



IRISS workshop: Internationalization of the application of SSbD in materials and chemicals

26th of October 2023
2:30 – 4:30 PM CET



Funded by the
European Union

The project receives funding from the European Union's HORIZON EUROPE research and innovation programme under grant agreement n° 101058245

UK participants in Project IRISS are supported by UKRI grant 10038816

CH participants in Project IRISS receive funding from the Swiss State Secretariat for Education, Research, and Innovation (SERI)

AGENDA



2:30 – 2:35 | **Welcoming remarks**, Marco Falzetti (APRE Director)

2:35 – 2:50 | **Overview on the EU Policy Framework: background, objectives and main SSbD initiatives the EU level**, Sofie Nørager (European Commission, DG RTD)

2:50 – 3:05 | **Introductory session on IRISS Project: general overview, specific objectives and achieved results**, Emma Strömberg (IVL)

3:05 – 3:15 | **Ice breaking session: who are we?**

3:15 – 3:35 | **Global inputs towards the implementation of the SSbD Roadmap: scientific research needs, skills and knowledge sharing needs**, Christina Apel (LEUPHANA)

3:35 – 4:00 | **Best practices and Value Chains networks: an open discussion between EU and extra-EU experts**, Anne Chloé Devic (Cefic)

4:00 – 4:25 | **Challenges & Opportunities for further cooperation on SSbD**, Sara Anderson (IVL)

4:25 – 4:30 | **Conclusions**, Mattia Ceracchi (APRE)

WELCOMING REMARKS

Marco Falzetti
APRE Director



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Overview on the EU Policy Framework: background, objectives and main SSbD initiatives the EU level

Sofie Nørager – Industrial Transformation Unit
Directorate General Research and Innovation
European Commission



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Safe and sustainable by design chemicals and materials

*Sofie Nørager – Industrial Transformation Unit
Directorate General Research and Innovation
European Commission*

The European Green Deal



Chemicals Strategy for Sustainability

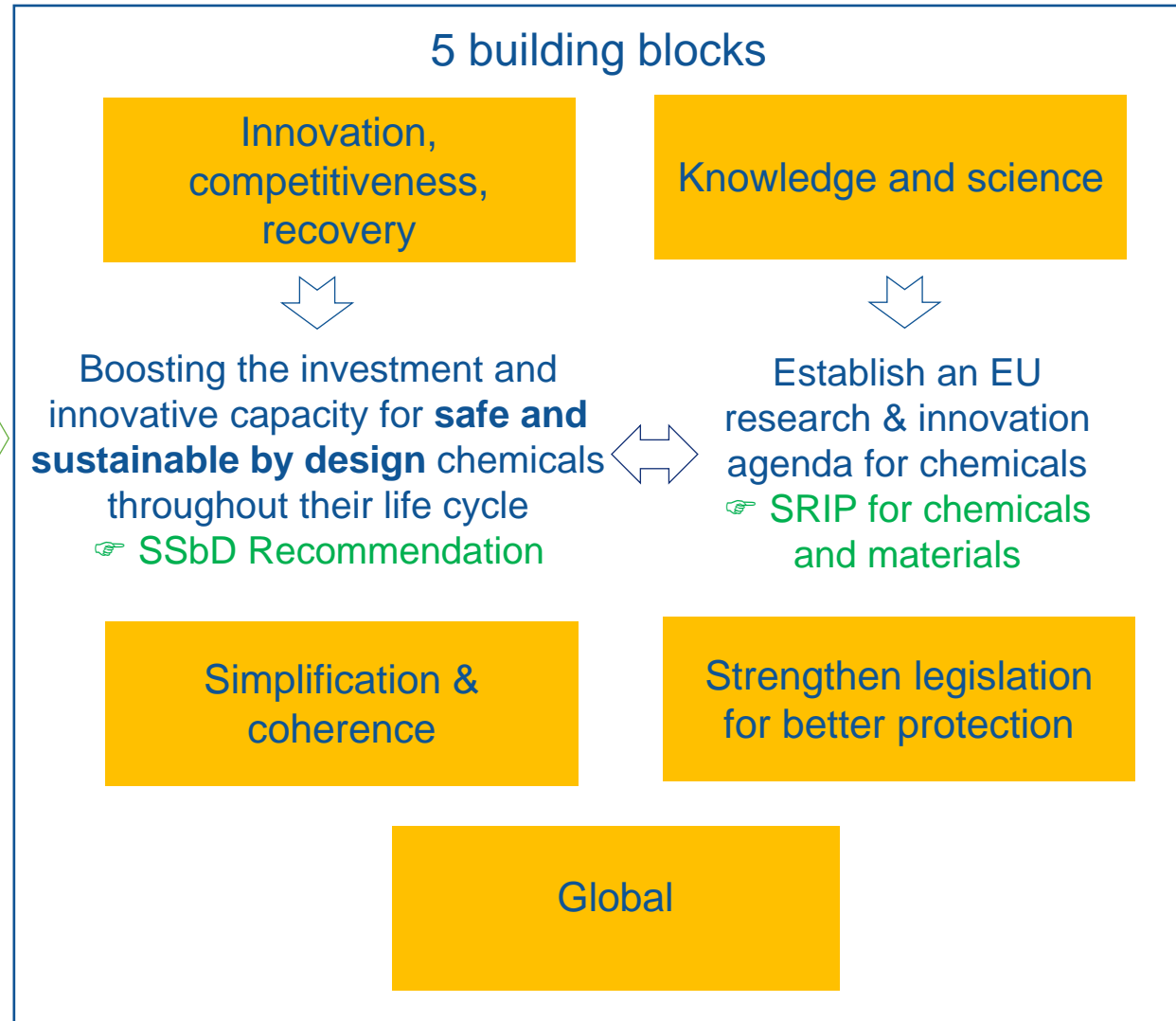
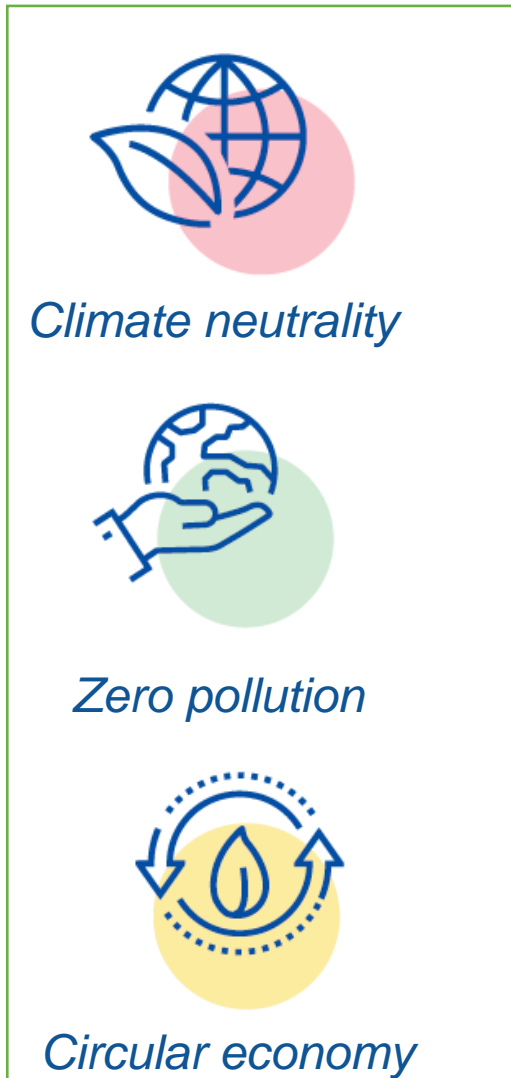
**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**Chemicals Strategy for Sustainability
Towards a Toxic-Free Environment**

