



European Environment Agency



Third Eionet webinar on resource efficiency policies  
**Industrial symbiosis initiatives**

Webinar agenda and background document  
Final version 3 Dec 2013

**2 Dec 2013 (13:30-15:00 CET)**

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EEA project manager:  
**Paweł Kaźmierczyk**

Documents and presentations from resource efficiency webinars can be found in a password-protected section of the Eionet forum at (please use your normal circa account and password):

<http://forum.eionet.europa.eu/nrc-scp-waste/library/eionet-webinars/webinars-resource-efficiency>

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# 1 Objectives of the webinar

Webinars on resource efficiency policies and instruments are organized by the [European Environment Agency](#) and the [European Topic Centre on SCP](#) to support exchange of information and sharing of experience among those national institutions which are responsible for the practical implementation of resource efficiency policies at the country level.

The 90-minute online computer-based webinars are organized as a spin-off initiative from the 2011 [survey of resource efficiency policies](#). The guiding idea is to present examples of relevant policy initiatives recently adopted by countries under the heading of resource efficiency and discuss lessons learned. The webinar participants are policy makers from national administrations responsible for the practical implementation of resource efficiency policies which are members of the [Eionet](#) network. Typically, some 40 and 60 participants from 15 to 20 countries take part in a webinar.

The first webinar on national strategies for resource efficiency was organized in February 2013, followed by the June 2013 event on targets and indicators. The upcoming third webinar, focusing on industrial symbiosis initiatives, will be held on 2 December 2013 from 13:30 till 15:00 CET.

Industrial Symbiosis (IS) programmes are concerned with regional collaboration of companies from traditionally separated sectors which exchange by-products, energy, water and materials in such a way that the waste from one industry becomes raw material for another. The 2011 Roadmap to a Resource Efficient Europe calls for improving the re-use of raw materials through greater ‘industrial symbiosis’. It also stipulates that Member States should help companies work together to make the best use of the waste and by-products they produce (e.g. by exploiting industrial symbiosis). Industrial symbiosis also supports other policy areas such as waste management and prevention, and circular economy.

The webinar will present main drivers and policy approaches that support the development of industrial symbiosis programmes as well as barriers hindering implementation. The webinar will also explore how industrial symbiosis programmes could be integrated under resource efficiency policy frameworks. It will start with an introductory presentation of various types of industrial symbiosis, opportunities for savings of resources and money, and policy drivers and barriers. The second presentation will focus on Kalundborg, Denmark, one of the first ever industrial symbiosis sites. The third presentation will examine what governments can do to support IS initiatives, drawing on the example of UK National Industrial Symbiosis Programme.

## 2 Short introduction to industrial symbiosis

### 2.1 Background

Industrial symbiosis is increasingly seen as a strategic tool for economic development, green growth, innovation and resource efficiency at all policymaking levels in Europe – local, regional, national and international. At the European level, industrial symbiosis was recognized for its potential contribution to sustainable production and EU industry competitiveness under the ‘Resource Efficient Europe’ flagship initiative. The [Roadmap to a Resource Efficient Europe](#)<sup>1</sup> being part of the Resource Efficiency Flagship initiative calls for improving the re-use of raw materials through greater ‘industrial symbiosis’. It also stipulates that Member States should help companies work together to make the best use of the waste and by-products they produce (e.g. by exploiting industrial symbiosis).

In a broad sense industrial symbiosis is defined as the synergistic exchange of waste, by-products, water and energy between individual companies in a locality, region or even in a virtual community. Key to industrial symbiosis is collaboration between companies and the synergistic possibilities offered by geographical proximity. Industrial symbiosis engages traditionally separate industries in a collective approach to competitive advantage involving physical exchanges of materials, energy, water and/or by-products<sup>2</sup>.

The classical industrial symbiosis concept envisions all industrial inputs being used in final products or converted into value-added inputs for other industries or processes. In this way, industries will be reorganized into clusters such that each industry's wastes / by-products are fully matched with the input requirements of another industry, and the integrated whole produces no waste.

To be counted as a basic type of industrial symbiosis at least three different entities must be involved in exchanging at least two different resources<sup>3</sup>.

### 2.2 Types of industrial symbiosis

Early researchers, such as Chertow provide the following classification of different resource exchange types:

- *type 1*: through waste exchanges
- *type 2*: within a facility, firm, or organization
- *type 3*: among firms co-located in a defined eco-industrial park
- *type 4*: among local firms that are not co-located
- *type 5*: among firms organized “virtually” across a broader region

Types 3, 4 and 5 can readily be identified as industrial symbiosis. While in the case of *type 3* firms are explicitly located in an eco-industrial park with the aim to exchange resources, in case of *type 4* the area where the exchange takes place was not planned as an industrial park, but the proximity of the companies permits them to take advantage of already generated material, water and energy streams. *Type 5* exchanges allow the benefits of industrial symbiosis to be expanded to encompass a regional economic community in which the potential for the identification of by-product exchanges is greatly increased owing simply to the number of firms that can be engaged.<sup>4</sup>

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<sup>1</sup> [http://ec.europa.eu/environment/resource\\_efficiency/pdf/com2011\\_571.pdf](http://ec.europa.eu/environment/resource_efficiency/pdf/com2011_571.pdf)

<sup>2</sup> Chertow, M. 2000. Industrial symbiosis: Literature and Taxonomy. Annual Review of Energy and the Environment 25

<sup>3</sup> Chertow, M. 2007. “Uncovering” Industrial Symbiosis. Journal of Industrial Ecology 11(1)

<sup>4</sup> Chertow, M. 2000. Industrial symbiosis: Literature and Taxonomy. Annual Review of Energy and the Environment 25

### 2.3 History on industrial symbiosis initiatives and examples

The first full realization of industrial symbiosis was the case of Kalundborg<sup>5</sup> in Denmark. The Kalundborg Symbiosis came into being as a result of private conversations between a few enterprise managers from the Kalundborg region in the '60s and '70s. The primary partners in Kalundborg, an oil refinery, power station, gypsum board facility, pharmaceutical plant, and the City of Kalundborg exchange a variety of residues that become feedstock in other processes and share ground water, surface water and waste water, steam and electricity. Over the years more and more businesses were linked into the scheme, and in 1989 the term 'industrial symbiosis' was used to describe the collaboration for the first time.

From this initial case study, several models for industrial symbiosis have been developed by industry actors. Furthermore regional and national programmes were initiated with policy support.

Biopark Terneuzen<sup>6</sup>, an agro-industrial symbiosis initiative of private companies in the Netherlands promotes and facilitates the exploitation of key synergies between businesses located in the same geographic area. Specifically, it helps to maximise the potential of the exchange and use of each other's by-products and waste products, which then become feedstock, energy or utility supplements for their own production processes. Within the Biopark Terneuzen framework, among a number of companies involved, heat, biomass, water, starch and steam is exchanged.

At regional and national policy level, many initiatives are currently being taken or have been taken in the past few years to promote industrial symbiosis. One of these is the National Industrial Symbiosis Programme (NISP) in the United Kingdom. In Sicily, Italy, a regional program, SYMBIOSIS<sup>7</sup> has been started that is inspired by NISP UK. In Ireland an on-going industrial symbiosis project, SMILE<sup>8</sup> (Saving Money through Industry Links and Exchanges) involves numerous SMEs. It has started as a local pilot program and has expanded its geographical scope over the years to a much wider scale. Under the SYMBIOSE Platform<sup>9</sup> in Flanders a series of resource matchmaking workshops has been organized with the participation of 70 Flemish organizations. In Portugal, an Organized Waste Market (OWM)<sup>10</sup>, an online platform endorsed by the Portuguese Environment Agency, was established to promote the exchange of waste products.

There are examples of industrial symbiosis initiatives from countries outside Europe including among others Australia, Canada, China, Mexico and South Africa. One of these is the initiative of the Guitang Group (GG)<sup>11</sup>. It operates one of China's largest sugar refineries and has been developing and implementing an internal and external industrial symbiosis strategy for decades. The GG first invested in developing its own collection of downstream companies to utilize nearly all by-products of sugar production. This strategy has generated new revenues and reduced environmental emissions and disposal costs, while simultaneously improving the quality of sugar. The GG's complex consists of interlinked production of sugar, alcohol, cement, compound fertilizer, and paper and includes recycling and reuse.

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<sup>5</sup> [www.symbiosis.dk/en](http://www.symbiosis.dk/en)

<sup>6</sup> <http://www.bioparkterneuzen.com/en/biopark.htm>

<sup>7</sup> <http://www.industrialsymbiosis.it/>

<sup>8</sup> [www.smileexchange.ie](http://www.smileexchange.ie)

<sup>9</sup> <http://www.fi-sch.be/nl/programmas/valorisatie-van-nevenstromen/symbiose/>

<sup>10</sup> [http://www.moronline.pt/UK/1\\_1\\_oqueomor.asp](http://www.moronline.pt/UK/1_1_oqueomor.asp)

<sup>11</sup> Zhu, Q. Lowe, E. A. Wei, Y. Barnes, D. 2007. Industrial Symbiosis in China: a Case Study of the Guitang Group. *Journal of Industrial Ecology*. 11(1)

## 2.4 Policy support for industrial symbiosis, national programmes

Although economic instruments are the main drivers behind industrial symbiosis, a number of policy features seem to be important for the development of such initiatives.

There is a need for strong economic/regulatory instruments that penalizes lower waste hierarchy options. Denmark is a good example of stringent environmental requirements, recording among the highest landfill and incineration taxes. Also the UK has high incineration taxes. In this respect, also landfill bans on several waste types can provide strong incentives.<sup>12</sup>

It is important to allow a flexible regulation in waste management, preferably at sub-national level, such that companies are given enough room to look for creative/innovative solutions for waste problems.

In addition, coordination programmes that provide information and help developing local initiatives aimed at informing and bringing local actors together can facilitate the development of industrial symbiosis projects. The dissemination of information can happen through the creation of voluntary instruments where firms can engage in the selling or buying of waste materials. A government can also take the concrete initiative to gather relevant actors and establish so-called eco industrial parks.

