



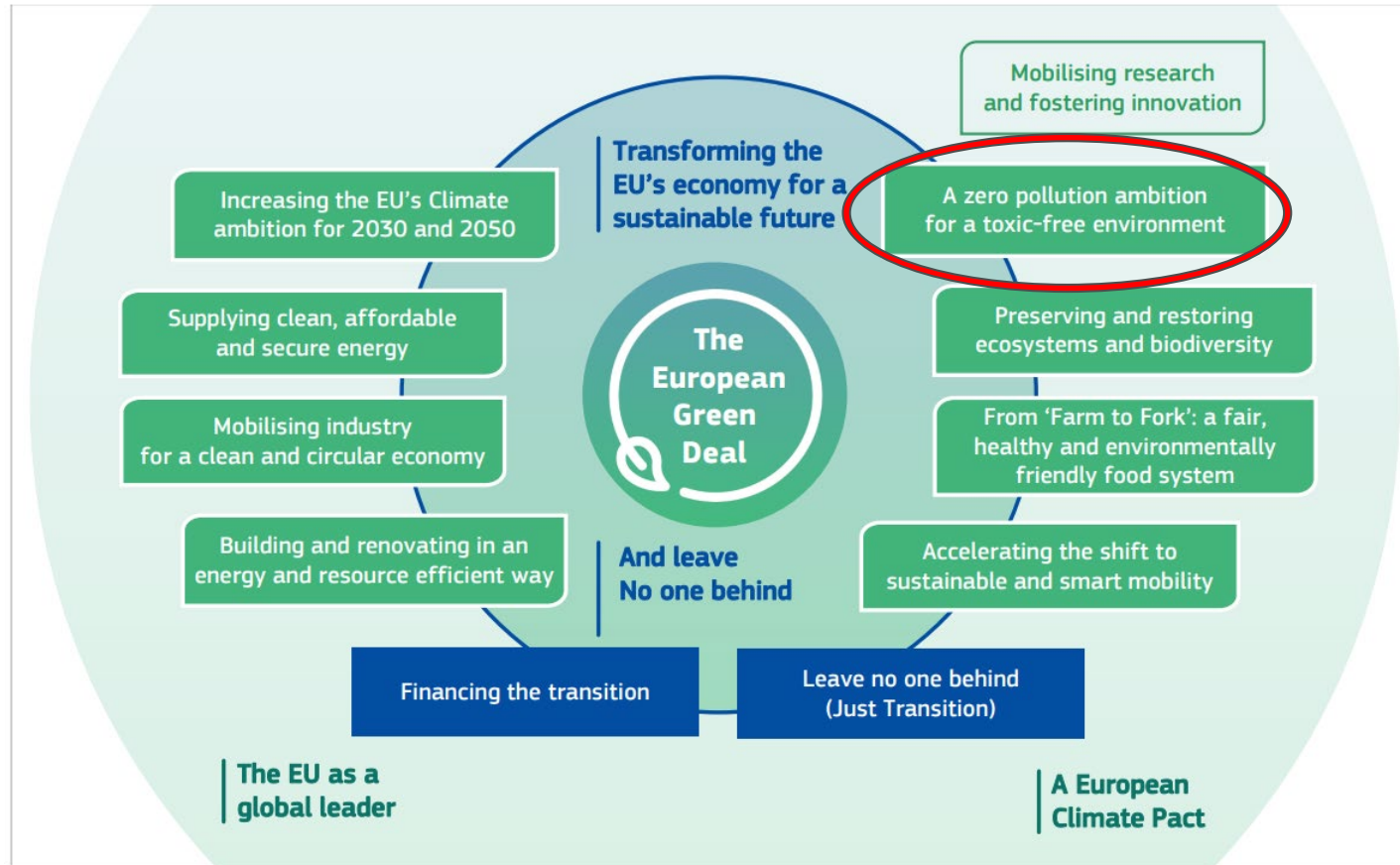
# Safe and sustainable chemicals and materials – strategic R&I approaches

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# Overview

- SSbD
  - Policy context
  - Impact, purpose and scope
  - The framework
  - Funding
- HE funding on exposure
- PARC

# The European Green Deal



# Policy context

## The EU Green Deal



Zero pollution



Climate neutrality



Circular economy

## Chemicals Strategy for Sustainability (CSS)

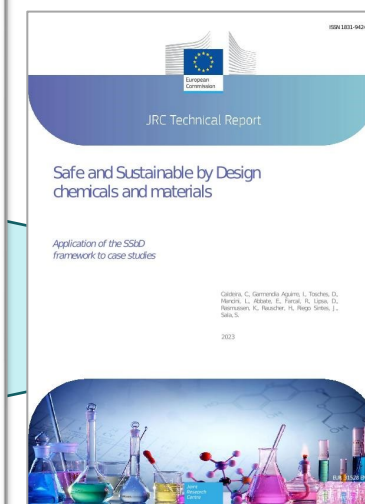
- phase out the most harmful (not only SVHCs) substances and
- substitute, as far as possible, all other substances of concern, and otherwise minimise and track them.