{SWD(2020) 225 final} - {SWD(2020) 247 final} - {SWD(2020) 248 final} -
{SWD(2020) 249 final} - {SWD(2020) 250 final} - {SWD(2020) 251 final}

R&I in the Chemicals Strategy for Sustainability

The Green Deal



Chemicals Strategy for Sustainability

Expected impact of 'safe and sustainable by design'

- **Steering innovation process** towards the green industrial transition
- **Substitute** (as far as possible) or **minimise** the production and use of **substances of concern**
- **Minimising the impact on health, climate and the environment** (air, water, soil) during sourcing, production, use and end-of-life of chemicals and materials



➔ **Enabling change through R&I**

SSbD Recommendation: Purpose and scope



- Proposes a European **framework** for ‘**safe and sustainable by design**’ chemicals and materials for **R&I activities on a voluntary basis**.
- Addressed to Member States, industry, academia and research and technology organisations (RTOs).
- The purpose of this Recommendation is to **test the assessment framework** and get feedback to be able to improve relevance, reliability and operability.
- Results obtained from applying the framework will make it possible to **refine the framework** and **define ‘safe and sustainable by design’ criteria** to guide the design process.



Brussels, 8.12.2022
C(2022) 8854 final

COMMISSION RECOMMENDATION

of 8.12.2022

establishing a European assessment framework for 'safe and sustainable by design' chemicals and materials



ISSN 1831-9424



JRC Technical Report

**Safe and Sustainable by Design
chemicals and materials**

*Application of the SSbD
framework to case studies*

Caldeira, C., Garmendia Aguirre, I., Tosches, D.,
Mancini, L., Abbate, E., Farcas, R., Lipsa, D.,
Rasmussen, K., Rauscher, H., Riego Sintes, J.,
Sala, S.

2023

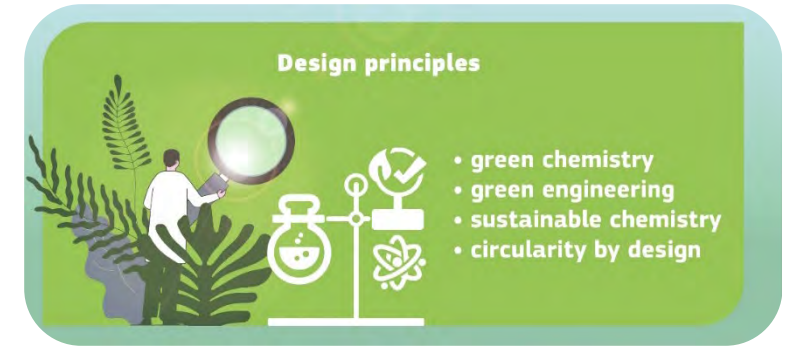


European
Commission

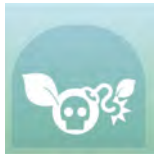
The SSbD framework

Stage 1: guiding (re)design principles

- Principles to be considered to maximize the possibility of a successful safety and sustainability assessment outcome



Stage 2: safety and sustainability assessment



- Step 1 - Hazard assessment of the chemical/material



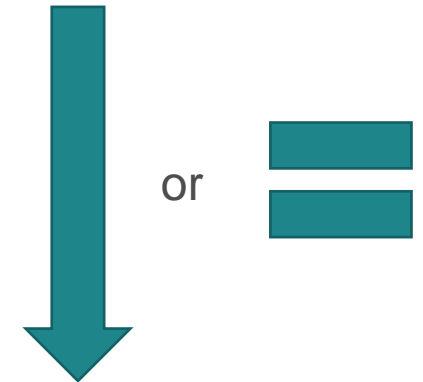
- Step 2 - Human health and safety aspects in the chemical/material production and processing phase



