Industrial Symbiosis:

UK National Industrial Symbiosis Programme and Beyond

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International Synergies Limited

Eoinet Webinar, Resource Efficiency Policy
(Industrial Symbiosis Initiatives)
2nd December 2013

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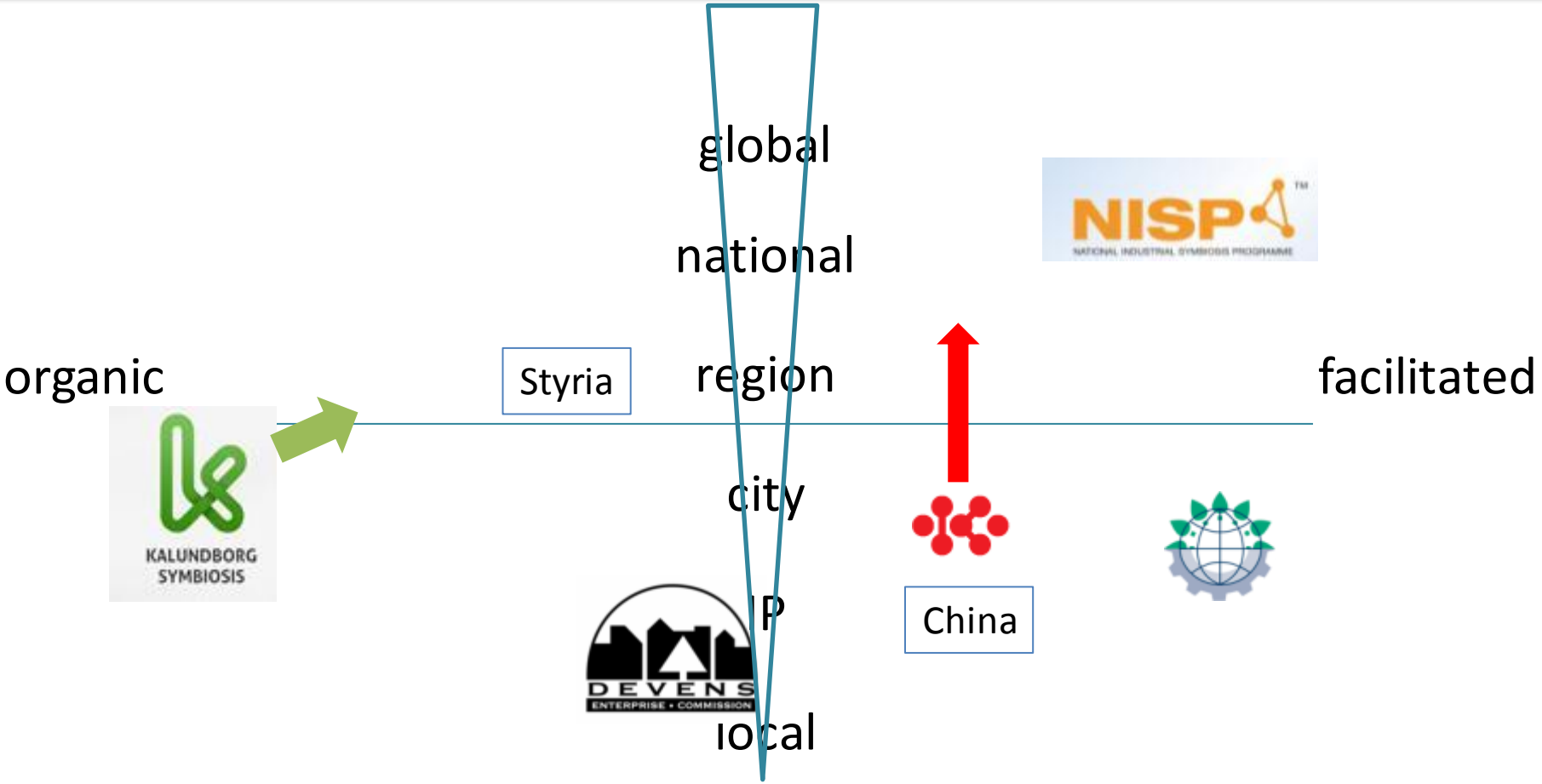
International Synergies – Our Vision

