



European
Commission

Quarterly - July 2019



#ResourceEfficiency #EREK

INDUSTRIAL SYMBIOSIS

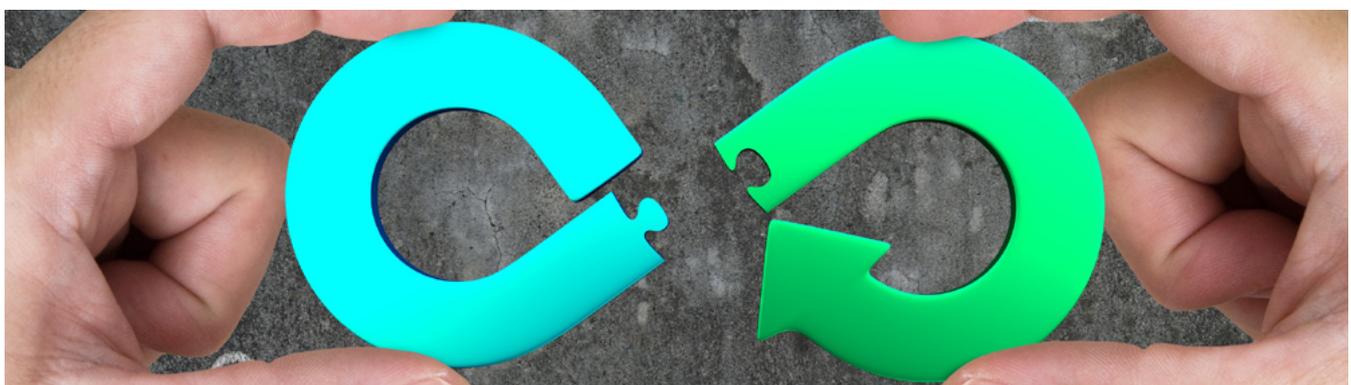
The concept of industrial symbiosis is inspired by biology, where symbiosis is often defined as a relationship between individuals of different species where both individuals benefit. The symbiotic exchanges among different entities yield a collective benefit greater than the sum of individual benefits alone. Industrial symbiosis thus refers to mutually beneficial connections among traditionally unconnected organizations. These connections are based on the exchange, transaction or sharing of resources such as material, energy and water. Through the process of industrial symbiosis, the waste of one company can become the raw material of another.

Industrial symbiosis has a lot of potential. Its main contribution to businesses' activities is the reduction of industrial material and energy use, which in turn can increase businesses' economic performance, improve the ecological footprint of industrial processes and foster eco-innovation as well as the creation of added value for the actors involved.

This has led to industrial symbiosis being increasingly acknowledged as a strategic tool for the realisation of industrial ecology and the implementation of a circular economy. The European Commission has stated its intent to propose elements to facilitate industrial symbiosis and it will engage with Member States to help ensure a common understanding of the rules of by-products. The Commission is also proposing to clarify rules on by-products to facilitate industrial symbiosis and to help create a level-playing field across the EU.



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In this edition of EREK Quarterly, read our interview with Paula Eskola: senior expert at Motiva in resource and material efficiency of businesses and coordinator of Business Finland's Cleantech, Bio- and Circular Economy programme (page 2-3), practical examples from companies (page 4), information on public-funded support programmes (page 5) and a lot of other relevant tips and information.

Industrial Symbiosis: ‘Not just for industry’

Motiva is a Finnish government owned company that provides the public sector, businesses, municipalities and consumers with information, solutions and services that allow them to make resource efficient, effective and sustainable choices.

Inspired by a UK Industrial Symbiosis programme, Motiva started development on their own programme in 2013. In cooperation with Sitra and the UK company *International Synergies* the first pilot stage of the Finnish programme started in 2014. The work with the companies is done at the regional level, where the regions got involved one by one. Currently 14 out of 18 Finnish regions are involved.

EREK News spoke with the national coordinator of the Finnish Industrial Symbiosis System (FISS), **Paula Eskola** about the programme, common misconceptions people have about industrial symbiosis and the key factors necessary for industrial symbiosis.