One of the most successful national programmes includes the National Industrial Symbiosis Programme in the United Kingdom. NISP that is operated by International Synergies originated as three pilot schemes in Scotland, West Midlands and Yorkshire and Humberside in 2003. Based on the success of the pilots Department for Environment and Rural Affairs (Defra) awarded in 2005 International Synergies GBP 27 million over three years to roll out the programme across all nine English regions. NISP is a business-led programme with over 15,000 participating industry members who form part of a unique network. Through the network, NISP identifies mutually profitable transactions between companies so that underused or undervalued resources (including energy, waste, water and logistics) are brought into productive use. NISP members comprise of micros, small and medium businesses (SMEs) and multinational/corporates from every industry sector. NISP has enabled its UK business members to divert 47 million tonnes of industrial waste from landfill, reduce carbon emissions by 42 million tonnes, reuse 1.8 million tonnes of hazardous waste, save 60 million tonnes of virgin material and 73 million tonnes of industrial water from April 2005 until March 2013.<sup>13</sup>

Other examples include initiatives cited above (SMILE, Organized Waste Market, SYMBIOSE Platform, SYMBIOSIS), as well as the National Industrial Symbiosis Programme in Hungary<sup>14</sup> and the ECOREG Project<sup>15</sup> in Romania.

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<sup>12</sup> Costa, I., Massard, G. & Agarwal, A. 2010. Waste Management Policies of Industrial Symbiosis Development: case studies in European Countries. *Journal of Cleaner Production* 18(8)

<sup>13</sup> <http://www.international-synergies.com/projects/national-industrial-symbiosis-programme-nisp>

<sup>14</sup> <http://nisp.hu/en/introduction>

<sup>15</sup> [http://www.nisp-ecoreg.ro/default\\_en.aspx](http://www.nisp-ecoreg.ro/default_en.aspx)

### 3 Webinar Agenda

## Third Eionet Webinar on Resource Efficiency Policies: Industrial symbiosis initiatives

**2 December 2013, 13:30-15:00 CET**

*Webinar IT platform will open for joining at 13:00 (CET) - please follow the detailed instruction sent in a separate document*

**Chairs:** Paweł Kaźmierczyk (EEA) and Márton Herczeg (ETC/SCP)

13:00 - 13:30 Login	
13:00 – 13:30	<ul style="list-style-type: none"> <li>• <b>Technical set-up</b> The webinar platform will be open in order to make sure all participants successfully - join in for a <b>precise kick-off at 11:30</b>. Please follow the detailed instruction sent to participants in a separate document. <b>IMPORTANT:</b> you will need an access code which will be sent to you by email. Please have it to hand when logging in.</li> </ul>
The Industrial Symbiosis Concept	
13:30 – 14:00	<ul style="list-style-type: none"> <li>• <b>Welcome, introductions and technical briefing (5 min)</b> by Paweł Kaźmierczyk (EEA) and Márton Herczeg (ETC/SCP)</li> <li>• <b>Opening presentation: What is industrial symbiosis?</b> By Dr. Guillaume Massard, Scientific director – Sofies SA (20 min)</li> </ul>
14:00 – 14:10	<p><b>Clarifications and feedback (10 min)</b> <i>Please use the chat function to send your questions directly to the user 'ETC/SCP' who will collect questions and comments during the presentations.</i></p>
Industrial Symbiosis in practice	
14:10 – 14:45	<ul style="list-style-type: none"> <li>• <b>Kalundborg Symbiosis</b> Ms. Mette Skovbjerg, Kalundborg Symbiosis Center, 10 min presentation + 5 min Q&amp;A</li> <li>• <b>UK National Industrial Symbiosis Programme</b> Mr. Ian Humphreys, Director of Operations, International Synergies 10 min presentation + 5 min Q&amp;A</li> </ul>
Discussion and follow-up	
14:45 – 15:00	<ul style="list-style-type: none"> <li>• <b>Discussion and clarifications (10 min)</b> <i>Please use the chat function to send your questions directly to the user 'ETC/SCP' who will collect questions and comments during the presentations.</i></li> <li>• <b>Reflections and wrap-up (5 min)</b> by Paweł Kaźmierczyk (EEA)</li> </ul>

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## Annex 1 The presenters

### **Dr. Guillaume Massard (Switzerland)**

Guillaume Massard has a PhD in environmental science from the University of Lausanne (Switzerland). His current research focuses on the implementation of industrial symbiosis and eco-industrial park in European countries. He is the author of the recent international survey on eco-innovation parks in 17 European countries conducted in the framework of the ECO-INNOVERA program (European Union, forthcoming). Since 2008, Dr. Massard is partner and scientific director of Sofies SA (Geneva, Switzerland, <http://www.sofiesonline.com>), a consultancy specialized in industrial ecology and the optimization of natural resource consumption for economic activities. He is senior consultant, managing projects on industrial ecology, sustainable resource management, industrial symbiosis, industrial and urban development, waste management in Western Europe, Asia and North Africa

### **Mette Skovbjerg (Denmark)**

Mette has an academic background in Political Science and has previously worked as a researcher and project manager at the Copenhagen Institute for Futures Studies. Currently she is working as a project manager at the Development Department of Kalundborg Municipality and is engaged in projects related to further exploring symbiotic opportunities within the Kalundborg Symbiosis as well as facilitating business collaboration in new Industrial Symbiosis projects outside of Kalundborg. Further, Mette is project advisor to the Danish Business Authority under the Ministry of Business and Growth on the recent Task Force for Industrial Symbiosis that work to create new symbiosis projects in all regions of Denmark.

### **Ian Humphreys (UK)**

A chartered environmentalist, after 17 years working in the food and drink industry, Ian joined International Synergies Ltd in late 2007 to work on the world renowned UK National Industrial Symbiosis Programme. Starting as part of the project team delivering NISP in the West Midlands, Ian now heads up UK operations for International Synergies which includes leading all Industrial Symbiosis delivery in the UK as well as a wider involvement in a number of International projects, including a BP financed initiative in Turkey and establishing IS programmes in both China and Bulgaria as part of International Synergies worldwide projects.



## **Annex 2 Presentations from the webinar**

**Guillaume Massard (Sofies SA):**

*Industrial Symbiosis: Best practices in the European Union*

**Mette Skovbjerg (Kalundborg Symbiosis Center):**

*Industrial Symbiosis V 2.0*

**Ian Humphreys (International Synergies Limited):**

*Industrial Symbiosis: UK National Industrial Symbiosis Programme and Beyond*

# Industrial symbiosis

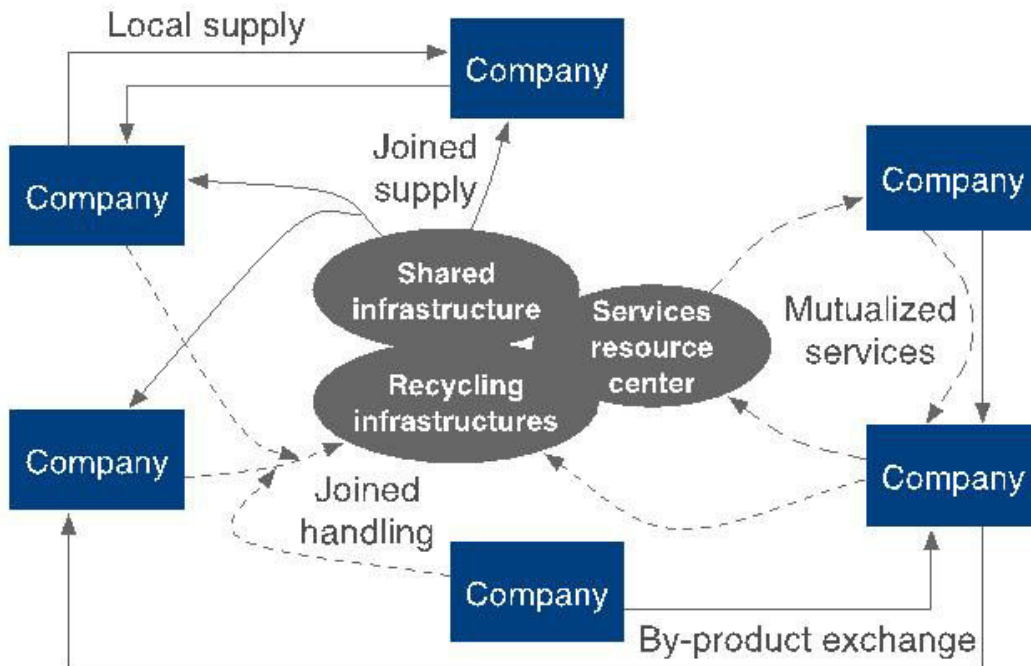
## Best practices in the European Union

Eionet webinar on Resource efficiency  
02.12.13

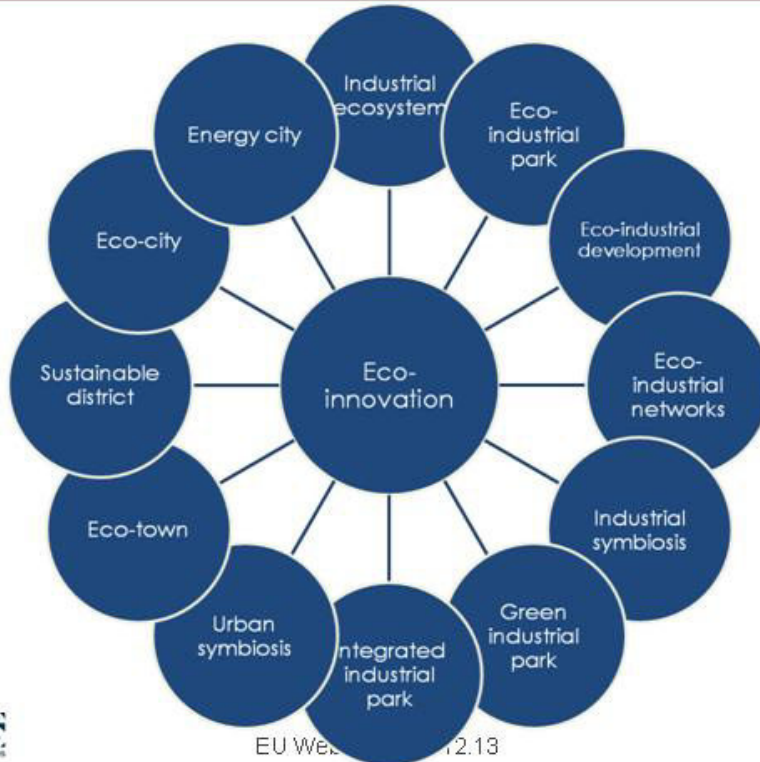
**Guillaume Massard**  
Scientific director – Sofies SA  
+41 22 338 15 24  
+41 78 625 27 51  
guillaume.massard@sofiesonline.com

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## What is industrial symbiosis ?