New approaches to tackle releases and emissions across all life cycle stages, and move towards zero-pollution for air, water, soil and biota.

## CSS Action Plan

Develop safe and sustainable-by-design (SSbD) criteria for chemicals



Caldeira et al. (2022). Safe and Sustainable by Design chemicals and materials Review of safety and sustainability dimensions, aspects, methods, indicators, and tools. <https://doi.org/10.2760/879069>

Caldeira, et al. (2022). Safe and Sustainable chemicals by design chemicals and materials - Framework for the definition of criteria and evaluation procedure for chemicals and materials. <https://doi.org/10.2760/487955>

Caldeira et al. (2023). Safe and Sustainable by Design chemicals and materials - Application of the SSbD framework to case studies. <https://doi.org/10.2760/329423>

European Commission. (2022). Commission recommendation of 8.12.2022 establishing a European assessment framework for 'safe and sustainable by design' chemicals and materials. Brussels, 8.12.2022 C(2022) 8854 final <https://eur-lex.europa.eu/eli/reco/2022/2510/oj>

# 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**

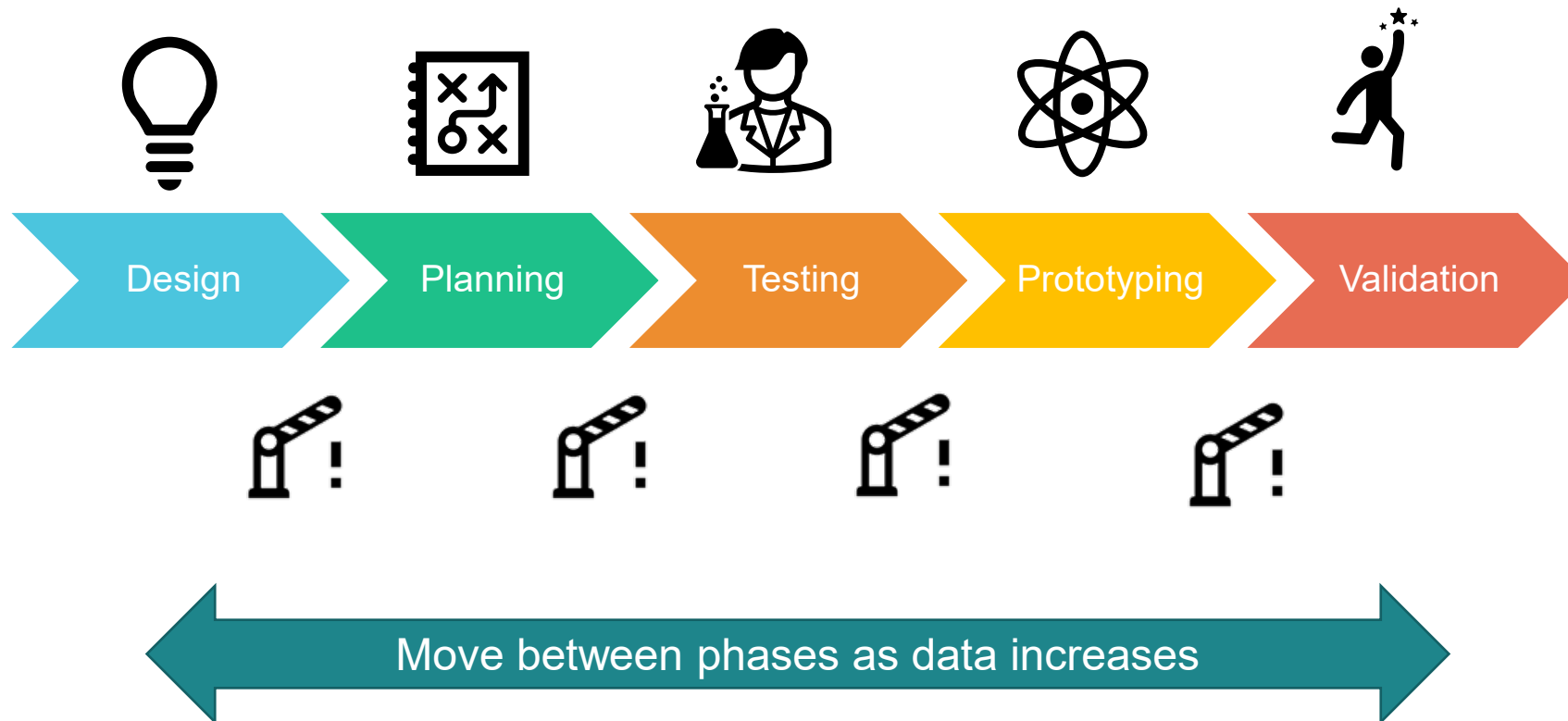
# SSbD Recommendation: Purpose and scope



- 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.

