
**Methods and tools for the implementation
of industrial symbiosis**
Best practices and business cases in Italy

Symbiosis User Network - SUN
Proceedings of the first SUN Conference

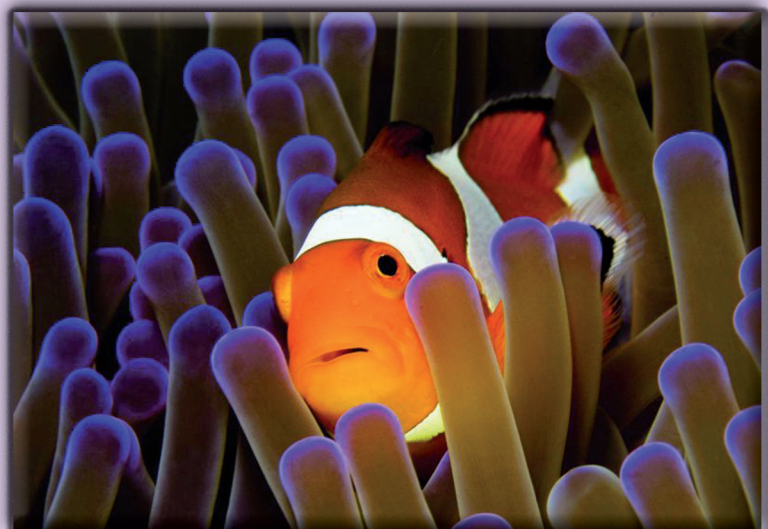
Rome
25th October 2017

Edited by Erika Mancuso and Valentina Fantin

SYMBIOSIS
USERS NETWORK



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



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2017 ENEA
National Agency for New Technologies, Energy and
Sustainable Economic Development

ISBN: 978-88-8286-358-6

Editorial review: Giuliano Ghisu

Cover design: Cristina Lanari

INDUSTRIAL SYMBIOSIS NETWORK IN UMBRIA, ITALY

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Abstract

This paper reports the activity developed by Sviluppumbria (Multi-functional Agency of the Umbria Regional Authority) and ENEA (Italian Agency for New technologies, Energy and Sustainable Economic Development) in the framework of the project to support SME's to individuate symbiosis opportunities at regional level. The project for an Industrial Symbiosis (IS) network in Umbria is currently in progress and at this stage includes: analysis of the productive sector in Umbria; local network activation with public and private actors; and collection and processing data. Two workshops have been held in Terni and Assisi, where more than 50 SME participated, sharing 200 resources in output and about 80 resources in input. More than 200 potential matches were found among the participating companies which will be processed by ENEA. The resource streams and synergies will be studied to realise technical dossiers

Keywords: Circular economy, Resource efficiency, By-products, Synergies

Introduction

Industrial symbiosis (IS) studies the physical flows of resources (e.g. materials and energy) through the local industrial system using a systematic approach. IS approach is in line with the recent European strategies of decoupling economic growth from natural resource consumption through the promotion of a more sustainable business models. IS is actually identified as a tool to implement circular economy in the last circular economy package of European Commission [1]. According to the internationally recognized waste hierarchy [2] IS application at local scale can contribute to the systematic reuse of waste and by-products minimizing in this way the need to extract natural resources and the depletion of environment. For this reason the project in Umbria aims at support the SME's to individuate symbiosis opportunities in this region. ENEA and Sviluppumbria shared a common interest to develop a network model among the companies in the Umbria territory for the implementation of industrial symbiosis and for evaluating the response of the territory to this new business model. Sviluppumbria contacted about 100 companies in order to involve them in the IS working tables. 51 companies participated at the two Terni and Assisi workshops. They shared 200 output resources and about 80 input resources. More than 200 potential synergies were identified. ENEA processed all the resources data in order to carry out the single company reports. These reports include the input and output resources, the matches occurred during the two workshops and eventually other matches proposed by ENEA.

Methods

The methodology followed to support companies and to enhance the implementation of industrial symbiosis pathways has been developed by ENEA [3] and consists of the following steps:

- Analysis of productive sectors in the region;
- Companies involvement;
- Network activation and promotion activities through stakeholders involvement at regional level;
- Workshop finalized to have input-output related information;
- Development of a draft of the technical dossiers for the main synergies;
- Consultation with companies and other stakeholders (e.g. public authorities, decision makers, institutions and associations of category);

- Revision of the dossiers and development of their final version;
- Delivery of the final dossiers to the companies involved.

According to the ENEA methodology, prior to the workshop companies have been asked to fill in input-output tables with resources to be shared within the project. Those resources could be eventually be updated and improved both during and after the workshop. ENEA is now working on the analysis of all the data in order to individuate potential additional synergies. Also the first version of the dossiers is in progress. These dossiers are operative handbooks including European, Italian and regional regulations, guidelines, technical standards, logistic and economical aspects useful for supporting companies in synergies implementation. Many technical solutions for waste and by-product materials, water, and energy reuse between neighboring industries will be studied as well .

Results

At this stage of project it is possible to show the first results of the workshops. At the workshop held in Terni, on 7th of April, the distribution of companies by production sector appears balanced, as they came from the manufacturing sector, energy , chemistry, agriculture and construction. Instead, at the Assisi workshop, held on 9th of June, most companies came from agricultural sector (about half of participants), followed by manufacturing sector and with a small contribution of energy, paper construction sectors. More than 250 resources were shared and about 200 potential synergies were identified, as reported in Table 1.

Table 1. Resources shared and matches during the Terni and Assisi workshops

	Terni's Workshop	Assisi's Workshop
Resources Input	32	35
Resources Output	95	90
Matches	95	90

After the workshop ENEA and Sviluppumbria carried out and sent to the companies a summary report with the first results coming from the workshops. In addition, all data collected on resources and matches were merged into a single file, called "master report". This master report includes also the potential additional matches proposed by ENEA. The company report for each company have been extracted from the master report and have been sent to the companies involved. The company report is the first step for implementing an IS pathway. After this stage, ENEA will process the data for specific resource in order to carry out the final dossiers.

Conclusion

The industrial symbiosis project in the Umbria region is currently in progress. At this stage the companies are actively involved and received the reports on resource shared and potential synergies. The collaboration between ENEA and Sviluppumbria is really advantageous in order to receive a good response from the local productive actors. Currently, ENEA is working on the identification of the main resource streams which will be studied for the dossier. The next steps will be the involvement of the interested companies to focus on specific solutions for waste valorization and a consultation with other stakeholders, in order to analyse the feasibility of the synergy and the potential barriers.

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