# What is industrial symbiosis ?

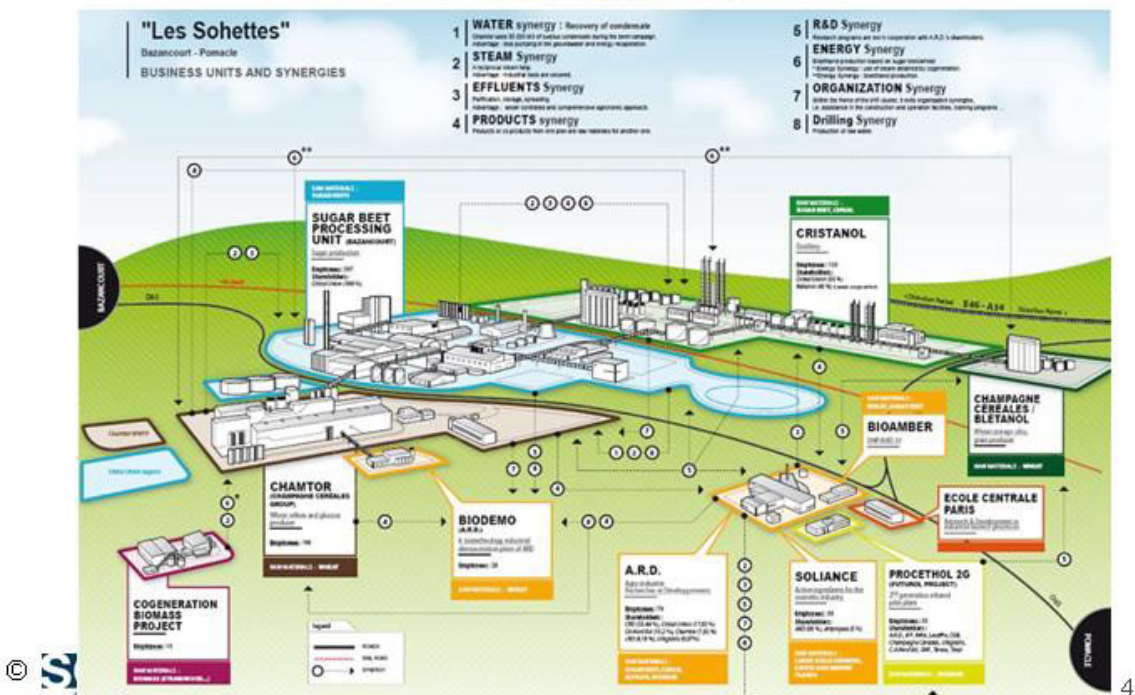


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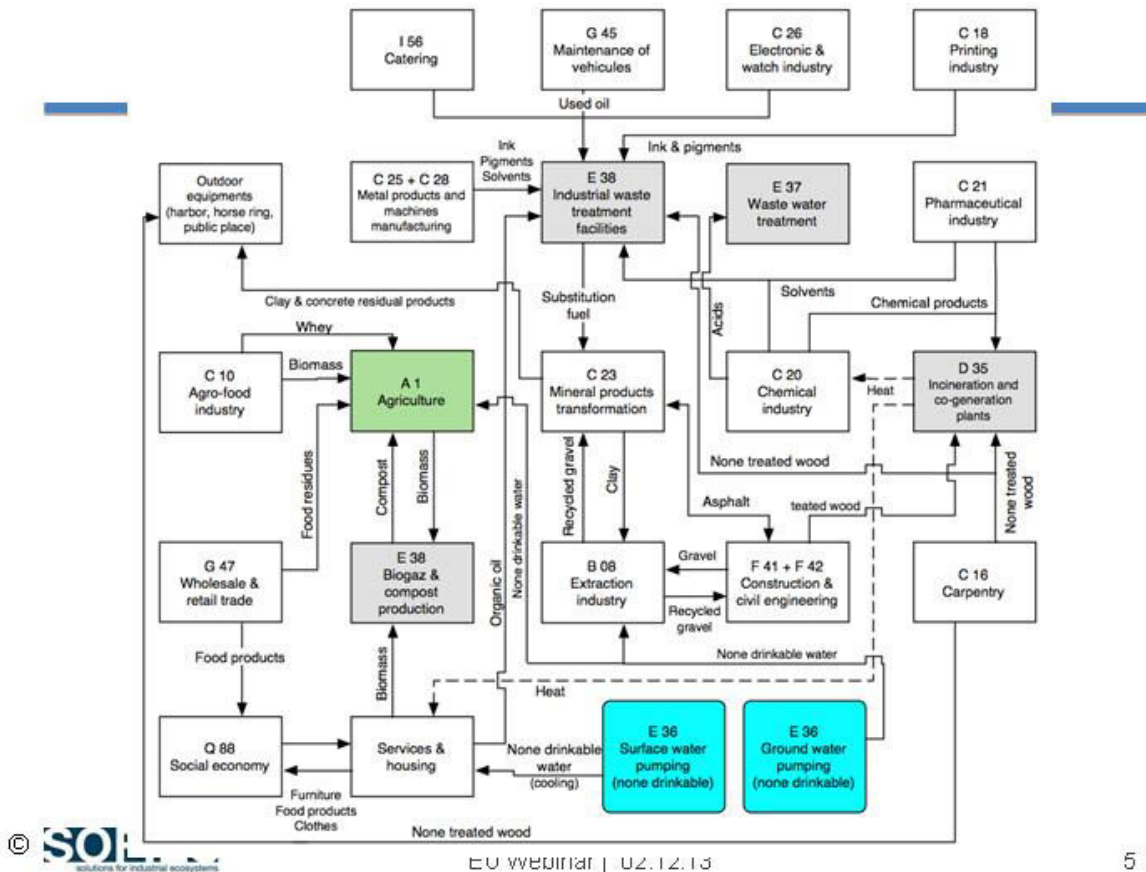
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## Case studies

### Pomacle-Bazancourt



4



5

## What is industrial symbiosis ?

**Industrial symbioses** offer an innovative resource management approach for companies wishing to **reduce their environmental impacts** while **securing their resource supply** and **strengthening their economic competitiveness**

