Kick-Off Industrial Symbiosis Standardization Roadmap

What Working Groups are needed to develop the Standardization Roadmap on Industrial Symbiosis?

28 March 2025 | 09:00 – 11:00 CET

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Agenda

	09:00 – 09:10	**Welcome Remarks**	**Sebastian Vogel** European Committee for Standardization (CEN) and European Committee for Electrotechnical Standardization (CENELEC)
	09:10 – 09:20	**Context of the Standardization Roadmap**	**Izabela Ratman-Kłosińska** Institute for Ecology of Industrial Areas (IETU)
	09:20 – 09:30	**Goals & Expected Outcomes**	**Nico Kimpel** German Institute for Standardisation (DIN)
	09:45 – 10:30	**Introduction to Working Groups**	**James Woodcock** International Synergies Ltd (ISL)
	10:30 – 10:45	**Working Group Participation & Next Steps**	**Sebastian Vogel** European Committee for Standardization (CEN) and European Committee for Electrotechnical Standardization (CENELEC)

How to get out the most of today's meeting?

- The **slides** will be shared afterwards with calls for action.
- The session will **not be recorded** but pictures might be published.
- Please **raise your hand** if you want to speak or use the Q&A section.
- We will ask you to fill out the **participation survey**.

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Welcome Remarks

About CEN and CENELEC

Sebastian Vogel, CEN and CENELEC

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Who Are CEN and CENELEC?

- **CEN**: European Committee for Standardization
- **CENELEC**: European Committee for Electrotechnical Standardization

Together: Develop European Standards (ENs) that support the Single Market, competitiveness, innovation, safety & sustainability

Membership: National Standardization Bodies from 34 countries

CEN and CENELEC at a Glance

- 2024 Statistics:
  - CEN: 2263 Technical Bodies
  - CENELEC: 429 Technical Bodies
  - Over 26.000 European Standards (all types) published – 1.509 in 2024
- Main collaborations: ISO, IEC, ETSI
- Open, inclusive process engaging industries, SMEs, NGOs, policymakers, and researchers

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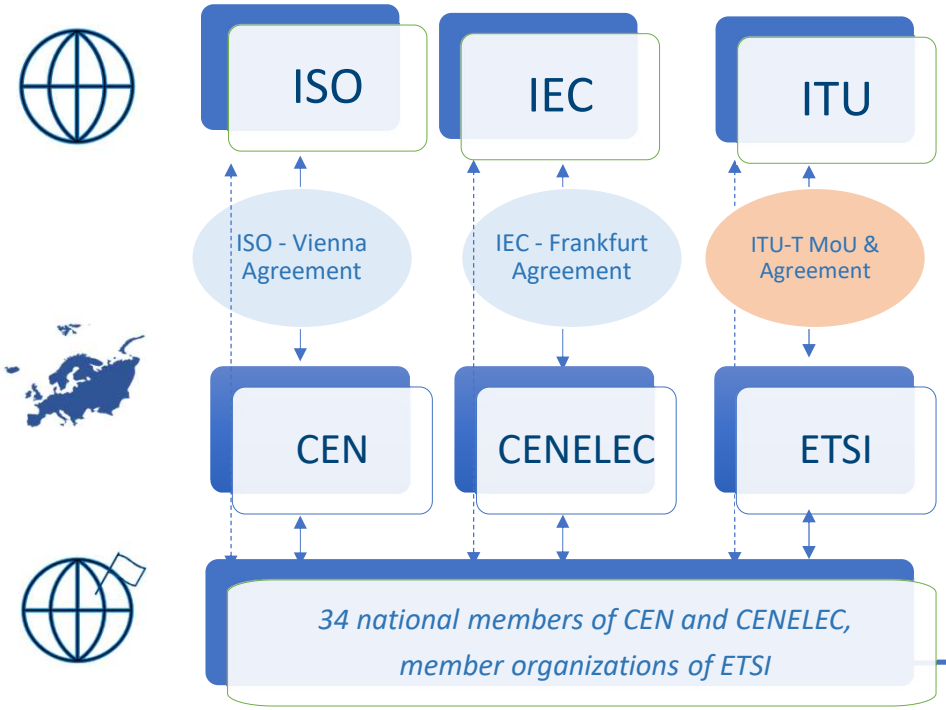
The European Standardization System

WTO principles

EC/EFTA

National authorities



CEN National Standards Bodies and CENELEC National Committees work with:

- *Industry & SMEs*
- *Government Departments*
- *Environmental NGOs*
- *Consumer Bodies*
- *Trades Unions*
- *Academic Bodies*
- *Research Organizations*
- *Certification Bodies*
- *Other stakeholders*

CEN and CENELEC Role in RISERS

- Support **development of the Standardization Roadmap** on Industrial Symbiosis
- **Ensure alignment** with European and international standardization frameworks
- Provide **platforms and governance** for future standardization activities
- Facilitate **uptake of recommendations** in Technical Committees