# SSbD along innovation stages

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



# Important information

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

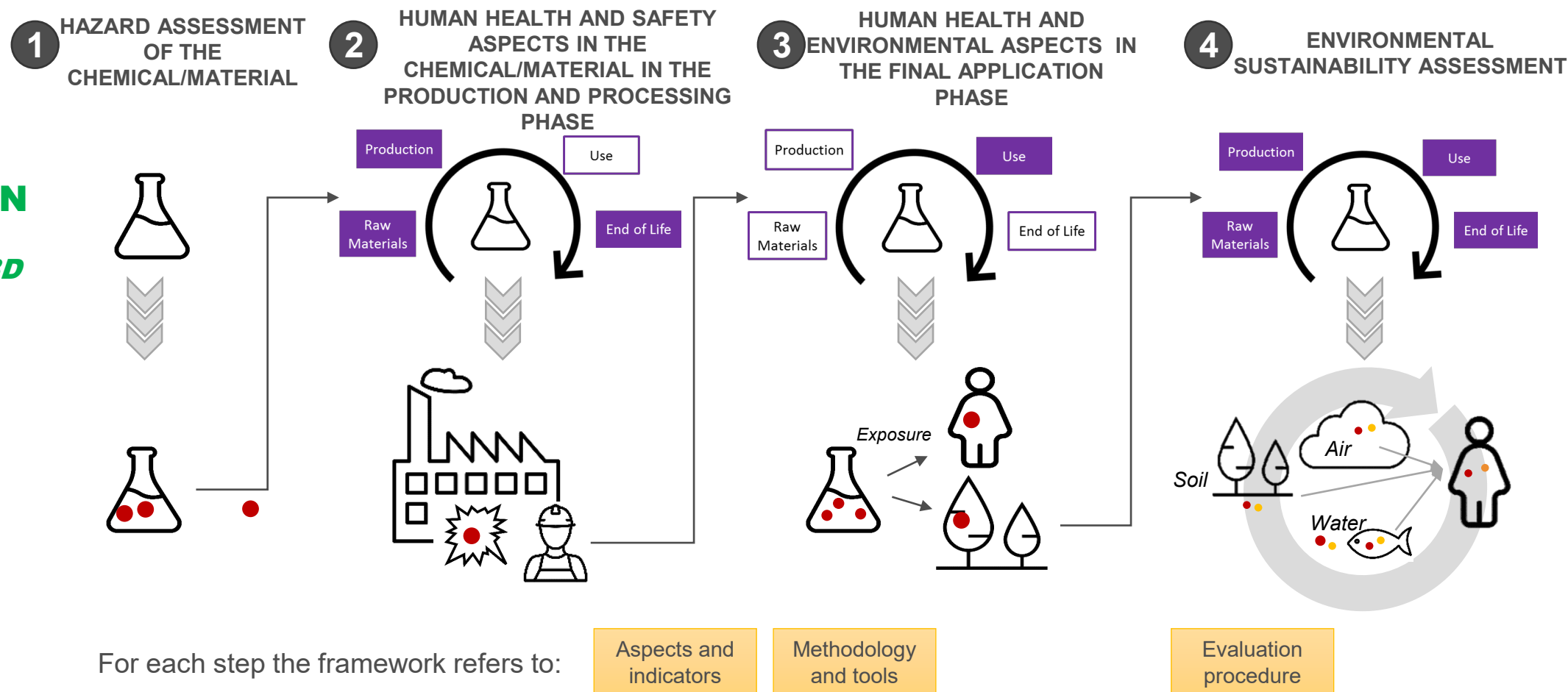


SSbD is **voluntary** and promoted **within R&I actions** across EU research programmes, especially Horizon Europe. Member States, industry, academia and RTOs are invited to promote the use of SSbD in innovation.



