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Ministry of Trade & Industry
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GEIPP

GLOBAL ECO-INDUSTRIAL PARKS PROGRAMME



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Eco-Industrial Parks in Egypt

Capacity Building Workshop

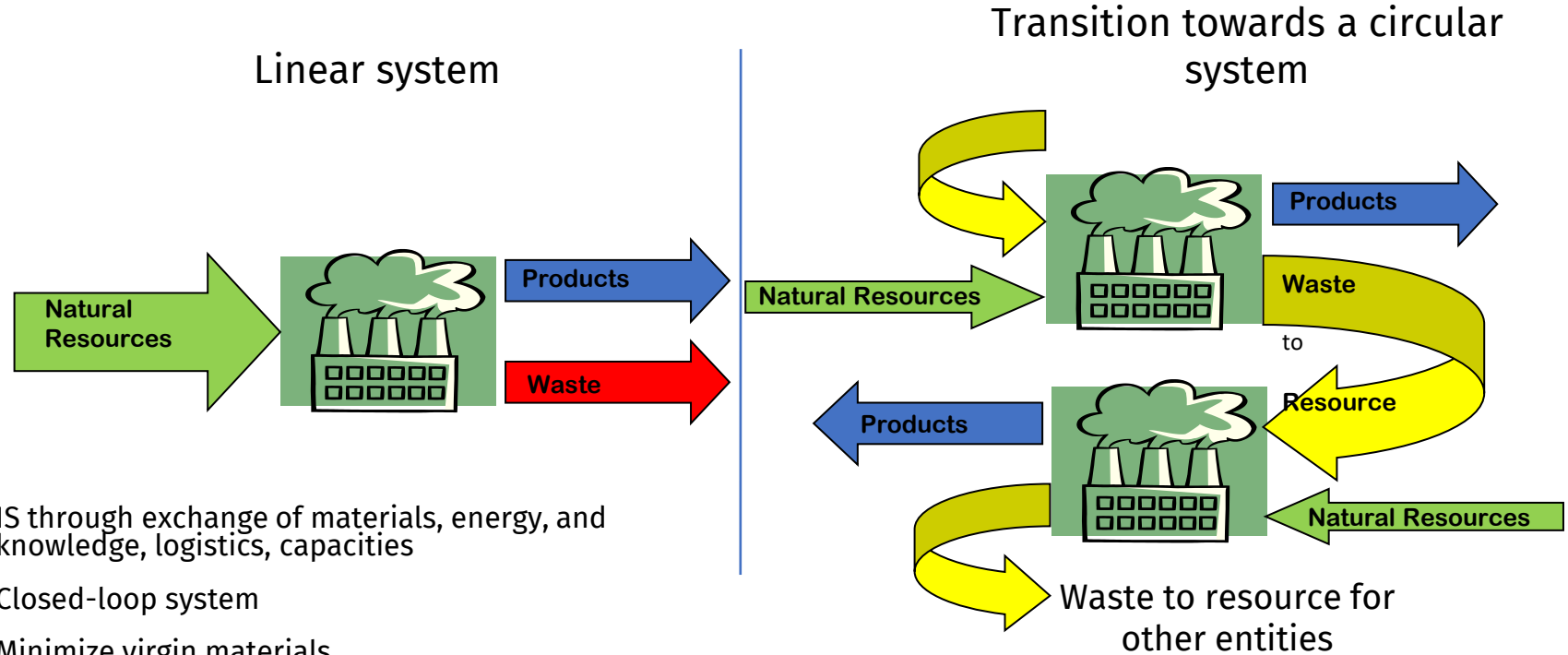
18th May 2023

Industrial Symbiosis (IS) Introduction

James Woodcock
International Synergies Limited

What is Industrial Symbiosis?

What is Industrial Symbiosis (IS) ?