Could you explain what the Finnish Industrial Symbiosis System entails?

We have regional teams that help companies find the resources they need and help them to network. They actively facilitate symbiosis. They collect impact data through interviews and workshops about the synergies and keep a database up to date. These regional teams often work for business support organisations that have a strong network of regional companies, which helps them to easily identify the companies.

What are some common misconceptions about industrial symbiosis?

That industrial symbiosis is only about industry. It is not. Any kind of organisation can be a part of industrial symbiosis: a school, a hospital or a farmer. The only thing necessary is that the company or organisation has waste or excess materials like water or energy, that is made available to others. The name causes confusion. We often have to explain this to public and agricultural sector representatives.

Can you give some examples of industrial symbiosis in Finland?

We have a lot of big forest companies and steel companies who have a lot of by-products, these companies are already very advanced in industrial symbiosis. The side streams of these factories can be used in e.g. road construction or energy production. But the symbiosis can also be formed on a smaller scale: a brewery or bakery

who have food waste from the production, which can be used for biogas production. Or greenhouses where CO₂ can be utilised as a by-product from energy production. Many eco-industrial parks have also been established to former landfill areas. One driver for this has been the landfill ban for organic waste at 2016. It is often easier for companies to establish and form symbiosis if they are just starting up, then it is for companies who have to change their existing structure.

“Industry can save money and find new business by becoming more sustainable. It is not a cost, but a benefit”

What are the key factors that are needed for industrial symbiosis?

The most important thing in the beginning is finding the right partners. This is not easy. It is difficult to know what resources other companies have that you can use. Most companies lack that knowledge and the network to find out. That is why the Finnish model works, because we facilitate these connections.



Paula ESKOLA graduated in Environmental technology and biotechnology at the Helsinki University of Technology. She has worked as an environmental research scientist for the VTT Technical Research Centre of Finland for almost 12 years, before she started to work for Motiva. In this capacity she has been responsible for the development, launch and implementation of the Finnish Industrial Symbiosis System.

Industry is often seen as a difficult field to make more sustainable, is this the case in your opinion?

What we have found is that industry can save money and find new business by becoming more sustainable. It is not a cost, but a benefit. This makes it very interesting for companies, but companies often don't know what to do or how to find partners, or they don't have the capacity in the company to try to find out. That is what our programme is trying to address. This is also where EREK, with its tools and case examples is fulfilling a need.

You organized the EREK workshop on industrial symbiosis, what was the core of what you wanted to get across?

Industrial symbiosis was the theme of the workshop, because it is something that we often forget when we are talking about Resource Efficiency. That is why we wanted to emphasize it. Peter Laybourn from Industrial International Synergies, the organisation from the UK that helped us set up our system, was one of the speakers. That organisation has done very impressive work and have exported their model to between 30 and 40 countries. The workshop agenda was quite comprehensive containing international and Finnish experiences of promoting industrial symbiosis which made the workshop interesting also for international participants. And because we held the workshop as a side-event of the World Circular Economy Forum, we managed to reach a lot of new people.

What one piece of advice would you give to industry in Finland or elsewhere who are interested in industrial symbiosis?

Look for the right kind of organisations to partner with. If you can't find them yourself: get help. What kind of help you can get depends on the country, but EREK has identified intermediary companies who can help. Looking at other case examples can also help and the EREK website is one place to start.



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More info:

Motiva

Finnish Industrial Symbiosis System

International Synergies

Industrial Symbiosis in Practice

Industrial symbiosis ecosystem in Denmark



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The Kalundborg Symbiosis is an industrial ecosystem located in Denmark where the residual product of one enterprise is used as a resource by another enterprise, in a closed cycle. This symbiosis is a local collaboration between public and private enterprises which buy and sell residual products, resulting in mutual economic and environmental benefits.

Measures such as recycling and re-using materials and water and generating biogas in one plant from slurry produced in another demonstrate how the symbiosis works. The relationship delivers yearly CO₂ emissions savings of an estimated 275 000 tonnes.