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

Illustrative models of industrial symbiosis

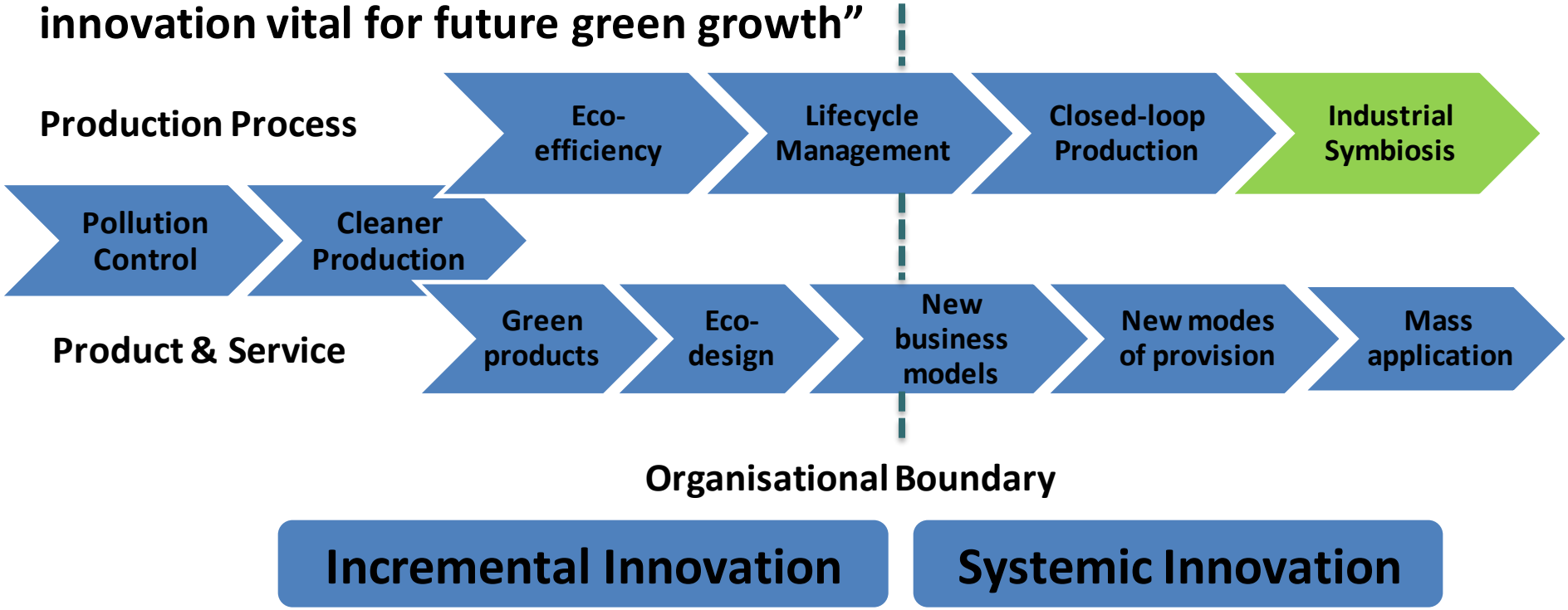


European Policies Promote Industrial Symbiosis for Green Growth

- 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

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"



1

Building the IS Network:

- recruit new business members
- access a diverse range of resources, sectors, business sizes and locations.

Quick Wins Workshop:

- facilitate exchange of information between businesses

2

Resource Mapping:

- record resources
- facilitate potential matches

3

Practitioners facilitate all stages of a synergy

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4

SYNERGie Management System:

- on-line tool
- information on resource and contact details
- new and stored data.