Context of the Standardization Roadmap

About the RISERS Project

Izabela Ratman-Klosinska,
Institute for Ecology of Industrial Areas

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the European Union

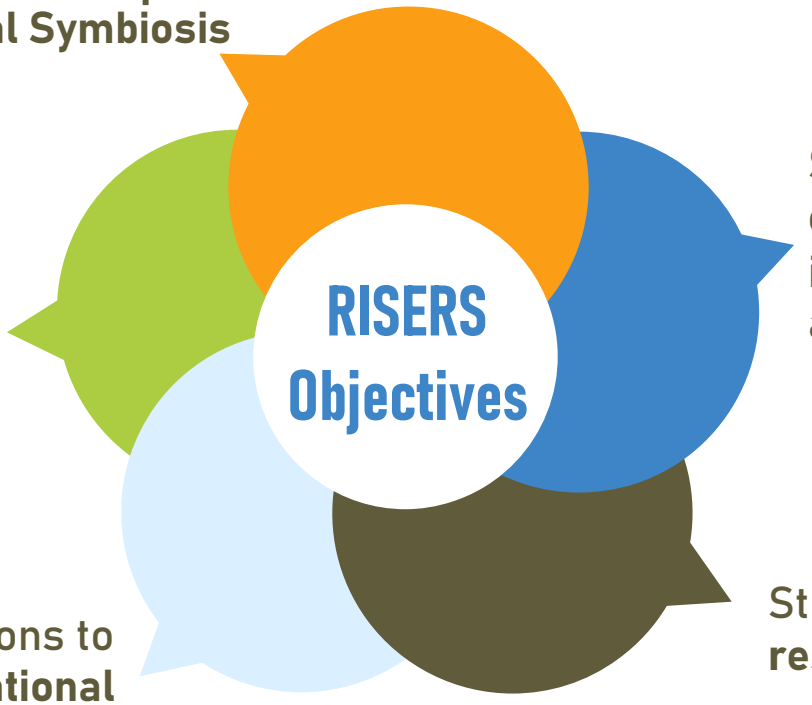
RISERS in a Nutshell

- **Full Name**: A Roadmap for Industrial Symbiosis Standardisation for Efficient Resource Sharing
- **Horizon Europe CSA project**
- Duration: **1.1.2024–31.12.2026** (36M)
- Goal: Accelerate **Industrial Symbiosis (IS)** through standardization

RISERS Objectives

Develop a **Standardization Roadmap for Industrial Symbiosis**

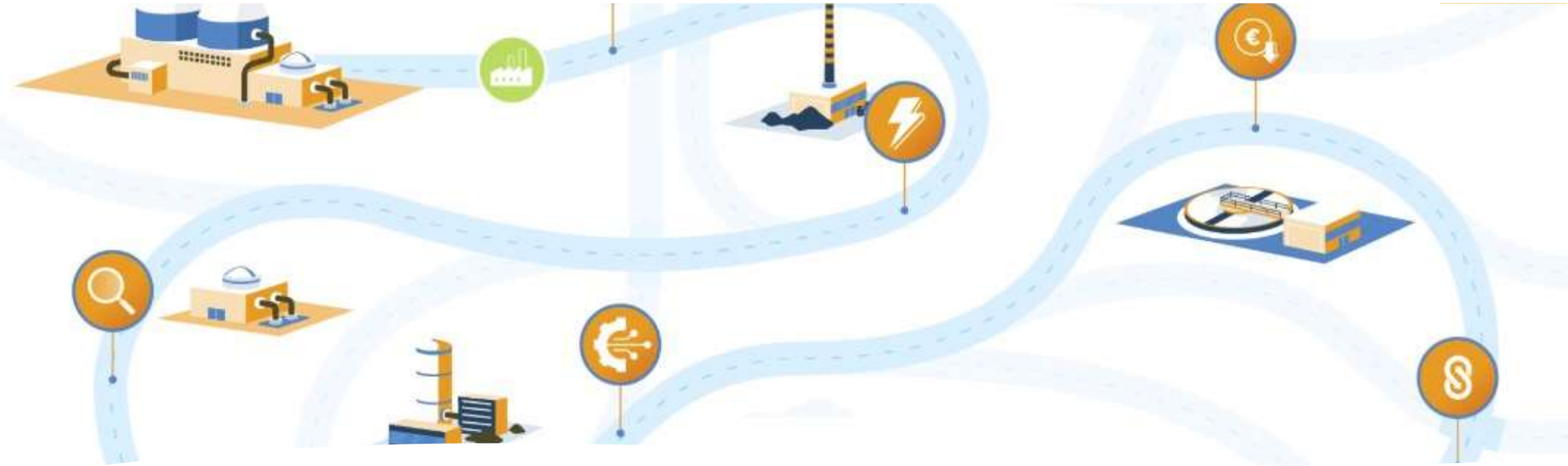
Support **cross-sector synergies** for resource efficiency and circular economy



Strengthen **stakeholder engagement** across industry, research, policy, and standardization bodies

Provide recommendations to **European and international standardization bodies**

Strengthen **the uptake of R&I results in IS standardisation**



RISERS Activities

- **Mapping** of existing standards and best practices
- **Reviewing** industrial symbiosis activities in order to identify limitations and barriers.
- **Stakeholder engagement** via workshops, surveys, interviews
- **Development of recommendations** for standards and regulation
- Working Groups to **define needs and gaps**, propose **standardization solutions**, and feed into the Roadmap

