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SIDE EVENT

From a gap analysis to the standardisation roadmap for industrial symbiosis

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SCOPE

- **What existing R&I projects tell us about standardisation needs and gaps for Industrial Symbiosis:**
  - Over 150 research and innovation projects were screened (IS and CE).
  - 21 were identified as highly relevant (standards, policies & technology).
  - 13 strategic Topic Areas:
    - **3 Horizontal Areas:** Industrial Symbiosis in General, End-of-Waste, and Digitalisation & Data.
    - **10 Vertical Areas**: Steel, Batteries, Packaging, Waste Heat, Textiles, Energy Data, Biomass, Construction, Finance & Market, and Life Cycle Assessment.

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HORIZONTAL GROUPS

- **Industrial Symbiosis in General**
  - Lack of coordinated KPIs for monitoring circularity and resource productivity.
  - Existing frameworks are often "product-centric" rather than holistic.
- **End-of-Waste**
  - Current standards focus on "end-of-pipe" solutions (treatment/disposal) rather than reuse and recycling.
  - There is a critical need for harmonised criteria to distinguish waste from secondary raw materials.

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HORIZONTAL GROUPS

- **Digitalisation & Data**
  - Lack of standards for digital platforms ensuring data privacy, security, and interoperability across diverse energy-intensive industries.
  - Urgent need for priority harmonised standards to make DPP operational (e.g., unique identifiers, data carriers, and security protocols).

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VERTICAL GROUPS

- **Steel**
  - Absence of formal standards for cross-sectoral steel recycling management.
  - Additional gaps in the definition, classification, testing, analysis, and technical delivery requirements for metallurgical products.

- **Batteries**
  - Critical need for interoperability standards for swappable battery systems across different vehicles and manufacturers.
  - Lack of normative guidance for the industrial re-use and performance assessment of second-life batteries.

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VERTICAL GROUPS

- **Packaging**
  - Standardisation needs concern shapes, formats, and materials, which should be harmonised to simplify reuse, sorting, and recycling.
  - New biopolymers often lack specific application standards because they have not yet reached a significant market share or been assigned to a specific TC.
- **Waste Heat**
  - Absence of EU-level legislation and standardised data models to allow transparency in heat exchange across sectors.
  - Existing heat pump standards are inclined toward space heating and do not account for industrial processes.

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VERTICAL GROUPS

- **Textiles**
  - Standardisation is needed for tags, QR codes and other data carriers that can support high-speed automated sorting.
  - Testing methods are lacking to verify actual recycled content in man-made cellulosic fibers.

- **Energy Data & Grids**
  - Existing energy efficiency standards (like ISO 50001) need adaptation for inter-plant energy exchanges.
  - Standardisation is required to systematise information according to Industry 4.0 perspectives.

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- **Biomass**
  - Insufficient standards governing the general requirements of biomass resources (e.g. quality, variability, and properties measurement).
  - Confusion between bio-based content and biodegradability (need for rules on biogenic carbon assessment).

- **Construction**
  - Outdated mandates from the 1990s/2000s do not meet current needs and standards.
  - Develop standards for recycling ability and performance-based criteria for secondary raw materials to verify long-term durability.

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- **Finance & Market**
  - Long time for implementing standards in the market. The current process is viewed as too complex, necessitating simpler access for stakeholders.
  - Absence and lack of alignment in IS standards for sustainable finance (e.g. green bonds and ESG goals).

- **Lyfe Cycle Assessment**
  - Need of a unified standardised framework linking circular economy principles, eco-design, and LCA.
  - Lack of specific standards for calculating material and energy intensities from a life-cycle perspective.

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IN SUMMARY

- **Key Findings**
  - Current frameworks are insufficient to support IS implementation.
  - Absence of a unified European framework for Industrial Symbiosis.
  - Fragmented End-of-Waste (EoW) criteria.
  - Insufficient digital and data interoperability standards.
- **Strategic Insights**
  - Standardisation is the critical enabling mechanism for scaling IS.
  - Prioritise the alignment between research outputs and standardisation development processes.

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IN SUMMARY

- **Expected Impact**
  - Faster market uptake of innovative IS solutions.
  - Reduced regulatory uncertainty for circular business models.
  - Improved interoperability and data-driven decision-making.

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