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Symbiosis Users Network – SUN  
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**Il ruolo della simbiosi industriale  
per la prevenzione della produzione di rifiuti:  
a che punto siamo?**

**The role of industrial symbiosis  
for waste prevention: where are we at?**

**November 4<sup>th</sup> 2020**

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Edited by Tiziana Beltrani and Marco La Monica



Italian National Agency for New Technologies,  
Energy and Sustainable Economic Development



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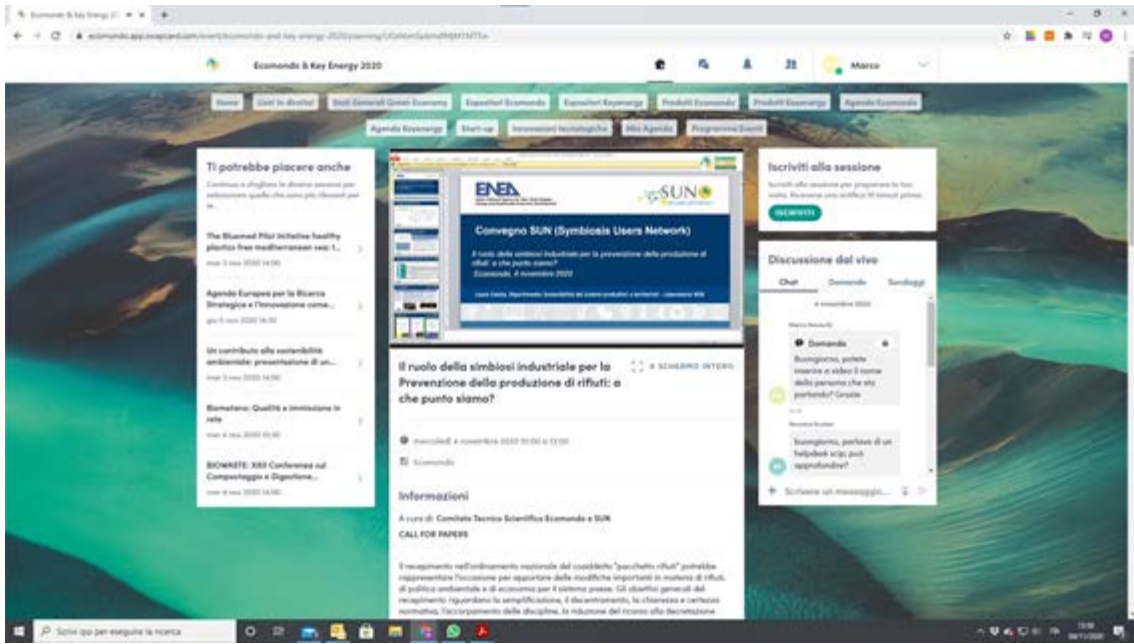
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# THE APPLICATION OF BY-PRODUCTS LEGISLATION IN ITALY AS A STRATEGIC LEVER FOR THE COMPETITIVENESS OF BUSINESSES: AN EVOLVING LEGAL ADMINISTRATIVE SCENARIO

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## ABSTRACT

In 2018 the Italian production of special waste amounted approximately to 143.5 Mt with an increase of 3.3% if compared to 2017 and disposal costs in the range of 160-240 €/ton, practically doubled within the last years. Many companies have therefore experienced increasing difficulties in waste managing because of both the increase in disposal costs and the collection timing required by sector operators. In order to make the production residues a new resource for other production activities, it is possible to qualify and manage the residues as by-products by creating paths of industrial symbiosis. Industrial symbiosis allows the transfer of resources (such as by-products and waste but also services and expertise) between two or more dissimilar industries and it represents a key to reduce their annual management costs achieving as well greater competitiveness. In addition to these advantages, there are environmental and social benefits that can have positive impacts not only on the individual companies involved but also on a territorial scale. The economic advantages can be more relevant where the industrial symbiosis approach takes place in a systematic way, against a specific project, allowing to obtain economic margins from the transfer of resources from one company to another. The main administrative legal instrument for the realization of industrial symbiosis is the by-product regulated in Italy by art. 184-bis of Legislative Decree 152/06 and subsequent amendments. Despite some steps forward to encourage and facilitate the use of by-products (Ministerial Decree of the Environment October 13, 2016, n.264, List of producers and users of by-products, List of by-products of the Emilia-Romagna Region), application difficulties persist in Italy, preventing a systematic and organic implementation of industrial symbiosis as a normal practice in the management of

industrial production residues. The purpose of this work is to carry out an examination of the regulatory and application landscape of industrial symbiosis in Italy with particular reference to the regulation of the by-product, identifying some possible tools and measures to overcome the difficulties highlighted and to favor the use as by-products of production residues that meet specific criteria as required by current legislation.