5

Facilitated synergy – Role of practitioners

- identify 'idea'
- facilitate negotiations
- provide **technical expertise**

6

'Outputs Report' for Implemented Synergies

- summarises outputs
- used for verification

Workshops

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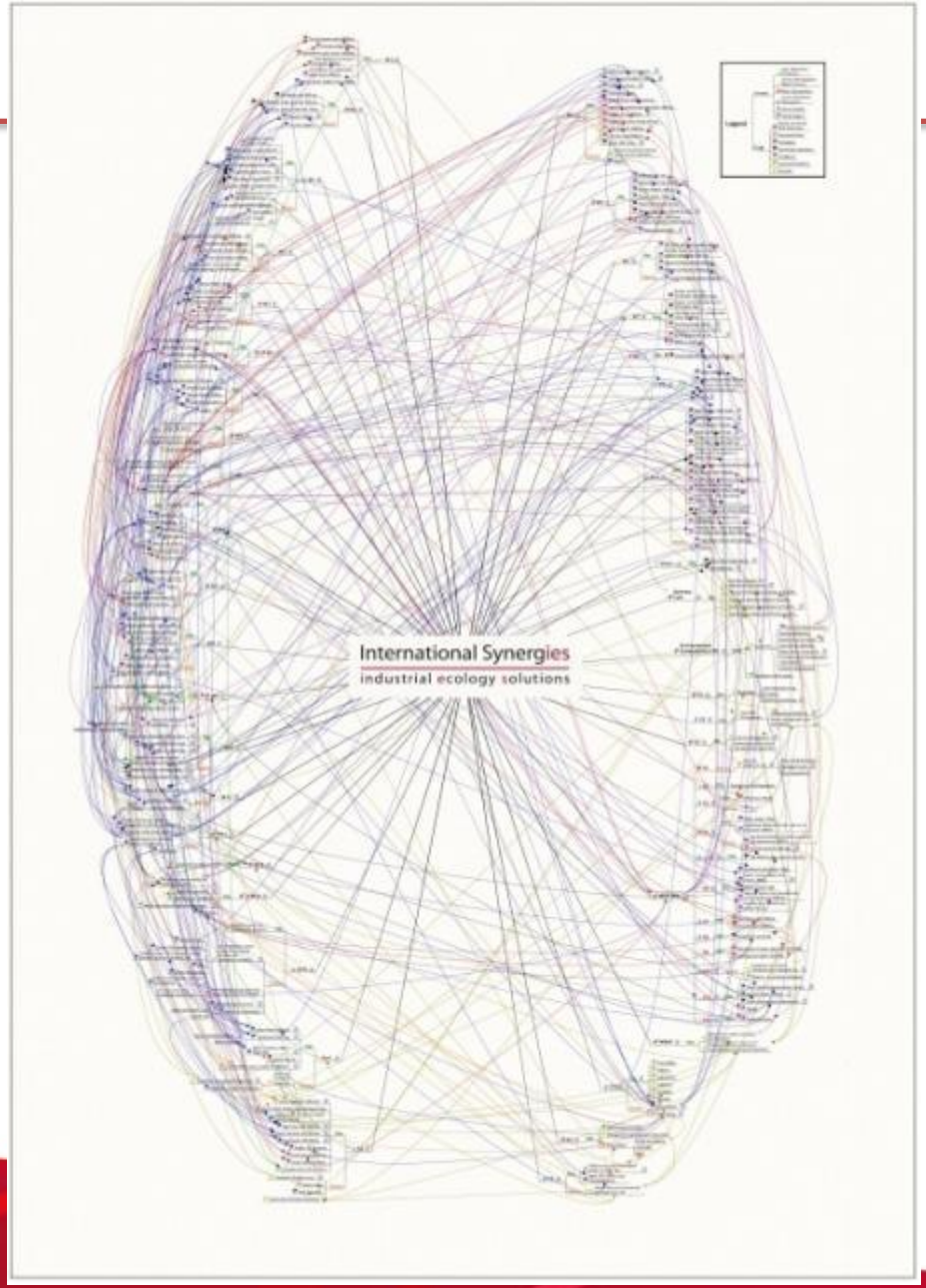
Opportunity Mapping



Industrial Case Studies

NISP

A fruitful collaboration

ORGANISATIONS INVOLVED

Terra Nitrogen (UK) Limited
John Baarda Ltd

SUMMARY

NISP North East is working with members Terra Nitrogen (UK) Limited and John Baarda Ltd in a fruitful collaboration which sees a record breaking 38 acre greenhouse in Billingham growing tomatoes all year round, creating 65 new jobs and diverting 12,000 tonnes of Carbon dioxide emissions.