Goals & Expected Outcomes

Standardization Roadmap for Industrial Symbiosis

Nico Kimpel, DIN

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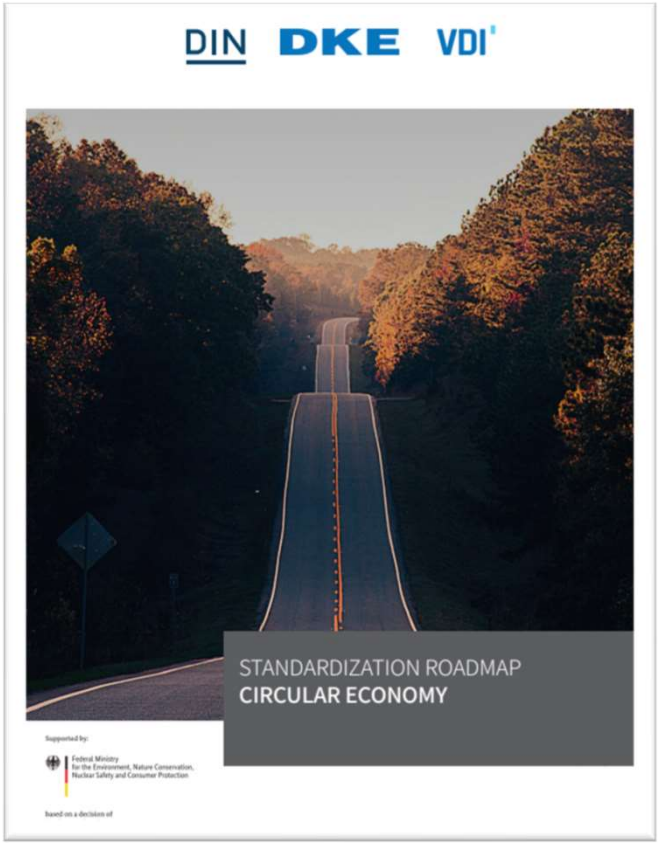
Circular Economy Roadmap as Basis

- A model leading to our roadmap
- Holistic coverage of CE
- Similar vertical topics
- End-of-Waste as horizontal topic
- Further develop the findings
  - With a focus on **Industrial Symbiosis**
  - Work on **European level**

Download the Roadmap here.



