



# Towards a Safe and Sustainable Future

**Impressum:**

**Owner and publisher:**

BioNanoNet Forschungsgesellschaft mbH

Kaiser-Josef-Platz 9, 8010 Graz, Austria

UID: ATU 63046279, FN 285326 y

**Graphic Design & Layout:** Barbara Ebner

Images by stories / Freepik

# WHAT IS SSbD?

## All you need to know about SSbD for future policies



*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' (SSbD)** is a pre-market approach to **guide the innovation** process for chemicals, (advanced) materials, and products as announced in the **Chemicals Strategy for Sustainability**.

SSbD integrates safety as well as the three dimensions of sustainability (i.e., environmental, social, and economic) together with functionality throughout the innovation taking a lifecycle perspective.

SSbD aims to steer the innovation process towards a green and sustainable industrial transition to:

- Substitute or minimise the production and use of substances of concern, in line with, and beyond existing and upcoming regulatory obligations.
- Minimise the impact on health, climate and the environment during sourcing, production, use and end-of-life of chemicals, materials and products.

**SSbD is aligned on policy developments:**

- The 'one substance, one assessment' approach linking safety and sustainability data across EU legislation to achieve a common data platform
- For safety, Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) revision

- For environmental sustainability, Ecodesign for Sustainable Products Directive (ESPR)
- For socio-economic sustainability, Corporate Sustainability Reporting Directive (CSRD), Corporate Sustainability Due Diligence Directive (CSDDD), and Critical Raw Material Act (CRM Act).

**Why is SSbD important for policymakers?**

- To support the European Green Deal, Clean Industrial Deal and the EU Competitiveness Compass.
- To support ethical and socio-economic responsibility.
- SSbD is one of the three pillars of the **Safe and Sustainable Innovation Approach (SSIA)**. SSIA is a proactive approach rather than a reactive measure and requires that policy makers **become aware** of and understand innovations sufficiently early to take **timely action**, and that appropriate regulatory tools are modified or developed as needed.
  - SSbD in combination with regulatory preparedness, aiming to improve the **anticipation of policymakers** in order to facilitate the development of adaptable safety and sustainability regulation that can keep up with the pace of knowledge generation and innovation of chemicals, (advanced) materials, and products.

- Both SSbD and regulatory preparedness are supported by a process to share and exchange knowledge, information and

views in a **Trusted Environment**. SSIA thus relies on dialogue between innovators and regulators.

## The SSbD Framework: Key Points

As one key action defined in the **Chemicals Strategy for Sustainability**, the European Commission's Joint Research Centre (EC-JRC) has published an **SSbD Framework** to support the operationalization of SSbD.

The SSbD Framework and **Methodological Guidance** consist of (1) the scoping and (2) the assessment.

The Scoping Analysis helps the implementation of the SSbD framework according to (re)design aspects and maturity of the innovation itself

The **assessment phase** comprises: (1) hazard, (2) workers exposure and safety aspects during production, (3) exposure during use phase, and (4) environmental lifecycle. The (5) socio-economic lifecycle assessment is optional and currently under development. The assessment phase can be carried out either on newly developed chemicals and/or materials, or on existing chemicals and/or materials to improve their safety and sustainability performance during production, use and/or end-of-life.



### **SSbD Scoping Analysis**

- Actors in the lifecycle
- System Definition
- (Re)Design Definition
- Assessment Boundaries

### **SSbD Assessment**

- Hazard assessment of the chemical/material (intrinsic properties)
- Human health and safety aspects in the chemical/material production and processing phase
- Human health and environmental aspects in the final application phase
- Environmental sustainability assessment
- Social and economic sustainability assessment

**The latest version of the SSbD Framework is available on the website of the European Commission:**



# SSIA – The combination of SSbD and Regulatory Preparedness

The **Safe and Sustainable Innovation Approach (SSIA)** seeks to enhance the ability of all stakeholders to address the safety and sustainability assessment of innovations in a robust yet agile manner. **SSIA aims at reducing the time gap between the emergence of technological innovations and the development of suitable risk and sustainability assessment tools and frameworks.**

SSIA combines SSbD and Regulatory Preparedness:

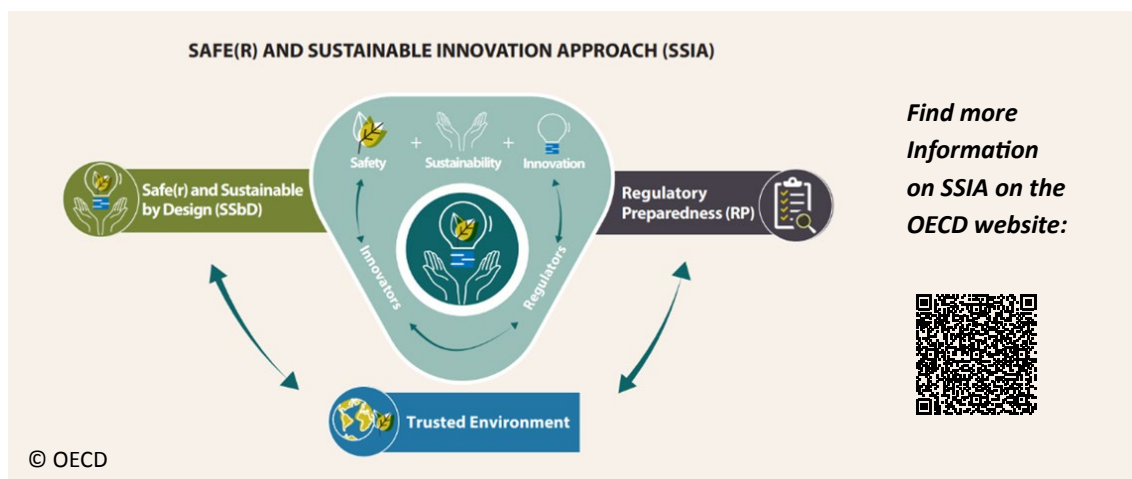
- **SSbD**, which recommends innovators to integrate safety and sustainability considerations as early as possible into the innovation process; and

- **Regulatory Preparedness** which aims to improve the anticipation of regulators in order to facilitate the development of adaptable (safety and sustainability) regulation that can keep up with the pace of knowledge generation and innovation of chemicals, (advanced) materials and products and processes.
- Both **SSbD and Regulatory Preparedness** concepts are supported by a process to share and exchange knowledge, information and views in a **Trusted Environment**.

