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The workshop was held on Tuesday 11th of October 2022 at the Provadis School of Business in Frankfurt, Germany.

The workshop provided the opportunity to share experiences and knowledge regarding industrial symbiosis (IS) transactions to ensure that the work of the CircLean network remains relevant to its members. The workshops also provided the opportunity for German companies, business associations, public authorities, and R&I institutions to share views and suggestions on how to increase the uptake of IS nationally and at the EU level. The event was organised in cooperation with the Process4Sustainability cluster and Provadis Hochschule.

Highlights

It was a great pleasure to share experiences and knowledge regarding industrial symbiosis (IS) in a group with such diverse participants – start-ups, public authorities, regional players, EU representatives and students – since joined forces are needed to usefully implement the transformation of industry.

EU Strategic Landscape and CircLean Benefits

- The **European Green Deal** and the **EU Industrial Strategy** have emphasised the potential of industrial symbiosis (IS) as an innovative circular business model. One of the EU objectives on IS to be pursued through the CircLean project concerns the development of a European industry-led monitoring and reporting system for IS transactions.
    - **Industrial symbiosis is an important lever for reducing a region's and industry's environmental footprint.** However, it is not only about environmental aspects and in times of rising prices for raw materials and high energy prices, as **industrial symbiosis also holds economic potential.** The idea of industrial symbiosis is much older than the term itself and Verbund sites in the chemical industry have long followed this concept for economic reasons.
    - **Transparency about available resources and waste in a region is a critical starting point for closing regional resource loops.** As companies are focused on their core competencies, they might not be aware of opportunities outside their industry. One example for combining industries is the use of hydrogen from industrial park Höchst for fueling local trains. New alliances may bring opportunities to better use our resources and platforms such as CircLean might help to connect potential partners.
    - Existing industrial parks can play the role of an innovation campus for the upscaling of new low carbon technologies as the industrial infrastructure is already in place. Moreover, resource streams from other companies could be used as sustainable resources.
    - Different perspectives need to be taken into account: the perspective of incumbent companies may differ from startups and regulators' perspectives. Resources, physical assets, business models and regulatory aspects are intertwined. We need to reconsider our perception (and definition) of waste and see it as a potential valuable resource instead of something we need to get rid of.

CircLean Toolbox

- The CircLean Toolbox comprises a Self-assessment module and a Matching tool. The Self-assessment module prepares businesses for engaging in industrial symbiosis, with a three-stage assessment process of their site, resources, and potential match opportunities. The user is guided through identifying waste streams and other under-utilised resources that can be repurposed by companies in different sectors, and how to gather evidence and data for these resources. Ideas are presented to help the user identify substitutes for inputs leading to a diversified and more robust supply chain. More information on the Self-assessment module is available here. Companies that are confident in these areas can move straight to the online Matching tool here, which will offer them the opportunity to enter into regional or cross-border IS transactions.

Facilitation of Industrial Symbiosis - good practices

The good practices were presented by the following speakers with Dr. Rachel Lombardi, International Synergies Limited, moderating the session:

- Infraserv GmbH & Co. Höchst KG: Climate neutrality, Prof. Thomas Bayer

- INERATEC GmbH, Christina Kuhnle
- ARCUS Greencycling Technology GmbH, Julian Odenthal
- FES Frankfurter Entsorgungs- und Service GmbH, Benjamin Scheffler

The presentations of the good practices are summarised by the following points:

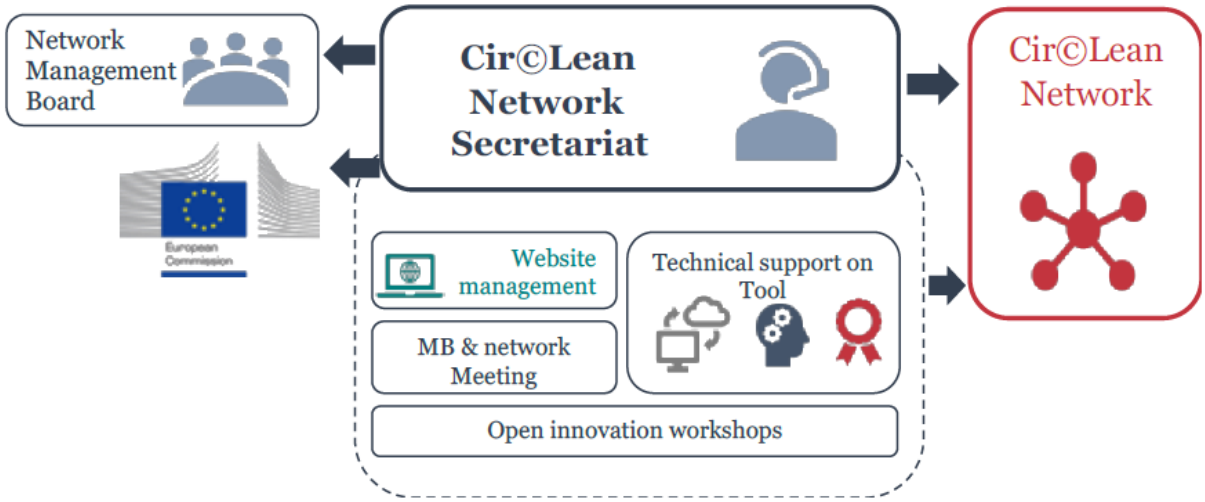
- **When choosing to pursue industrial symbiosis** or other means of processing waste, it was emphasised that companies choose to focus on their core competencies. The easier it is for industry to develop and integrate more sustainable options, the more likely they are to adopt green solutions. Even with new technologies to process waste into other products such as CO2, the companies prefer not to own the technology but to just take advantage of its products.