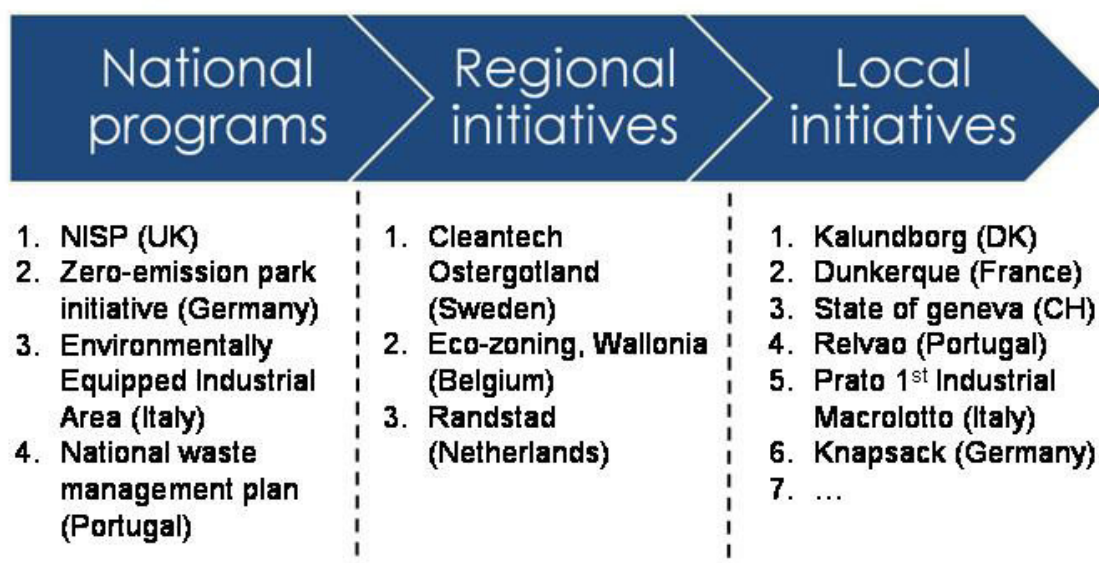


## Who are the actors involve in industrial symbiosis ?

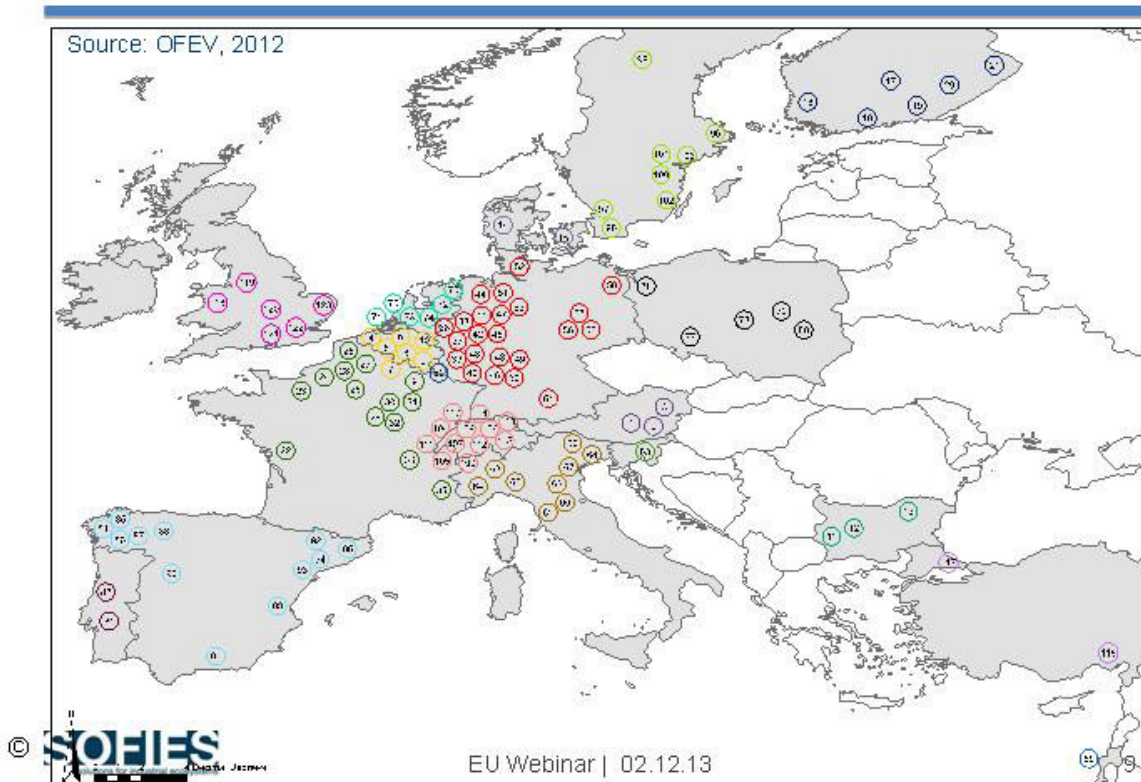


## Who are the actors involve in industrial symbiosis ?

### Diversity of support mechanisms for industrial symbiosis and eco-industrial park in Europe



## International survey on eco-innovation in industrial parks



## International survey on eco-innovation in industrial parks

Source: OFEV & Sofies, 2012

	Identified	Non-detailed	Detailed as case study				
			total	total	total	industrial	combined
Austria	4	1	3	2	0	1	
Belgium	10	3	7	6	1	0	
Bulgaria	2	1	1	1	0	0	
Denmark	5	2	3	0	2	1	
Finland	9	4	5	5	0	0	
France	19	5	14	13	0	1	
Germany	40	15	25	24	1	0	
Ireland	2	2	0	0	0	0	
<b>European countries</b>	<b>Italy</b>	18	9	9	7	2	0
	Luxembourg	1	0	1	0	1	0
	Netherlands	16	9	7	7	0	0
	Poland	6	1	5	4	1	0
	Portugal	7	5	2	1	1	0
	Slovenia	1	0	1	1	0	0
	Spain	15	3	12	9	3	0
	Sweden	11	4	7	1	5	1
	Switzerland	22	14	8	7	1	0
	United Kingdom	14	9	5	4	1	0
<b>Non-European countries</b>	Australia	8	4	4	4	0	0
	China	20	7	13	7	6	0
	India	12	6	6	6	0	0
	Israel	2	1	1	1	0	0
	Japan	28	20	8	8	0	0
	South Korea	7	0	7	6	0	1
	Turkey	3	1	2	2	0	0
	United Arab Emirates	2	0	2	0	0	2
	United States of America	17	8	9	6	3	0
	<b>TOTAL</b>	<b>301</b>	<b>134</b>	<b>167</b>	<b>132</b>	<b>28</b>	<b>7</b>

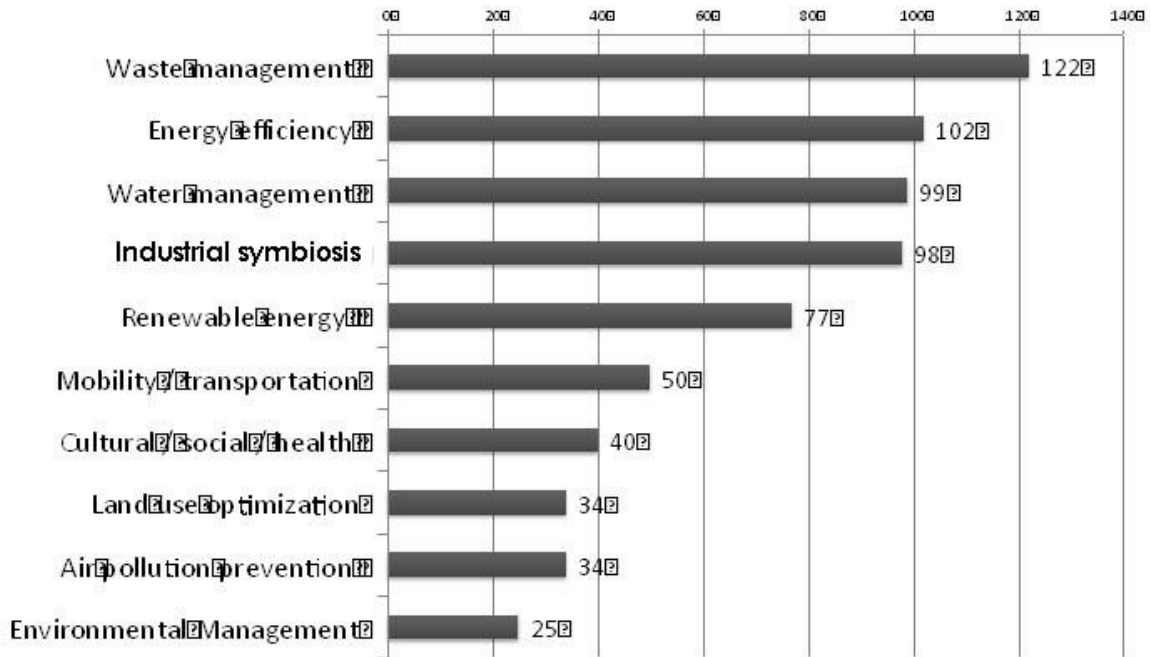
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# International survey on eco-innovation in industrial parks

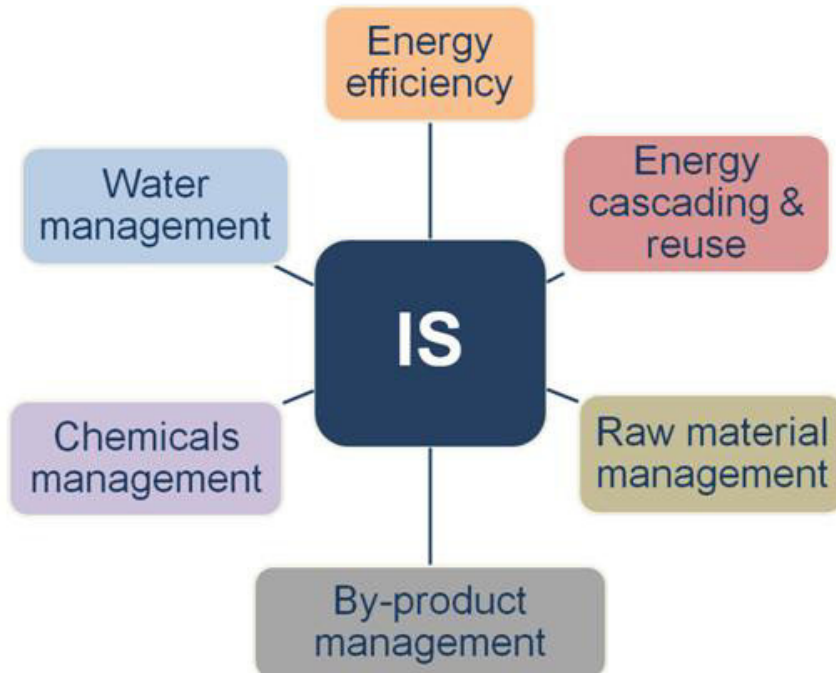
Source: OFEV & Sofies, 2012



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## Industrial symbiosis: business opportunities



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## Influence of regional recycling systems



### Juvenile recycling system

- Divert waste from landfill through the development of eco-industries or direct waste reuse
- Waste to energy

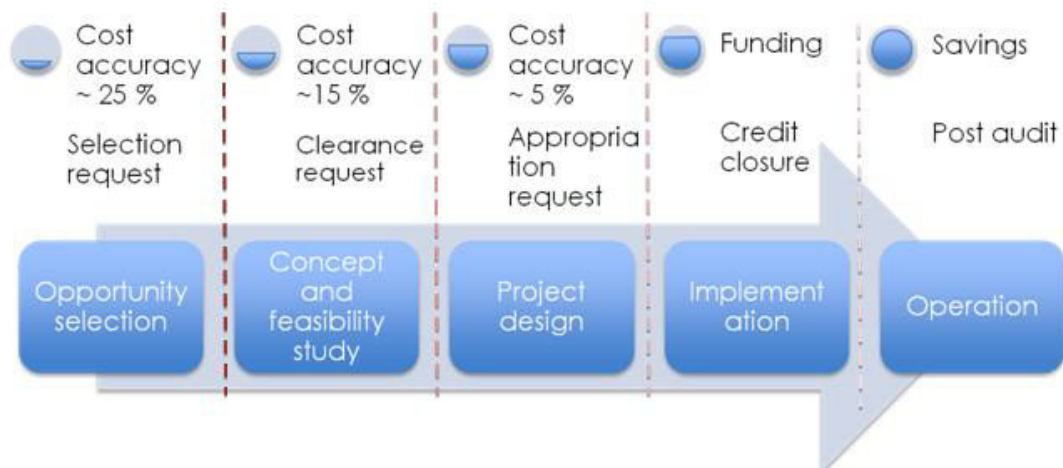


### Mature recycling system

- Energy networks
- Shared services
- Eco-industrial development
- Clustering reinforcement

## Industrial symbiosis: business opportunities

Capital expenditure should be made with a view to creating value and expanding business.