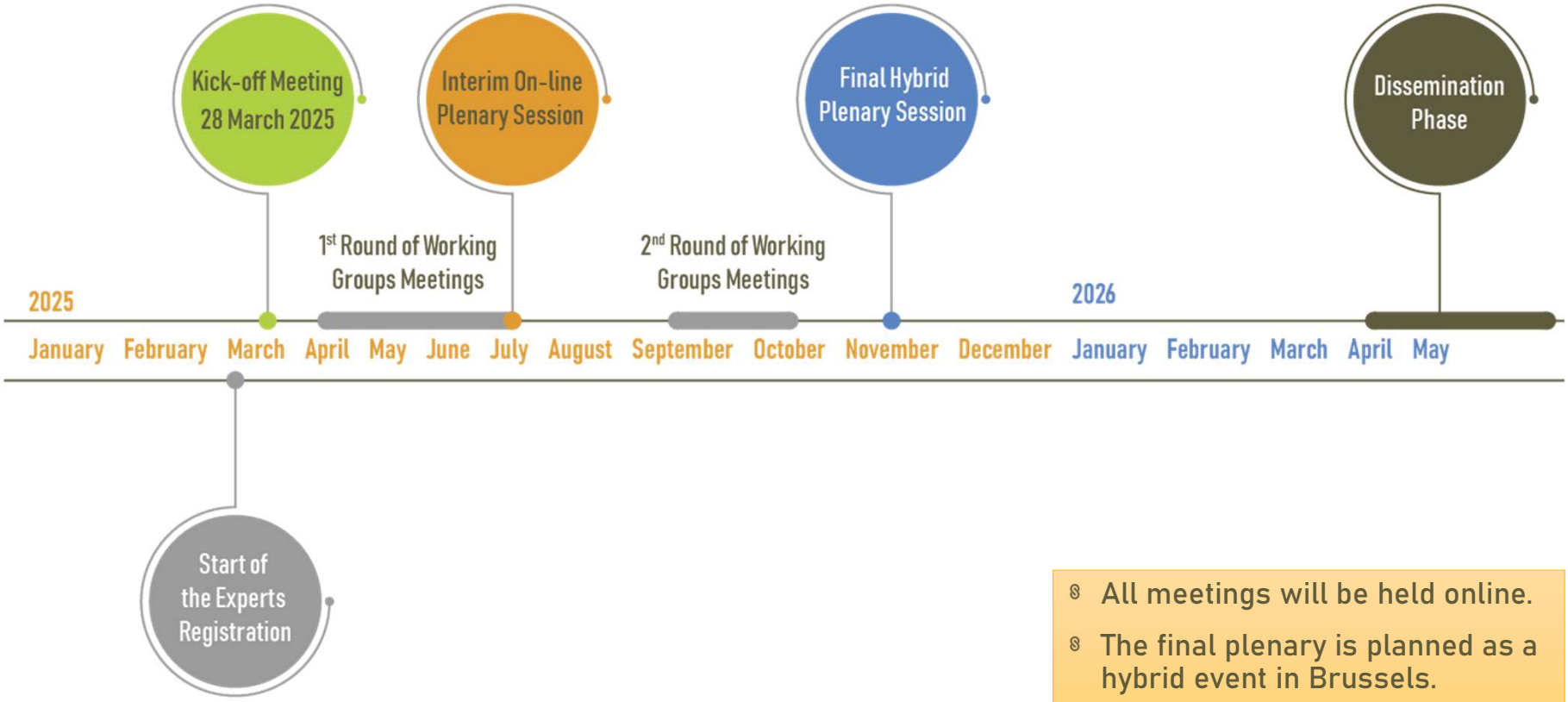
Goals of the Standardization Roadmap

- **Facilitate** and **harmonize** resource sharing practices to scale up
- Create a **common understanding** of Industrial Symbiosis and define practical **examples** within and across sectors
- Identify **challenges** for implementation concerning standardization and regulation
- Use opportunities of standardization to provide clear **guidance** and **frameworks** for application
- Discuss and formulate **recommendations** with and for policymakers
- Networking

Development Process

- **Working Groups**: Discuss challenges, needs, and recommendations
- **Plenary Meetings**: Share progress and gather feedback
- **DIN.ONE platform:** Collecting and commenting content
- **Coordination Committee**: Validate and consolidate inputs
- **Final Deliverable**: Standardization Roadmap

Timeline Overview



- All meetings will be held online.
- The final plenary is planned as a hybrid event in Brussels.

Introduction to Working Groups (WGs)

Working Groups Overview

James Woodcock, ISL

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ISL's Mission

"To lead the world in innovated industrial symbiosis solutions for a low carbon, sustainable economy."

50 Countries
Projects Delivered

50 Mt
CO2 Reduction Facilitated

£3B
Economic Value Generated

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What We Do

- Industrial symbiosis facilitation
- Net Zero Industry Support
- Place-based Decarbonisation Strategies
- Resource Matching Platform
- Upskilling in CE, RE

Rachel Lombardi
Chief Executive

Ian Humphreys
COO

Peter Laybourn
Founder, Chairman

Jacqueline Gibson
Director

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RISERS Working Groups (WGs)

Objective:
Facilitate structured discussions on industrial symbiosis standardization to deliver clear, actionable outcomes for the roadmap.

Working Groups – Scope & Flexibility

- Each Working Group is free to:
  - Define its own **priority synergies**
  - Focus on **challenges and standardization needs** most relevant to the sector
  - Propose **recommendations** for standards, best practices, and regulatory alignment
- The following examples provided are for **inspiration**.

👉 *Your contributions will directly shape the content of the Standardization Roadmap!*

Working Group Participation – Role & Responsibilities

- **General Time Commitment:**
  - Primarily participation in three WG meetings (max. 3h)
  - Optional ad-hoc calls or written inputs between meetings
  - Support will be provided for moderation and content alignment
- **WG Leaders** (and optional co-leaders) will:
  - Facilitate Working Group meetings (with support from CEN, DIN, and RISERS partners)
  - Summarize key discussion points and compile WG outputs
  - Represent WG at plenary sessions on 5 June and 12 November 2025

⚠ *No specific background is required: Expertise in the topic and commitment to the process is key!*

How did we define the Working Groups?

RISERS Priority Synergies Analysis

- **600+ Industrial Symbiosis (IS) cases** collected
  - From EU projects (EPOS, SCALER, MAESTRI) and academic studies
  - Organized as Material, Energy, and Service streams (MES)
- Cases mapped by **sectors** (input/output) and **resources**
- **Semi-structured interviews** with industry experts validated gaps and opportunities

Two-Step Evaluation Process

1. **Qualitative Assessment**
   LESTS Methodology
   1. Legal, Economic, Spatial, Technical, Social factors
   2. Identified barriers and potentials for IS implementation
2. **Quantitative Assessment**
   3P Framework (People, Planet, Profit)
   1. Environmental, economic, and social impact
   2. Aligned with e.g., EU Green Deal, CE Action Plan

How did we define the Working Groups?