In the development and running of the Kalundborg Symbiosis, the most important element has been healthy communication and good cooperation between the participants

➤ www.resourceefficient.eu/en/good-practice/industrial-symbiosis-ecosystem-denmark

Industrial symbiosis for exchanging heat



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Aleris Rolled Products Germany GmbH produces semi-finished aluminium products. Their aluminium casting processes tended to produce a lot of unused waste heat. The neighbouring company, Avangard Malz AG, produces malt from brewing barley. For the drying process the company needs a huge amount of heat.

As an economic and environmental-friendly solution, the two companies decided to start a heat-exchange programme. A 1 200 m pipeline was built which transfers desalinated hot water from the casting process to the malt-drying chambers in a closed system. In fact, the malting plant no longer needs natural gas for its drying process

➤ www.resourceefficient.eu/en/good-practice/industrial-symbiosis-exchanging-heat

Saw residues into bioenergy



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FM Timber is a family-owned sawmill based in Pihtipudas, Finland. A subsidiary company, Timber Heat, was established in 2000 to produce heat from wood residues for kiln chambers and the local municipality, as well as for companies in the nearby industrial area, Rupo.

About 50 % of the total volume of used raw wood ends up as a byproduct, which means they play a major role in the company, in economic terms and for energy efficiency. Pure wood chip residue is delivered to pulp mills and sawdust is sold either to briquette producers or heating plants. Other byproducts like ashes are used in the sawmill area as ground dressing. All byproducts are either recycled or used in heat production.

➤ www.resourceefficient.eu/en/good-practice/saw-residues-bioenergy

Check out our EREK database for other good practices, measures and technologies that allow SMEs to cut resources and energy through digital solutions.

Want to integrate industrial symbiosis but not sure where to start?

Below you can find some examples of European and national programmes offering support (funding, contacts, expertise, information) to SMEs interested in industrial symbiosis.

EREK network members can also advise companies looking for experts on this topic and relevant support measures.

CD2E - Creation Development of Eco-Enterprise in Hauts-de-France

The Creation Development of Eco-Enterprise is one of the largest clusters in France and Europe to work on eco-technologies, bringing together around 250 members (companies, research centres, entrepreneurs, public institutions, etc.) in the Hauts-de-France region. It has developed tools and actions to support companies in the domains of energy and material efficiency. On its website, companies can directly access a number of resources, such as an online market for waste sales and industrial symbiosis. CD2E also fosters innovation in eco-technologies by promoting the results of regional environmental research, stimulating collaboration between companies and laboratories, and encouraging technology transfer and awareness of new eco-innovation developments.

➤ www.resourceefficient.eu/en/support-programme/cd2e-creation-development-eco-enterprise-haut-de-france

Support for Industrial symbiosis

Kouvola Innovation in Finland develops new expertise, brings players together and builds networks that implement circular economy solutions. They provide support for the creation of industrial symbiosis collect data and organise workshops.

➤ www.resourceefficient.eu/en/support-programme/support-industrial-symbiosis

Eco-Innovation LT

Eco-Innovation LT+ encourages micro-, small- and medium-sized enterprises to install eco-innovative technology to reduce the adverse effects of climate change and the greenhouse effect. Eco-Innovation LT invests in tangible assets that reduce the negative environmental effects of economic activity, promote industrial symbiosis and promote a sustainable environment. Furthermore, they are involved in modifying existing production equipment to improve process efficiency and reduce pollution and many other activities.

➤ www.resourceefficient.eu/en/support-programme/eco-innovation-lt

Scrap exchange

ŠROTY is an online platform that enables companies to offer and request scrap and secondary materials (namely metal), by-products or used tools and machinery. The online scrap exchange is operated as a part of a more comprehensive information tool focused on secondary used materials.

Guidelines are available in Spanish.

➤ www.resourceefficient.eu/en/support-programme/scrap-exchange



Further reading & resources

If you want to learn more about sustainable packing, please check the following links and resources.