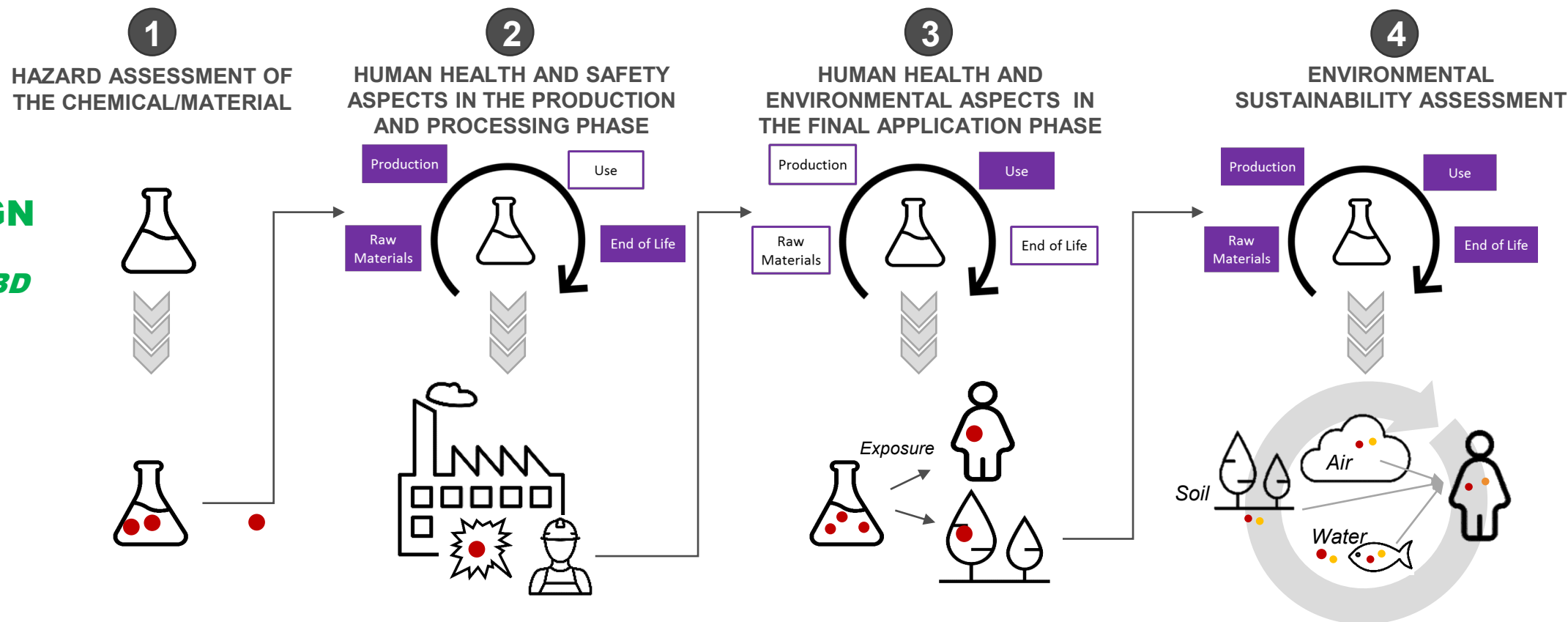
# Structure of the framework: a stepwise approach

**(re)DESIGN**  
following  
specific *SSBD*  
principles



# Structure of the framework: a stepwise approach

**(re)DESIGN**  
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principles



For each step, the framework refers to:

Aspects and indicators

Methodology and tools

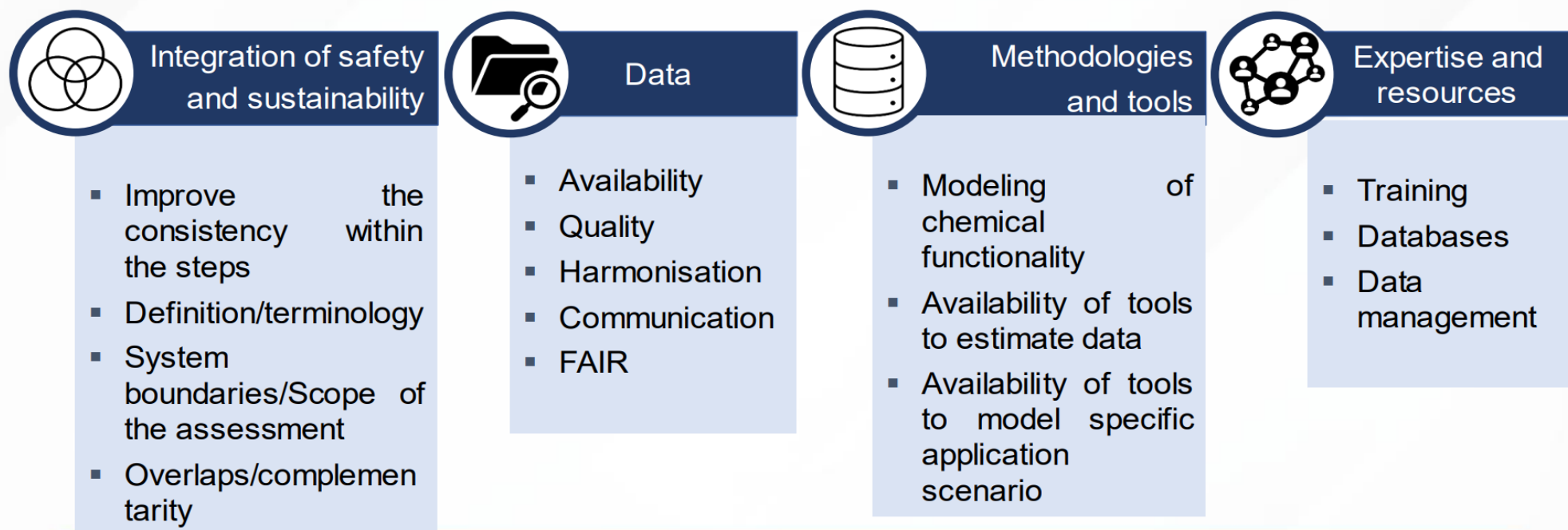
Proposal for the definition of criteria

Evaluation procedure

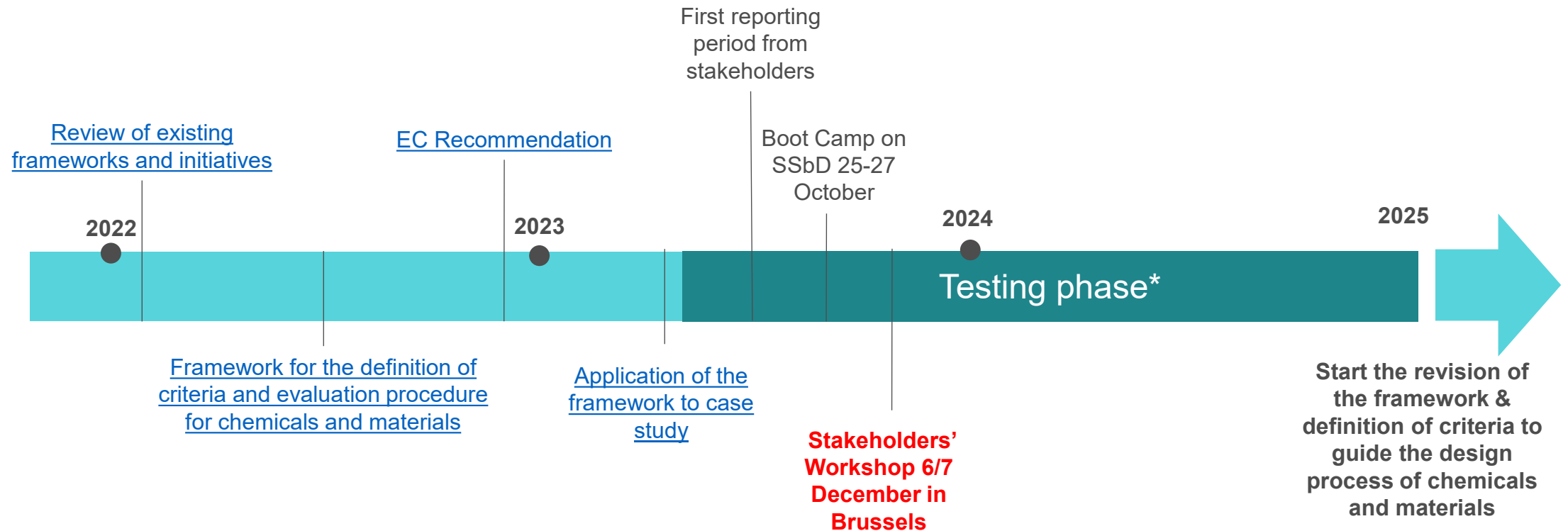
# 1<sup>st</sup> case studies for applicability

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

Lessons learned:



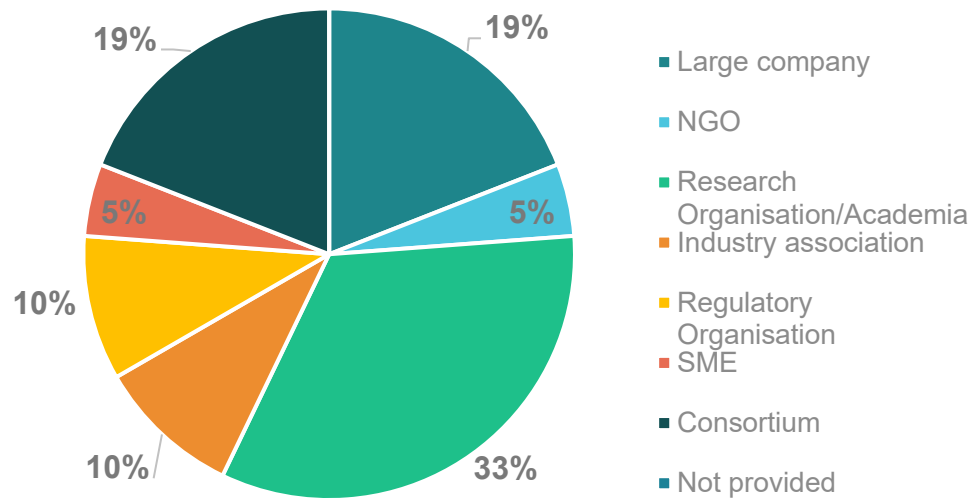
# Testing phase: incoming events



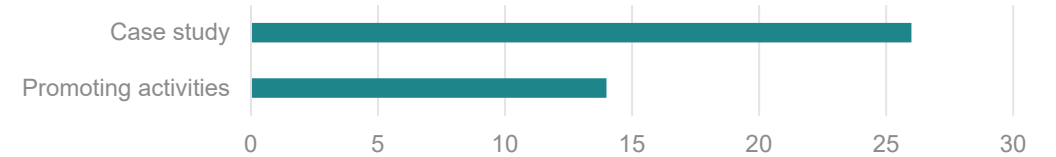
\*For updates on testing phase, write at [RTD-SUSTAINABLE-BY-DESIGN@ec.europa.eu](mailto:RTD-SUSTAINABLE-BY-DESIGN@ec.europa.eu)

# 1<sup>st</sup> reporting period feedback overview

Feedback from 22 organisations:



Activities on SSbD framework



Sectors



# Funding opportunities on SSbD and community building

## Horizon Europe WP 21-22

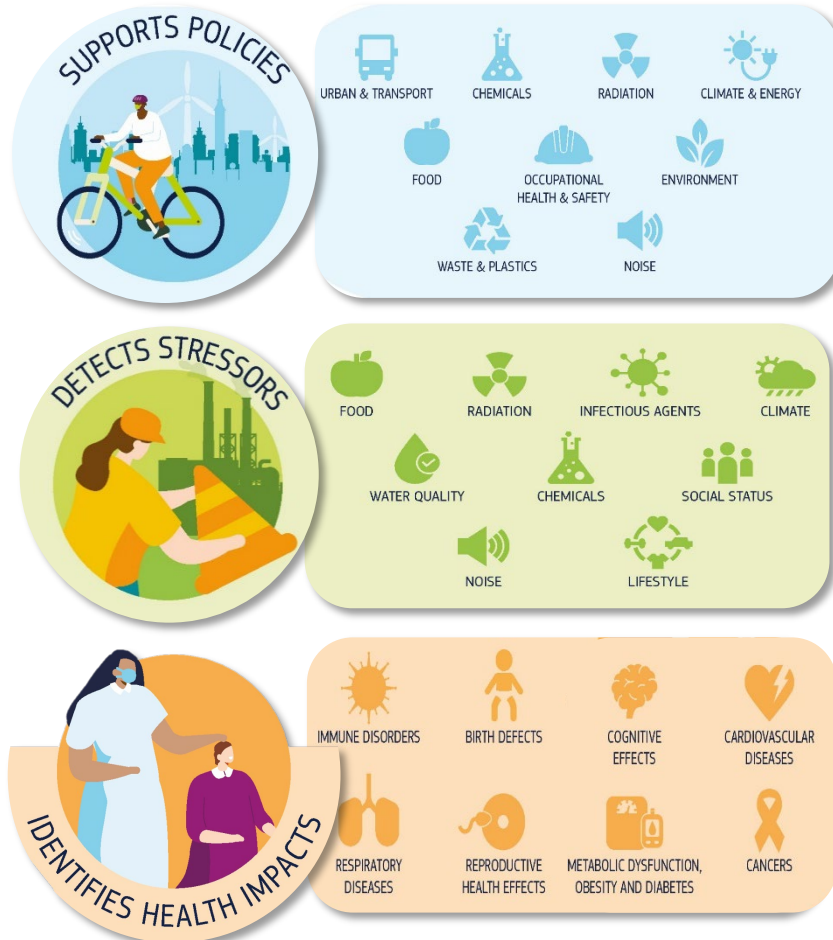
- First 12 projects on SSbD materials (**EUR 58 million**)
  - Safe- and sustainable-by-design polymeric materials
  - Safe- and sustainable-by-design organic and hybrid coatings (incl. PFAS alternatives)
  - Safe- and sustainable-by-design metallic coatings and engineered surfaces
- IRISS - network and roadmaps for value chains (**EUR 3.58 million**) - CSA
  - Establish an ecosystem for the uptake and utilization of SSbD strategies by industry and SMEs
  - <https://www.ivl.se/english/ivl/project/iriss.html>
- PARC – Partnership on Assessments of Risk from Chemicals (co-funded **EUR 400 million**)
  - Joining forces to drive innovation in risk assessment: exposure, hazard, innovation in risk assessment
  - A toolbox for “safe and sustainable by design” in line with EC framework
  - [www.eu-parc.eu](http://www.eu-parc.eu)