- **Result: 10 Priority Synergies.**
  - Highest impact and relevance across sectors
  - Direct input for defining the **Working Groups (WGs)**
- WGs are **open frameworks**, participants will identify their own key **synergies and priorities.**

- *We may change and merge WGs if requested.*

Proposed Working Groups

Working Group	Focus
WG 01 Industrial Symbiosis in General	Cross-sector synergies and IS systems
WG 02 End-of-Waste	Regulatory status and standards on waste reuse
WG 03 Digitalization & Data	Data sharing, monitoring & digital twins for IS
WG 04 Steel, Slag & Refractories	Industrial symbiosis in steel production & by-products
WG 05 Batteries	Recycling, reuse, and symbiotic opportunities
WG 06 Packaging	Circular packaging and material reuse in IS
WG 07 Waste Heat	Utilization of excess heat across industries
WG 08 Textiles	Textile recycling and IS applications
WG 09 Energy Data & Grids	Data exchange and energy grid symbiosis
WG 10 Biomass & Waste Wood	Organic waste valorization in IS

RISERS Standardization Roadmap Industrial Symbiosis - Working Group Registration

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WG 01 – Industrial Symbiosis in General

- **Scope & Focus**
  Cross-sectoral industrial symbiosis systems, focusing on governance models, business frameworks, and enabling conditions.
- **Inspiration Example**
  National Industrial Symbiosis Programme (NISP®)
  - Facilitated membership
  - Supplies/Receives: Multiple industries/multiple resources
  - Replication across over 25 countries
  - Realised benefits: Improved resource efficiency, cost reduction, enhanced competitiveness
- **Other Ideas to Explore**
  - Development and standardization of industrial symbiosis definitions and frameworks (building on the CWA on IS)
  - Business models and governance frameworks for industrial symbiosis implementation
  - Certification schemes, cross-sector cooperation agreements, and systemic enablers

WG 02 – End-of-Waste

- **Scope & Focus**
  Regulatory status and connection with standards related to waste, focusing on definitions, quality requirements, and harmonized End-of-Waste (EoW) criteria.
- **Inspiration Example**
  Defining End-of-Waste criteria for construction and demolition waste
  - Supplies: Construction industry
  - Receives: Secondary raw material processors, manufacturers
  - Potential benefits: Legal certainty, market creation, reduced waste
- **Other Ideas to Explore**
  - Standardized methods for assessing End-of-Waste status
  - Alignment of criteria for reused materials to process input standards and other requirements (RHOS, POPs etc)
  - Role of standards in supporting cross-border recognition of EoW decisions
  - Synergies with existing and upcoming EU waste legislation

WG 03 – Digitalization & Data

- **Scope & Focus**
  Data sharing, monitoring, and digital twins for industrial symbiosis — including governance, interoperability, and trust frameworks.
- **Inspiration Example**
  Data platforms for material and energy flow tracking to facilitate industrial symbiosis matchmaking
  - Supplies: Industrial operators
  - Receives: Symbiosis networks, policymakers, decision-makers
  - Potential benefits: Transparency, efficiency, better resource allocation
- **Other Ideas to Explore**
  - Digital platforms and matchmaking services for industrial symbiosis stakeholders
  - Data-sharing agreements, governance, and interoperability standards
  - Traceability and transparency solutions (e.g., blockchain applications)

WG 04 – Steel, Slag & Refractories

- **Scope & Focus**
  Industrial symbiosis in steel production and by-products, focusing on slag reuse, refractory recycling, and material substitution across sectors.
- **Inspiration Example**
  Reuse of BOF/EAF slag in cement production
  - Supplies: Steel industry
  - Receives: Cement industry
  - Potential benefits: CO_2 reduction, raw material substitution, reduced landfill needs
- **Other Ideas to Explore**
  - Recovery and reuse of refractory bricks in construction
  - Extraction of valuable metals from slags
  - Cross-sector applications for secondary raw materials (e.g., road building)

WG 05 – Batteries

- **Scope & Focus**
  Recycling and reuse of batteries, focusing on recovery of critical raw materials and energy storage symbiosis.
- **Inspiration Example**
  Recycling lithium and rare earth elements from EV batteries
  - Supplies: End-of-life EV batteries
  - Receives: Material processing industry, energy storage sector
  - Potential benefits: Resource security, reduced environmental impact, improved supply chain resilience
- **Other Ideas to Explore**
  - Second-life applications for EV batteries (stationary storage)
  - Standardized processes for battery disassembly and recycling
  - Opportunities for industrial symbiosis through shared logistics and recovery facilities

WG 06 – Packaging

- **Scope & Focus**
  Reuse and recycling of packaging materials within industrial symbiosis frameworks, including circular design and material flows.
- **Inspiration Example**
  Use of plastic packaging waste as alternative fuel in cement kilns
  - Supplies: Packaging waste streams
  - Receives: Cement industry
  - Potential benefits: Waste reduction, resource recovery, reduced use of virgin fuels
- **Other Ideas to Explore**
  - Chemical recycling for high-quality raw materials
  - Standardization of reusable industrial packaging (e.g., pallets, drums)
  - Integration of packaging standards with circular economy initiatives (PPWR, SUP Directive alignment)

WG 07 – Waste Heat

- **Scope & Focus**
  Recovery and reuse of industrial waste heat across sectors, supporting energy efficiency and decarbonization.
- **Inspiration Example**
  Recovery of waste heat from industrial processes for district heating
  - Supplies: Process industries
  - Receives: Urban utility services, district heating networks
  - Potential benefits: Energy efficiency, reduced emissions, lower energy costs for municipalities and industries
- **Other Ideas to Explore**
  - Cross-sector heat exchange systems (e.g., between different industries)
  - Waste heat integration into hydrogen production and industrial cooling
  - Standardization for waste heat capture technologies and energy transfer protocols

