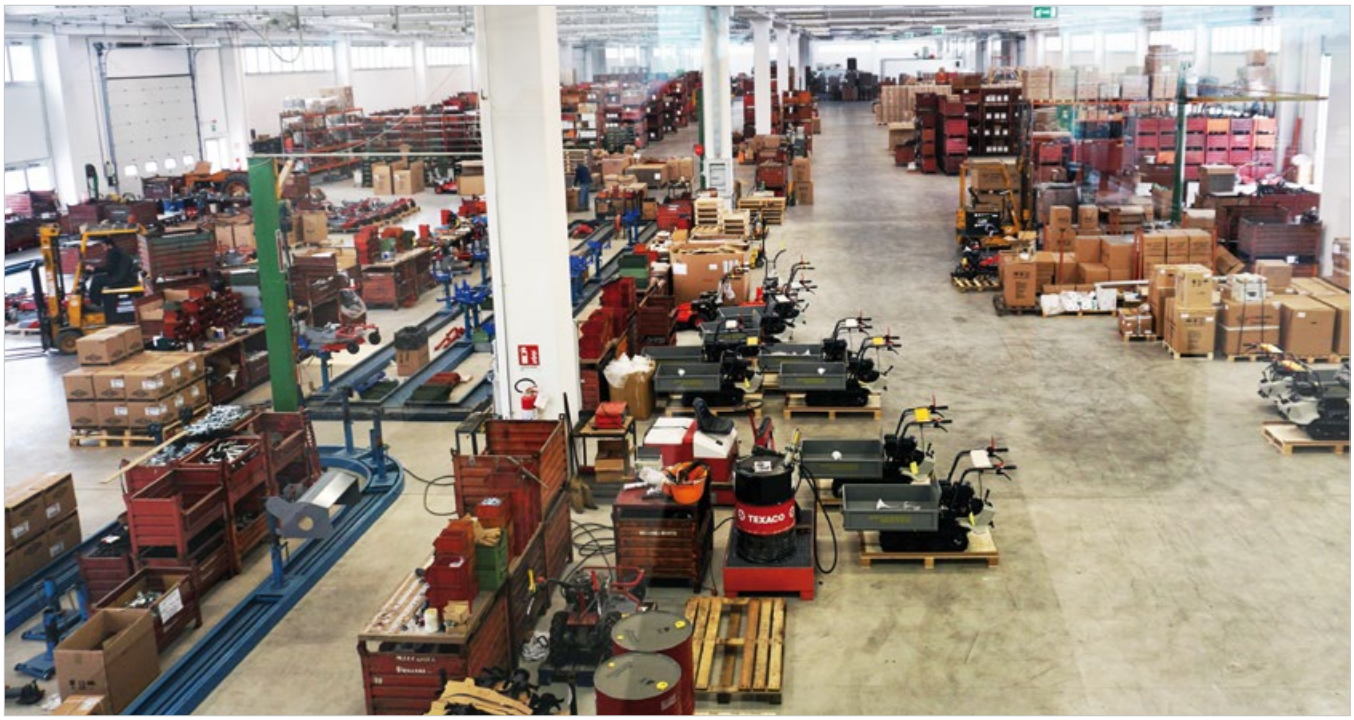
INDUSTRIAL SYMBIOSIS IN EMILIA-ROMAGNA

THE FIRST PILOT EXPERIENCEE OF INDUSTRIAL SYMBIOSIS IN EMILIA-ROMAGNA HAS IDENTIFIED POSSIBLE SYNERGIES BETWEEN ENTERPRISES, AS WELL AS PROPOSING OPERATING MANUALS. THE TRIS PROJECT NETWORKED SEVERAL EU REGIONS, ANALYZING REGULATORY AND FINANCIAL ASPECTS, PROFESSIONAL NEEDS AND PROMOTING OPERATING PRACTICES.

The awareness of the "non-endless" availability of natural resources in our planet, which started at the beginning of the '70s, has been increasing ever since. In recent times such awareness has favoured the definition of a new economic model: circular economy, which is currently the pathway chosen by the EU in order to achieve greater overall sustainability of production processes and of the whole Industrial sector[1]. One of the instruments to implement circular economy is industrial symbiosis, a methodology for the efficient re-use of waste and by-products. Such methodology is strongly related to both circular economy – as an application and policy instrument for the practical implementation of a circular model in production processes – and to industrial ecology – which defines the theoretical and scientific context for the development of symbiosis.
According to one of the most recent definitions, industrial symbiosis *"engages diverse organizations in a network that fosters eco-innovation and long-term culture change"*.
Creating and sharing knowledge through the network yields mutually profitable transactions, for instance for novel sourcing of required inputs and value-added destinations for by-products. Such definition differs from the one (and probably better known) proposed by Chertow: *"The part of industrial ecology known as industrial symbiosis engages traditionally separate industries in a collective approach to competitive advantage involving physical exchange of materials, energy, water and/or by-products. The keys to industrial symbiosis are collaboration and the synergistic possibilities offered by geographical proximity"*. Note that the main differences are linked to the concept of *"geographical proximity"*, necessary to Chertow, which becomes *"economic proximity"* to Lombardi and Laybourn[2].
In general, however, symbiosis is an instrument based on the identification and implementation of synergies between companies in a well-defined context.
To sum up, reference can be made to the payoff in the website of Nisp (National Industrial Symbiosis Programme, UK): *"Industrial symbiosis fosters the circulation of resources, in a continuous production cycle that prevents waste: it is circular economy in action"*[3].
In Italy, the Resolution No. 60 passed on 20 December 2016 by the VIII Environment Commission of the Chamber of Deputies underlines that the circular economy model should be based on a systemic approach, aiming to promote the so-called "qualifying factors" that also include industrial symbiosis.