*keywords: Waste; Production residue; By-product; Industrial symbiosis; Circular economy*

## Introduction

In 2018 the Italian production of special waste amounted approximately to 143.5 Mt with an increase of 3.3% if compared to 2017. The increase is almost entirely attributable, in quantitative terms, to non-hazardous waste, and in particular those from construction and demolition operations which increased by 6.6%, equal in quantitative terms to 3.7 million tons [1].

Many companies have therefore experienced increasing difficulties in waste managing because of both the increase in disposal costs and the collection timing required by sector operators. There are no official tools and data that accurately detect the trend in waste disposal costs for businesses: while urban waste is treated and disposed of at predetermined costs by the Planning Authority (AATO) through tariffs or taxes, special waste Instead, it is managed on the free market with the possibility for companies to contact the operator that best meets their needs, including economic ones, and to draw up specific private contracts.

Nevertheless, it is possible to refer to various unofficial sources, in particular sector surveys, which report the evolution of disposal costs, allowing to collect at least the order of magnitude of the phenomenon. One of these sources is the "Borsino dei rifiuti" which reports an average disposal cost of 160 €/ton, with peaks of 240€/ton. More generally, in light of the many sources examined a study by the REF Research Laboratory estimates that the average increase may have exceeded 40% in the last two years, with an additional cost of almost 1.3 billion euros for the only manufacturing sector [2].

## *By-products and Industrial Symbiosis: economic, environmental and social benefits*

In order to make the production residues a new resource for other production activities, it is possible to qualify and manage the residues as by-products by creating paths of industrial symbiosis. Industrial symbiosis allows the transfer of resources (such as by-products and waste but also services and expertise) between two or more dissimilar



industries and it represents a key to reduce their annual management costs achieving as well greater competitiveness.

Therefore, the production residue that meets all the legal requirements to be managed as a by-product can be transferred as a "resource" from one company to another with undeniable economic advantages: for the "transferring" company a reduction of the annual waste management costs, as well as a profit in the event of a sale; for the company that uses the by-product (secondary resources of lower cost, with the same technical-operational characteristics of the raw materials to be purchased on the market) a reduction of production costs. Further economic benefits can arise from the creation of new business networks and from new market opportunities.

In addition, there are environmental and social benefits that can have positive impacts not only on the individual companies involved but also on a territorial scale.

From the environmental point of view, an efficient use of natural resources in production processes reduces the demand for ecosystem goods and services (water, coal, oil, fertilizers, etc.) and determines a lower impact of production activities (containment of atmospheric emissions, waste prevention and reduction and consequent disposal in landfills, etc.). From the social point of view, the management of some residues as by-products can produce new jobs, new professional positions, creation or enhancement of the quality of the existing workforce, the reduction of social costs related to waste disposal, a cultural change and the creation and sharing of knowledge [3, 4, 5, 6, 7, 8].

Overall, the valorization of residues as by-products in industrial symbiosis paths allows to obtain win-win solutions, in which all the actors involved can benefit from reciprocal interactions. Industrial symbiosis is therefore able to generate a virtuous interaction between companies and the territory through the activation of collaboration processes between the various actors involved. The implementation of this business model creates important advantages for the business system and for the community, both in economic and environmental terms thanks to an increase in the overall competitiveness of local production systems, a reduction in pressure on ecosystem services and on biodiversity of a territory, to an improvement in the quality of community life [9, 10].

#### *The ENEA Methodology to support the implementation of industrial symbiosis paths*

Based on the experience gained in recent years through various research projects both at national and European level, ENEA has developed an innovative methodology [11] for carrying out the audit of company resources in order to support the implementation of circular economy actions, increase resource efficiency and promote industrial symbiosis

[12] by favoring synergies between companies through resource sharing tables, stimulating companies to cooperate according to an Eco-industrial Park approach, or even through the creation of networks of companies and/or companies that manage similar resources in a shared manner, eg. through the construction of barycentric systems to favor economies of scale.