- **Chemical recycling processes are being developed to process waste materials but being tested with non-wastes, as the variability of wate flows can disrupt the technologies. Waste is a complex flow that can change day to day and player to player.**

- Cooperation and trust between IS partners was discussed in the context of the **cooperation and trust appropriate to a critical supplier relationship**: cooperation ensuring the quality of the resource flow for processing, and trust that the supplier will handle any waste flows transferred to the legal requirements. IS practitioners confirm this is the appropriate interpretation of cooperation and trust within an industrial symbiosis context.

- Biowaste component of the municipal waste stream is a source of renewable resources for industry and energy in the form of biomethane. More must be done to optimise its separate collection, and motivate residents to properly separate their waste so that this opportunity can be fully realised.

CircLean Governance



How to join CircLean in 3 easy steps

Step 1: Express your interest by sending a **signed Letter of Intent** to the CircLean Secretariat at circlean.project@technopolis-group.com

Step 2: Fill in the **Membership Application Form** including information on industrial symbiosis activities; experience with industrial symbiosis, etc. There is a basic and an active membership.

Basic membership

- Contribute to the development of the CircLean resource tool with their details and availability for matchmaking
- Contribute to the overall progress of the network
- Register details and resources in the CircLean tool and agree to contribute to the "Network" of resources shared online
- Active involvement in the more-advanced network activities (e.g. network meetings) is not compulsory

Active membership

- Register details and resources in the CircLean tool and contribute to the "Network" of resources shared online
- Involvement in the Management Board and in specific network meetings playing a more prominent role in the activities organised to develop the network, establish it as a sustainable hub for industrial symbiosis in the EU, and expand its membership base.

Step 3: Sign the **Network Charter/Code of Conduct** which includes mutual respect, integrity-based relationships among members, etc. More information is available here.

Discussions on the implementation of circular economy and industrial symbiosis

The discussion on the implementation of circular economy and industrial symbiosis was moderated by Dr. Manfred Kircher and attended by a panel of experts:

- Hessian Ministry for the Environment, Climate Protection, Agriculture and Consumer Protection, Dr. Christian Hey
- Rhein-Main-Abfall GmbH, Jens Will
- International Synergies Limited, Dr. Rachel Lombardi

During the roundtable of the event, the panellists discussed the following key points for industrial symbiosis in Germany:

- **Industrial symbiosis as a concept is being adopted across DGs in the European Commission,** including the Circular Economy Action Plan, Waste Framework Directive, Smart Specialisation Strategy, Energy Strategy and various research calls from DG RTD. In Germany the sustainability strategy provides guidelines and context for various policies and regulations; regulation at the interface of the environment and human health must be strict on final fate but not prescriptive on technologies to foster innovation.
- **Waste regulations and environmental permits were emphasised as main challenges for** European companies in Germany. The challenges are systemic and the problem indirect.
- **Another big challenge, especially for IS** is how to capture the value in the waste flows under management, given that the existing systems e.g. of municipal collection and processing are largely based on outdated models (often requiring high volumes of waste as feedstock) with high capital investment and long-term contracts.

Frequently Asked Questions (FAQ)

✓ **What will happen to the CircLean network after the end of the funded coming from the European Commission in November 2022?**

The CircLean network was designed with the ambition to become self-sustainable after the three years of EU funding. There are ongoing discussions with the members of the network that will be intensified in the coming months regarding this aspect, as the continuation of the network depends on the engagement of its members. The European Commission and the consortium implementing the CircLean project are supporting this process. The CircLean website and toolbox will remain online for one year after project end.