WG 08 – Textiles

- **Scope & Focus**
  Recycling and circularity in the textile sector, focusing on material recovery and reuse within industrial symbiosis systems.
- **Inspiration Example**
  Fibre-to-fibre recycling of post-consumer textiles
  - Supplies: Textile waste streams
  - Receives: Textile manufacturing
  - Potential benefits: Reduced landfill, resource efficiency, closed-loop textile production
- **Other Ideas to Explore**
  - Chemical recycling of blended fabrics (cotton-polyester)
  - Standardization for sorting and quality requirements for recycled fibres
  - Integration of circular design principles and Extended Producer Responsibility (EPR) schemes

WG 09 – Energy Data & Grids

- **Scope & Focus**
  Data exchange, flexibility services, and energy grid integration supporting industrial symbiosis and energy efficiency.
- **Inspiration Example**
  Virtual Power Plants (VPPs) enabling energy flexibility for industrial clusters
  - Supplies: Industrial energy flexibility (demand-response services)
  - Receives: Energy grids, system operators
  - Potential benefits: Grid stability, optimized energy use, reduced energy costs
- **Other Ideas to Explore**
  - Standardization of data exchange protocols for energy flows
  - Integration of renewable energy and storage systems within industrial symbiosis networks
  - Data governance and interoperability standards for energy data sharing

WG 10 – Biomass & Waste Wood

- **Scope & Focus**
  Valorization of biomass residues, including waste wood and bark, for energy generation, material use, and bio-based product development.
- **Inspiration Example**
  Waste wood recovery for energy generation
  - Supplies: Pulp and paper industry, wood processing
  - Receives: Energy generation (biomass combustion plants), materials production
  - Potential benefits: Renewable energy production, reduced waste disposal, circular use of biomass resources
- **Other Ideas to Explore**
  - Carbon Capture and Utilization (CCU) in biomass energy processes
  - Cascading use of biomass in bio-refineries (e.g., for chemicals, fuels, materials)
  - Standards for sustainable sourcing and certification of biomass residues

Open Discussion

- Should we **reconsider** any WG(s)?
- In which WG(s) would you like to **participate**?
  - *Later changes are possible!*
- Who would like to **lead** which WG?

RISERS Standardization Roadmap Industrial Symbiosis - Working Group Registration

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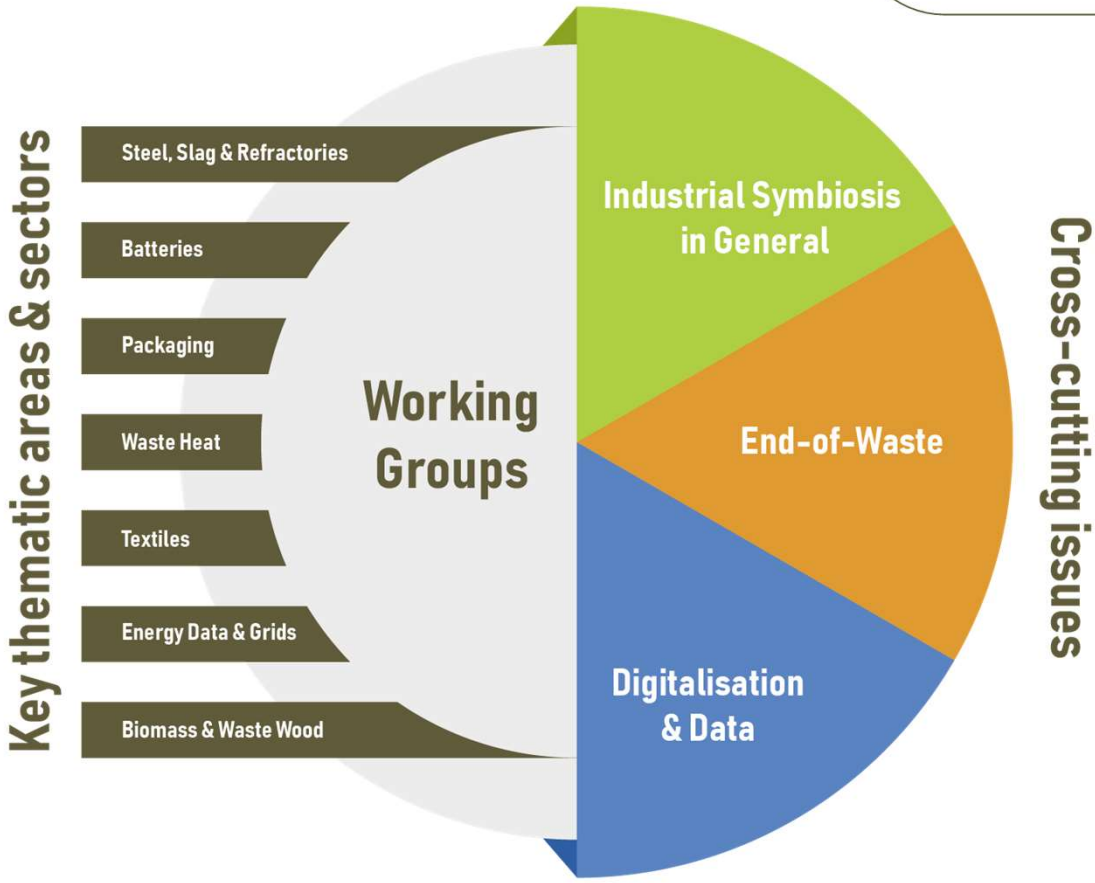