BACKGROUND

Terra Nitrogen is part of Terra Industries Inc, a leading international producer of nitrogen products and methanol. Looking for alternative ways to use its by-products, the company teamed up with Humberside fruit and vegetable grower John Baarda Ltd to provide the infrastructure to supply and deliver utilities to the 38 acre site.

The £12 million greenhouse, the largest in the UK, will grow over 300,000 tomatoes a year to be sold on to retailers such as Somerfield and Sainsbury. The site will use more than 12,500 tonnes of CO_2, a by-product of Terra's nearby manufacturing site, significantly reducing the company's emissions. Steam from the plant will also be used to heat the greenhouses. In addition, Terra Nitrogen will supply electricity to the greenhouses, ensuring Baarda benefits from specially agreed low rates, enabling them to produce tomatoes throughout the winter, providing a real boost for British agriculture as tomatoes would normally be imported from Spain during the colder months.

THE NISP CONNECTION

- NISP worked with Terra Nitrogen to identify alternative ways to use by-products of the company's manufacturing plant.
- Tees Valley Regeneration liaised with the two companies, both members of the NISP North East Programme, to ensure the project's feasibility in terms of development of technology and implementation of infrastructure. NISP assisted this process and ensured continued promotion of this symbiotic relationship.

ACHIEVEMENTS

- 65 new jobs created
- Reduction of 12,5000 tonnes of CO_2 emissions
- Successful reuse of waste heat
- £15 million private investment in region

CONTACT DETAILS

Dave Sterrill, National Programme Manager, NISP – 0121 766 4580
Christine Parry, Regional Co-ordinator, NISP North East – 01624 342409

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NISP

Alternative uses for waste beer.

ORGANISATIONS INVOLVED

Diageo UK Ltd,

SUMMARY

Diageo, are the owners and producers of the world famous beer Guinness. As part of the production process this beer undergoes very strict quality control procedures. The result is some waste beer is produced and gets disposed of in a secure manner in Sheffield. NISP were asked to examine the viability of using secure disposal points nearer to the production facility in Runcorn, Cheshire

BACKGROUND

Diageo produce this beer and have very keen duty of care procedures that not only have to satisfy the Environment Agency but also HM Customs & Revenue. They take steps to ensure that this beer does not fall into the wrong hands and therefore protect the quality of their products. As a NISP member, they asked for our help in finding a more financially and environmentally viable option for their liquid wastes.

THE NISP CONNECTION

NISP identified key solution providers with the potential to help Diageo in their quest for more financially and environmentally sustainable solutions to the treatment of the beer. The beer went through a strict waste acceptance criterion involving various lab tests to assess suitability and Diageo performed audits on the solution providers involved to ensure that their security procedures were of the correct standard for the waste to be treated and disposed of properly. As a result, the beer has gone to uses ranging from benefiting agricultural land to the provision of power through anaerobic digestion, and Diageo have managed to secure a definite environmental and financial win for this waste beer.

ACHIEVEMENTS

- Reduction in CO2 of 9084 tonnes per year
- Diversion from waste disposal of 2600 tonnes per year

CONTACT DETAILS

Stuart Smith, NISP North West – 07920 861947

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www.nisp.org.uk

Case Study

Fab savings met in the UK for Michelin

Organisations involved: Michelin, Waste End Strategy (WES)

The Challenge

Michelin manufactures and sells tyres for all kinds of vehicles, publishes maps and guides and operates a number of digital services in more than 170 countries. For Michelin Ballymena, which celebrates its 40th anniversary in 2009, the disposal of 'Meltab', the metallic reinforcing with its own unique nature used in heavyweight tyres, was increasing overall production costs and also needed to be diverted from landfill to achieve local environmental targets set by the Ballymena plant. Each year the plant, which is the only truck tyre producing plant in the UK, produces 1.4 million heavyweight tyres for trucks and buses.

