

A background image of a molecular structure with blue spheres and connecting rods, overlaid on a dark blue rectangular area.

Implementation of the Safe and Sustainable by Design concept

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Safe-and-Sustainable-by-design



Working description from the Chemicals Strategy for Sustainability:

At this stage, **safe-and-sustainable-by-design** can be defined as a **pre-market** approach to chemicals that focuses on providing a function (or service), while **avoiding** volumes and chemical properties that may be **harmful to human health or the environment**, in particular groups of chemicals likely to be (eco) toxic, persistent, bio-accumulative or mobile.

Overall **sustainability** should be ensured by **minimising** the **environmental footprint** of chemicals in particular on climate change, resource use, ecosystems and biodiversity **from a lifecycle perspective**.

Safe and Sustainable by Design Chemicals and Materials. Revised framework (2025)

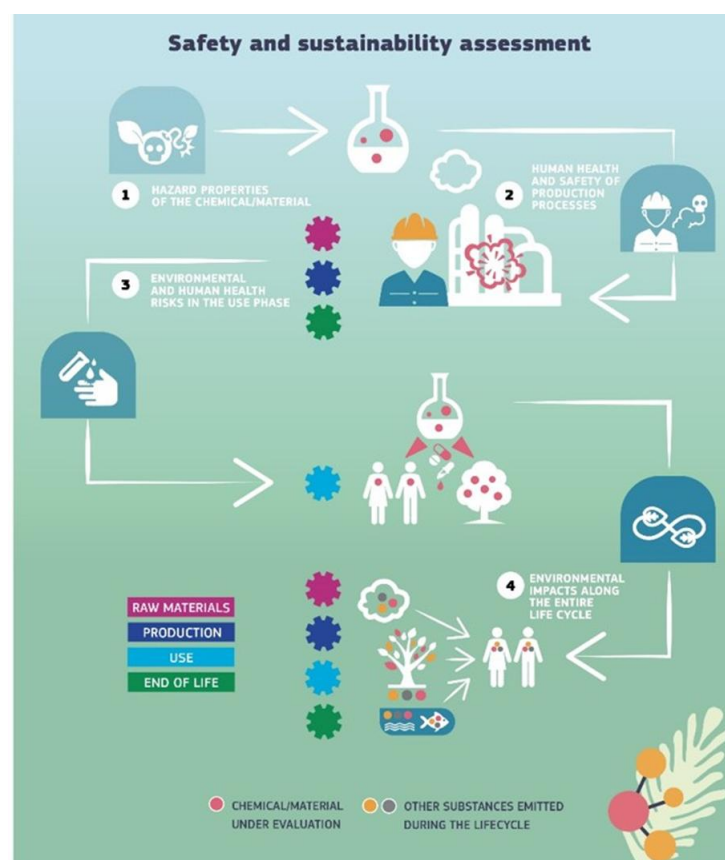
By integrating safety and sustainability from the earliest stages of innovation, the SSbD framework can support a more resilient, competitive and innovation based, future-proof industrial ecosystems.



A system approach integrating

- Safety
- Climate neutrality
- Circularity and functionality of materials, products and processes throughout their lifecycle