Next Steps & Dates

Working Group Participation & Next Steps

Sebastian Vogel, CEN and CENELEC

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Next Steps for Working Groups

1

Kick-off Working Group Discussions

Start defining **challenges, gaps, and standardization needs** during WG Meetings Round 1 (April–May 2025)

2

Deliver Interim Inputs

WG outputs from Round 1 will feed into the **Draft Roadmap Outline**

Contributions presented at the **5 June 2025 Plenary**

3

Refine & Validate Recommendations

WG Meetings Round 2 (Sep–Oct 2025): Validate initial findings and **recommendations**

Prepare for the Final **Plenary on 12 November 2025**

Next Steps for Working Groups

🗓️ **Meeting 1** – Apr/May 2025:
Problem Definition & Standardization Needs

🗓️ **Meeting 2** – May 2025:
Refinement & Initial Recommendations

🗓️ **Meeting 3** – Sep/Oct 2025:
Validation & Finalization

✓3 sessions (max. 3h each)

✓~10 participants per WG

✓Online format (ad-hoc sessions if needed)

Expected Outputs from Working Groups

5 June 2025

Interim Report

- Initial findings
- Identified challenges and **standardization gaps**
- Early recommendations (draft roadmap outline)
  (To be validated at the June Plenary)

Final Report

- **Finalized recommendations** for standardization
- Consolidated contributions for the roadmap
  (Presented and validated at the November Plenary)