WES offers solutions for the production and management of waste that are both cost-effective and in compliance with relevant legislation and policy.

Above: Fab savings met in the UK for Michelin, Ballymena

The Solution

Management at the Ballymena plant needed to source an alternative disposal route to achieve their landfill diversion targets. 'Meltab', owing to its unique nature and structure, requires specialist outlets to recover the steel content and the rubber. Waste End Strategy sought to maximise the cost effectiveness of an alternative outlet for the 'Meltab' and saw the NISP methodology as a means of providing a sustainable solution. Through collaboration with an established partnership, WES was able to provide a different outlet for the 'Meltab' in London and now also in Cardiff. This represents a two phased solution that helps divert the material from landfill to a number of outlets for the Ballymena site. WES is currently testing additional outlets with spare capacity to process the output from another Michelin plant in Dundee and later in the year the French plants. The diversion from landfill, of 'Meltab', to satisfy stringent local targets at the Michelin Ballymena plant was a solution delivered by Waste End Strategy with the end results documented below.

The Results

- Additional Sales: £54,891
- Businesses Assisted: 4
- CO2 Reduction: 381 T
- Training Outcomes: 4
- Landfill Diversion: 501 T
- Virgin Materials: 501 T

"The Michelin team at Ballymena and in GB are grateful to NISP for identifying and helping to implement economically viable and innovative recovery solutions."

Paul Kinkead
Quality Assurance & Environmental Systems Manager
Michelin Ballymena: 028 2509 3600

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Case Study

Befesa, a new home for Waste Foundry Sand

Organisations involved: Befesa Salt Slags Limited, Various Foundries

The Challenge

Through links with the Cast Metal Federation, numerous local foundries contacted NISP West Midlands for assistance in identifying alternative and sustainable ways to reuse spent foundry sand, a waste product of their process.
Befesa Salt Slags operate a purpose built facility to treat waste streams produced by the primary, secondary and associated aluminium and iron industry sectors. Over the last few years as the capacity of the plant increased the decision was made to look at other waste streams that were being generated within the foundry industries on the basis of offering an alternative to landfill.

BEFESA

Above: The waste treatment facility at Befesa

The Solution

NISP have facilitated the relationship between Befesa Salt Slags Limited and numerous foundries within the West Midlands region. The Befesa factory was commissioned in 1998 and is recovering on a annual basis 4000 tonnes of aluminium concentrate with a liquid metal yield of 3-3500t, the re crystallisation of up to 18000t of salt, which is a mixture of potassium and sodium chloride for reuse within the industry and also as a fertiliser, and the remainder of the mass balance being made up of alumina / aluminium oxide suitable for the aggregate, cement and brick industries. Prior to 1998 the vast majority of these valuable materials were being disposed of to landfill. By way of NISP introducing the foundries to Befesa, deals have been agreed which has resulted in over 10,000 tonnes of material being diverted away from landfill, and into alternative outlets.

The Results

- Additional Sales: £200,000.00
- Businesses Assisted: 4
- CO2 Reduction: 1,020
- Cost Savings: £300,000.00
- Landfill Diverted: 10,000
- Virgin Materials: 10,000

"The assistance from NISP in introducing Befesa to potential customers, and the technical backup, especially connected to environmental issues since then has been vital."