✓ **What are the benefits for my company/organisation in joining the CircLean network?**

Getting free access to an EU endorsed industry-led community of peers equipped with robust tools to discover, engage in, monitor and report about industrial symbiosis transactions across the EU, i.e. a self-assessment module, a matching tool to identify suitable opportunities for IS transactions, a common reporting methodology, and a EU label.

Opportunity to share views and suggestions for the Commission to increase the uptake of industrial symbiosis in the EU.

✓ **What are the benefits for my company/organisation to engage in industrial symbiosis?**

- *Reducing cost*: Decreasing costs associated with inputs to production and waste disposal improves profitability and competitiveness.
- *Fostering innovation*: Industrial symbiosis produces a demand-pull on innovation as industry identifies novel uses for underutilised resources. The OECD and UNEP identify industrial symbiosis as supporting eco-innovation.
- *Increasing revenue and competitiveness through diversification*: Creating new business opportunities to sell what used to be a 'waste', thus converting the cost of waste management and disposal into a revenue opportunity.
- *Mitigating resource risk*: Finding alternatives to traditional inputs, often outside the usual sector boundaries, decreases reliance on critical materials.
- *Creating jobs and encouraging entrepreneurs and new business start-ups.*
- *Reducing emissions and contributing to climate neutrality targets.*

✓ **To what do I commit by agreeing to become a member of the CircLean network?**

CircLean is a voluntary network and by joining it you only commit to respecting the CircLean Charter/Code of Conduct. Your active participation and contribution will be appreciated. Membership is free of charges.

✓ **Will I have any benefit if I follow the CircLean voluntary reporting methodology? When will it be developed?**

The protocol for the voluntary reporting methodology is ready. The main benefit associated to its implementation is the award of the EU CircLean label. The label will not only help businesses to participate in communicating their sustainability efforts, but will also signal that they are trustworthy partners to other operators.

✓ **Who holds the copyright of the Self-assessment module and the Matching tool?**

The European Commission holds those rights.

Other resources on IS

- European Resource Efficiency Knowledge Centre
- EC, Cooperation fostering industrial symbiosis: market potential, good practice and policy actions, 2018
- Industrial Symbiosis in the Baltic Sea Region, Nordregio Policy Brief
- FISSAC Project
- Guidelines on how to capitalise GPP as an enabler of industrial symbiosis, SYMBI project
- Interreg Europe Policy Learning Platform, Policy brief on industrial symbiosis
- Interreg Europe Policy Learning Platform, Policy brief on circular economy business models
- Interreg Europe Policy Learning Platform's webinar on circular economy business models

Event agenda

Time	Sessions	Additional details	Speaker
9.30-9.35	**Introduction**	*Presentation of the agenda*	International Synergies Ltd for CircLean
9.35-9.50	**Provadis Hochschule / Cluster Process4Sustainability**	**Welcome and orientation**	Prof. Dr. Hannes Utikal
9.50-10.05	**Speech from the representative of the European Commission**		European Commission representative
10.05-10.25	**Presentation of the CircLean toolbox (i.e. Self-assessment module and Matching tool)**	*A presentation on the use of the Self-assessment module and matching tool with Q&A*	International Synergies
10.25-11.40	**Good examples of local industrial symbiosis initiatives and projects**	*Good examples of local industrial symbiosis initiatives and projects, followed by Q&A.*	**Moderator: Dr. Rachel Lombardi** • Infraserv GmbH & Co. Höchst KG: Climate neutrality, Prof. Thomas Bayer • INERATEC GmbH, Christina Kuhnle • ARCUS Greencycling Technology GmbH, Julian Odenthal • FES Frankfurter Entsorgungs- und Service GmbH, Benjamin Scheffler
11.40-12.10	**Coffee break**		
12.10-13.25	**Roundtable about the opportunities and challenges for the reporting & regulations of industrial symbiosis**	*Roundtable addressing opportunities and challenges for the uptake and reporting of industrial symbiosis.*	**Moderator: Dr. Manfred Kircher** **Participants:** • Hessian Ministry for the Environment, Climate Protection, Agriculture and Consumer Protection, Dr. Christian Hey • Rhein-Main-Abfall GmbH, Jens Will • International Synergies, Dr. Rachel Lombardi
13.25- 13.40	**Presentation of the communication toolbox for CircLean Ambassadors**	*A presentation of the communication toolbox for CircLean available to CircLean members and other industrial symbiosis stakeholders.*	Arctik
13.40-13.55	**Presentation on how to join the CircLean network**	*A presentation of the CircLean project, how to join the network, and the opportunities offered as a CircLean member*	International Synergies Ltd.
13.55-14.15	**Wrap up and conclusions**	*Takeaways messages and next steps*	Dr. Rachel Lombardi & Prof. Hannes Utikal
Networking, lunch buffet			
15:15	*Closing*		