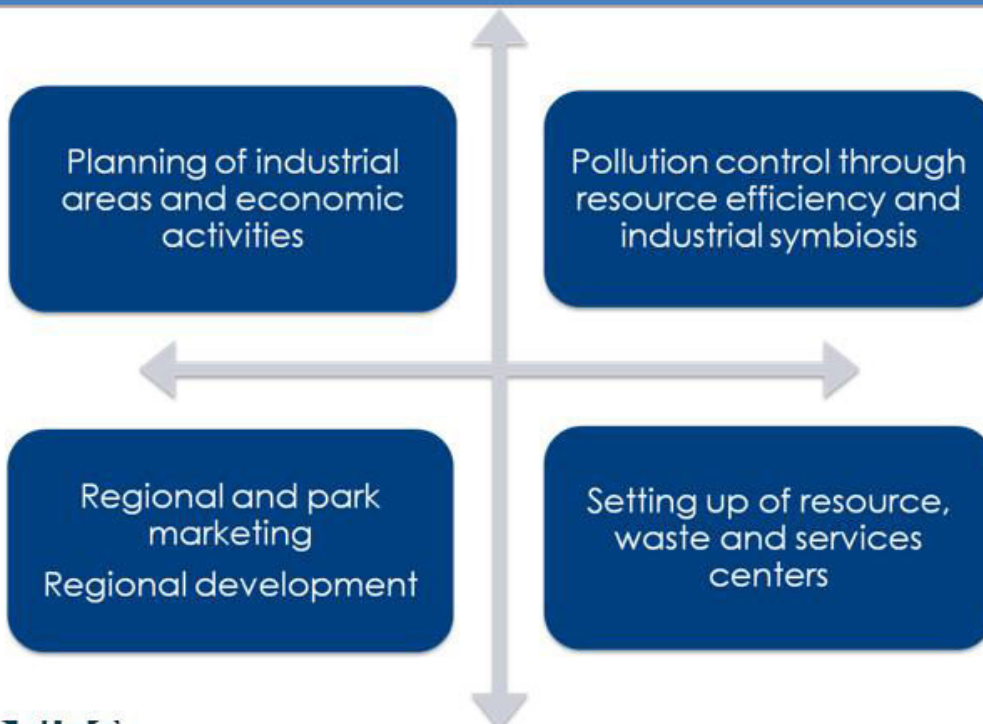




## Industrial symbiosis: business opportunities



## Industrial symbiosis: opportunities for regions



# What is Sofies ?

**30 consultants active in 21 countries**



© **SOFIES** solutions for industrial ecosystems

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## Thank you for your attention !

Sofies International – executive board



Prof. Buran Eriman Ghalmi



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# INDUSTRIAL SYMBIOSIS V 2.0



- HOW GLOBAL CHALLENGES BECOME LOCAL ADVANTAGES

Mette Skovbjerg, Project Manager, Symbiosis Center





Kalundborg Municipality

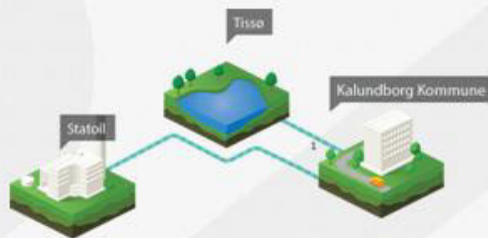
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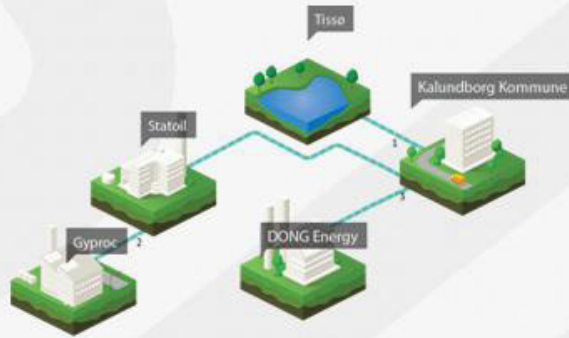
1961



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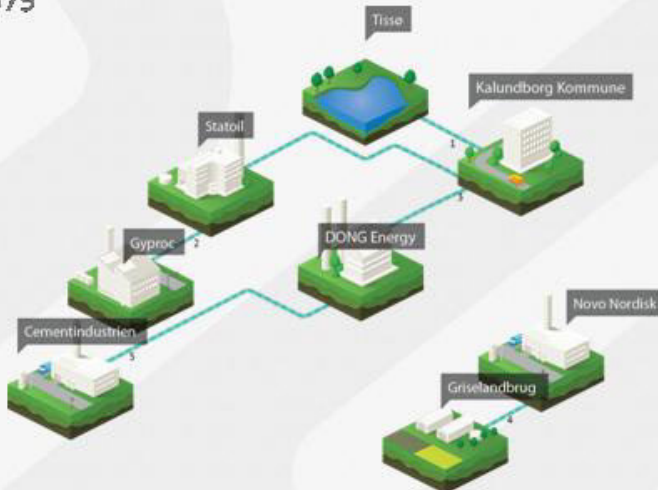
1972



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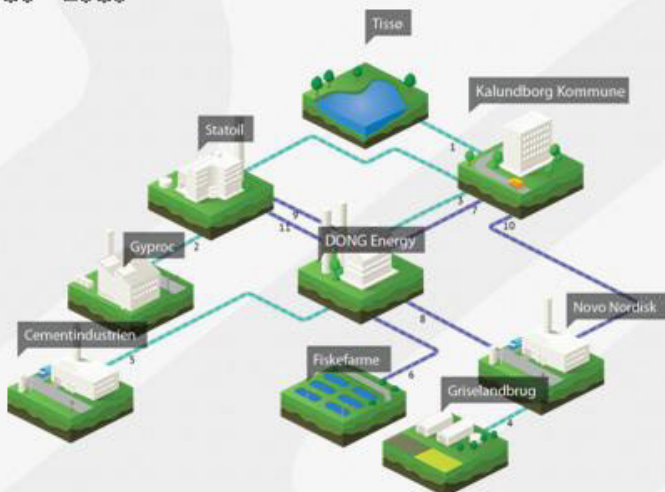
1979



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Vi investerer i din fremtid



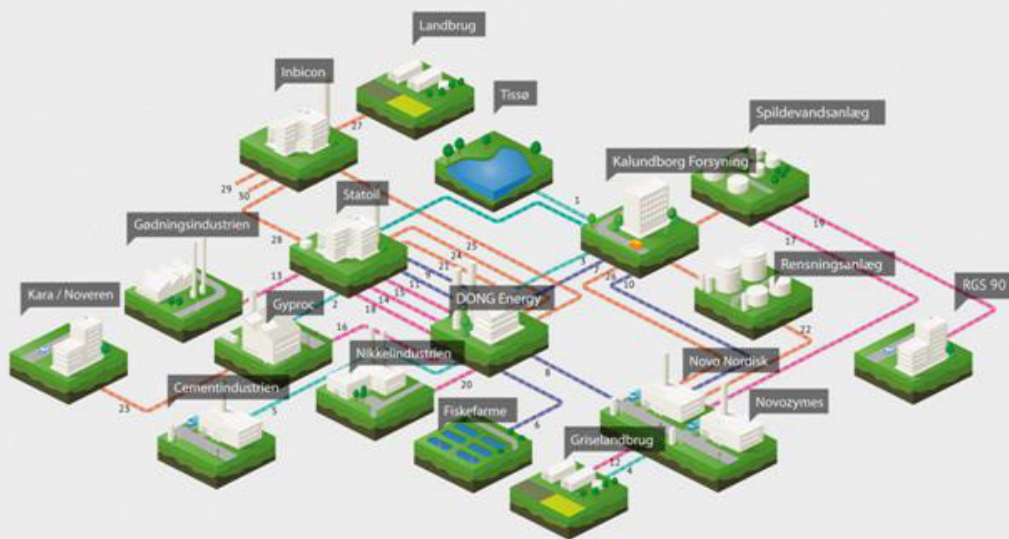
1980 - 1989



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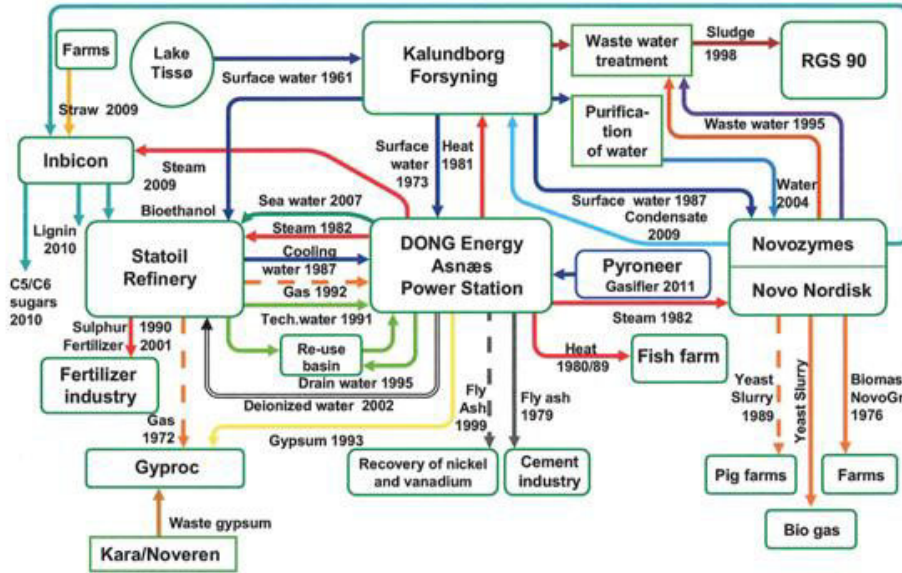

2000 - 2010



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# TOTAL SYMBIOSIS SYSTEM 2011



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## Types of Projects

Three types of projects:

Recycling of water:	14 Projects
Exchange of energy:	7 Projects
Recycling of waste products:	12 Projects



A model for business development in 3 dimensions:

- **Economy:** Minimizing costs and improved bottom line and competitive edge
- **Environment:** Resource efficiency through reuse, recycling, and reduced intake of virgin materials
- **Innovation and development:** Improved introduction and access to new technologies and R&D, job creation and regional development



