EXECUTIVE SUMMARY

Relevance of the study

Resource productivity and waste recovery indicators show that Portugal is below the European average. Despite the targets and actions plans set by most of national waste management plans, there has been little improvement or even tangible initiatives towards resource efficiency. It is important to foster company-level projects such as those based on the industrial symbiosis concept, by identifying their potential and the associated environmental, social and economic benefits impacts.

Objectives

The "Sinergias Circulares" study aims to promote industrial symbioses by identifying potential synergies between participating companies and the rest of the economy, by quantifying the potential environmental, social and economic benefits and, finally, by identifying which actions can accelerate the transition to the circular economy and symbiosis-based development models. More specifically, the study's objectives were

- Mapping of the quantities of produced and received waste and by-products from the participating companies;
- Identification of industrial symbiosis opportunities among participating companies and the rest of the economy;
- Assessment of the potential environmental, social and economic impact of the identified symbiosis;
- Identification of a set of recommendations and opportunities for action within the scope of public policies to support the transition to a circular economy and industrial symbiosis.

Methodology

To determine the potential of industrial symbioses, qualitative and quantitative data for the year 2015 were collected from 32 BCSD member companies. The data was consolidated in a database after analysis and standardization of information. The data analyzed has more than 22.300 waste movements, representing 267 different waste typologies and 8.3 million tons of waste produced.

Opportunities for industrial symbiosis and new operations were identified among the waste streams produced and received, within the universe of the 32 participating companies. For the eliminated waste without recycling options within this universe, solutions were found by using

the DISC tool, which consists of a database with more than 1000 concrete examples of industrial symbioses, identifying other economic sectors where the waste could be valued.

The potential benefit of industrial symbiosis was evaluated through an environmental extended input-output model, which allowed to simulate the effects along the economy resulting from a change in the structure of the economic sectors.

Based on the main challenges for the establishment of waste streams between companies, recommendations were made for action at the level of public policies. Six priority actions for action are aimed at speeding up the transition to industrial symbiosis: "Regulatory changes to facilitate waste transactions", "Boost green procurement", "Foster knowledge in companies", "Develop fiscal and funding instruments", "Promote collective platforms for resource management" and "Communicate results ".

The data set of the “Circular Synergies” study corresponded to a universe of 32 companies, with 51 different economic activities codes which produce about 8.3 million tons of 267 waste streams, through 22,314 movements (waste transactions - transportation and shipping for treatment).

Main Findings

- Currently, 57% of reported waste is disposed of with only 43% being recovered.
- The six waste categories with greater potential for becoming alternative raw materials are: “biodegradable waste", “bottom ash, slag and boiler dust”, "septic tank sludge", “oily water from oil/water separators”, “green liquor sludge” and “aqueous washing liquids and mother liquors”. 59% of waste from these categories – equivalent to 210 thousand tons – is currently disposed of.
- It is estimated that the promotion of industrial symbiosis of these 210 thousand tons of waste could reduce 95 thousand tons of intermediate consumption – the consumption between companies – and about 1 million tons of domestic extraction. This reduction is translated into savings of 42 million euros, whose availability to increase the final demand could generate around 11,5 million euros in GVA (gross value of production minus the cost of consumption in the production process) and around 450 new jobs.
- Considering the waste production and receiving reported by the participating companies, there is an effective direct transaction potential of 17 thousand tons – about 0.2% of the total waste produced – referring to edible oil and fat, textile packaging and batteries and accumulators. It is in the northern and southern region areas of Portugal that the greatest opportunities for transaction of these waste streams can be found.
- In Portugal, 1 million tons of waste are currently disposed of (2015). Although this value may be underestimated, if this waste was managed through industrial symbiosis, at an environmental level, an estimated reduction of around 5,5 million tons of domestic extraction would be achieved. At a social and economic level, the avoided intermediate

consumption is translated into 165 million euros, whose availability to increase the final demand could generate 32 million euros in GVA and 1,300 new jobs.

- Six priority actions aimed at speeding up the transition to industrial symbiosis are presented, namely: regulatory changes to facilitate waste transaction, boosting of green purchasing, fostering of knowledge in companies, facilitation of tax and financing conditions, promotion of collective platforms for resource management and communication of results. These actions include 14 initiatives.