- Step 3 - Human health and environmental aspects in the final application phase

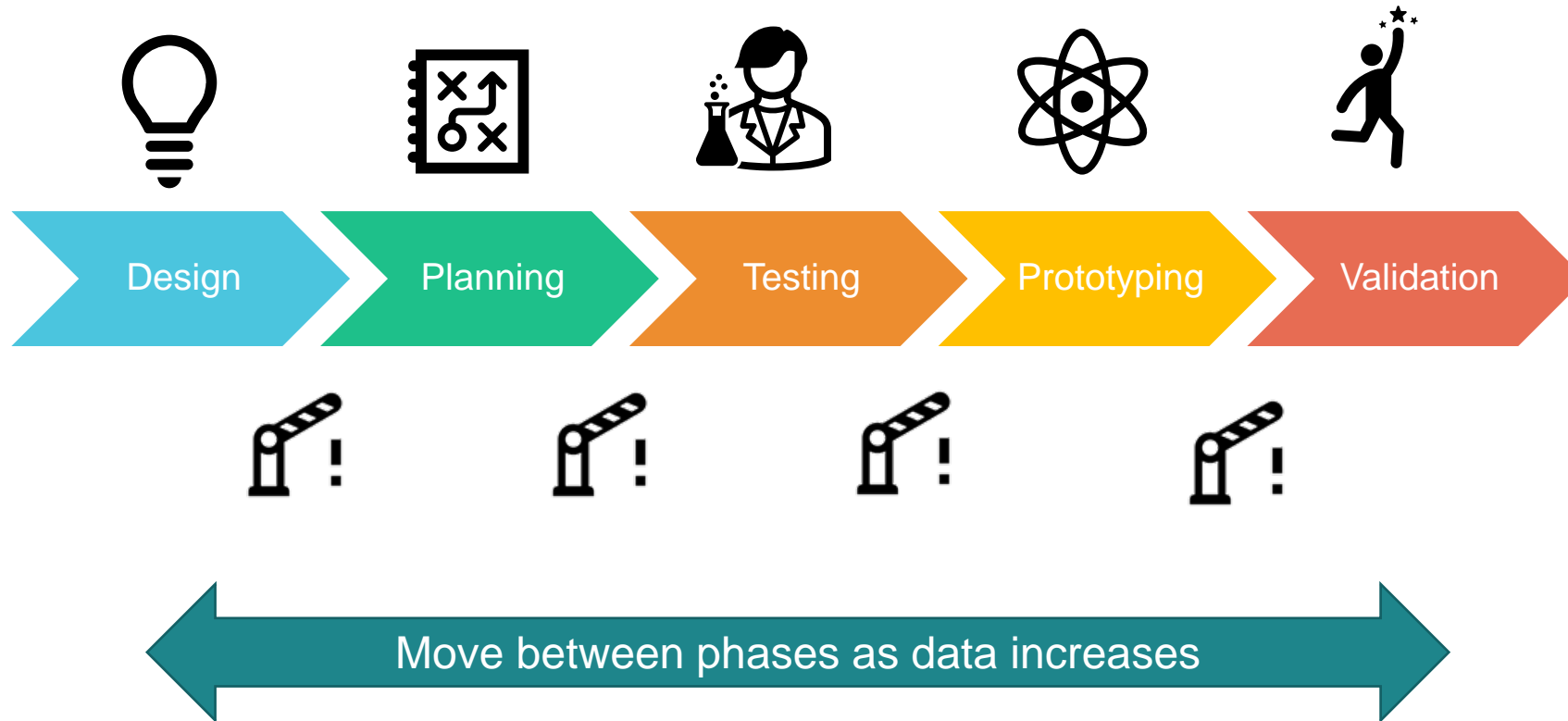


- Step 4 - Environmental sustainability assessment



SSbD along innovation stages

A voluntary approach: SSbD is neither a regulation, nor mandatory



Important information

- SSbD is an **R&I approach** to promote use of the latest scientific knowledge, **harmonize assessments** and to meet ambitious levels for **safety and sustainability in innovation**.



- SSbD is **voluntary** and promoted **within R&I actions** across EU research programmes, especially Horizon Europe. Member States, industry, academia and RTOs are invited to promote the use of SSbD in innovation.

1st case studies for applicability

1. Plasticisers in food contact materials
2. Flame retardants in IT products
3. Surfactants (enzymes) in textiles

Lessons learned:



Integration of safety and sustainability

- Improve the consistency within the steps
- Definition/terminology
- System boundaries/Scope of the assessment
- Overlaps/complementarity



Data

- Availability
- Quality
- Harmonisation
- Communication
- FAIR



Methodologies and tools

- Modeling of chemical functionality
- Availability of tools to estimate data
- Availability of tools to model specific application scenario



Expertise and resources

- Training
- Databases
- Data management



Participative testing period

2023

- A **two years** period to test the framework and collect feedback – starting January 2023

2024

- Stakeholders input via the **reporting template** in **defined periods** – 2023 reporting period from 1 May – 30 June
- One **stakeholder workshop** per year - Q4 2023 and Q4 2024
- Provide **methodological guidance** and collect input on new/updated assessment methods and data availability

2025

- **2025 start the revision** of the framework and **definition of criteria** to guide the design process of chemicals and materials

Next steps

- Next SSbD hybrid workshop 6-7 December in Brussels
 - Input from 1st testing period
- 2nd reporting period Q2 2024
- In addition:
 - Bootcamp(s)
 - Collaboration with SETAC
 - Coordination with projects funded under Horizon Europe



Important links




- Join the SSbD stakeholder network: <https://ec.europa.eu/eusurvey/runner/9c66713d-15e4-b8ea-36b4-d5d1d8b471db>



- Dedicated SSbD webpage for testing phase: https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/chemicals-and-advanced-materials/safe-and-sustainable-design_en#documents



- Chemicals and Advanced Materials webpage: https://research-and-innovation.ec.europa.eu/research-area/industrial-research-and-innovation/key-enabling-technologies/advanced-materials-and-chemicals_en



MAKING CHEMICALS AND MATERIALS SAFE
AND SUSTAINABLE TO PROTECT HUMAN
HEALTH AND THE ENVIRONMENT.

Join us in testing the **framework**
and using the safety and sustainability
assessment for your R&I activities
on chemicals and materials.

This framework can

- steer **innovation**
- become a global **reference**
- accelerate the development of **alternatives**
to substances of concern.

Thank you



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The international ecosystem for accelerating the transition to Safe-and-Sustainable-by-design materials, products and processes

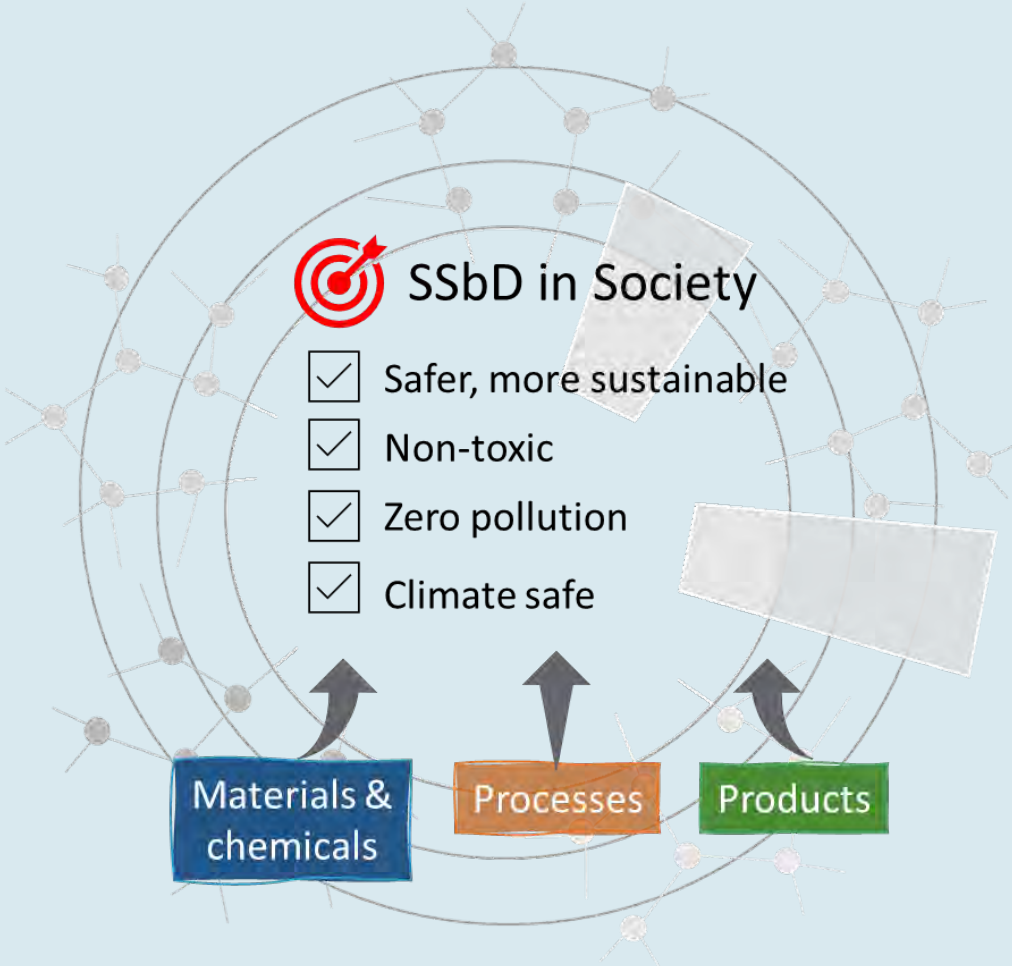
Emma Strömberg
IVL Swedish Environmental Research Institute