## Economy:

- Individual agreements between companies
- Jan Hoff, Production Manager Novo Nordisk:  
600 mio. DKK or app. 80 mio. Euro



## Environmental Aspects

Resource savings:

Examples:

Ground water .....	2,0 mill. m <sup>3</sup> /year
Surface water .....	1,0 mill. m <sup>3</sup> /year
Natural gypsum .....	200,000 tons/year
Oil .....	20,000 tons/year

Reduction of CO<sub>2</sub> emission (2008): app. **275.000 tons**



## Innovation

Kalundborg Symbiosis has proven to be an environment which nurtures **innovation and the establishment of test facilities** (pitstop between laboratories and market):

- DONG Energy's demonstration plant Inbicon
- DONG Energy's Pyroneer
- E4Water micro algae test facility



DEN EUROPEISKE UNION  
Den Europæiske Fond  
for Regionaludvikling  
Vi investerer i din fremtid



Minimizing costs on waste handling and creating revenue from new by-products

And at the same time reducing the ecological footprint by minimizing the intake of virgine resources and increasing reuse and recycling



DEN EUROPEISKE UNION  
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for Regionaludvikling  
Vi investerer i din fremtid



A targeted process of communicating and establishing links between diverse companies

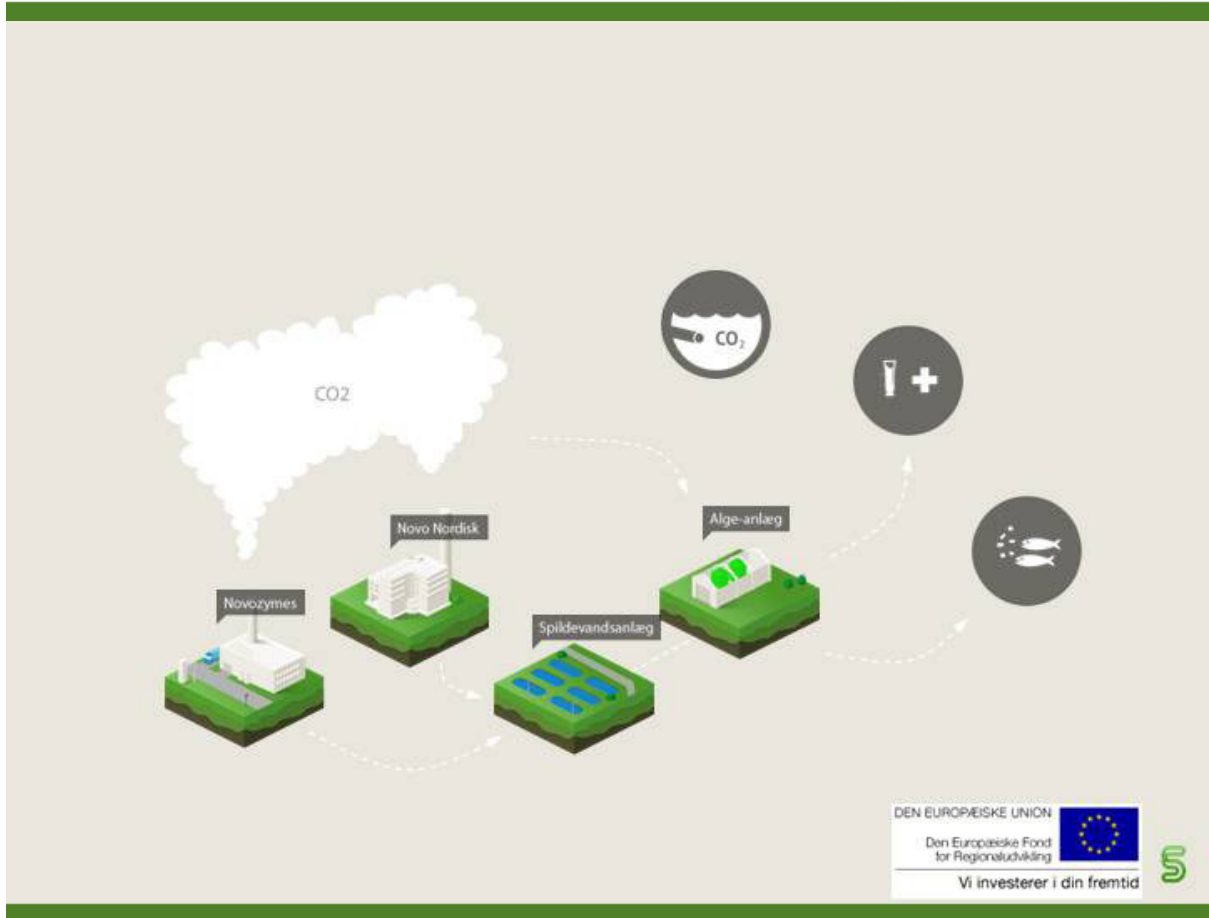
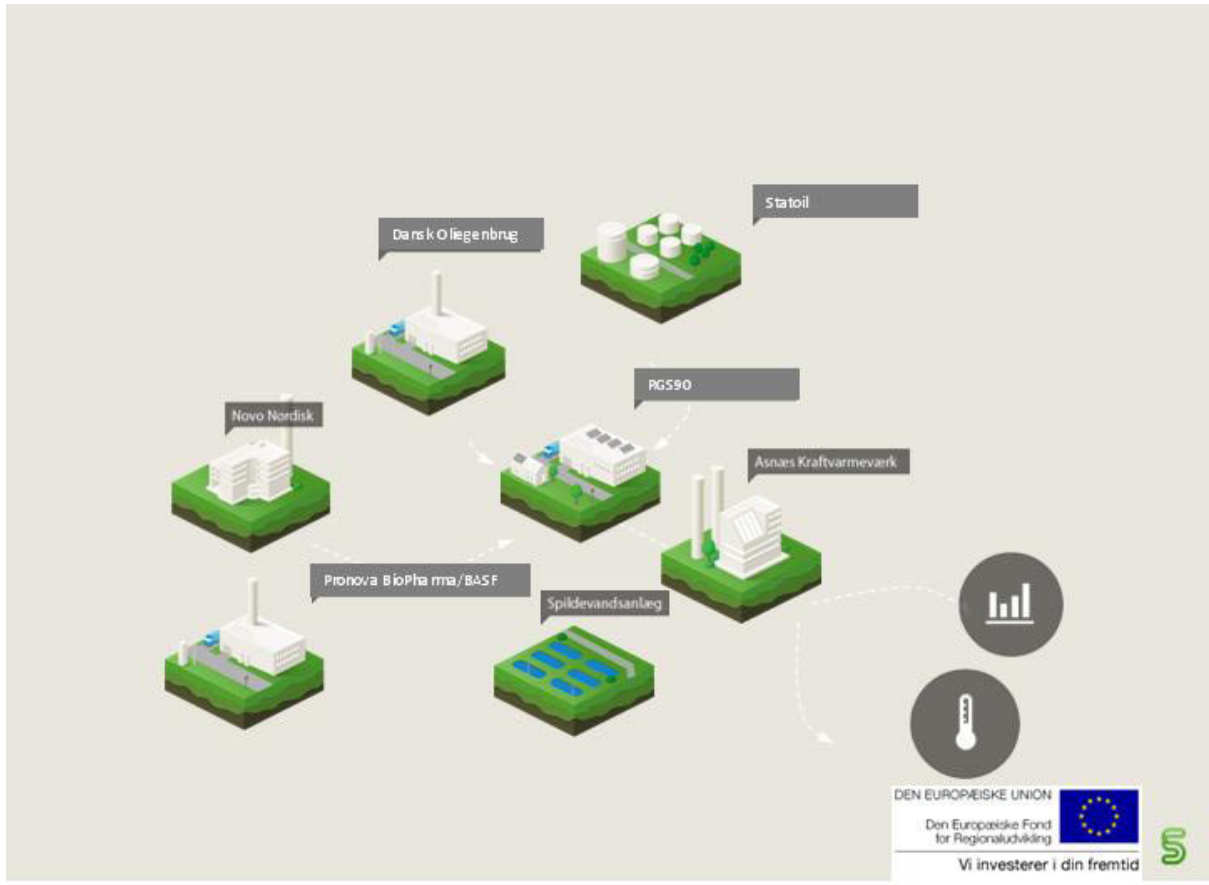