2022 EC SSbD Framework



➤ Implementation of design principles

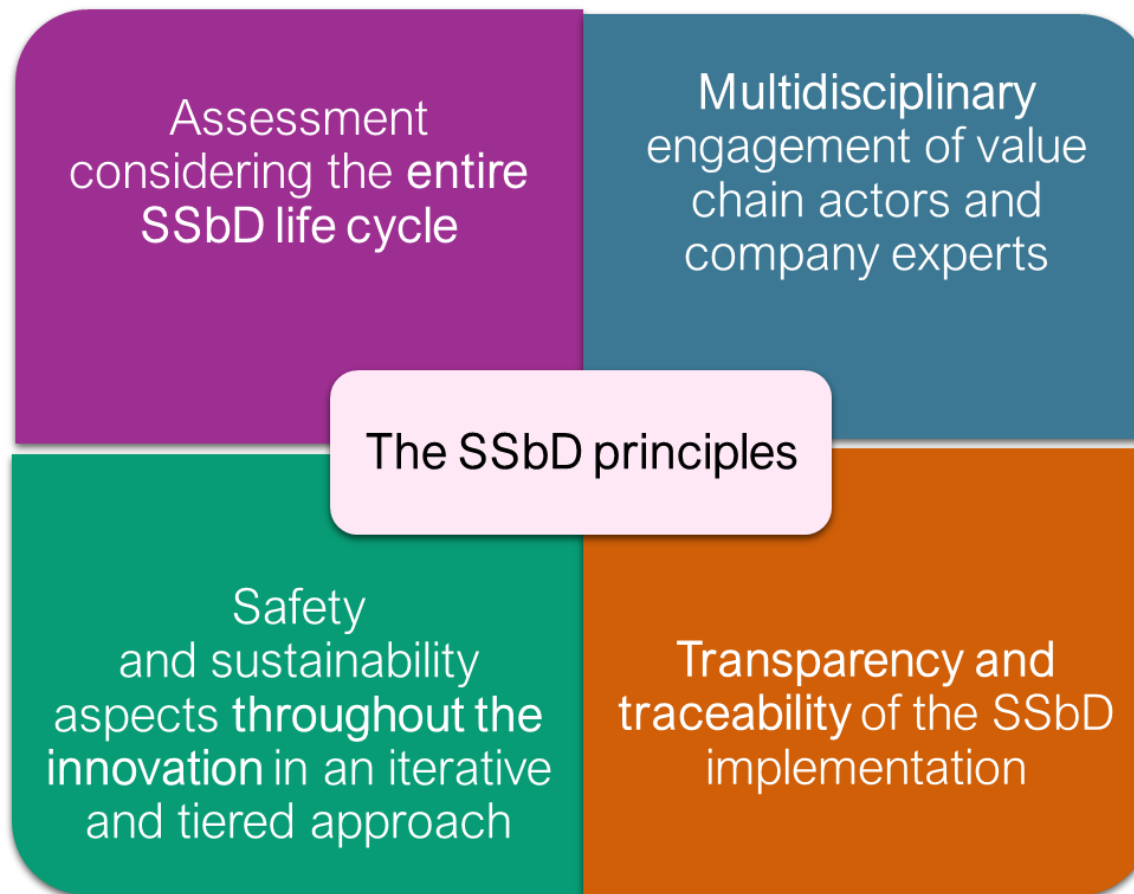
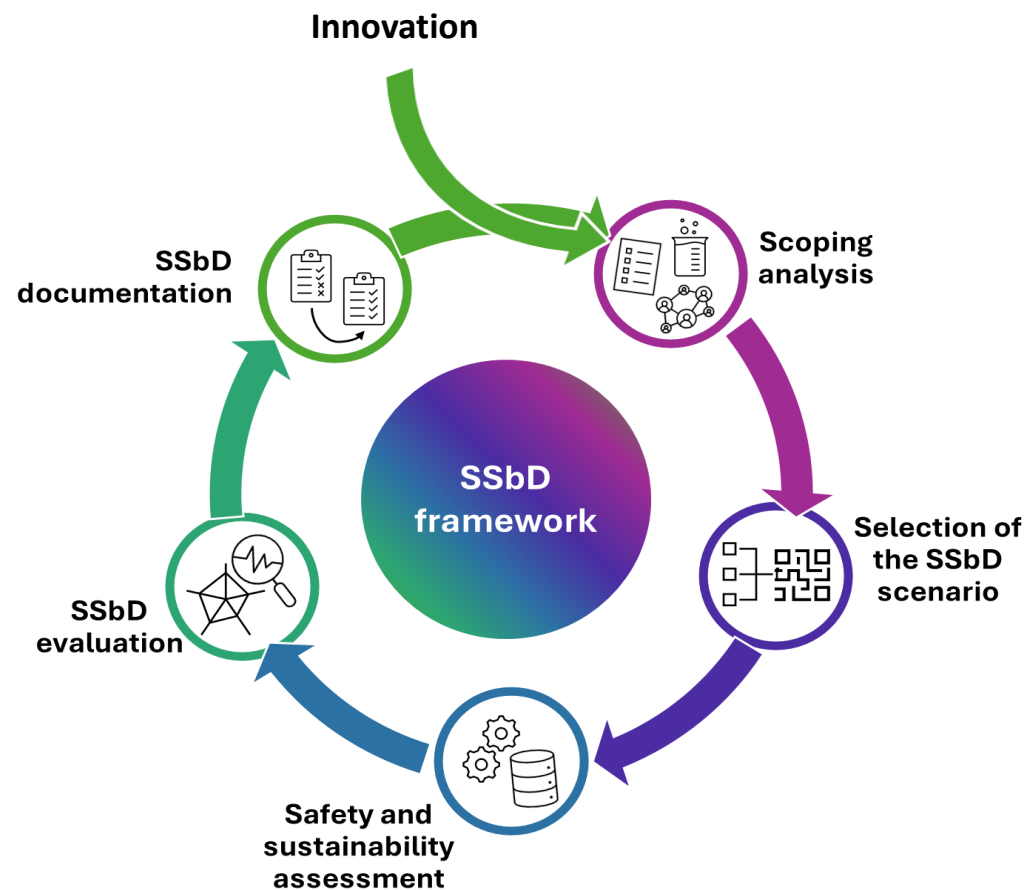
- SSbD1 Material efficiency
- SSbD2 Minimise the use of hazardous chemicals/materials
- SSbD3 Design for energy efficiency
- SSbD4 Use renewable sources
- SSbD5 Prevent and avoid hazardous emissions
- SSbD6 Reduce exposure to hazardous substances
- SSbD7 Design for end-of-life
- SSbD8 Consider the whole life cycle
- Others, based on specific sector under consideration and the particular application**

