REACH Annex XVII

Collaboration between stakeholders: NGO & Industry

Supply chain evaluation and management

- Greenpeace Detox My Fashion campaign
- Focus on chemical **use in the supply chain**, not only residues in products
- **Testing products** for presence of hazardous chemicals
- Investigate releases from **manufacturing facilities**
- Brands commit to 'detox' their manufacturing supply chain
 - Monitor progress by brands on their commitments

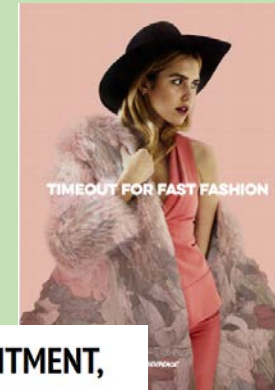


Timeline and reports: <https://www.greenpeace.org/international/act/detox/>

Collaboration between stakeholders: NGO & Industry

Supply chain evaluation and management

- Moving towards slowing & closing the loop
- Some retailers make commitments to increase sale of products that last longer & are easier to recycle



- July 2018: Destination Zero
 - Progress of global clothing brands and suppliers in 'detoxing' from use of hazardous chemicals
 - Identify future challenges



Timeline and reports: <https://www.greenpeace.org/international/act/detox/>

Collaboration between stakeholders: NGO & Industry

Prato textile district, Italy

- Italy's largest fashion supply chain pledged to 'Detox' hazardous chemicals
- Eliminate from the supply chain by 2020
- The largest Detox commitment of its kind
- 20 companies from Italy's Prato textile district
- Affects over 13 thousand tons of yarn and raw materials as well as over 13 million meters of fabric every year.



FEBRUARY 2016

DETOX COMMITMENTS, PRATO, ITALY, 20 COMPANIES

As of today, 20 companies in the Prato textile district, the oldest in Italy, have joined the Greenpeace Detox campaign. They have already made great strides to remove hazardous chemicals from their factories and they are eager to make more. [Read more](#)

Collaboration between stakeholders: NGO & Industry

PFCs: An example of NGO technical and professional capability

- Product testing & investigations of manufacturing facilities
- Also environmental contamination
- Leading to brand policies

- Technical input to brand policy development:
 - Gore Fabrics release Goal and Roadmap for eliminating 'PFCs of Environmental Concern'
www.gore-tex.co.uk/technology/responsibility/pfc-goal
 - Gore Fabrics study on end-of-life aspects (PTFE incineration)



paragraph B below):

Trait	Definition	Reference
1. highly fluorinated ¹	Per-fluorinated or poly-fluorinated organic substances	Buck 2011, Perfluoroalkyl and Polyfluoroalkyl Substances in the Environment: Terminology, Classification, and Origins
2. small enough to be bioavailable	Capable of crossing a cell membrane, molecular weight less than 3,000 Daltons ²	De Mello WC. Ed., Cell-to-Cell Communication, Plenum Press, NY, 1987, p34; Beyer EC, Gap Junctions. Inter. Rev. Cytol. 137, 1993 p2; Molecular Biology of the Cell, 3rd Ed., Alberts B, Bray D, Lewis J et al., Garland Science, NY, 1994, pp 958, 963. Data Analysis of the Identification of Correlations between Polymer Characteristics and Potential for Health or Ecotoxicological Concern, OECD, Paris, 2009, pp. 9, 37.
3. Persistent	Half-life > 2 months (> 60 days) in water or soil*	Derived from REACH persistence criteria for PBT and vPvB substances

Back to policy: Contribute to development of EU regulations

Nonylphenol ethoxylates (NPEs) in textiles

- Collaboration with Industry leading back to collaboration with policy makers
- Background: manufacture and use of NPEs regulated in EU since 2005
 - Did not cover residues in imported textiles, due to the use of NPEs in textile manufacture outside the EU
- 2016: Regulation of NPEs in textiles imported into the EU after February 2021
 - (above 0.01% NPE by weight)
- NGO studies contribute to data on levels of NPEs in imported textiles, and estimates of releases to EU waters post-sale



Collaboration between stakeholders: NGO and independent verification/certification bodies

OEKO-TEX® – Detox to Zero tool

- Analysis and evaluation in accordance with Detox to Zero criteria
 - Chemical management systems
 - Composition of wastewaters & other wastes
- Developed by OEKO-TEX® to align with Greenpeace Detox campaign
- Independent of NGO
- Independent of manufacturers

www.oeko-tex.com/detoxtozero



From functional substitution to greater sustainability

- A focus on function might help break deadlock where chemicals are difficult to substitute within existing products
- Need to look across whole supply chain to identify problems and potential solutions (and potential partners and innovators)
- As far as possible, 'loop the chain'
 - Close the loop
 - Clean the loop (may need to be the first step to closing it)
 - Slow the loop (substitution alone will not tackle over-consumption)
- Explore 'emotionally durable design' – what makes us want to keep things and how can we build on that?