In the process fostering a productive environment for innovation and development



## Which all can be summed up as the Symbiosis Model





# The Regional Symbiosis Center



**A Symbiosis Center to facilitate new symbiosis projects and expand the learnings from the Kalundborg Symbiosis**



## Service to companies



Initial screening of area or waste fractions



Training of management and employees



Matchmaking between potential partners



Facilitating of new projects

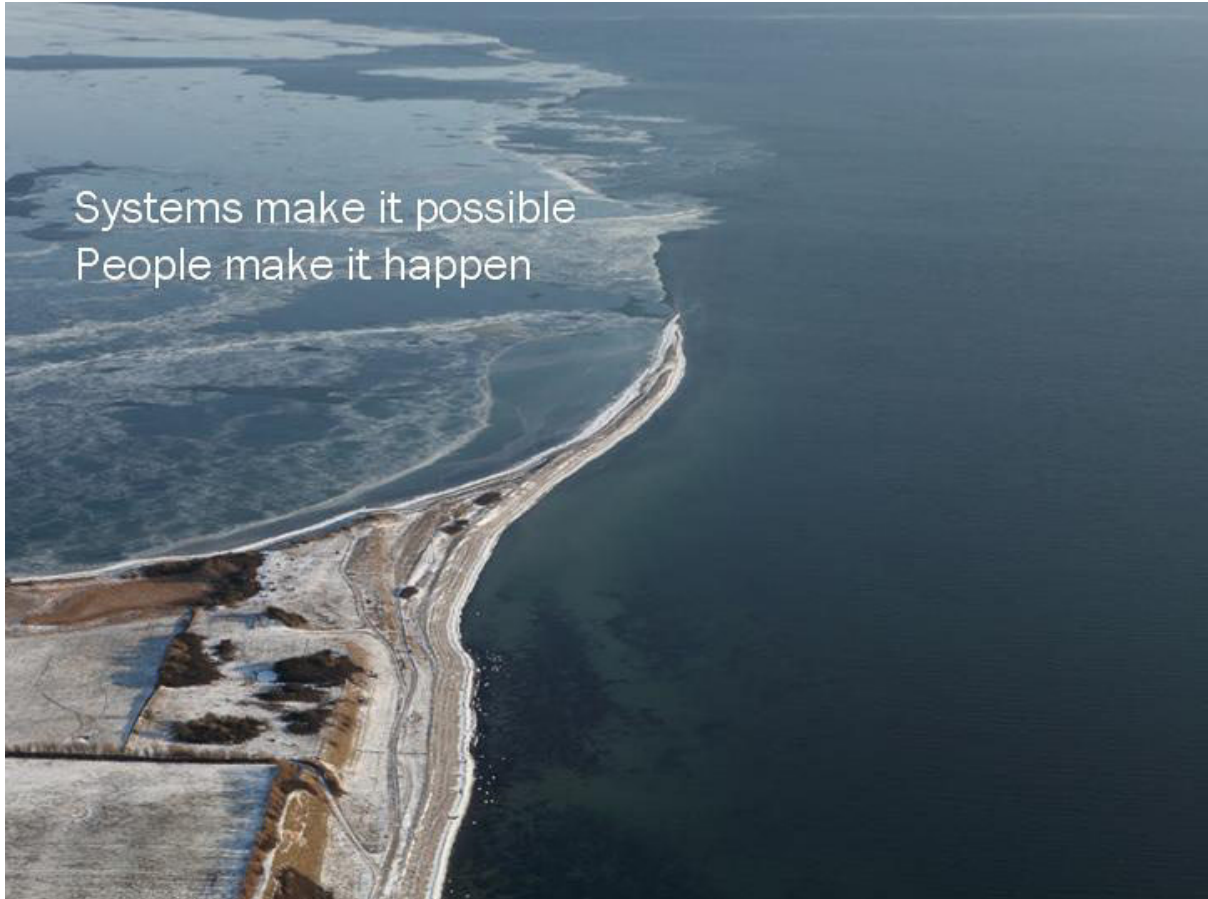


## Green Industrial Symbiosis

A national program facilitated by  
the Danish Business Authority



Systems make it possible  
People make it happen





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# Industrial Symbiosis:

## UK National Industrial Symbiosis Programme and Beyond

**Ian Humphreys**  
**Director of Operations**  
**International Synergies Limited**

**Eoinet Webinar, Resource Efficiency Policy**  
**(Industrial Symbiosis Initiatives)**  
**2<sup>nd</sup> December 2013**

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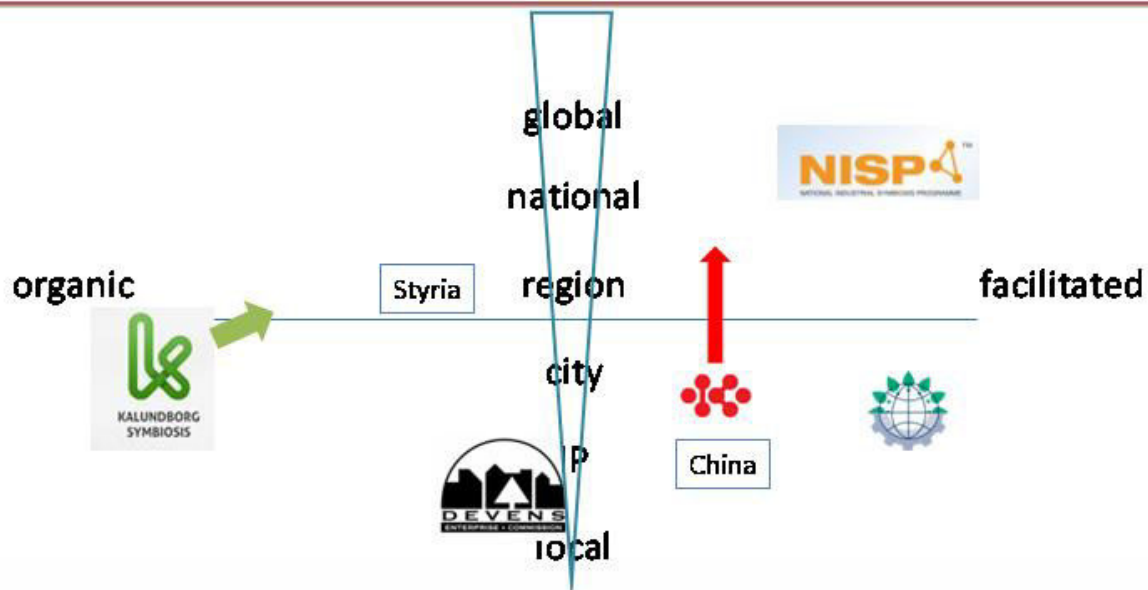
## International Synergies – Our Vision

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**"Striving to lead the world in innovative  
industrial ecology solutions for a low  
carbon, sustainable economy"**

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# Illustrative models of industrial symbiosis



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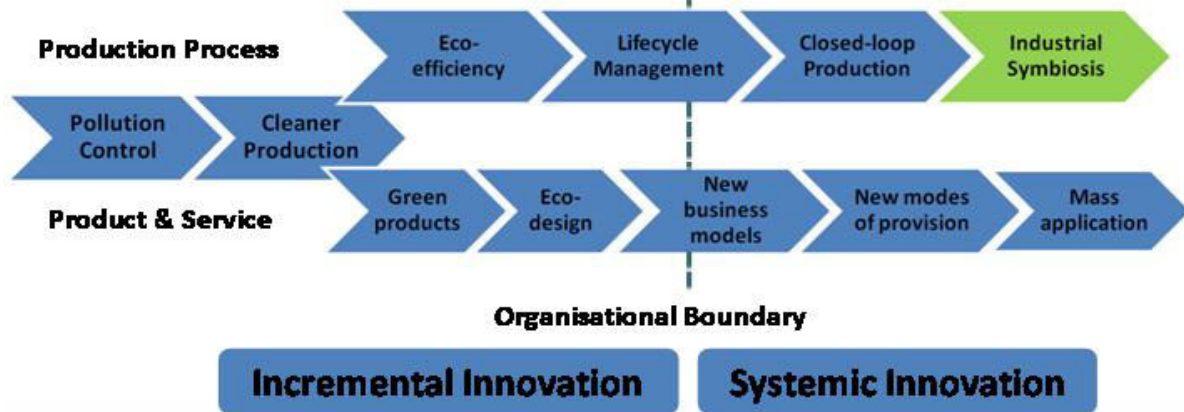
## European Policies Promote Industrial Symbiosis for Green Growth

- European Waste Framework Directive - Best Practice (2009)
- Roadmap to a Resource Efficient Europe (2011) – *exemplar case study*
- DG Enterprise: Sustainable Industry-Going for Growth & Resource Efficiency (2011) – *exemplar case study*
- DG Regions: Connecting Smart and Sustainable Growth through Smart Specialisation – *exemplar case study* (2012)
- European Resource Efficiency Platform (2013) key recommendation
- DG Environment: Priority for industrial policy in (2013) recommendation
- DG Enterprise: Communique on Green Entrepreneurship (2013)
- Horizon 2020 (draft 2013) included to deliver circular economy

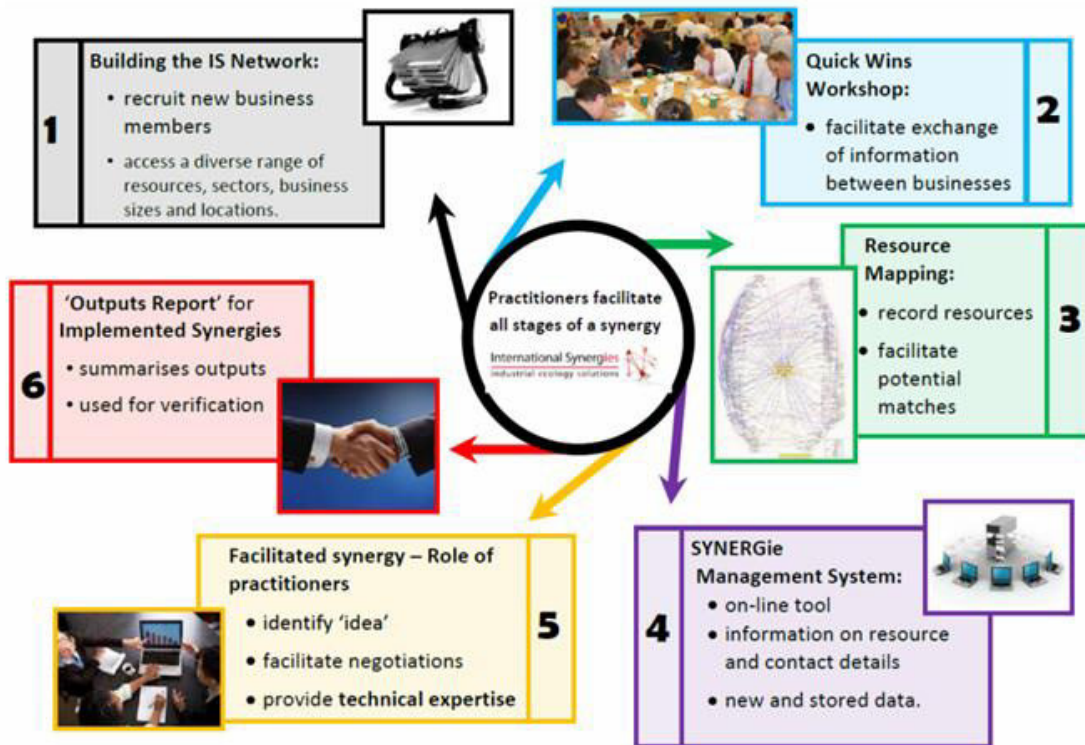
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# OECD Identifies Industrial Symbiosis as Critical to Growth Agenda

