

RISERS Insights Brief #2

June 2026

Welcome to the second RISERS Insights Brief. With our draft of the Industrial Symbiosis Standardisation Roadmap now open for consultation, RISERS is entering a key stage of its journey towards supporting the large-scale uptake of industrial symbiosis in Europe.

In this issue, we examine how policy and regulatory frameworks shape industrial symbiosis, share insights on future research and standardisation priorities, present new voices of RISERS podcast episodes, and provide an update on upcoming opportunities for stakeholder engagement, including the RISERS Final Conference. We invite you to explore the latest project developments and contribute to shaping the future of industrial symbiosis standardisation.



Industrial Symbiosis in Europe: Why Policy Matters

Introduction

According to Rogge and Reichard¹, policy instruments constitute the specific tools to achieve overarching objectives, as techniques of governance that address policy problems. They are introduced by a governing body, thereby translating plans of action. Shown in table 1, three types of policy instruments can be distinguished: economy instruments, regulation and information.

Table 1: Type-purpose typology of policy instrument with instrument examples, modified. Source: Rogge and Reichard (2016) his article discusses regulatory policy instruments in the context of industrial symbiosis (IS). Starting with describing four demand-pull regulations of the groups “prohibitions” and “limitations”, it finishes with presenting several standardisation and coordination options to overcome various barriers created by the selected regulations.

IS ‘synergies’ are transactions where one organisation acquires underutilised resources (including waste, by-products, residues, energy, water, logistics, capacity,

Expertise, equipment and materials that are not the primary output of the production process) from the organisation generating them, and integrates them as inputs into their own production processes to create mutual economic, environmental and social benefit (see CEN Workshop Agreement CWA 17354:2018²).

IS transactions frequently involve materials that may start the process legally defined as “waste,” chemically complex substances, or regulated emissions streams. Therefore, European Union (EU), regulatory frameworks such as

- Waste Framework Directive
 - REACH - Registration, Evaluation, Authorisation, and Restriction of Chemicals
 - RoHS - The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment
 - BAT/IED - Best Available Techniques/Industrial Emissions Directive
- significantly shape the feasibility and economics of symbiotic transactions.

PRIMARY TYPE	PRIMARY PURPOSE		
	Technology push	Demand pull	Systemic
Economic instruments	RD&D* grants and loans, tax incentives, state equity assistance *Research, development and demonstration	Subsidies, feed-in tariffs, trading systems, taxes, levies, deposit-refund-systems, public procurement, export credit guarantees	Tax and subsidy reforms, infrastructure provision, cooperative RD&D grants
Regulation	Patent law, intellectual property rights	Regulation in combination with technology/performance standards, prohibition of products/practices, application constraints	Market design, grid access guarantee, priority feed-in, environmental liability law
Information	Professional training and qualification, entrepreneurship training, scientific workshops	Training on new technologies, rating and labelling programs, public information campaigns	Education system, thematic meetings, public debates, cooperative RD&D* programs, clusters

1 Rogge, K. S., & Reichardt, K. (2016). Policy mixes for sustainability transitions: An extended concept and framework for analysis. *Research Policy*, 45(8), 1620–1635. <https://doi.org/10.1016/j.respol.2016.04.004>

2 CEN-CENELEC (2018). CWA 17354:2018. Industrial Symbiosis: Core Elements and Implementation Approaches. https://www.cencenelec.eu/media/CEN-CENELEC/CWAs/RI/cwa17354_2018.pdf



As mentioned before, this article describes the framework conditions of IS created by these policy documents, where they function as enablers or barriers and proposes mechanisms to reduce regulatory friction while maintaining high environmental safeguards.

Waste Framework Directive (2008/98/EC, WFD) & End of Waste (EoW)

The WFD defines when materials are “waste” and sets rules for by-products (Article 5) and End of Waste (EoW) status (Article 6). Waste is heavily regulated. Once EoW criteria are met, the material becomes a product or secondary raw material. EU wide EoW criteria for some streams give legal certainty, unlock financing, and support markets for recovered materials. However, for materials without EU level EoW criteria, national decisions fragment the internal market and hinder cross border IS. Ambiguity around by-product conditions and the regulatory shift from waste law to REACH (see below) at EoW create legal and compliance risks that may deter firms from using others’ residues.