SAFETY	<p style="text-align: center;">Score Step 1, Score Step 2, and Score Step 3</p> <p style="text-align: center;">Hazard properties, Human health & Safety aspects in production and processing phase, Human health and environmental aspects in application phase</p>	SSbD SCORE / LEVEL
ENVIRONMENTAL SUSTAINABILITY	<p style="text-align: center;">Score Step 4</p> <p style="text-align: center;">Life Cycle Assessment</p>	
SOCIAL AND ECONOMIC SUSTAINABILITY	<p style="text-align: center;">Score Step 5</p> <p style="text-align: center;">Socio-economic aspects</p>	

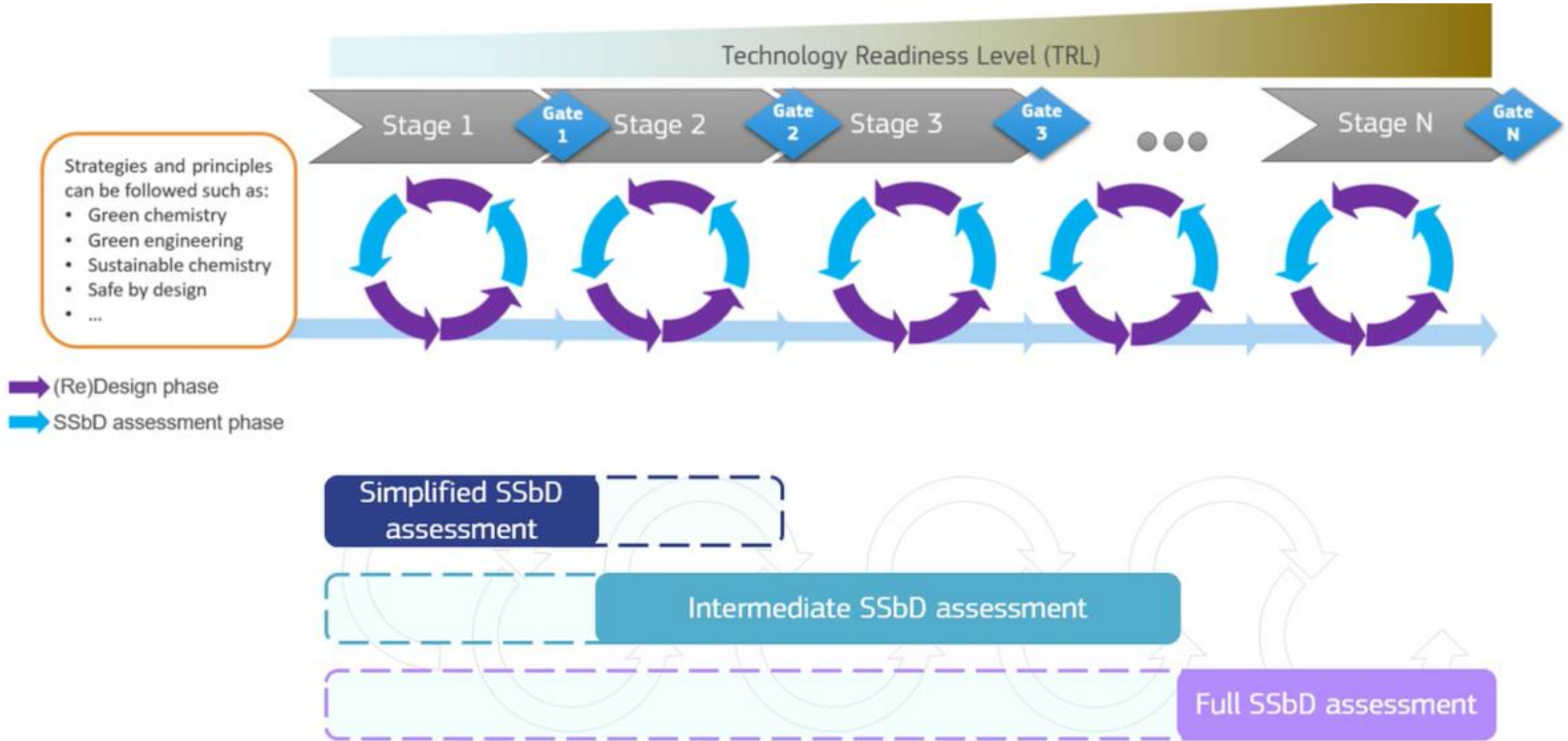
Revised 2025 EC SSbD Framework