SSIA thus relies on **dialogue between innovators and policy makers.**

## Benefits for policy makers include:

- Development of regulations for safer and more sustainable chemicals, (advanced) materials, and products and processes
- Better anticipation of emerging safety and sustainability issues
- Preparedness for future regulatory challenges (Regulatory Preparedness)
- More efficient communication and collaboration with industry
- Timely actions
- Clear contributions to regional strategies on sustainable chemistry and thereby to the Sustainable Development Goals of the United Nations

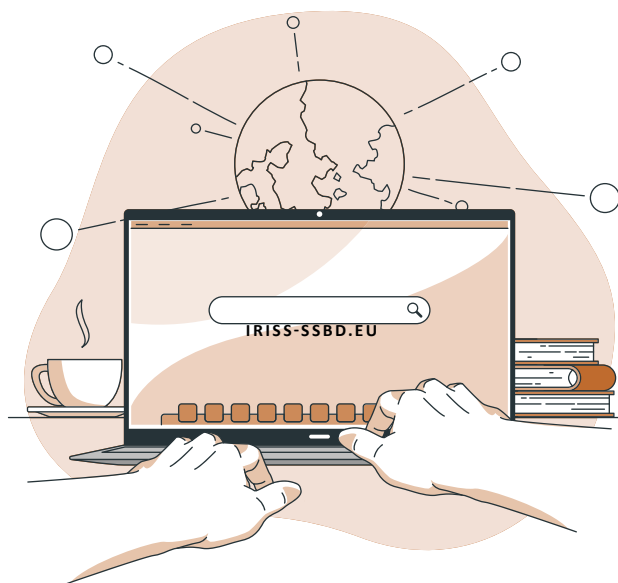




## What can policymakers do to accelerate the implementation of SSbD?

*Policy makers should align and synergise between all Member States to:*

- **Develop strategies to create awareness** about SSbD among all relevant stakeholders
- **Consider SSbD** in the development of upcoming innovation, safety and sustainability policies
- **Promote the SSbD framework** in national research and innovation programmes
- **Increase the availability** of findable, accessible, interoperable, reusable (**FAIR**) data for safe and sustainable by design assessment: Promote open-access databases and consistent methodologies for hazard and sustainability assessments.
- **Support the improvement of assessment methods, models and tools and standardize data practices**
- **Support the development of educational curricula on skills** related to safety and sustainability of chemicals and materials
- **Develop more flexible and adaptable legislation** to capture new concerns or needs in a timely manner
- **Encourage cross-value chains synergies:** Facilitate knowledge exchange between industries to accelerate the adoption of best practices.
- **Investment & funding** to support upscaling and current value chain initiatives.
- **Ensure competitiveness of European companies:**
  - **Provide incentives will be key:** Create financial and regulatory frameworks that reward SSbD adoption (e.g., tax benefits, green public procurement) , which could be done at national level. Incentives are needed for companies to innovate and offer products that meet these criteria and implement SSbD in the product development processes.
  - **SSbD labels or certification** can raise citizens awareness on the benefits of SSbD produced products and influence market trends.
  - **Support innovative SMEs:** Offer targeted funding, tools, and training to enable smaller players to adopt SSbD principles effectively.



### ***Where to find more information on SSbD?***

#### ***European Commission:***

*Visit their website on SSbD to find more information on the recommendation, concept, objectives, framework, guidance, and related events.*



#### ***IRISS SSbD Community:***

*Visit the website [www.iriss-ssbd.eu](http://www.iriss-ssbd.eu)*

*In January 2025, the IRISS SSbD Community has launched a policy hub on their digital platform to inform about recent policy developments and facilitate a science-policy-industry dialogue*

*Join the Community to get access!*

#### **Authors:**

Lya G. Soeteman-Hernández, National Institute for Public Health and the Environment (RIVM), the Netherlands  
Christina Apel, Leuphana University Lüneburg, Germany  
Johanna Scheper, BioNanoNet Forschungsgesellschaft mbH (BNN), Austria  
Anne Chloé Devic, SSbD Consulting for Europe, Spain

Emma Strömberg, IVL Swedish Environmental Research Institute, Sweden  
Cris Rocca, University of Birmingham, UK  
Eugenia Valsami-Jones, University of Birmingham, UK  
Maurice Brennan, University of Birmingham, UK

---

Note: This report was created within a project funded by the European Commission within the Horizon Europe Framework Programme named "IRISS – The international ecosystem for accelerating the transition to Safe-and-Sustainable-by-design materials, products and processes". The project lasts three years (from June 2022 to May 2025) and is composed by 22 different entities, experts in relevant fields related and necessary for the understanding and translation of the Safe-and-Sustainable-by-Design (SSbD) concept to different types of sectors, including textiles, energy, fragrances, electronics, automotive, construction and packaging.