Why – identified needs

The transition to Safe-and-Sustainable-by-Design innovation is a **societal urgency** assuring toxic free environment and preservation of the resources

Identified needs:

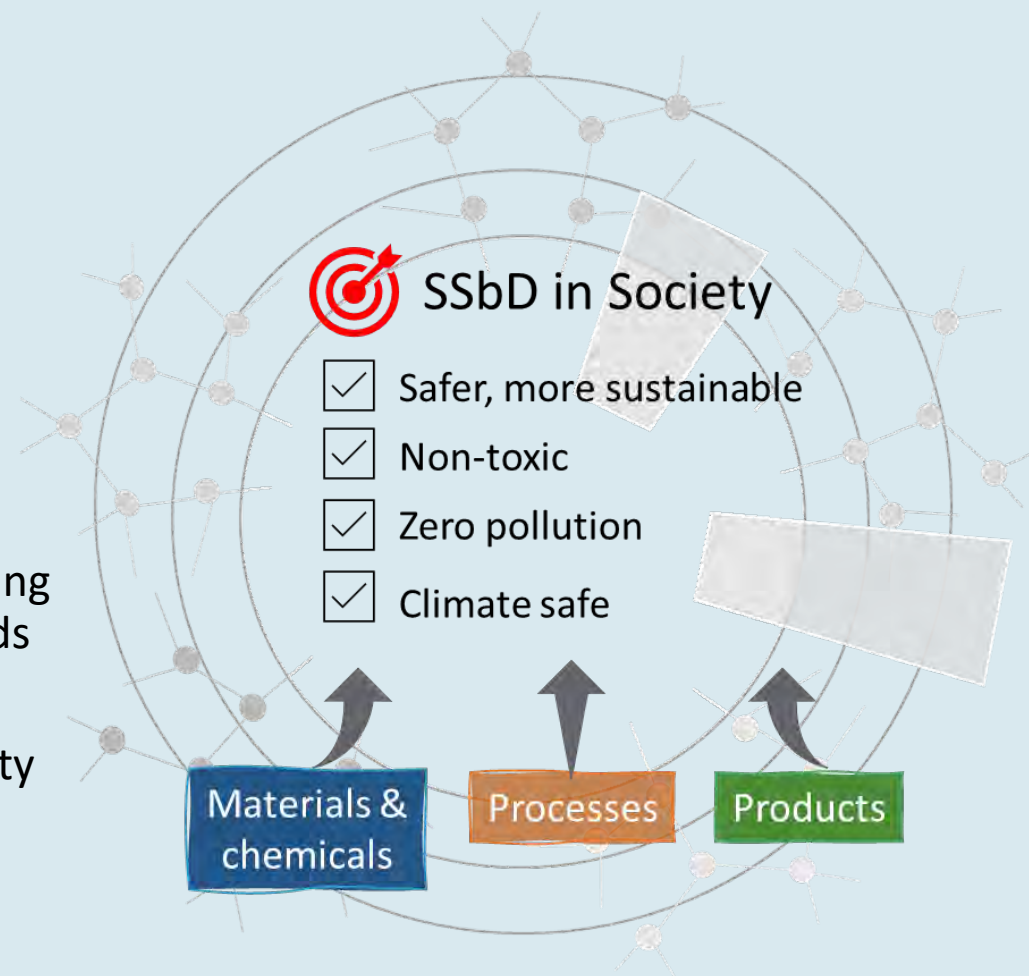
- **Common understanding** of the SSbD concept
- **Criteria and guiding principles** for SSbD (integrating safety, circularity and functionality of materials, products and processes throughout their lifecycle)
- A permanent structure for long-term operation of **established expert’s network** with the involvement of wider communities engaged
- Broadly supported and periodically updated **roadmaps** based on state-of-the-art knowledge, identified information gaps and their translation into specific R&D questions and governance needs
- **Support** in implementation of the SSbD framework



What - Scope of the project

The IRISS project aims to connect, synergize and transform the SSbD community in Europe and globally towards a life cycle thinking