In particular, the experiences gained by ENEA in direct contact with companies have allowed an overview of the industrial symbiosis and of the operational and managerial difficulties in applying the legislation on by-products.

#### *National by-product legislation*

The Italian regulation of the by-product is contained in articles 183 and 184-bis of Legislative Decree n. 152/2006 [13]. Article 183, paragraph 1, lett. qq), defines the by-product as "any substance or object that satisfies the conditions set out in Article 184-bis, paragraph 1, or which meets the criteria set out in accordance with Article 184-bis, paragraph 2".

In particular, Article 184-bis, paragraph 2, provides for the possibility, on the basis of the conditions laid down in paragraph 1, to take measures to establish qualitative or quantitative criteria to be met so that specific types of substances or objects are considered by-products and not waste. The adoption of these criteria is carried out with one or more decrees of the Minister of the Environment.

In 2016 the Ministry of the environment issued decree 13 October 2016 n.264 [14]. ("Regulation containing indicative criteria to facilitate the demonstration of the existence of the requirements for the qualification of production residues as by-products and not as waste") that entered into force on 2 March 2017. As also specified by the explanatory Circular n. 7619 of 30 May 2017[15] of the Ministry of the Environment, the Decree 264/2016 does not innovate the general discipline of the sector but it aims to be a clarification tool available to companies, administrations and supervisory bodies concerning the demonstration of the conditions set up in art. 184-bis.

Furthermore, Ministerial Decree n.264/16, in order to promote the transfer and sale of by-products, provides for the establishment at the Chambers of Commerce of a public list of by-products in which producers and users of by-products can register. As clarified by the Explanatory Note prot. 3084 of 3 March 2017[16], registration in the list of by-products does not constitute an enabling requirement but has only a cognitive function and it aims at a mere facilitation of exchanges.



The qualification of a material as a by-product does not depend on the registration of the producer or the user in this list, since it is exclusively linked to the demonstration of the conditions laid down in article 184-bis.

Finally, since the by-product rules are exceptional and derogate from the ordinary waste rules, the burden of proof concerning the existence of the above conditions must be met by those producing the residue and manage it as a by-product.

#### *Regional by-products regulations*

The Italian legal system transfers to the Regions some competences in the field of waste, including the preparation of regional management plans, the promotion of integrated management, the incentive to reduce the production of waste and the recovery of materials and energy. In order to reduce waste production, some Italian regions such as Emilia Romagna and Tuscany have proven to be particularly active in promoting the by-product market.

The Emilia Romagna Region established with the regional law n.16/2015[17] on the circular economy the "Permanent coordination of by-products" composed of the main players in the sector (representatives of the Region, of ARPA Emilia-Romagna, of Confindustria and Coldiretti, etc.). With the resolution of the Regional Council n. 2260/2016[18], the regional list of by-products was subsequently approved. Downstream of the regional list, the Emilia Romagna region has envisaged the formalization of the production processes (contained in a specific sheet) and of the resulting by-products for the different supply chains identified (currently eight).

The Tuscany Region with the recent Regional Council Resolution n. 12/2020[19] published the "First Guidelines for the application of the by-product regulation to the textile industry" and with the Regional Law of 4 June 2020, n. 34, "Provisions on the circular economy for waste management"[20], it established the possibility of adopting other guidelines on by-products, to identify operational methods and solve application problems relating to article 184 bis paragraph 1 of Legislative Decree 152 / 2006.

#### *Critical issues on the interpretation and application of by-products*

The use of production residue as a by-product in the presence of all the conditions set by article 184-bis paragraph 1 of Legislative Decree n.152/06 does not require any authorization for businesses and it entails for them undoubted management and economic benefits.

Despite some important advances in the field of by-products, in Italy application difficulties persist that slow down the systematic and organic application of the by-

product and of industrial symbiosis as normal practice in the management of production residues:

1. the general nature of some of the conditions set by the aforementioned art. 184-bis paragraph 1 does not facilitate the burden of proof, with negative repercussions for both companies and supervisory bodies.
2. In this respect, Ministerial Decree n.264/16 represents a useful but not a decisive tool. In order to create a common basis for producers and control bodies, it suggests some tools/methods the use of which is the result of an exclusively voluntary membership. Therefore, application difficulties remain for sector operators in terms of the burden of proof, especially as regards the condition of direct use without any further treatment other than normal industrial practice (letter c, paragraph 1 of article 184-bis of Legislative Decree 152/06), one of the most discussed, as evidenced by the jurisprudence on the subject. Judicial decisions, often not univocal, sometimes favor the most restrictive theses and, in some cases, confuse operators, making the market for using the by-product even more complex. Yet, European Commission already since 2007 with the "Interpretative communication on waste and by-products"[21] and, then, in 2012, with the "Guidance on the interpretation of key provisions of Directive 2008/98 (par. 1.2.4)" [22], provided some guidance in this regard to the competent (monitoring) authorities.
3. The criminal nature of the sanctions applicable when the existence of all the conditions established by article 184-bis paragraph 1 is not demonstrated can constitute a deterrent for those who want to commit a crime, but also a concern and/or a disincentive for those who want to operate correctly in the absence of certain indications on the real extent of the above conditions. The result is that producers / companies are disincentivated to resort to the qualification of by-products for production residues that could be profitably used in another production cycle. The interests at stake are in fact different: on the one hand the interest in an advantage (also competitive) for entrepreneurs through an efficient use of resources, without the risk of incurring heavy penalties, on the other hand the protection of the environment and health by the State that cannot loosen the controls. It is necessary to think of tools that in a reasonably short time lead to a legislative clarification on the highlighted critical issues so that the interested parties know with certainty whether a residue can be managed as a by-product, in compliance with the protection of the environment and of health implementing the principle of preventing the production of waste, while at the same time discouraging incorrect behavior in the use of the by-product as the simplest and fastest way for the (illegal) disposal of waste.

4. As already illustrated, in order to foster a circular economy and give greater certainty to operators in the sector (companies, supervisory authorities), some Italian regions have established a system for the recognition of by-products. In the absence of adequate measures adopted at national level in the field of by-products, other Italian regions could provide within their own territory some tools similar to those adopted by the Emilia Romagna and Tuscany regions (guidelines, list of by-products) with two potential limits:
- the exclusively regional recognition of by-products;
  - heterogeneous disciplines of the by-product on the regional territories.

*The “appropriate measures” required by Directive 2018/851/UE*

The recent Directive 2018/851/EU[23] amended Article 5 (on by-products) of Directive 2008/98/EC[24], requiring Member States to take "appropriate measures" to ensure that a substance or object (resulting from a process of production whose purpose is not the production of that substance or object) is not considered a waste but a by-product if it meets the conditions listed in the same Article 5 in paragraph 1.

According to the provisions of Article 5, measures can be established at national level through the adoption of detailed criteria on the application of the above conditions to specific substances or objects (where criteria have not been set at Union level), favoring replicable practices of industrial symbiosis. The European Union therefore urges Member States to give new impetus to the by-product sector and industrial symbiosis, in order to make this practice, in compliance with sector regulations, an effective system reality.

*Final considerations and recommendations for appropriate future actions*

In order to overcome the interpretation and application difficulties highlighted above and therefore favor the use of production residues as by-products, the following measures and actions are considered appropriate:

- issue of ministerial decrees (pursuant to art. 184-bis paragraph 2 of Legislative Decree 152/2006) for the adoption of qualitative or quantitative criteria to be respected so that certain types of substances or objects are considered by-products and not waste;
- to favor innovative industrial processes and facilitate production agreements between companies (industrial symbiosis) thanks to which the production residues of one company can become productive factors for the other;

- to Establish a Technical Commission at a national level that provides for the involvement of the main stakeholders to better frame the needs and difficulties in the application of by-product regulation and therefore provide support to the Central Government and / or the competent Ministries in the adoption of "appropriate measures";
- to favor program agreements on by-products and coordinate State-Regions initiatives to avoid different situations on the national territory;
- to favor the creation and adoption of a national database with free access, which for each type of residue allows the identification of some of the possible production destinations, taking into account already consolidated paths and experiences of industrial symbiosis to the advantage of their replicability and the indication, for this purpose, of any technical requirements to be met to allow an effective match between supply and request for resources;
- also based on the provisions of Ministerial Decree 264/16, art. 6 paragraph 2, on the subject of "normal industrial practice", design or redesign the company production process including the activities and operations that are essential so that the production residue, at the origin and according to its specific destination, has the characteristics to be qualified as a by-product;
- to implement a system of technical support to companies, such as the National Platform for Industrial Symbiosis ENEA, also with regional offices, which allows identifying opportunities for the enhancement of excess resources while trying to bring together demand and supply on the territory;
- to promote training activities for all stakeholders on the discipline of by-products.

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