

86th LCA Discussion Forum

Safe- and Sustainable-by-Design

Thursday April 25, 2024, 08:30-12:40h and 13:30-17:30h

ETH Zentrum campus, GEP Pavillion and online

WLAN access: public-5 or public (individual login with SMS code)

Sponsors
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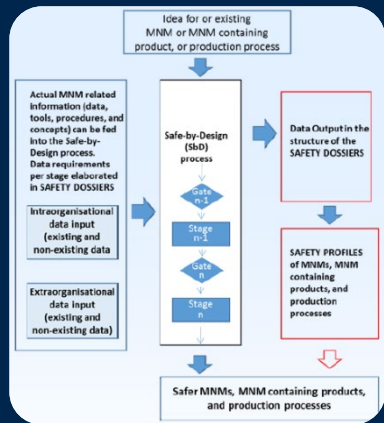
 **Empa**

Materials Science and Technology

ETH zürich



NANoREG (2013-2017)

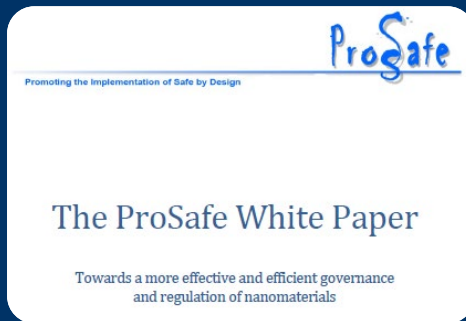


A common European approach to **regulatory testing** of Manufactured Nanomaterials



ProSafe (2015-2017)

Promoting the **Implementation** of Safe by Design



NanoReg² (2015-2019)



Demonstrate & establish new principles to **establish SbD** as fundamental pillar in **validation** of new MNM



