



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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Federal Department of the Environment, Transport,
Energy and Communications DETEC
Federal Office for the Environment FOEN
Air Pollution Control and Chemicals Division

86th Discussion Forum on Life Cycle Assessment, 25. April 2024

Safety & Sustainability of chemicals and materials: Where do we stand ?

Michel Wildi – Scientific Officer – Section Industrial Chemicals- FOEN



Content

- 1. Context**
- 2. Vision and Strategies**
- 3. Current Activities and Commitments**
- 4. Opportunities, challenges and concluding remarks**



1. What is the global and political context in CH relating to safe and sustainable chemicals and materials ?



Global context related to safety & sustainability of chemicals and materials in CH



Zero net emissions by 2050



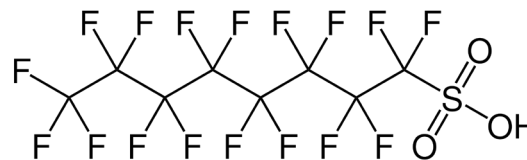
Adoption of the Climate and Innovation Act (18.06.2023)



Developing the circular economy



Adoption of art. 10h and 30d in Environmental Protection Act (15.03.2024)



Reduction load and risks associated with chemicals



Action plan on plant protection products (6.9.2017)

Report in response to postulate:
Action plan for reducing human and environmental exposure to persistent chemicals



Political context related to safety & sustainability of chemicals and materials in CH



Action plan to **reduce** human and environmental **exposure to persistent chemicals**. Postulat 22.4585



PFAS pollution in Swiss waters and fish. Consider **cumulative** and **combined effects** on human health. Postulat 23.4516



Additives in plastics: what is the impact on public health? Postulat 24.3359



Political context for safety & sustainability of chemicals and materials in CH



Assessing the health and environmental **impact** of plastics used in **synthetic surfaces** over their **entire life cycles**.
Postulat 24.3352



What are the objectives in **reducing** the **impacts** of **microplastics** from **tire abrasion** on national roads ?
Interpellation 24.3132



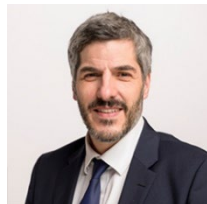
What is the planned limit regarding **intentionally added microplastics** ? Interpellation 24.3272



Political context for safety & sustainability of chemicals and materials in CH



- Let's fight littering and plastic pollution with **comprehensive packaging regulation**. Motion 24.3319
- How can we encourage **mechanical recycling of plastics** ? Interpellation 24.3306



Establish unified standards to prevent misleading **advertising** based on **ecological claims**.
Question 24.3198



Proliferation of **lithium batteries** in disposable electronic cigarettes. Dangers and costs for the community? Postulat 23.4236



2. What are the objectives and strategies related to safe and sustainable chemicals and materials ?




Objectives of the FOEN in the field of safety & sustainability of chemicals and materials

2024

Stratégie de l'OFEV
à l'horizon 2030



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1/6 Circular economy and immissions :

- **Reduce environmental impact throughout the life cycle** of products and structures, close the materials cycle, avoid waste generation and improve resource efficiency.
- **Respect limit values and reduction targets for immissions and substances** in order to protect the health of the population and the environment from any harmful or inconvenient effects. **With a view to prevention**, limiting damage as early as possible.



Priorities in the field of safety & sustainability of chemicals and materials

2024

Stratégie de l'OFEV
à l'horizon 2030



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Supporting sustainable manufacturing reuse and recycling of all materials, raw materials and products

- Parliamentary initiative 20.433 calls for the **circular economy** to be more closely **incorporated** in the **Environmental Protection Act**
- The FOEN's aim is to see **more materials and products** (based on the principles of the circular economy) **reintroduced** into the raw **materials cycle**.