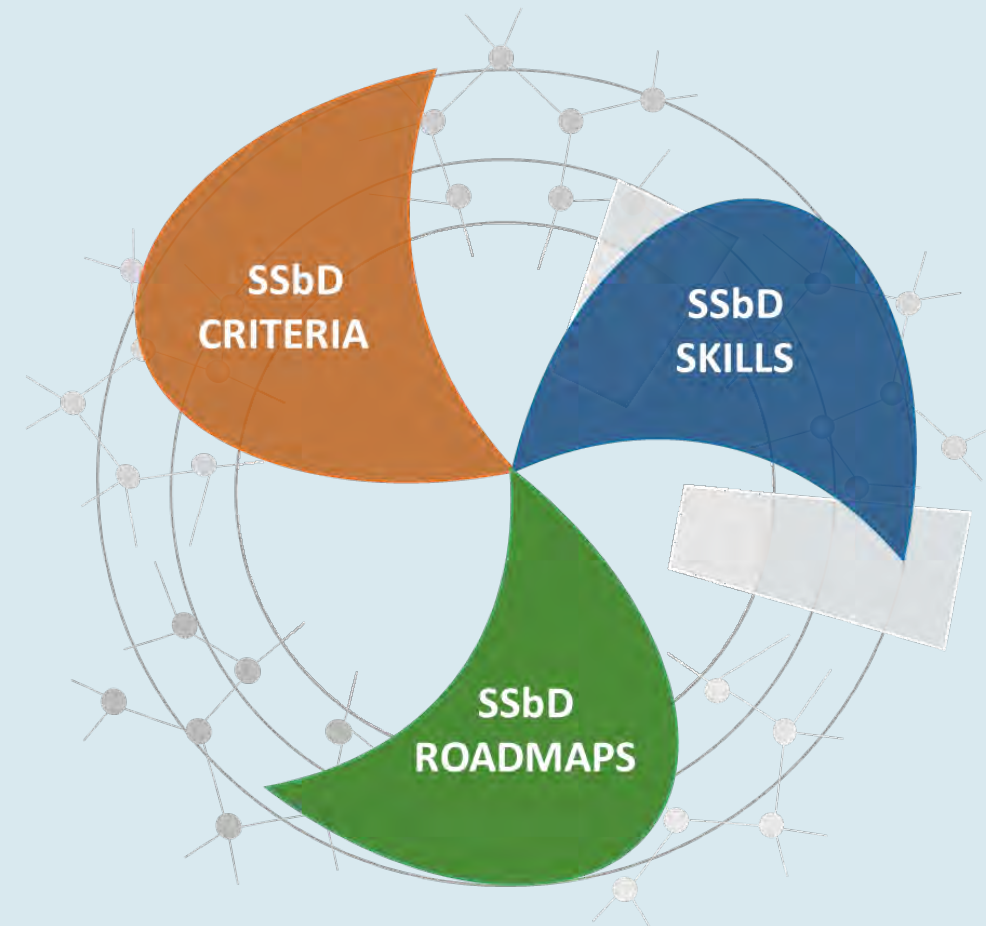
- Develop a **global permanent network** for long term cooperation between the networking members, engaging partners beyond the consortium, throughout and beyond the duration of the project
- Strongly support the **SSbD implementation** in industry **along value chains** to achieve more safe and sustainable products for society
- Focus on **materials including both products and processes**, considering the extensive progress to-date in chemicals and nanotechnology fields
- Establish cooperation mechanisms with relevant international initiatives to **align** and leverage the extensive international community
- Establish **synergy** with industry, EC and the projects that are working with SSbD concepts
- Building, sharing and transferring the **skills and knowledge** on SSbD



How – organisation and activities

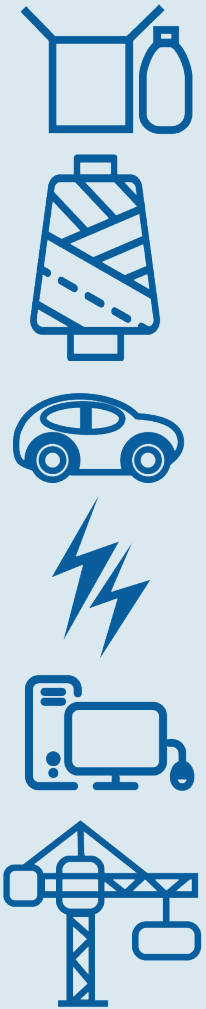
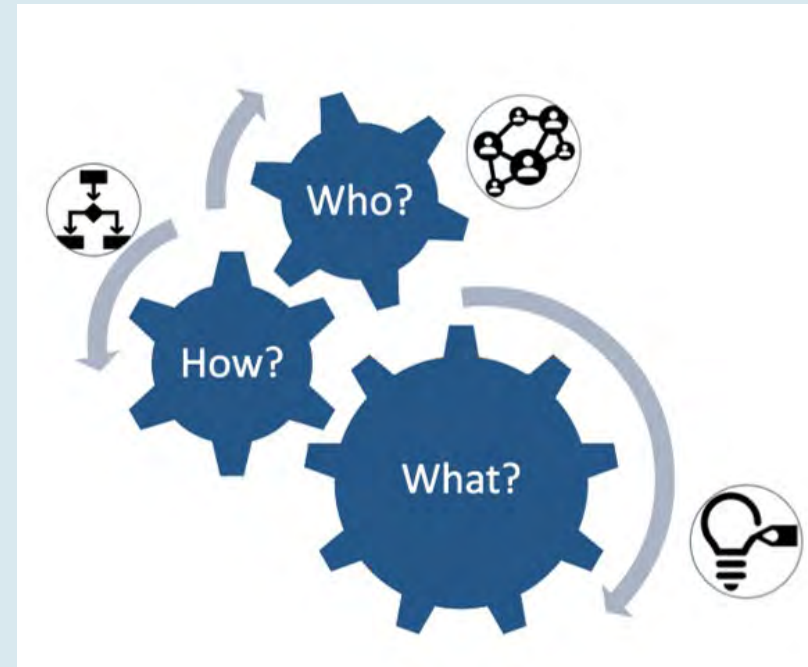
Mapping SSbD methods and criteria and Gap analysis

- **Safe-by-design and sustainable-by-design** criteria and methods
 - Methods along the whole **design and innovation processes** (Stage Gate Model) applied in **industry and in R&D projects**
 - **Engineering tools** for the implementation of SSbD principles at design stage
- Existing **sustainability criteria initiatives** (Ecolabels, Ecodesign directive...) and **design for recycling**
- **Existing SSbD frameworks**
- Sustainability **Environmental dimension: LCA** (Life Cycle Assessment), **Social dimension: S-LCA**
- **Skills** for application of SSbD



How - Supportive Roadmap and Value chains SSbD ecosystem

- Development of a broadly supported **SSbD Roadmap**
 - Aligning research needs to the innovation process
 - Skills, competences and education needs, and
 - Knowledge and information sharing needs
- Value chain **analysis**
- Value chain SSbD criteria **gap analysis**
- **Uptake** of the SSbD approach by the value chains
- **Value chain-specific** research and innovation roadmaps
- **Engagement** with additional value chain networks, internationalization and integration in the permanent structure
- **Case studies** for implementation of the SSbD framework



Establishment of an EU Led International permanent network

- A structure for continuous **co-creation, cooperation and services** to network members and other stakeholders with interests in SSbD
- Strengthen **collaboration and information exchange** between relevant actors along the value chains
- Build a **platform containing services** addressed to different key target groups
 - Training service for SMEs
 - Service for start-ups to boost business collaboration with industry
 - Co-creation service to establish hubs for specific value chains
 - Knowledge exchange services
 - Knowledge sharing services



Towards an efficient science-policy-industry interface

Building structural and efficient information sharing process and network



Science:

Initial steps on operationalization of SSbD

- IRISS-NSC collaboration
- IRISS-PARC collaboration
- IRISS-ongoing H2020 and HE projects

Bringing science to harmonization and standardization

- IRISS-OECD synergies



Policy:

IRISS structural dialogue with:

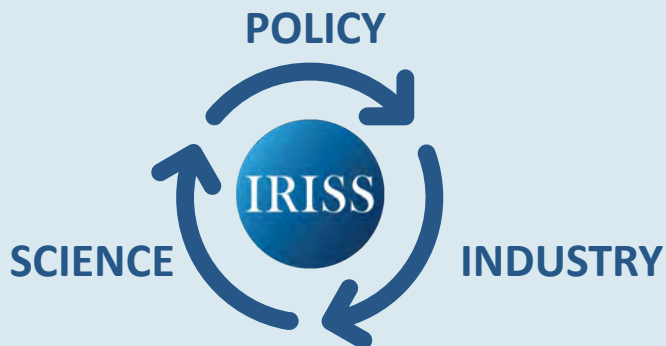
- EC RTD
- EC JRC



Industry:

Cefic coordinates SusChem NTPs and 7 value chains representatives

- **Packaging** (IPC; Industrial Technical Centre for Plastics and Composites)
- **Textiles** (ETP; EU Technology Platform for the Future of Textiles & Clothing)
- **Construction chemicals** (EFCC; European Federation for Construction Chemicals)
- **Automotive** (CLEPA; European Association of Automotive Suppliers)
- **Energy materials** (EMIRI; Energy Materials Industrial Research Initiative)
- **Electronics** (INL; International Iberian Nanotechnology Laboratory)
- **Fragrances** (IFRA; The International Fragrance Association)



Science-Policy-Industry Interphase

Major findings

- The Safe-and-sustainable-by-design (SSbD) is central in the EC Chemicals Strategy for Sustainability, but a **common understanding on the SSbD concept** and what it is in practice is still needed
- Preservation of previously generated **SbD knowledge** and ensuring its effective **transfer to SSbD** is necessary
- **SbD toolboxes** should be useful for SSbD, especially after their sufficient refinement, adaptation, and organization along the stage-gate mode
- Further development of **computational SSbD tools** that can operate under data and time constraints to truly operationalize SSbD - such tools require creation of relevant models that depend on physical tests
- **Case studies** from the sectors of chemical safety, sustainable and green chemistry, and benign-by-design should be explored further

Key results (missing in SSbD):

- Accounting for **material functionality** is important = can bridge gap between industrial and policy SSbD approaches
- Generally, most frameworks focus on production stage of lifecycle in detail to align with the 'by-design' (stage-gate or early innovation) concept = **need to combine stage-gate model and lifecycle approaches**

Skills and knowledge

Industrial perspective

- A clear **distinction between safety and sustainability** - high chemical safety related skillset - must comply with safety legislation for a long time, i.e., with REACH and CLP as well as sector-specific ones
- Focus on safety **largely varies between value chains** and production stages (for example worker safety, user safety or environmental safety)
- **Sustainability** - a more recent concept, and is much less established or integrated - lack of regulation - **market demand** is the major driver of sustainability efforts



Skills and knowledge

Training needed

- Training services on **sustainability aspects** - skills related to performing an LCA (mostly environmental, but also social and economic) and applying appropriate tools
- Better understanding of the **SSbD framework and its implementation** - at present the framework is **too complex** for companies (SME especially) to comprehend and work with and often difficult to translate to specific sectors
- Necessity for **knowledge-transfer along the value chain** - collaboration needed to share the relevant data or information for the whole product life cycle
- **Education** on SSbD needs to be encouraged within companies

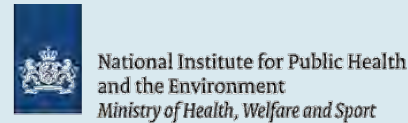


Collaboration

- State of the art SSbD knowledge sharing – Harmonization - International scientific collaboration
- Pool of experts for implementation of the SSbD framework
- Experience from case studies from the 7 value chains
- Support through seminars and webinars
- Services through the platform - Support industrial understanding
- Visibility in SSbD community (IRISS network) – direct use for industry
- Connection with other initiatives (for example ISC3, Change Chemistry (former GC3), AMI2030)
- International collaboration on environmental, ethical and societal aspects of chemicals and materials



Who - Our partners



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Contact and more information

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www.iriss-ssbd.eu



#IRISS_SSbD

IRISS – International SSbD network



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ICE BREAKING SESSION: WHO ARE WE?



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Best practices and Value Chains networks: an open discussion between EU and extra- EU experts

Anne Chloe Devic
SSbD Consulting Europe and Cefic



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IRISS Value chains



Packaging

(IPC; Industrial Technical Centre for Plastics and Composites)

Textiles

(ETP; EU Technology Platform for the Future of Textiles & Clothing)

Automotive

(CLEPA; European Association of Automotive Suppliers)

Energy materials

(EMIRI; Energy Materials Industrial Research Initiative)

Electronics

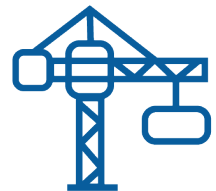
(INL; International Iberian Nanotechnology Laboratory)

Construction

(EFCC; European Federation for Construction Chemicals)