The aim of the SSbD is to guide chemicals and materials innovation **from the (re)design, along all the innovation stages, scaling up from prototyping, to market readiness.**



Iterative and tiered assessment

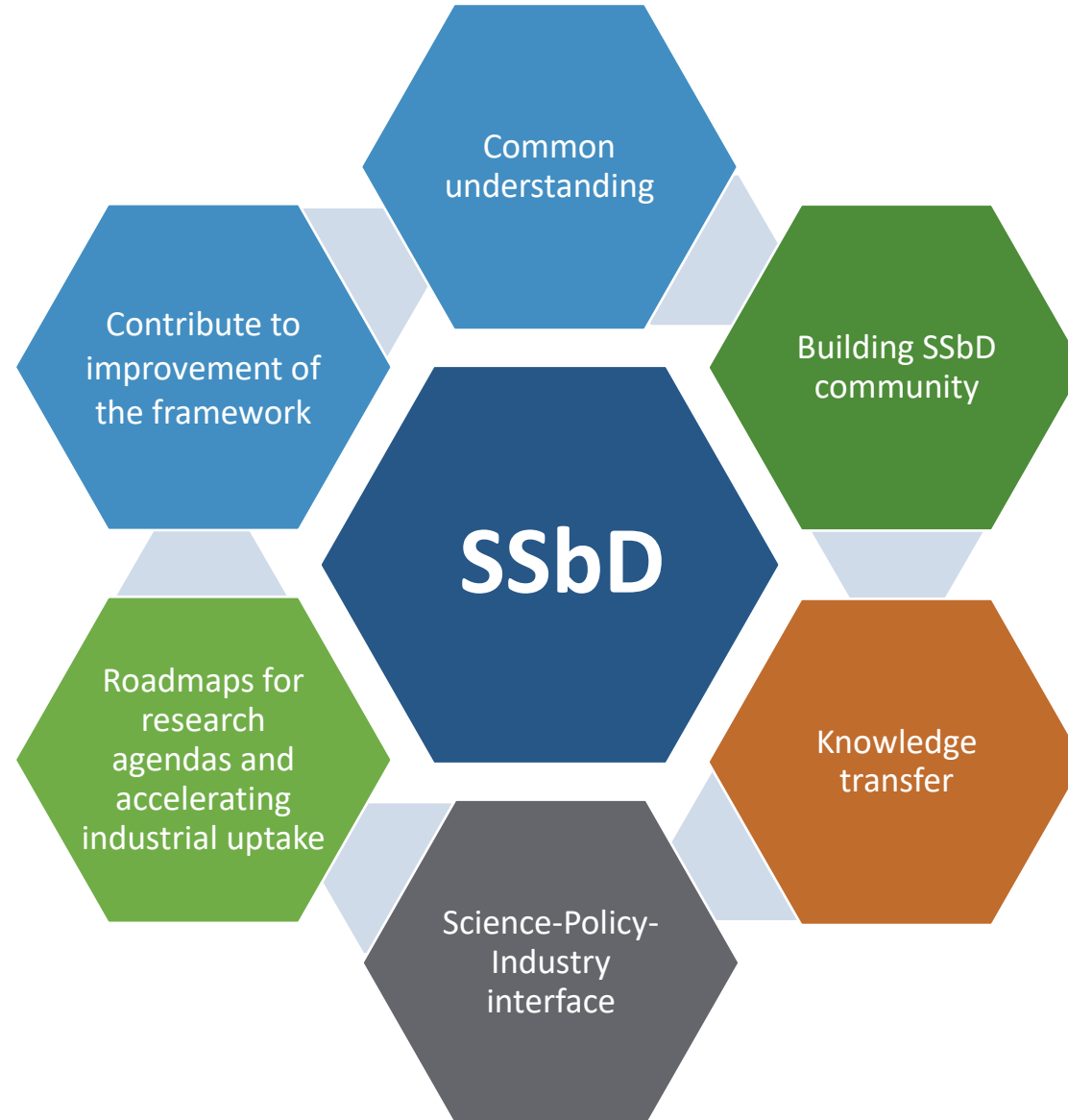


Linkages with relevant targets

- **Safe and sustainable management** of chemicals and materials throughout their life cycle. Prevention of negative effects from chemicals, processes and materials.
- Development of **reliable tools** for safety and sustainability assessment.
- **Traceability** through comprehensive data sharing - chemical properties, production, use, and environmental releases.
- Strengthening **networks and collaboration** among stakeholders to promote safe and sustainable chemical management.