REACH Regulation (EC 1907/2006)

REACH covers most chemicals in the EEA/UK, requiring registration, evaluation, and sometimes authorisation or restriction, especially for substances of very high concern. It improves knowledge of chemical composition and supports safer use of secondary materials while limiting the circulation of hazardous substances in recycled streams. Yet recovered materials only benefit from certain exemptions if recyclers can prove substance identity and that the substance has already been registered. Compliance costs are particularly heavy for SMEs and can exceed the value of low margin secondary materials, reducing incentives for IS.

Restriction of Hazardous Substances (RoHS) Directive (2011/65/EU)

RoHS limits ten hazardous substances in electrical and electronic equipment (EEE), with strict concentration thresholds and extensive product scope. It promotes eco design and cleaner material flows, reducing contamination in recycled EEE fractions. But much current WEEE predates RoHS and contains restricted substances above limits. This makes many recovered plastics and components unusable in new EEE unless costly sorting, testing, and documentation are carried out. These steps, plus the need for traceability and supplier declarations, are expensive, especially for SMEs. Non compliant materials often must be downcycled, used outside EEE, or sent

for energy recovery or disposal. Time limited exemptions create uncertainty for recyclers planning long term investments and symbiosis arrangements.

Industrial Emissions Directive (2010/75/EU) & Best Available Techniques (BAT)

The IED requires large industrial installations to operate under permits based on BAT, with binding emission limits. New BAT conclusions increasingly incorporate circular economy and resource efficiency aspects, pushing firms to optimise inputs and valorise residues. However, permits remain site specific. Accepting another company’s by-products may require permit changes, additional monitoring, and major Capital Expenditures (CAPEX)/Operational Expenditures (OPEX).

Summary and outlook

To improve the framework conditions of IS, the previous sections demonstrated a challenge of regulatory optimisation, which can be addressed by harmonisation, standardisation, and administrative efficiency. Properly aligned, EU regulation can transition from barrier to structural enabler of large-scale IS. RISERS supports the realisation of this goal. Its recommendations for regulatory updates include for example the harmonisation of EoW criteria across jurisdictions, the simplification of by-product classification and the possible replacement of EoW by standards. Another recommendation is to align legislative and regulatory requirements, including REACH, the Circular Economy Act (CEA) and the Construction Products Regulation: to align environmental reporting, and ensure mutual recognition of test results across countries. Specifically, we recommend a standardised digital compliance documentation systems. Various additional measures are described in the first draft of RISERS’ standardisation roadmap, which is available here: [Help Shape the Future of Industrial Symbiosis in Europe – RISERS](#). Stakeholders are invited to provide further input to this roadmap.

Authors:

Simone Wurster, Fraunhofer-Institut für System- und Innovationsforschung ISI, Policy and Society

James Woodcock, International Synergies Limited

Advancing Industrial Symbiosis: Research and Standardisation Needs

Mapping the Gaps

Work conducted in “Bridging R&I and standardisation” work package has identified standardisation gaps where existing frameworks are insufficient and to establish R&I priorities that guide future research efforts. This task will lead to the elaboration of the deliverable titled “Map barriers and enablers to market entry for innovative CE/IS solutions”, which is structured across 13 strategic topic areas including 3 horizontal themes (IS in General, EoW, and Digitalisation & Data) and 10 vertical sectors (Steel, Batteries, Packaging, Waste Heat, Textiles, Energy Data, Biomass, Construction, Finance & Market, and LCA).

The report concludes that standardisation is a pivotal mechanism for operationalising IS across Europe. However, overcoming current systemic failures requires transitioning away from industry silos toward horizontal standardisation that prioritise cross-cutting environmental indicators and resource-efficient metrics. The investigation also reveals that the current standardisation landscape for IS is characterised by significant fragmentation and critical gaps. Excessive

bureaucracy and rigid policy frameworks often fail to accommodate the innovative, adaptive nature of IS practices.

Embedding Standardisation in Research and Innovation

To address these gaps, future R&I initiatives must move beyond technical development and explicitly integrate standardisation as a core dissemination and exploitation tool. Research results should be timed to align with the revision cycles of major standards to maximise impact. Consortia should establish early communication with Technical Committees (TCs) and utilise CEN Workshop Agreements (CWAs) as a flexible route for rapid standardisation of innovative solutions. Moreover, standardisation training within research teams and the creation of new professional roles capable of navigating complex regulatory and technical documentation are also important.