# Funding opportunities on SSbD and community building

## Horizon Europe WP 23-24

- **Innovative methods** for safety and sustainability assessments of chemicals and materials  
(EUR 29 million)
- **Integrated approach for impact assessment** of safe and sustainable chemicals and materials  
(EUR 15 million)
- **Computational models** for the development of safe and sustainable by design chemicals and materials (EUR 29 million)
- Development of safe and sustainable by design **alternatives** (EUR 59 million) – **still open!**
- SSbD framework referred to in **CL4** (EUR 130 million), **CL5** (EUR 36 million) and **CL6** (EUR 33 million)
- SSbD also referenced in topics under the **Innovative Health Initiative**, **Circular Bio-based Europe** and is being discussed in the SRIA of '**Batteries for EU**'

# EU funded research in Environmental and Health:





# Environment & Health Clusters:

10 clusters of projects with a total EU contribution close to **400 million EUR**.



**Promoting collaboration  
between the projects and  
Increasing policy and  
societal impact**

EU-funded research on  
**Environment & Health**



## Clusters under **HORIZON 2020**

EURION <sup>1</sup>	8	€49	19	70+
EHEN <sup>2</sup>	9	€105	24	120+
CUSP <sup>3</sup>	5	€30	22	70+
Urban Health <sup>4</sup>	6	€30	26	90+
Green Deal <sup>5</sup>	6	€51	23	70+
ASPIS <sup>6</sup>	3	€60	16	60+

## Clusters under **HORIZON EUROPE**

IDEAL <sup>7</sup>	7	€47	25	100+
Climate Change & Health <sup>8</sup>	6	€59	28	100+
CLUE-H <sup>9</sup>	4	€29	18	60+
METEOR <sup>10</sup>	5	€20	21	50+

**EHEN:** European Human Exposome Network

**CUSP:** European research cluster to understand the health impact of micro and nanoplastics

# EU Research on the Exposome

expos  
omics



EU Exposome  
Initiative (FP7)  
2012-2018  
€29 million

**HELIX** BUILDING  
THE EARLY-LIFE  
EXPOSOME

**ATHLETE**  
The Exposome from Evidence to Translation

Equal-Life



longITools  
HEALTH & ENVIRONMENT DYNAMICS

European Human  
Exposome Network  
(H2020)  
2020-2025  
€105 million



EXIMIUS  
Mapping Exposure-Induced Chemical Effects

HEDIMED  
Human Exposomic Determinants  
of Immune-Mediated Diseases

EXPANSE

human  
exposome  
assessment platform

EIRENE Research Infrastructure

**EIRENE RI**

Bringing together exposome data

# CL4-Funded projects on exposure

- 10 projects dealing with exposure of Nanomaterials (57,3M EU funding)
  - 1 already closed ([BIORIMA](#)) on Risk Management of Biomaterials
  - 3 closed or closing in 2023 ([NANORIGO](#))([NanoSolveIT](#))([NanoInformaTIX](#)) on Risk Governance and informatic tools
  - 6 running projects ([MACRAME](#), [iCare](#), [ASSINA](#), [SbD4Nano](#), [DIAGONAL](#), [SUNSHINE](#)) on risk assessment, characterization, safety and design of nano-based materials and products



science and policy  
for a healthy future



## European Human Biomonitoring Initiative

Co-funded by H2020

5y / 2017-2022

Total budget: 75M (50M EU funding)

## Partnership for the Assessment of the Risks from Chemicals

Co-funded by HE

7y / 2021-2028

Total budget: 400M (200M EU funding)

## PARC European Partnership for the Assessment of Risks from Chemicals

Partnership supported by Horizon Europe

● EU Agency  
European Chemicals Agency (ECHA), Finland  
European Food Safety Authority (EFSA), Italy  
European Environment Agency (EEA), Denmark