Priorities in the field of safety & sustainability of chemicals and materials

2024

Stratégie de l'OFEV
à l'horizon 2030



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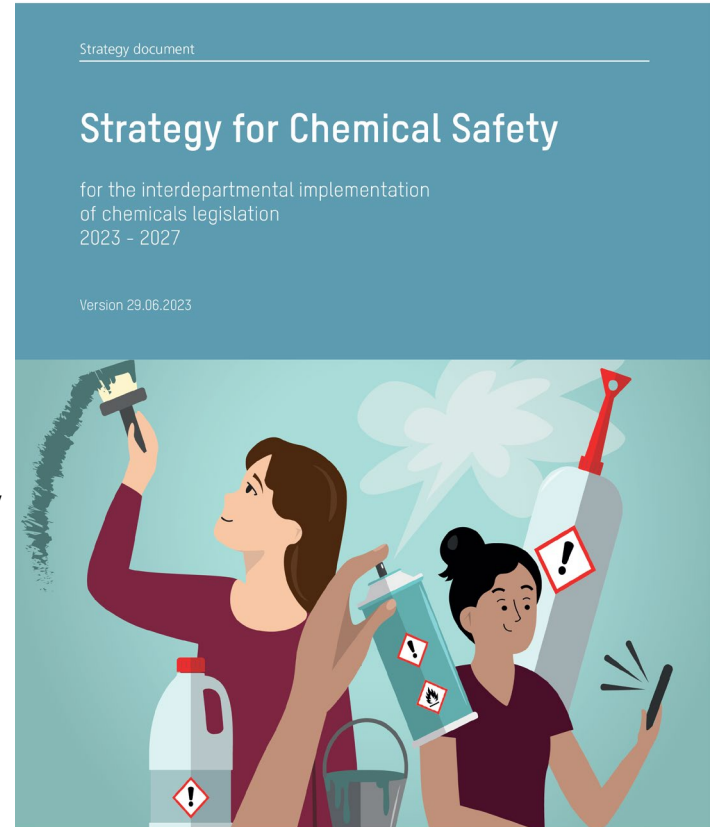
Reduce the load and risks associated with chemical products: PFAS, PPh and biocides

- Set or reduce **limit values** for water, soil and air, as well as for waste and remediation of contaminated sites.
- **Monitor the evolution** of impacts, sources into the environment and the success of measures taken
- Minimizing the inputs of problematic chemicals into the environment throughout **the life cycle**



Strategy for Chemical Safety 2023-2027: Vision

- At no point in their **entire life cycle** do **chemicals** have any harmful effect on the **environment** or on **human health**.
- If an environmental impact is intended, the chemicals involved are used in a way that ideally avoids and if not minimises any harmful side-effects





Strategy for Chemical Safety 2023-2027



A. Strategic objectives:

The fundamental principles of sustainable chemistry are respected in the manufacture, use and disposal of products as well as in the **development** of new processes and products.

B. Strategic measures

Projects, platforms and initiatives to help develop sustainable chemistry will be promoted and supported, **especially those adopting a Safe-by-Design approach** in their innovation phase and those designed to **substitute SVHCs** (see 7).



Research master plan Environment 2025-2028



Priority research areas

3.4 Establish the fundamentals and principles of green chemistry in the design, manufacture and use of chemical products and processes.



3. How is FOEN involved in the safety & sustainability of chemicals- and materials-related fields and activities ?



International commitments



Since 2007, we have been internationally engaged with UNIDO (with Ger and Aus) participating in :

- Chemical Leasing Working Group Vienna
- Global Chemical Leasing Award
- A joint declaration of intent was signed in 2016
- Organization of conferences on sustainable chemistry and chemical leasing (2014/2019)
- Contribution to the book Chemical Leasing



Chemical Leasing Goes Global

Selling Services Instead of Barrels:
A Win-Win Business Model for Environment and Industry

SpringerWienNewYork





International commitments

The GFC “*supports innovation to **provide better products that are safer and sustainable by design** and advance sustainable consumption and production patterns, including through resource efficiency and circular economy approaches*”

Strategic Objectives

D. Safer alternatives and innovative and sustainable solutions in product value chains that are already in place

Target D2

By **2035**, **Governments** implement policies that encourage production using **safer alternatives and sustainable approaches** throughout the life cycle, [...]





International commitments

The Global Plastic Treaty – Negotiation process

- Preparation of an international legally binding instrument to address plastic pollution crisis
Examples of terminology used:
 - *Product design, composition and performance*
 - *Safe and environmentally sound use*
 - *Promote product performance to] enhance the [design] [circularity] of plastic products, including packaging, and improve the composition [of plastics and] plastic products*
 - *Development of safe and cost-effective alternatives,*
- Tackling plastic pollution
- Whole life cycle of plastic





International commitments



**Working Party on
Manufactured Nanomaterials
(WPMN)**

**Testing and
Assessment
(SG TA)**



**Advanced Materials
(SG AdMa)**

**Safer and
Sustainable
Innovation
Approach
(SSIA SG)**

**Exposure
Measurement and
Exposure Mitigation
(SG8)**

Early Awareness and Action System
for Advanced Materials (Early4AdMa):
Pre-regulatory and anticipatory
risk governance tool to Advanced
Materials