Bridging Strategy and Implementation

The assessment of existing Strategic Research and Innovation Agenda (SRIA) underscores a notable disconnection between high-level strategic planning and

operational standardisation instruments. There is a need for stronger alignment between policy-driven research priorities and the technical requirements necessary to scale IS practices. Future SRIAs must explicitly integrate standardisation frameworks to ensure that strategic R&I outcomes can be effectively translated into the market and industrial environments.

Supporting the RISERS Roadmap

The findings of this deliverable will serve as the empirical foundation for subsequent RISERS tasks, including defining the content for training and awareness-raising activities. Additionally, the identified bottlenecks will directly inform the mapping

of market entry barriers and the finalisation of the European Roadmap for IS Standardisation.

Through these interconnected activities, the RISERS project will ensure that the identified research needs are not only merely documented but are actively translated into the regulatory and technical architecture of the European Research area.

Author:
João Santos, Instituto de Soldadura e Qualidade

New RISERS Podcasts Explore Key Building Blocks for Industrial Symbiosis

As the RISERS project moves towards finalising its Industrial Symbiosis Standardisation Roadmap, two new podcast episodes provide insights into topics that are fundamental for scaling industrial symbiosis across Europe: a common terminology framework and a shared vision for future standardisation activities.

The first episode, **“Speaking the Same Language: The Industrial Symbiosis Glossary”**, features James Woodcock (International Synergies Ltd.) discussing the importance of clear and consistent terminology. The conversation explores how different interpretations of concepts such as resource transactions, underutilised resources, waste and geographical proximity can create misunderstandings between sectors and disciplines. It also introduces the RISERS Industrial Symbiosis Glossary, developed to support greater consistency in communication, standardisation and stakeholder engagement.

The second episode, **“The Industrial Symbiosis Standardisation Roadmap Explained”**, features Sebastian Vogel (CEN-CENELEC), who presents the RISERS Industrial Symbiosis Standardisation Roadmap and its role in supporting the wider adoption of industrial symbiosis. The discussion explains the roadmap’s structure, covering cross-cutting themes, sector-specific priorities and system-level enablers, while highlighting how more than 120 experts contributed to its development. The episode also encourages stakeholders to review the draft roadmap and provide feedback as part of the ongoing consultation process.

Together, these podcasts illustrate how RISERS is helping to build both the conceptual foundations and the practical pathways needed to advance industrial symbiosis. While the glossary aims to establish a common language for stakeholders, the roadmap provides strategic direction for future standards, policies and collaborative actions that can support industrial symbiosis at European scale.

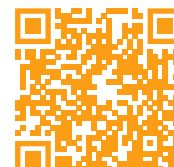
Both podcast episodes are available on the RISERS YouTube channel and through the project website.

Watch the podcast on our YouTube channel

Podcast: **“Speaking the Same Language: The Industrial Symbiosis Glossary”**



Podcast: **“The Industrial Symbiosis Standardisation Roadmap Explained”**



Chemical Recycling and the Future of Construction Plastics Waste

The construction sector is facing a growing plastics challenge. Plastic consumption in European construction is expected to increase significantly in the coming decades, while current recycling rates remain low and the reuse of plastic-based construction components is still rare. Complex material compositions, fragmented value chains and limited sorting infrastructure make many construction plastics difficult to recover through conventional recycling methods.

Against this backdrop, chemical recycling is attracting increasing attention as a potential pathway for recovering valuable materials from mixed and hard-to-recycle plastic waste streams. The technology offers promising environmental and economic benefits, but its large-scale deployment will depend on overcoming a range of challenges related to feedstock quality, collection and sorting systems, investment needs and regulatory support. We will explore these opportunities and challenges, and their implications for the future of circular construction, in a forthcoming contribution to be published in the second half of the year.

SAVE THE DATE - 03.11.2026 RISERS Final Conference

The RISERS Final Conference will bring together industry representatives, policy-makers, researchers, standardisation experts and industrial symbiosis practitioners to discuss the project’s key findings and future priorities for industrial symbiosis standardisation in Europe.

Date: 03.11.2026 from 09:00 to 15:30
Venue: EIT House, Brussels, Belgium
Format: hybrid

The event will present the Industrial Symbiosis Standardisation Roadmap, policy recommendations and guidance for future standardisation activities, while providing opportunities for networking and stakeholder dialogue.

Further details and registration information will be available soon.



Funded by
the European Union

DISCLAIMER:

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Health and Digital Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.