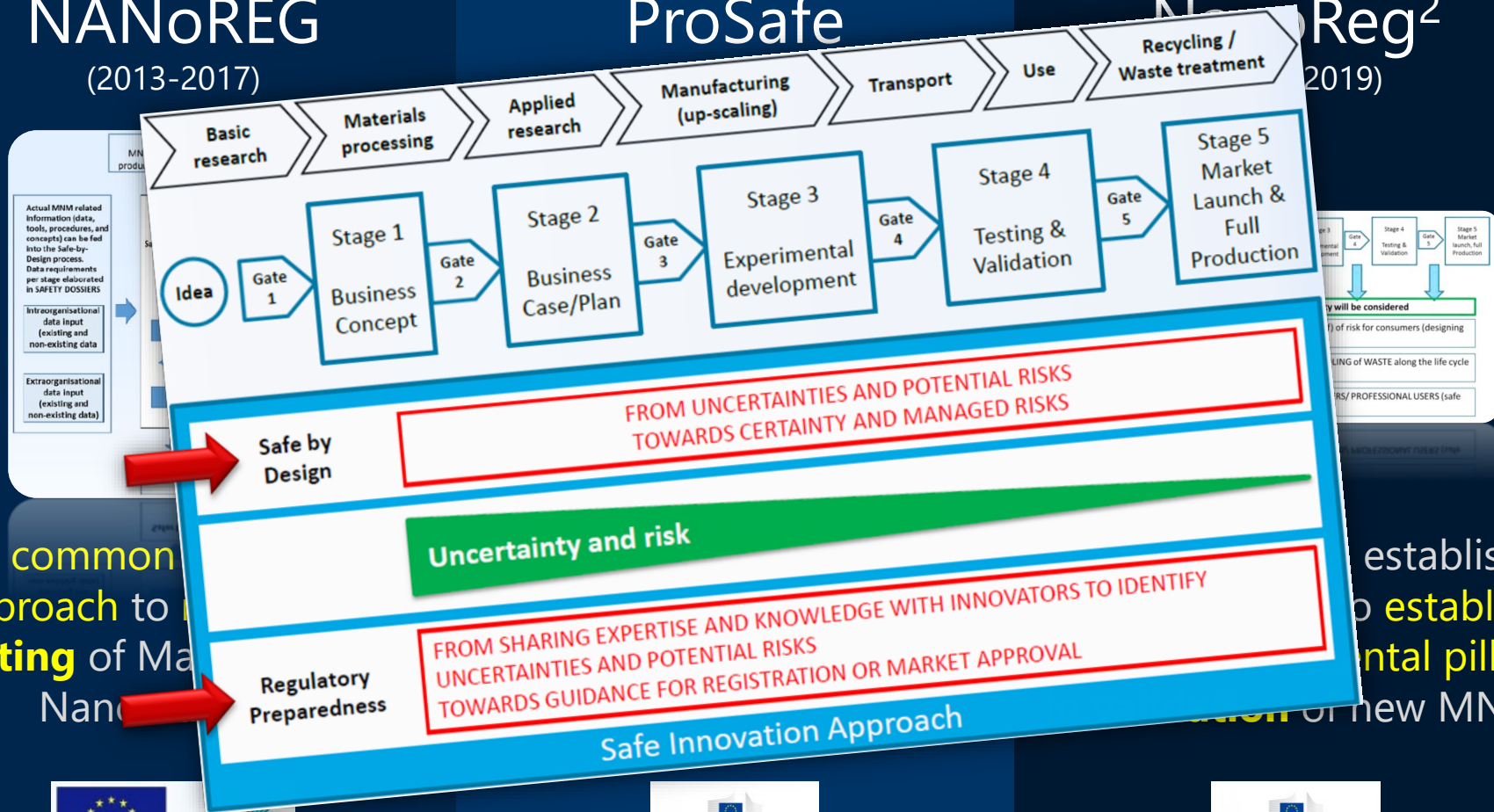
NANoREG

(2013-2017)

ProSafe

Next Reg²

(2019)

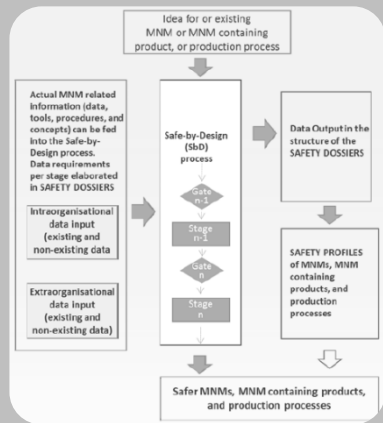


A common approach to testing of MNM Nan

establish to establish mental pillar of new MNM



NANoREG (2013-2017)

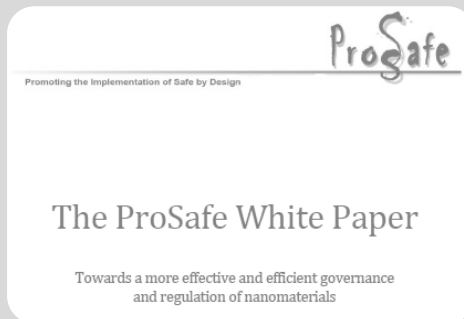


A common European approach to **regulatory testing** of Manufactured Nanomaterials



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Risk Assessment

What is Risk Assessment?



low

Risk



low

Exposure



high

Hazard

$$\text{Risk} = \text{Exposure} \times \text{Hazard}$$

1st MACRAMÉ Regulatory Risk Assessors Summit – November 27, 2023. Figures: [MARCIA GIBBILISIA on Unsplash](#), [Alex W. Webb on Unsplash](#), [Yaelm Escobar on Unsplash](#) 12

What is Risk Assessment?



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Hazard

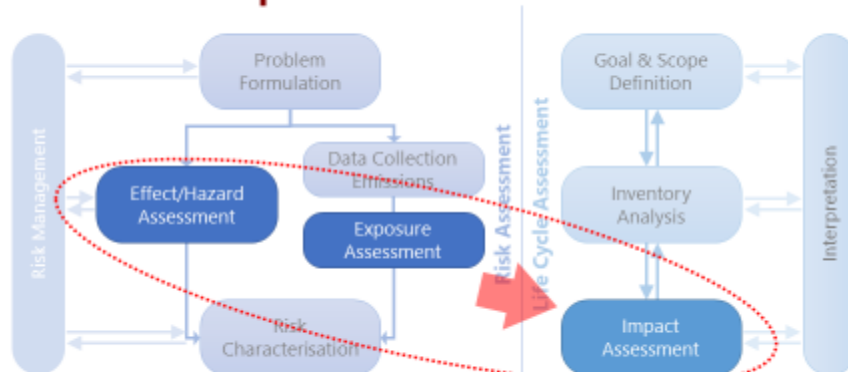
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Risk Assessment vs. Life Cycle Assessment