Series on the Safety
of Manufactured Nanomaterials
No. 108

Working descriptions:
sustainability and SSbD
Inventory of frameworks,
methods,
aspects/parameters/
tools/toolboxes

**Regulatory
assessment and
management
(SG RA)**





Research and provision of tools for pre-regulatory assessment

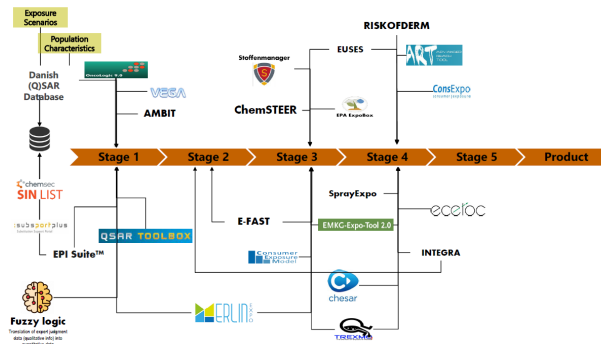
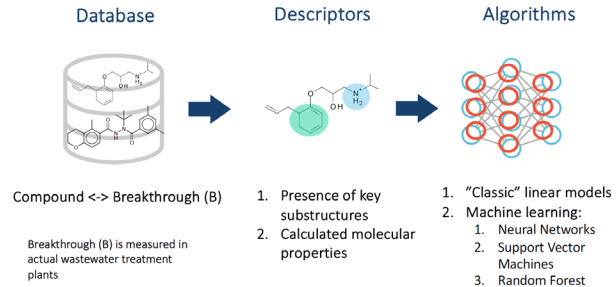


A machine learning-based QSAR approach to predict biological removal of organic micropollutants during wastewater treatment

Support of the PARC Toolbox through the development of two methods for evaluating the results of Sustainable by Design (SSbD) assessments



Precautionary matrix for synthetic nanomaterials



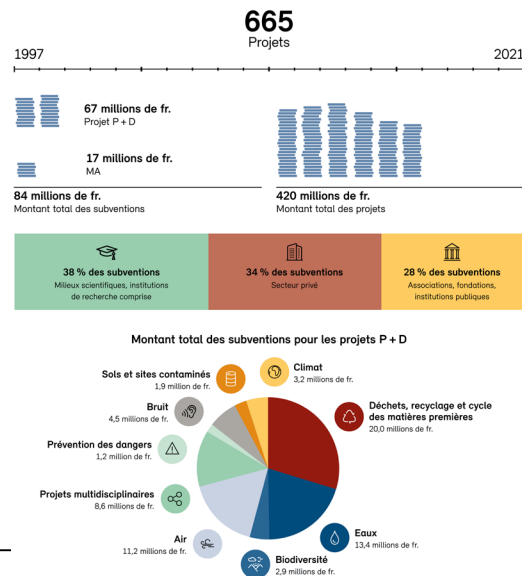


Promotion of sustainable technologies

Art. 49, para. 3, EPA (RS 814.01) empowers the Confederation to promote environmental technologies: «*The Confederation may promote the development of installations and processes that can reduce pollution in the public interest.*»

- Mobile fertilizer plant for production of fertiliser from urine
- Concrete recycling allowing CO₂ storage by carbonation
- Feasibility study for phosphorus recycling at the Thunersee WWTP
- **Long-chain aliphatic monomers from HDPE: Value-added chemistry towards circular economy DEHPOL**

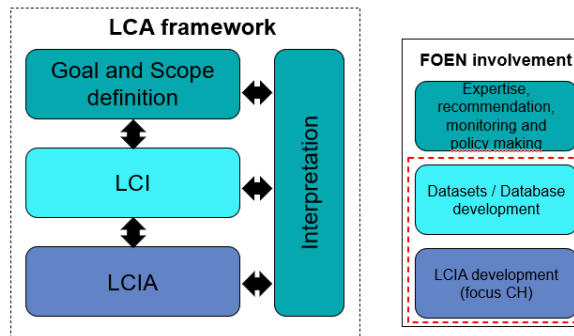
25 years of promoting environmental technologies (1997-2021)