7 YEARS (2021-2028) Total budget: €400 M (€200 M EU contribution) 199 Partner organisations Coordinated by ANSES\*\*

\*\* French Agency for Food, Environmental and Occupational Health & Safety

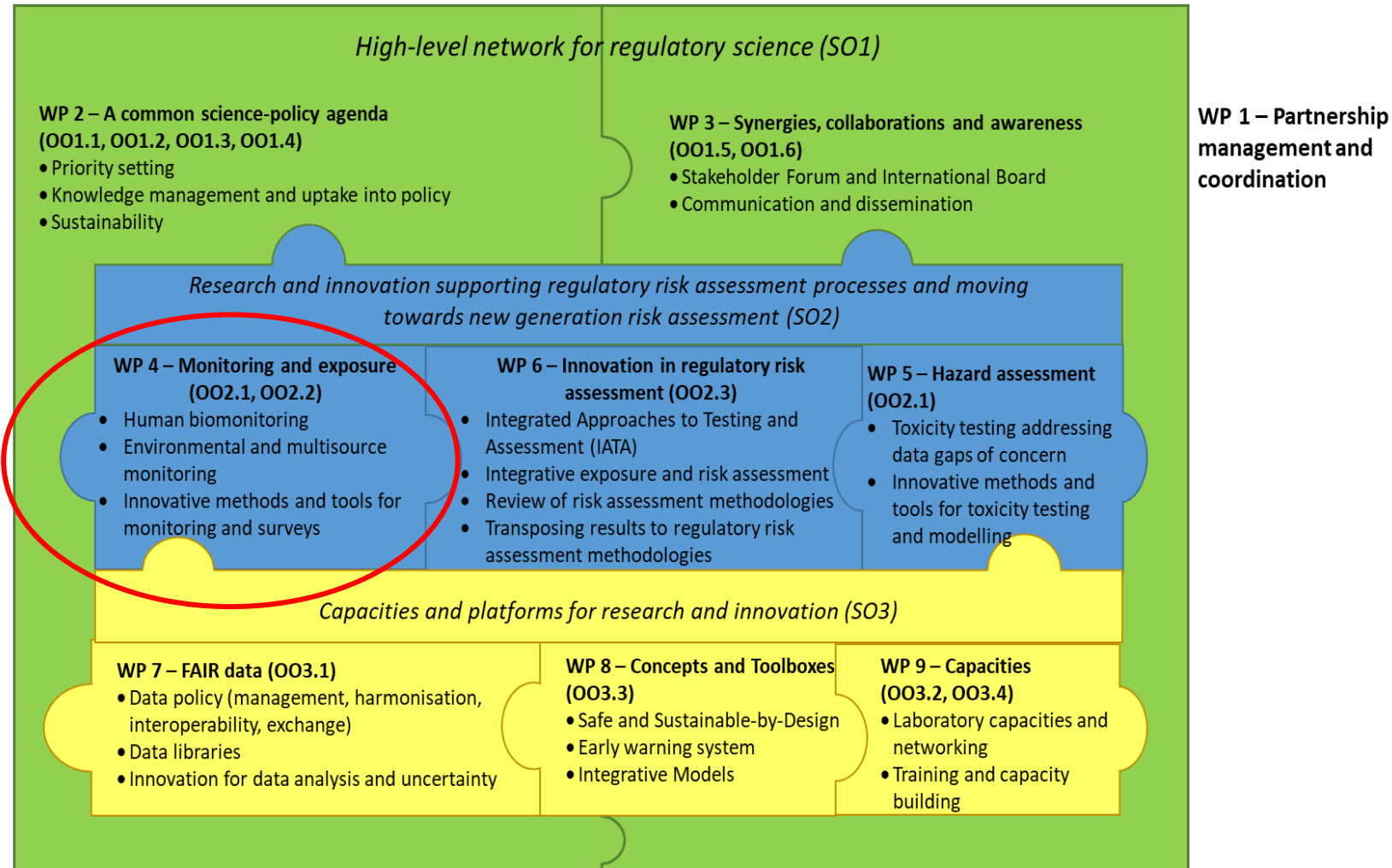
AT Austria	EE Estonia	IS Iceland	LU Luxembourg	SK Slovakia
BE Belgium	FI Finland	IE Ireland	NL Netherlands	SI Slovenia
HR Croatia	FR France	IL Israel	MK North Macedonia	ES Spain
CY Cyprus	DE Germany	IT Italy	NO Norway	SE Sweden
CZ Czechia	EL Greece	LV Latvia	PL Poland	CH Switzerland
DK Denmark	HU Hungary	LT Lithuania	PT Portugal	UK United Kingdom

## What is PARC ?

- A public-public **partnership** under Horizon Europe.
- An initiative where the **European Union**, with early involvement of **Member States**, **Associated Countries** and public partners (EU and National Risk Agencies, Universities, Public Research Organisations), commit to **jointly support the development and implementation of a programme** of research and innovation activities in relation to **the assessment of risk of chemicals**.



# PARC structure



SO: Specific Objectives  
OO: Operational Objectives

## WP4: Monitoring and Exposure

Monitoring chemicals in humans (internal exposure) and in the environmental and food compartments (external exposure).

### 4.1 Human Biomonitoring

Consolidate and further develop the **human biomonitoring platform**, generating and analysis of HBM data, and develop the network of qualified laboratories for biomarkers analysis

### 4.2 Environmental Monitoring

Understand the **presence of chemicals in the environment**, their exposure to humans, considering multiple sources (e.g. air, water food, consumer products)

### 4.3 Innovative tools and methods

Develop **innovative tools and methods** to improve human, food and environmental monitoring schemes, contribute to an early warning detection of chemicals of emerging concern.

# 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](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](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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