A pilot experience in Emilia-Romagna

Between June 2013 and December 2015, a pilot experience of industrial



symbiosis was carried out in Emilia-Romagna, within the framework of the project *"Green economy and sustainable development"*, promoted by Aster and by UnionCamere Emilia-Romagna – in its first phase – with the technical and scientific coordination of the Technical Unit - Environmental Technologies of Enea and with the contribution by researchers of the Rete Alta Tecnologia (High-Technology Network) Emilia-Romagna. The project aimed to develop relations between production sectors, researchers, and the territory, with the development of a circular economy model.
The project was divided in two phases and focused on the agro-industrial supply chain, with particular (but not exclusive) emphasis on solutions for the production of high added-value materials. The first phase concerned the identification of possible synergies among the participating businesses, and the second phase deepened the knowledge of paths to industrial symbiosis and their real implementation, also through the development of specific operating manuals. The project allowed to identify over 90 paths to industrial symbiosis and to draft three operating manuals, while drawing the attention of the Emilia-Romagna region towards symbiosis, included in the regional Waste Management Plan as a *"useful instrument to reduce the amount and hazardousness of special waste"*[4].

The Tris project, European regions towards industrial symbiosis

The Interreg project Tris (Transition Regions for Industrial Symbiosis) originated from the experience of the project *"Green economy and sustainable development"* and from a focus on this topic, with the engagement of the regions participating in Climate Kic, the main public-private partnership for innovation in the fight against climate change. The Tris project started in April 2016 and aims to support partner regions in the introduction of industrial symbiosis (IS) practices as instruments for the efficient use of resources and competitiveness of SMEs.
Through the analysis and exchange of best practices and policies between the partner regions (West Midlands, Emilia-Romagna, Comunidad Valenciana, South Sweden, and Central Hungary), Tris will analyse the regulatory and financial elements, the professional and cultural needs that hinder, or vice-versa, facilitate the widespread and lasting implementation of industrial symbiosis practices in the various regions. The outcomes of comparison and benchmark between the partner regions shall be embedded in an Action Plan to support the regional Waste Management Plan in Emilia-Romagna, and in other plans related to the efficient use of resources in the other regions.
Drafting the Action Plan is the output of the first phase of the Tris project, whose first phase will end in 2019. During the second phase, ending in 2021, the implementation of the action plan will be monitored.
The key players of the project are not only the regional partners, the General Directorate for Territory and the Environment of Emilia-Romagna and Aster, but also the stakeholders grouped in the Local IS Lab, whose major aim is to increase the awareness – at regional level – of the concept of industrial symbiosis and the ensuing economic and environmental benefits.
This working table also included the laboratories of the Rete Alta Tecnologia (High-Technology Network) Emilia-Romagna, businesses bringing innovative experiences, the professionals' associations, Arpae (the Regional Agency for Environmental Protection), and Ervet. The first Local IS Lab was held on 23 February 2017, with an in-depth analysis of the dialogue between researchers and businesses for the implementation of symbiosis-related practices. The next meetings will focus on other topics, such as specific supply chains identified among the representatives of the Local IS Lab.

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TRIS
Interreg Europe

European Union
European Regional
Development Fund

For more information on the Tris project and IS activities, send an e-mail to tris@aster.it; Url https://www.interregeurope.eu/TRIS/

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1. Aster
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NOTE

[1] European Commission, Circular economy package, 2015, available at http://ec.europa.eu/environment/circular-economy/index_en.htm

[2] Lombardi R.D., Laybourn P., "Redefining Industrial Symbiosis. Crossing Academic–Practitioner Boundaries", *Journal of Industrial Ecology*, 2012.

[3] International Synergies, 2016, www.international-synergies.com/our-approach

[4] Mencherini U., "Integrazione di processi industriali in una prospettiva di economia circolare" (Integration of industrial processes from the point of view of circular economy), PhD Thesis in Mechanics and Advanced Sciences of Engineering, University of Bologna, 2016.