Risk Assessment vs. Life Cycle Assessment Similar Data requirements



see also NEXT presentation (B. Nowack, Empa)

1st MACRAMÉ Regulatory Risk Assessors Summit – November 27, 2023

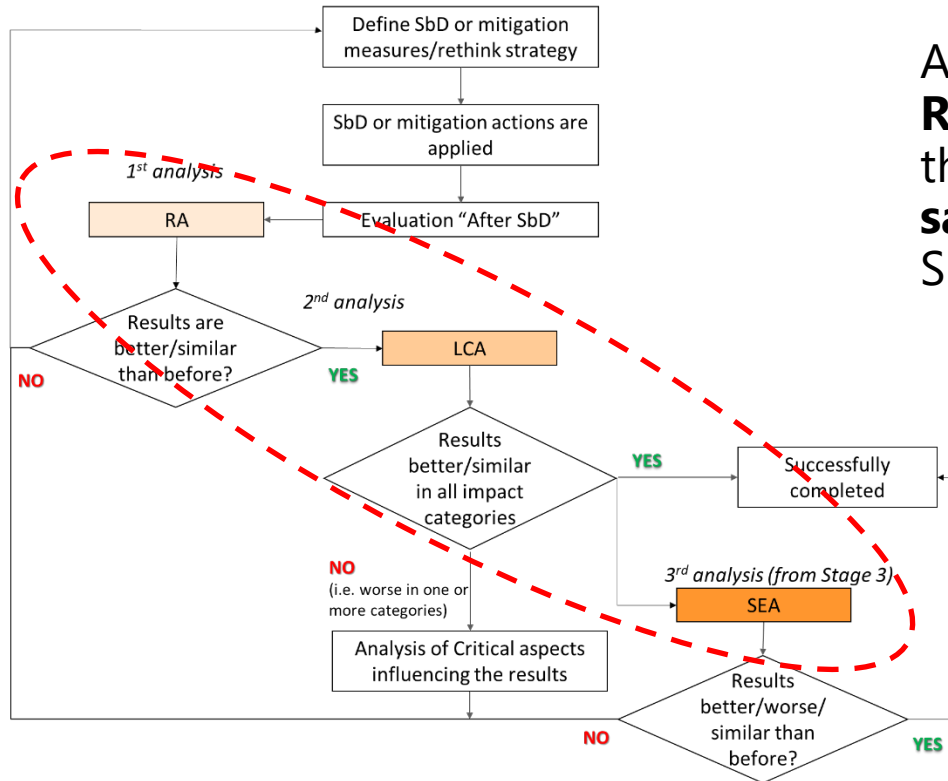
Figure based on Barberio et al. (2014) 15

Risk Assessment vs Life Cycle Assessment

... in summary ...

- **RA and LCA** represent fundamentally different approaches to assess human health and/or environmental consequences.
- **RA** compares an exposure level to a threshold value (acceptable exposure level) and comes up with a clear answer “no risk” or a “risk” level.
- The **goal of RA** is to prevent impacts.
- **LCA** takes relative approach with marginal impacts, i.e. a release will result in an impact (linearly increasing with increasing emission). Impact is related to an entire range of other impacts caused by other substances in order to put the (often marginal) impacts into a larger context.
- The **goal of LCA** is to provide an answer on the comparative advantages or disadvantages between two services or products.

Integrating RA and LCA into a decision ...



An **integrative approach**, combining **RA, LCA and SEA**, in order to ensure that new development ends up in a **safe and sustainable product** (fulfills SbD measure in sustainable manner).