Ben Arrowsmith
Commercial Director, Befesa Salt Slags Limited
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NISP

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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_2 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_2 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

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

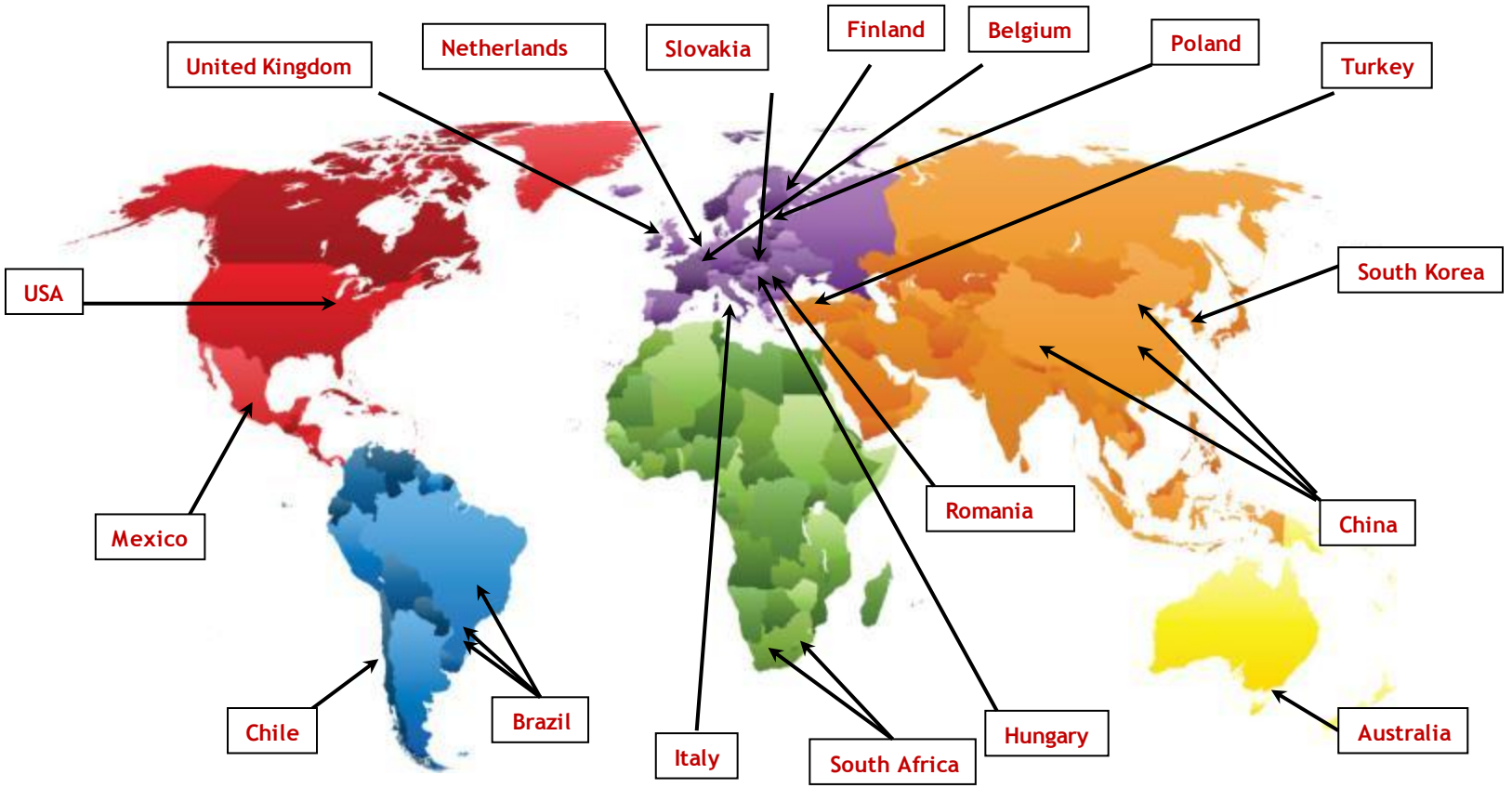
Engagement Model

- 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

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
Additional Sales	€7,480,000,000
Cost Reduced	€7,064,000,000
CO_2 Reduction	252,000,000 Tonnes
Water saved	461,000,000 Tonnes
Virgin Materials Saved	381,000,000 Tonnes
Waste Diverted from Landfill	281,000,000 Tonnes
Hazardous Waste Eliminated	14,560,000 Tonnes
Transition to Green Jobs	100,000 Jobs

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

Thank you for listening...

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