OECD has recently declared industrial symbiosis 'a la NISP' to be "an excellent example of systemic innovation vital for future green growth"



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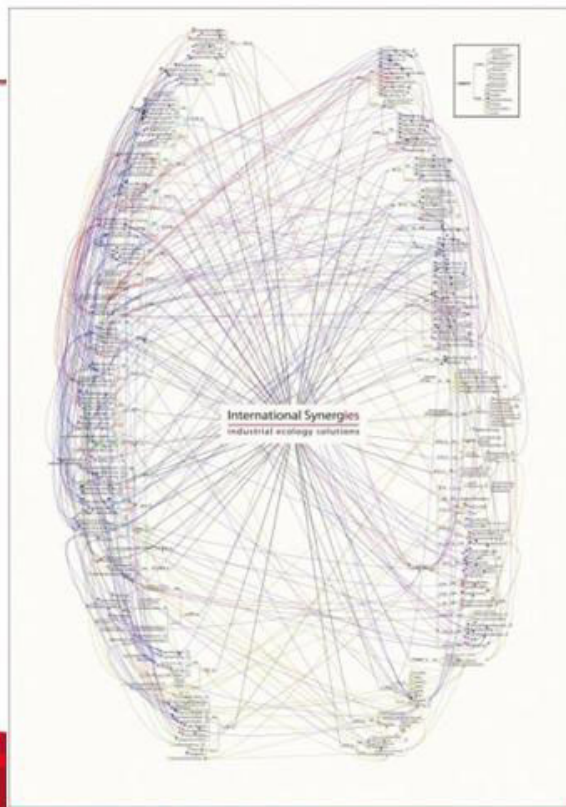


## Workshops



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## Opportunity Mapping



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# Industrial Case Studies



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## NISP (England) Delivered Outcomes April 2005 - March 2012

METRICS	In Year Benefits*	Lifetime Impact (Max 5 year)
Landfill diversion	9 million tonnes	45 million tonnes
CO <sub>2</sub> reduction	8 million tonnes	39 million tonnes
Virgin material savings	12 million tonnes	58 million tonnes
Hazardous waste eliminated	0.4 million tonnes	2 million tonnes
Water savings	14 million tonnes	71 million tonnes
Cost savings	€243 million	€1.21 billion
Additional sales	€234 million	€1.71 billion
Jobs	10,000+	???
Private investment	€374 million	???

€40 million investment since 2005  
\*all outputs independently verified

Rate Euro £1 = €1.18

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## Excellent Return on Investment April 2005 - March 2012

Unit Benefit Realised	In Year Spend	Lifetime Spend
€1 new income generated for industry	€0.02	€0.005
€1 saved by UK industry	€0.02	€0.005
1 tonne of virgin material saved	€0.48	€0.100
1 tonne of water saved	€0.40	€0.080
1 tonne of CO <sub>2</sub> reduced	€0.73	€0.150
1 tonne of waste diverted from landfill	€0.64	€0.130
1 tonne of hazardous waste eliminated	€13.74	€2.740

Rate Euro £1 = €1.18

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## Success Factors

### Practitioners

- Industrial expertise
- Long term relationship building and facilitation
- Marrying data and expert knowledge
- Working with the regulator and technology providers to 'enable' IS activity

### Engagement Model

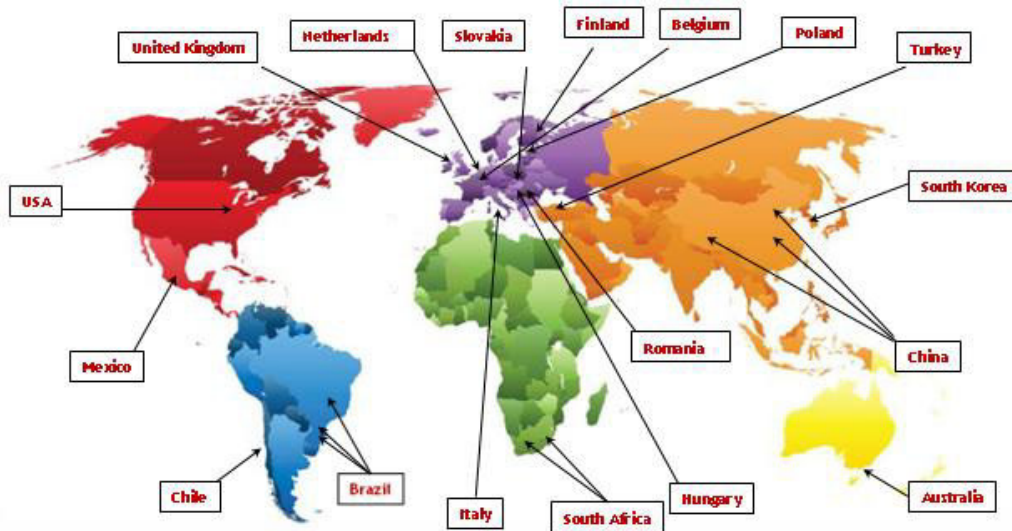
- Extensive, diverse network (incl. innovation, regulator, RDAs)
- Business opportunity programme
- Track record of excellent performance
- Creating a demand pull on innovation

### Data

- Quality NISP data direct from companies and regulatory data

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## International Experience: Our Customers



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## Potential Impact of Industrial Symbiosis for the EU

	NISP Equivalent Achievements if Applied at EU27* 5 Year Impact
<b>Additional Sales</b>	<b>€7,480,000,000</b>
<b>Cost Reduced</b>	<b>€7,064,000,000</b>
<b>CO<sub>2</sub> Reduction</b>	<b>252,000,000 Tonnes</b>
<b>Water saved</b>	<b>461,000,000 Tonnes</b>
<b>Virgin Materials Saved</b>	<b>381,000,000 Tonnes</b>
<b>Waste Diverted from Landfill</b>	<b>281,000,000 Tonnes</b>
<b>Hazardous Waste Eliminated</b>	<b>14,560,000 Tonnes</b>
<b>Transition to Green Jobs</b>	<b>100,000 Jobs</b>

\* Based on equivalent Gross Domestic Product contribution of EU Member States

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**Thank you for listening...**

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**Ian Humphreys**  
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@IntlSynergies  
@NISPnetwork





## Annex 3 List of registered participants

### Speakers

Presentation 1 – Introduction to Industrial Symbiosis	Dr. Guillaume Massard, <a href="mailto:guillaume.massard@sofiesonline.com">guillaume.massard@sofiesonline.com</a> SOFIES SA, Switzerland
Presentation 2 - Kalundborg Symbiosis	Ms. Mette Skovbjerg, <a href="mailto:Mette.Skovbjerg@kalundborg.dk">Mette.Skovbjerg@kalundborg.dk</a> Kalundborg Symbiosis Center, Denmark
Presentation 3 - The UK National Industrial Symbiosis Programme	Mr. Ian Humphreys, <a href="mailto:ian.humphreys@international-synergies.com">ian.humphreys@international-synergies.com</a> International Synergies, UK

### Country experts

Country (or organization)	Registered persons/contact details
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## Annex 4 Technical User Guide: Joining The Webinar

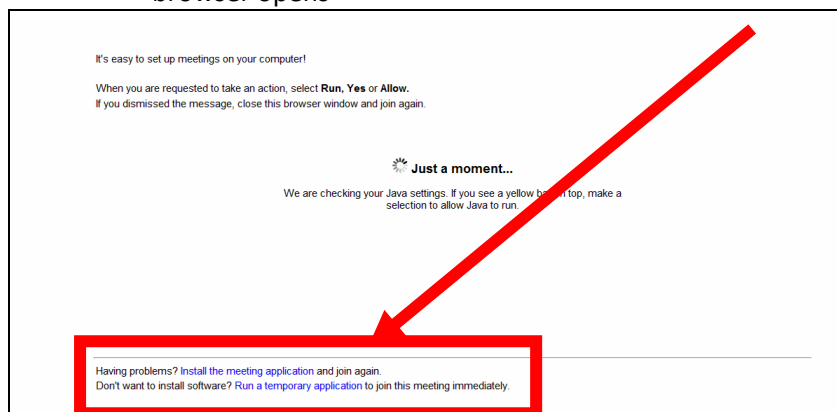
2 December 2013 (Monday), 13.30 – 15.00 (CET)

Technical joining: 13:00-13:30 (CET)

**TECHNICAL USER GUIDE: JOINING THE WEBINAR**

### In the week before the webinar: please check technical compatibility of your computer equipment

- **Computer** – the presentations and videostream of presenters will run via in your web browser using Cisco software called Web-ex. Optionally, you may use a webcam too, so other participants can see you in case you take the floor to speak. The system automatically uses any webcams properly installed on your computer.
- **At any time, you can do an interactive online session of WebEx in order to check the compatibility of the same (!) computer which you will be using and web its browser:**  
<http://www.webex.com/test-meeting.html>
  - We advise to select the **'Run a temporary application'** as the best option when the browser opens



- Should you face any technical problems, you can check or ask for your in-house technical support to check browser and system compatibility and required plug-ins here:  
[https://eea.webex.com/docs/T27L/mc08051/en\\_US/support/xplatform.htm](https://eea.webex.com/docs/T27L/mc08051/en_US/support/xplatform.htm)
- **Telephone** - we aim to broadcast all audio through telephone, NOT the computer audio (which often suffers from interruptions and delays). If more than one person will be following the webinar from the same computer, the telephone should be equipped with a loudspeaker.
- Should you have no access to direct landline, you may also use a mobile phone.

The system will **dial your direct number** that you provide when you log in.

**You will pay no charges for receiving the call - the EEA will cover the cost of the connection.**

**In principle the system can provide audio via the internet and the speakers of your computer, but we strongly recommend participants not to use this option in order to ensure the best audio quality.**

- **Please do sort out any technical issues a few days BEFORE the webinar as we cannot assist you right before or during the webinar.** Should you have problems which you cannot solve, please contact Örjan Lindberg ([Orjan.Lindberg@eea.europa.eu](mailto:Orjan.Lindberg@eea.europa.eu)) for help.