REPORTS, STUDIES:

- **FRACCASCIA, L., MAGNO, M., & ALBINO, V. (2016).** Business models for industrial symbiosis: A guide for firms. *Procedia Environmental Science, Engineering and Management*, 3(2), 83-93.
[see here](#)
 - **MOODIE, J., SALENIUS, V., & LEINO, J. (2019).** Industrial Symbiosis in the Baltic Sea Region : Current Practices and Guidelines for New Initiatives. Stockholm: Nordregio.
[see here](#)
 - **EUROPEAN COMMISSION (2015).** Measure Synthesis: Support for Industrial Symbiosis. A Framework for Member States to support business in improving its resource efficiency.
[see here](#)
 - **EUROPEAN COMMISSION (2017).** Cooperation fostering Industrial Symbiosis: Market potential, good practice and policy actions
[see here](#)
 - **EURONEWS BUSINESS (2015).** Industrial symbiosis in Kalundborg: turning waste into a resource
[see here](#)
 - **CENTRE FOR INDUSTRIAL SUSTAINABILITY (2016).** Value creation through industrial symbiosis: challenges and opportunities
[see here](#)
 - **INTERREG EUROPE (2017).** Industrial symbiosis for better waste management
[see here](#)
-

NEWSPAPERS AND BLOGS:

- **LILLIAN CHILDRESS.** Behind Europe's quest to scale industrial symbiosis. *GreenBiz*, 1 May 2019
[see here](#)
 - **ELLEN MACARTHUR FOUNDATION.** Effective Industrial Symbiosis; Kalundborg Symbiosis, n.d.
[see here](#)
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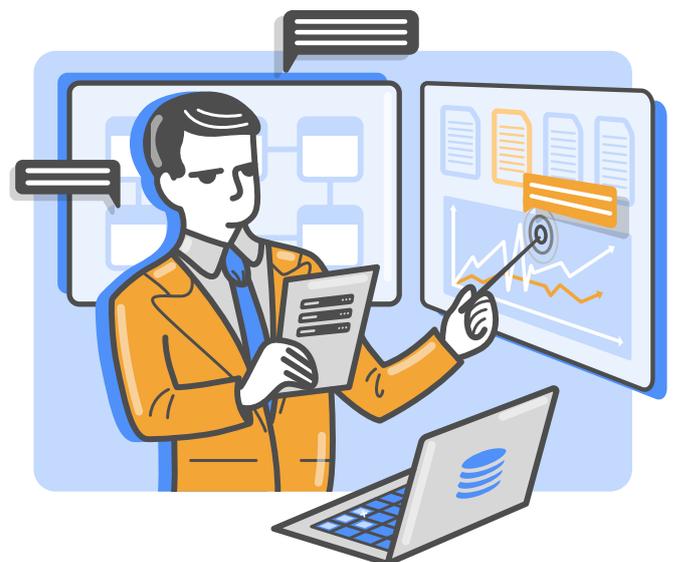
PROJECTS:

- **SCALER:** Helping industries increase efficiency through resource sharing
[see here](#)
 - **SYMBI:** Industrial Symbiosis for Regional Sustainable Growth and a Resource Efficient Circular Economy
[see here](#)
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VIDEOS:

- **TECHNOLOGY DEVELOPMENT FOUNDATION OF TURKEY (2014).** Industrial Symbiosis Project in Iskenderun Bay.
[see here](#)

EREK - YOUR REFERENCE POINT ON BUSINESS COMPETITIVENESS THROUGH RESOURCE EFFICIENCY





The European Resource Efficiency Knowledge Centre (EREK) is here to help European companies, especially SMEs, save energy, material and water costs. We provide tools, information and business opportunities that show you new and better ways to be resource efficient and benefit from circular economy business models which turn waste into an asset.

EREK also supports national, regional and local organisations across Europe that work with SMEs to improve their environmental performance, helping them to become more resource efficient.

www.ResourceEfficient.eu



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