

EFFICIENCY AND ZERO WASTE WITH INDUSTRIAL SYMBIOSIS

AN OVERVIEW OF THE RECENT REGULATORY TRENDS FOR THE ADOPTION OF INDUSTRIAL SYMBIOSIS POLICIES: FROM THE EUROPEAN DOCUMENTS TO THE G7 DOCUMENTS, INCREASING ATTENTION HAS BEEN DEVOTED TO THE PROMOTION OF PRODUCTION STRATEGIES ABLE TO TRANSFORM WASTE OF ONE INDUSTRY INTO USEFUL RAW MATERIALS FOR ANOTHER ONE.

The term *industrial symbiosis* first appeared in a European document dated 20 September 2011, in the European Communication “Roadmap to a resource efficient Europe”¹. In this document, industrial symbiosis is recognized as one of the useful strategies to stimulate a more efficient production through a better use of raw materials and the re-use of waste and by-products. The Commission indicated clear targets to be achieved by 2020, so that Europe may become resource efficient. The Commission also stated its commitment to increase the re-use of raw materials, also through industrial symbiosis, namely the transfer of diverse resources and residues between different industries with subsequent economic returns and benefits for the environment.

In the same year, Unep – while drawing possible pathways for sustainable growth² – pointed out the crucial role of industrial symbiosis for the green economy, namely a system of economic activities for the production, distribution, and

consumption of goods and services that increases the well-being of humans in the long term, while avoiding the exposure of future generations to significant environmental risks and natural resource scarcity. The UN document stresses the analogy between closed-cycle manufacturing and the industrial symbiosis approach, or eco-industrial parks, and wishes for a governance inspired by the principles of industrial ecology, able to invest in support infrastructures for waste treatment and the conversion of waste into resources. Such an approach is considered ideal in that it implements a production system that maximizes the useful life of products while minimizing waste, the loss of value and raw materials, in particular the so-called critical raw materials.

The following year, in December 2012, industrial symbiosis is explicitly referred to in the *Manifesto & Policy Recommendations for a resource-efficient Europe*³ by Erep; industrial symbiosis is defined as an accelerator for innovation

and the creation of green jobs. The practice of industrial symbiosis – whose effectiveness is proven – is promoted as one of the pan-European initiatives that may not only divert waste from landfills, but also upscale the value chain and contribute to the preservation of natural resources and the valorization of waste. The manifesto urges to focus on platforms for sharing knowledge, to export industrial symbiosis models outside the EU, through a match-making at cross-border level, and to create new networks, as well as scaling-up the existing ones.

A self-regenerating economy

With the new definition of circular economy – in which waste from a production and consumption process circulates as a new input in the same or in a different process – the meaning of industrial symbiosis becomes even more important. In 2014 the EU Communication⁴ embraced exactly this



concept of economy, which regenerates itself through sustainable procurement, by reproducing the natural model as much as possible. To plan and innovate while fostering a circular economy, the Commission insists on industrial symbiosis, in particular to identify the by-products markets and favour the grouping of businesses, and therefore waste streams, in order to take advantage of scaling factors and make it possible and cost-effective to recover and give value to by-products, so that they do not become waste.

In the same year, the programmes of Horizon 2020⁵ dedicated specific bids⁶ to finance projects for the implementation of industrial symbiosis. Horizon's work programme aims at systemic innovation on a large scale, able to transform the wasted resources from an industrial sector into useful raw materials for another one. The approach outlined by industrial symbiosis needs a far-reaching coordination between diverse actors, while businesses continue to play a central role, but are called upon to raise their awareness on this topic and be more accountable for the economic and social transformation underway.

Such considerations were certainly recognized in Berlin, where the G7 met in October 2015 to devise a strategy for efficiency in the use of resources. The *Alliance for Resource Efficiency*⁷ was one of the outcomes of the G7 meeting, and was designed to serve as a forum for the exchange and promotion of best practices and innovation, by the G7 partners, along with the relevant stakeholders from the business and public sectors, research communities and institutions, and civil society, on a voluntary basis. To start this process, the G7 organized some workshops, including one on industrial symbiosis covering the sharing of service, utilities and by-product resources among industries, including through eco-industrial towns. In the same year, on 2 December 2015, the European Commission adopted a new circular economy package to help European businesses and consumers to make the transition to a stronger and more circular economy, where resources are used in a more sustainable way. The proposed actions aim at "closing the loop" of product lifecycles through greater recycling and re-use, and bring benefits for both for the environment and the economy. The package envisages reviews of some Directives and an EU action plan for the circular economy⁸. The



actions to be implemented at production and consumption levels include the clarification of criteria concerning by-products in the revision of the legislation on waste, in order to facilitate industrial symbiosis. One of these actions aims to facilitate the development of new businesses, job creation, and local revitalization by accommodating and utilizing local resources, goods, and energy based on collaboration among diverse local actors (industrial and community symbiosis) in a region.

Industrial symbiosis in Italy

At national level, there are no legislative acts concerning industrial symbiosis directly. The Law Decree on the Environment, part of the Stability Act of 2016¹⁰, contains provisions that promote the green economy and curb the excessive use of natural resources, also through the strategy of industrial symbiosis. Industrial symbiosis has started to be mentioned in various planning and orientation instruments at regional and local levels. Various examples may be mentioned, including the case of the Emilia-Romagna Region: in its Regional Waste Management Plan (2014), industrial symbiosis is one strategy to adopt for the re-use and recovery of by-products, in compliance with the legislation. The 2016 Energy Plan of Lazio Region included industrial symbiosis models among the instruments for a change in the economic development model, decoupling the consumption of resources from Gdp. In addition, the guidelines for eco-industrial parks in Lazio require the

achievement of industrial symbiosis goals for such areas; the Cartesio network also mentions industrial symbiosis for eco-industrial parks. The Friuli Venezia Giulia region includes, among other topics, the promotion of industrial symbiosis in the Regional Plan for Waste Prevention (2016).

Erika Mancuso, Grazia Barberio, Silvia Sbaffoni, Antonella Luciano, Laura Cutaia

Enea, Rome

NOTES

¹ COM(2011) 571 "Roadmap to a resource efficient Europe"

² Unep (2011) "Towards a green economy: pathways to sustainable development and poverty eradication".

³ Erep (2012), European Resource Efficiency Platform, "Manifesto & Policy Recommendations".

⁴ COM(2014) 398 "Towards a circular economy: A zero waste programme for Europe".

⁵ Horizon 2020 "Work Programme 2014-2015 Climate action, environment, resource efficiency and raw materials".

⁶ Horizon 2020 Waste-1-2014 "Moving towards a circular economy through industrial symbiosis".

⁷ G7 (2015), "Alliance for resource efficiency".

⁸ COM(2015) 614 "Closing the loop - An EU action plan for the Circular Economy".

⁹ G7 (2016), Joint Communiqué of Environment Ministers.

¹⁰ Law 221/2015.