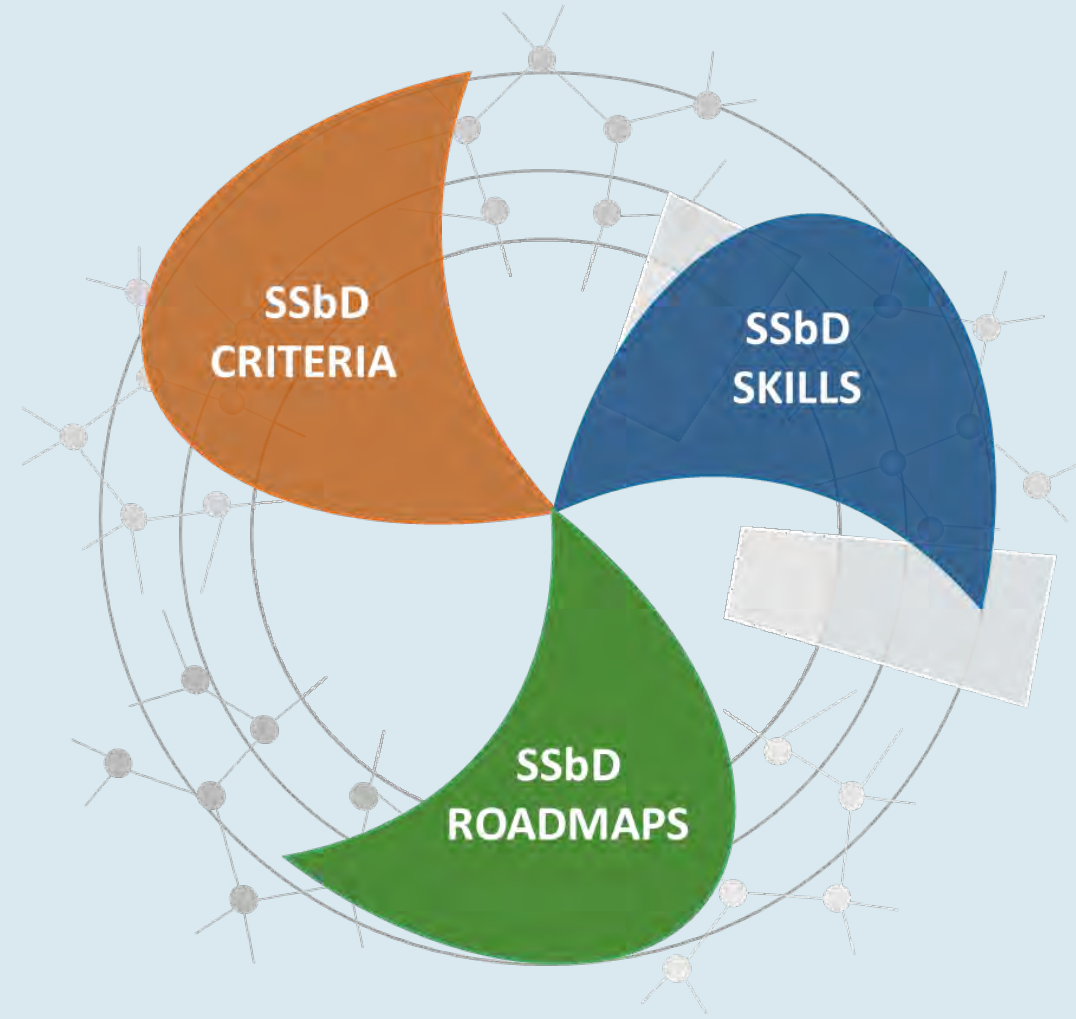
Fragrances

(IFRA, International Fragrance Association)



IRISS: Value chains SSbD ecosystem : working together

- **Value chain perspective**
 - **Analysis & challenges**
 - **Skills needs – gaps**
 - **Baseline analysis of SSbD criteria** - specificities and common grounds
 - SSbD criteria gap analysis
- Uptake of the SSbD approach by the value chains : **SMEs** as a target .
- Value chain-specific research and innovation SSbD roadmaps
- **Engagement with additional value chain networks, internationalization and integration**
- Case studies for implementation of the SSbD framework



Textiles example : Lifecycle Thinking Approach

Major safety and sustainability challenges in textiles

SAFETY	SUSTAINABILITY
<p>Human health and ecological impacts of textile processing and functionalisation chemicals and effluents</p>	<p>Environmental impacts associated with the production of natural and man-made fibres and their subsequent processing and manufacturing to produce textiles incl. the depletion of soil and water resources in the production of natural fibres (especially cotton)</p>
<p>Dispersion/persistence of textile fibres & chemicals released in the environment during production, use and end-of-life (microplastics)</p>	<p>Assurance of reliability, traceability and transparency of SSbD-related data and information along complex global textile value chains and capacity building among small-to-medium enterprises making up most of the textile and clothing value chain</p>
<p>Safe recycling/disposal of end-of-life textile products</p>	<p>Improvement of occupational health and basic labour rights in textile and garment factories (mainly in lower cost manufacturing locations outside Europe)</p>

Textiles Ecosystem Transition Pathway – Co-creation process

Brussels, 30.3.2022
COM(2022) 141 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

EU Strategy for Sustainable and Circular Textiles

The presence of hazardous substances used in textile products placed on the EU market, around 60 of which are considered as carcinogenic, mutagenic or toxic to reproduction, is a source of concern that the Commission is addressing under REACH²². Furthermore, by developing criteria for safe and sustainable by design chemicals and materials, the Commission will support industry to substitute as much as possible and otherwise minimise the substances of concern in textile products placed on the EU market, as announced in the Chemicals Strategy for Sustainability²³. This is in line with the actions to increase the protection of workers exposed to hazardous substances as defined in the EU strategic framework on health and safety at work 2021-2027²⁴.



Lutz Walter

Main Results: Challenges, Gaps and Needs



VC	Design Principles and Procedures	Safety by Design	Occupational Health, Safety and Environmental Risks	Environmental sustainability (including Lifecycle Assessment)	Social and techno-economic assessment	Other: Trade-offs and Challenges
Packaging	Vast variety of SSbD principles that co-exist in packaging Value Chain	lack of harmonized method to quantify presence of a substance	site is carrying of OHSE evaluation and it is not consolidated with design team.	need of harmonized LCA Product Category Rules	Develop tools for S-LCA and LCC	Substitution of material (functionalities)
Textiles	In this highly regulated market, little incentive to change if all legal certifications are met	SbD is focused on the safety of the user and not the longer term LCA or Circulatory impacts of the use of toxic material	OHS not regarded as major problem in Europe. Risk issues more likely in the global supply chain	Recycled materials may still contain contaminants but below regulatory trigger levels	If you are a small brand agitating for S-LCA change, instead of responding positively you may find yourself dropped as a client of that manufacturer	Cost from design to market will have an influence on SSbD viability of every stage of the supply chain
Construction	For additives , green chemistry principles-design driven by CO2 reduction	CMR superplasticizers case –strictly REACH driven	Taken in account during design phase	Energy , CO2 and H2O footprints Landfill or recycling – Long lifetime of the product to be considered	Shoul dbe included in the LCA	Raw material sourcing outside EU
Automotive	Regulatory pressure to reduce use of raw materials in components and to recycle rare materials	Make sure that components built outside Europe meet relevant EU SSbD standards	Meet the EU regulatory standards on worker safety	PEF and LCA development are high on the agenda but still much work to be done to implement the strategies		Barriers to the substitution of high risk or toxic materials may be technological or financial or both especially for SMEs-challenge
Energy	resources availability	Lack of Tools and methodologies that perform environmental and social life cycle assessment	batteries thermal runaway risk	research on the possible environmental implications of LIB production and LIB-based electric mobility are available, with mixed results that are difficult to compare.	wind turbines can be noisy and unappealing aesthetically, and can sometimes adversely impact the physical environment around them	studies are ongoing to resolve the trade-offs
Fragrances	harmonisation of tools and methods	NAMs validation and harmonisation		alignement on methodologies, supplier data	consumer impact	Biodegradability/ toxicity vs renewability vs LCA (not always aligned)
Electronics	no direct regulations	Mainly focused on	some concerns about workers'	It is not clear how to apply existing		Trade-offs in the area of hazardous

Take away on Value Chains from 1 year of IRISS

- SSbD more understood by the Chemical Industry especially in Chemicals substitution and larger companies with resource for safety and sustainability evaluations.
- Downstream industry stakeholders relying on suppliers for information
- Current SSbD framework fits Chemicals substitution better than complex articles .
- SMEs find it challenging to integrate SSbD into Design/Innovation processes ; collaboration with national platforms like SusChem and SMEs networks is vital
- Many Sustainable Chemistry Initiatives : IRISS and International connections