Involvement in LCA field

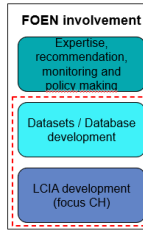
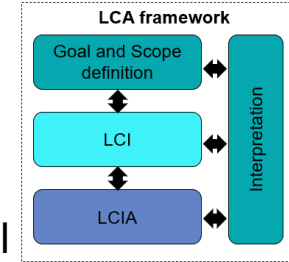
- Life Cycle Inventories (LCI):
 - Federal Administration has to develop disaggregated background data to perform LCA with Switzerland as focus area
- This requirement is given by:
 - Open Government Data Strategy: “*The strategic mission statement is open data by default*”
 - Strategy on Sustainable Development: “*Measure 1 - Make eco-inventory data available as open digital datasets*”
 - Law on Climate and Innovation: The Confederation must provide the necessary basis to support and monitor the net-zero goal for the Federal and Cantonal authorities





Involvement in LCA field

- Life Cycle Impact Assessment LCIA: Provide specific assessment method (Ecological scarcity)
 - Single score approach that considers the Swiss environmental objectives



Umweltvergr. / Methode	Treibhausgasbilanz	Ökologischer Fussabdruck	Eco-Indicator 99	UBP-Methode		ReCiPe 2016	Environmental Footprint PEF 3.0	Impact: World+ (2019)	LUNEP Life Cycle Initiative
				Schweiz (UBP'21 CH)	Deutschland (UBP'15 DE)				
Ressourcen									
Primärenergie, nicht erneuerbar	⊗	⊗	√	√	√	√	√	√	⊗
Primärenergie, erneuerbar	⊗	⊗	⊗	√	√	√	√	√	⊗
Erze und Mineralien	⊗	⊗	√	√	√	√	√	√	√
Süßwassernutzung	⊗	⊗	⊗	√	√	√	√	√	√
Biologische Ressourcen (Wildtiere)	⊗	⊗	⊗	√	√	√	√	√	⊗
Landnutzung (Biodiversität)	⊗	⊗	√	√	√	√	√	√	√
Landnutzung (Bodenfruchtbarkeit)	⊗	√	√	⊗	⊗	⊗	√	⊗	⊗
Lebensräume am Meer (Biodiversität)	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
Emissionen									
Treibhausgas CO ₂	√	√	√	√	√	√	√	√	√
Andere Treibhausgase	√	⊗	√	√	√	√	√	√	⊗
Ozonschicht-abbauende Stoffe	⊗	⊗	√	√	⊗	√	√	√	⊗
Sommersmog	⊗	⊗	√	√	√	√	√	√	⊗
Humantoxizität	⊗	⊗	√	√	√	√	√	√	√
Ökotoxizität	⊗	⊗	√	√	√	√	√	√	√
Verseuerung + Überdüngung	⊗	⊗	√	√	√	√	√	√	√
Radioaktive Emissionen	⊗	⊗	√	√	⊗	√	√	√	⊗
Lärm aus Verkehr	⊗	⊗	⊗	√	⊗	⊗	√	⊗	⊗
Lichtverschmutzung	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
Andere:									
Abfälle	⊗	⊗	⊗	√	√	⊗	⊗	⊗	⊗
Radioaktive Abfälle	⊗	⊗	⊗	√	⊗	⊗	⊗	⊗	⊗
Mikroplastik	⊗	⊗	⊗	√	⊗	⊗	⊗	⊗	⊗
Erosion von fruchtbarem Boden	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗

Basierend auf: Frischknecht R. (2020) Lehrbuch der Ökobilanzierung. SpringerSpektrum, Heidelberg, Tab. 4.13

→ Consider many environmental categories to provide conclusive & complete analysis based on the Swiss legislation

→ Could support the LCA aspect within the SSbD framework



4. Opportunities, challenges and concluding remarks



Challenges

- SSbD requires further work (testing models) for **practical implementation**.
- SSbD needs to reach a **good balance** between "ease of use", a reasonable number of experimental data, and low uncertainty.
- In order to assess sustainability, **collaboration** between **risk assessor** and **LCA experts** is needed.
- SSbD should also somehow support and help industries comply with regulatory requirements to **avoid duplication** or coexistence of parallel systems.



Conclusions

- The SSbD approach is an important **holistic tool** that is necessary to reach some of our **strategic objectives**.
- The data used should conform to the **FAIR** principles.
- We welcome this pre-regulatory and voluntary approach to **stimulate innovation** in safe and sustainable products and materials.
- We want to talk to the various stakeholders and discuss their **needs**.
- We encourage the **networking** of the various stakeholders and the establishment of exchange platforms.
- We **support research** in this area within the limits of available resources.



Thank you very much for your attention