Approach is building on **interactive and nested structure** that has to be applied each time SbD measures are implemented in order to evaluate if applied measures lead indeed towards a safer and also a more sustainable nanomaterial and/or nano-enabled product ...



Goal of today

Today's forum will address across various presentations the following questions / issues :

- "Safe- and Sustainable-by-Design" from different view points ;
- How is "safety" integrated into this framework ?
- How is "sustainability" integrated into this framework ?
- First case studies applying the framework



... spotlight into SSbD-related Research in the Netherlands ...

Program overview

Welcome & Introduction

Part I – Setting the Scene

SSbD ... Definition(s) – from a regulator's perspective – from a consultant's perspective – from a research perspective

Part II – Integrating Safety Issues into SSbD

Hazard Assessment – USEtox as linking element – 'Use maps' ...

Short presentations

Part III – Integrating Sustainability Issues into SSbD

LCA challenges – Social LCA – MCDA in SSbD ...

Part IV – Case Studies

first application examples and first learnings ...

Synthesis & Conclusion

Program overview



	Time		Speaker [Chair]
	08:30	Registration, coffee & croissants	Roland Hischer (Empa)
	08:50	Welcome and introduction into day	[Akshat Sudheshwar]
Setting the Scene			
01	09:00	Safe and sustainable by Design – the JRC framework: updates on ongoing activities and next steps	Michel Wildi (Bafu)
02	09:20	Safety & sustainability of chemicals and materials: where do we stand?	Cyrille Durand (TEMAS Solutions)
03	09:40	SSbD: a paradigm shift for chemicals and materials development	Bernd Nowack (Empa)
04	10:00	Operationalisation of SSbD – the PARC Toolbox	
	10:20	Discussion	[Joanke van Dijk]
	10:45	Coffee break	Katrin Fenner (EAWAG)
Integrating Safety Issues into SSbD			
05	11:15	Early-stage hazard assessment - What do we have and what should we aim for?	Peter Fantke (DTU)
06	11:35	USEtox as linking element between Safety & Sustainability	Shufan Keetiaer-Oi (CEPE)
07	11:55	Safety assessment using sector specific 'Use maps'	
	12:15	Discussion	[Merve Tunali]
	12:40	Lunch	
Short presentations			
S1	13:30	Short presentations of 10' per presentation : - Optionality and systems thinking in SSbD with prospective LCA - Deepening the Paradigm Shift: Revisiting the Integration of LCA and Chemical Process Design for Sustainability - Decision Supports Systems for Safe and Sustainable Innovation	T. Arblaster (CML)
S2			B. Häussling Löwgren (CML)
S3			C.F. Blanco Rocha (TNO)
Integrating Sustainability Issues into SSbD			
08	14:00	LCA's alchemy challenge: assessing chemicals that do not exist	[Merve Tunali]
09	14:20	Social LCA evolution – Its uptake in Sustainability Assessment Approaches	Andre Bardow (ETH)
10	14:40	Multi-Criteria Decision Analysis in SSbD assessments: requirements and recommendations	Sonia Valdivia (WRF)
	15:00	Discussion	Martin Schringer (ETH)
Case Studies			
	15:15	Coffee break	
11	15:45	First application examples and first learnings (15 min each) - Assessing the suitability of tools for SSbD to guide early innovation: a case-study for BPA and alternatives - Prospective LCA modelling for chemically produced fragrances - Safe and Sustainable Chemistry by Design: selected case insights from the Mistra SafeChem research programme Panel discussion with presenters of case studies (30 min)	Joanke van Dijk (Empa);
12			Ulla Letinois (dsm-firmenich);
13			Jutta Hildenbrand (RISE)
Synthesis and Conclusion			
14	17:00	Co-creation Session for SSbD Roadmaps Roadmaps developed by the European Project "IRISS" to facilitate SSbD will be briefly presented. A co-creation session will follow during which the participants reflect on the day and contribute ideas to bridge research, skills and education, and knowledge sharing needs within the SSbD roadmaps.	[Roland Hischer]
		Synthesis and conclusions of the day	Akshat Sudheshwar (Empa)
			Roland Hischer (Empa)