International initiatives linked to safe and sustainable chemicals and materials

- All connections with IRISS (as a team or as partner) :
 - WBSCD (Cefic + VCs)
 - OECD SSIA (RIVM)
 - ISC3 (Leuphana)
 - GC3/Change Chemistry (Cefic + IVL + VCs)
 - UNEP/ICMM5/SAICM (Leuphana + Cefic)
 - John C Warner GREEN CHEMISTRY SSL/Beyond benign (Cefic)
 - OECD SSIA (RIVM)
 - AMPT network (US – EUMAT/Tekniker)
 - International Fragrances (IFRA/VC)

Mentimeter Question

Would you be ready to involve yourself/international experts of your organisation in the IRISS network? – YES/NO/MAYBE



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Challenges & Opportunities for further cooperation on SSbD

Sara Anderson
IVL Swedish Environmental Research Institute



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Establishment of an EU Led International permanent network

- A structure for continuous cooperation and services to network members, potential members, network associates as well as other stakeholders with interests in SSbD.
- Definition of services provided by the platform and testing of services addressed to different key target groups.



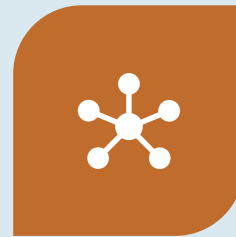
Services to potentially be provided by the platform



TRAINING SERVICE
FOR SME:S



SERVICE FOR
START-UPS TO
BOOST BUSINESS
COLLABORATION
WITH INDUSTRY



CO-CREATION
SERVICE TO
ESTABLISH HUBS
FOR SPECIFIC
VALUE CHAINS

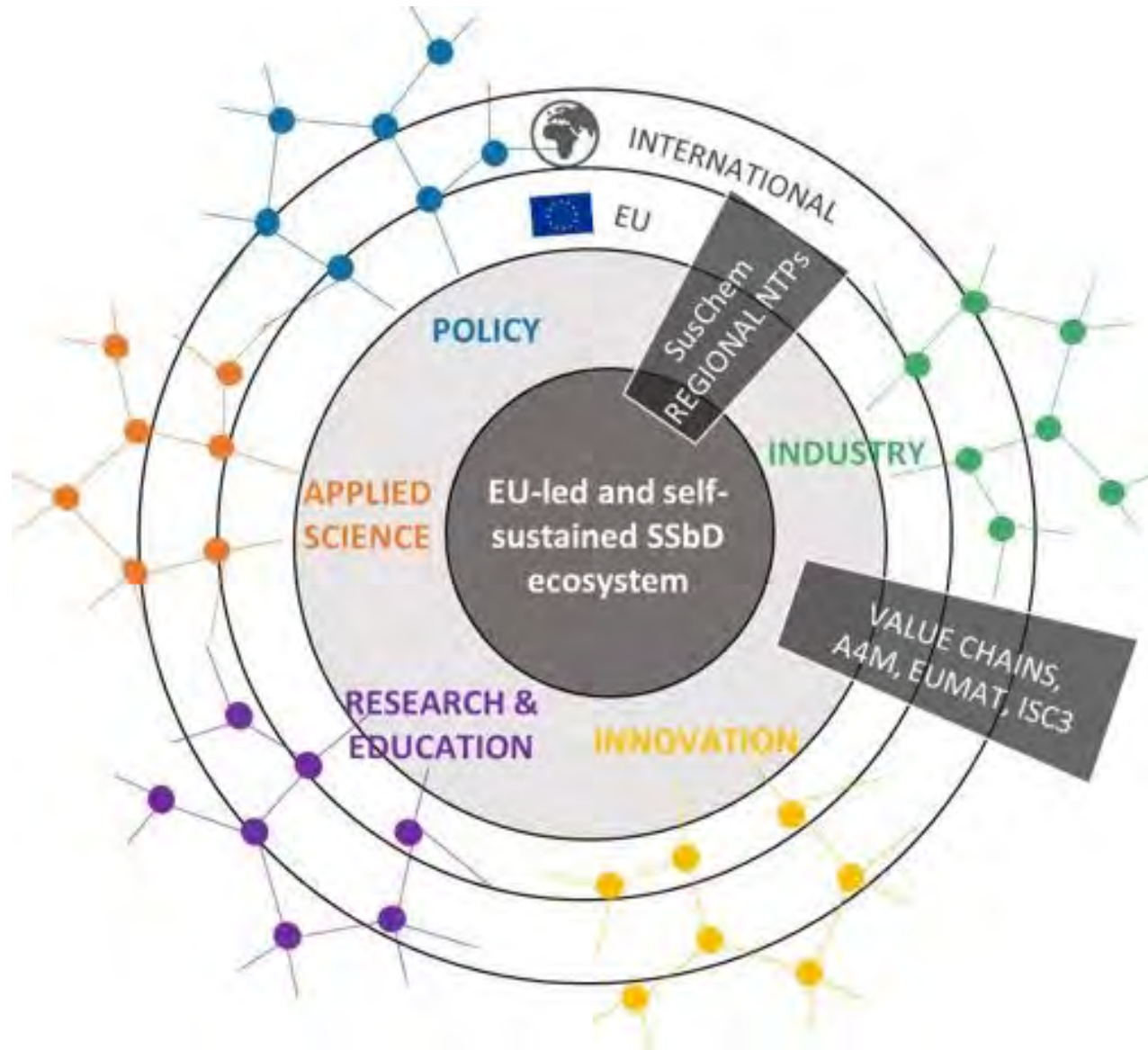


KNOWLEDGE
EXCHANGE
SERVICES



KNOWLEDGE
SHARING SERVICES

Extended network of stakeholders



Challenges & Opportunities for further
cooperation on SSbD

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CONCLUSIONS

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APRE – Agency for the Promotion of European Research



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IRISS upcoming events

- **Advanced Materials Safety 2023** ⇒ 8-10 November 2023 (on-site, Germany)
- **Workshop on Sustainable Materials** ⇒ 21 November 2023 (on-site, Spain)
- **Macrame Workshop on harmonization and standardization for Nanomaterials and advanced materials**, ⇒ 22-23 November 2023, 10:00 - 15:00 (online)
- **Stakeholder workshop on Safe-and-Sustainable-by-Design** ⇒ 6-7 December 2023 (on-site, Belgium)
- **LUBMAT 2024 Conference, on sustainable lubrication, tribology and condition monitoring**, ⇒ 18-20 June 2024 (on-site, San Sebastian)
- **2nd training for SMEs** ⇒ 28 June 2024 (online)
- **Summer School on Sustainable Chemistry and SSbD** ⇒ 8-12 July 2024 (on site, Leuphana University of Lüneburg, Germany)

Contact and more information

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IRISS – International SSbD network

Thank you for joining us!



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