12 Nov. 2025

Role of WG Leaders – Summary

Lead WG discussions, supported by RISERS partners, CEN-CENELEC, and DIN

Lead preparation of WG deliverables

Represent the WG at plenary sessions

Optional: Coordinate subgroups or ad-hoc meetings as needed

Collaboration Platform & Tools

📌 **DIN.ONE platform**

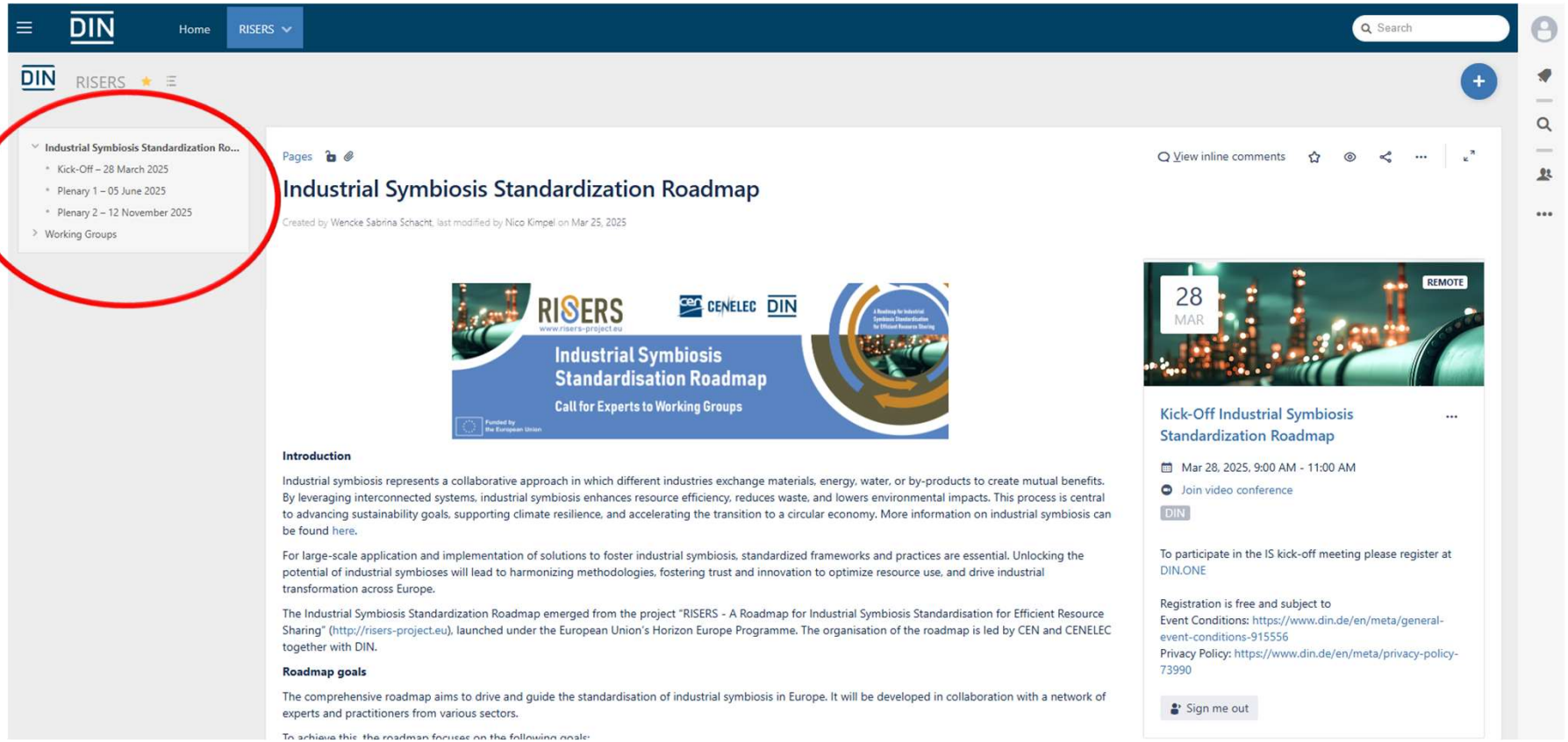
🔗 https://din.one/display/RISERS

Used for document sharing, comments, and online collaboration.

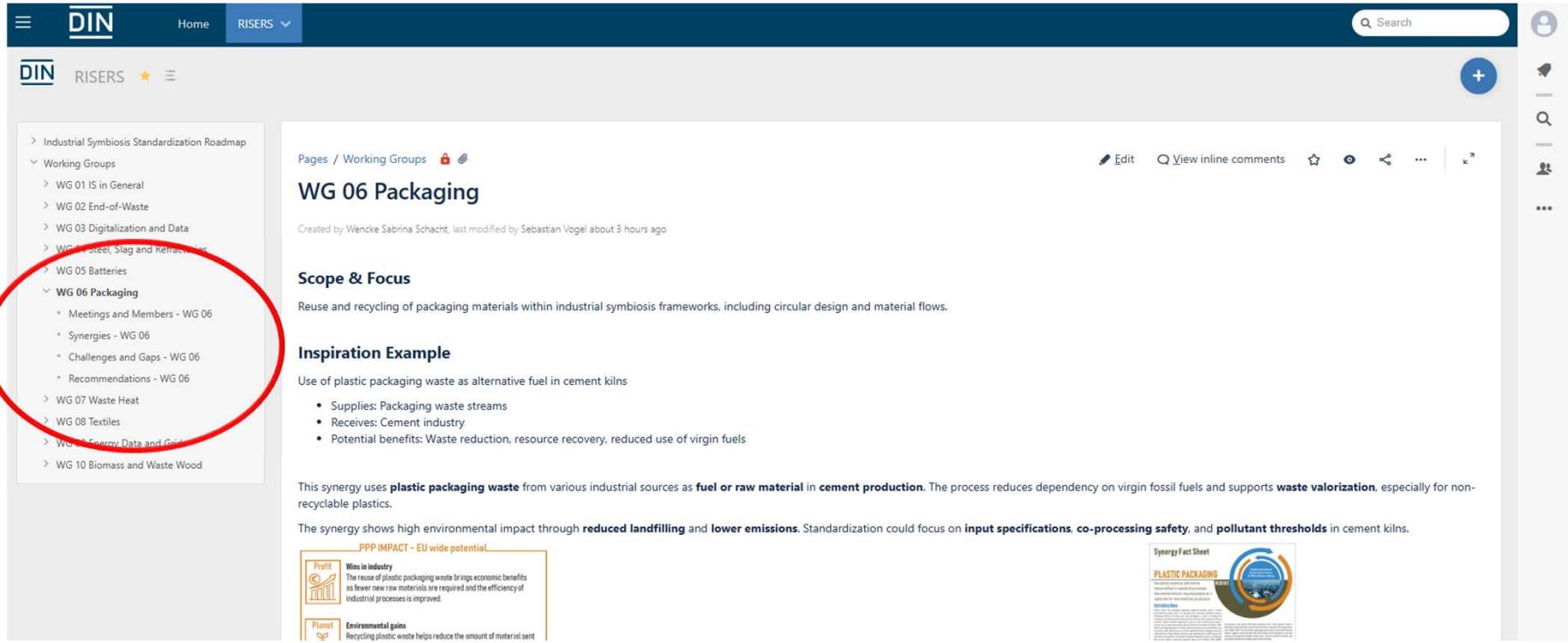
Legal disclaimers (GDPR, ToR & IP) need to be signed.

All participants will have access and guidance on its use and next steps!

Collaboration Platform & Tools - Events



Collaboration Platform & Tools - Workspace



Dissemination Activities

🎯 **Current Participants:** ~75
🎯 **Target:** 100 participants

✅ Help us broaden participation!

- Share invitations via email and LinkedIn
- Invite additional stakeholders: SMEs, industry players, policymakers, academia
- Register via RISERS website: www.risers-project.eu

Open Discussion

RISERS Standardization Roadmap Industrial Symbiosis - Working Group Registration

Thank You & Contact Info

🙏 Thank you for your participation!

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www.risers-project.eu

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