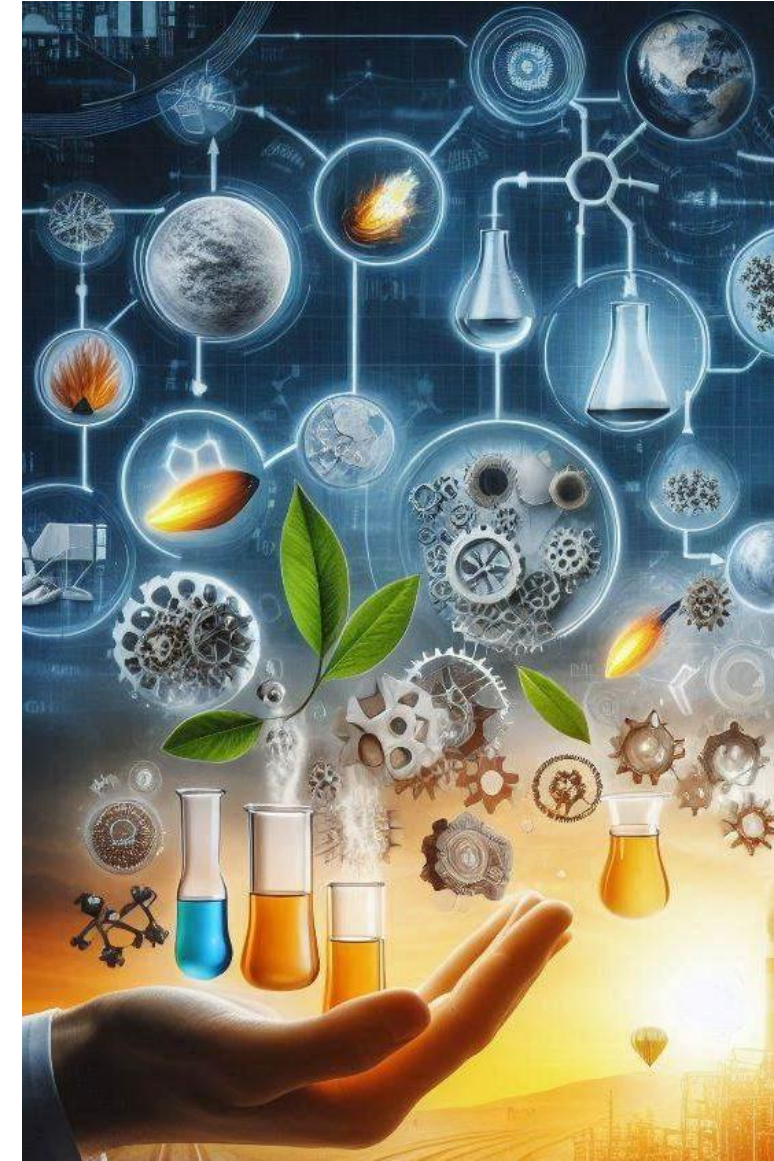


Synergize and connect



Creating solutions

- Strong need for **cooperation** between industry, policy and science/research
- **Transfer knowledge** and best practice from larger organisations to SMEs
- **Cross-exchange of knowledge** between different value chains and disciplines
- **Training** on methodologies, developing skills
- **Educational programs** at universities
- Discussion on **trade-offs**
- Measures **against greenwash**





Knowledge and tools

- ✓ Information and guidelines on SSbD
- ✓ Information on the latest scientific findings
- ✓ Newsletters
- ✓ Directory of tools for SSbD assessment
- ✓ Webinars
- ✓ Training sessions and workshops



Community and Networking

- ✓ Virtual collaboration areas
- ✓ Annual SSbD conference



Expert support

- ✓ Support to tackle SSbD challenges
- ✓ Support consortia building for projects
- ✓ IRISS SSbD community's joint voice for SSbD

Strengthen European industry's competitiveness regarding safe and sustainable processes, materials and products

SSbD 26

Stockholm, Sweden

 9 -11th of November 2026



Empa

Materials Science and Technology



Executive board and Value chain ambassadors



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