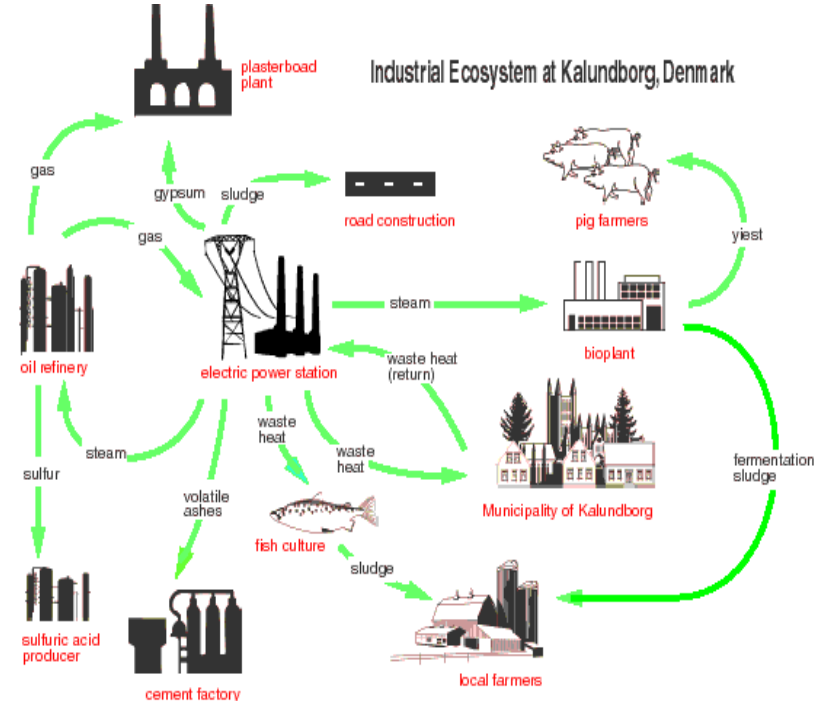


- IS through exchange of materials, energy, and knowledge, logistics, capacities
- Closed-loop system
- Minimize virgin materials

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Industrial Symbiosis (IS) History

- The idea was born in England during World War II to rationalize resources but stopped after the war I
- In the 1970s, several industrial waste exchange facilities emerged in Europe
- The US practiced the exchange of waste in a more systematic manner
- Then waste exchange systems spread in many countries Industrial
- waste exchange systems in these countries are managed by governmental or non-governmental institutions



Lombardi & Laybourn, 2012, Journal of Industrial Ecology 16(1):28-37

Who Does Industrial Symbiosis (IS) Include?



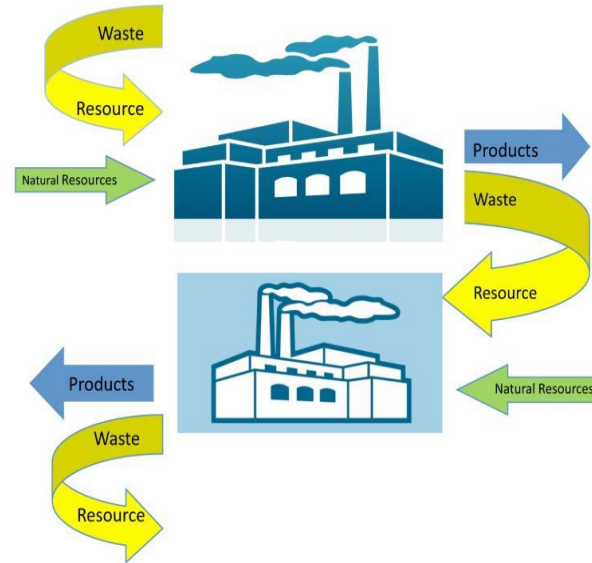
All sectors



All resources



Profitable transactions



Lombardi & Laybourn, 2012, Journal of Industrial Ecology 16(1):28-37

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Benefits of Industrial Symbiosis (IS)



Reduce use of virgin materials and associated cost and carbon implications



Save on energy, material disposal, water spending, and CAPEX



Create income on waste or excess resources



Improve firm brand equity as being environmentally friendly



Decrease needs for foreign currency and possible export

Different Industrial Symbiosis (IS) Delivery Models



Self-Organised



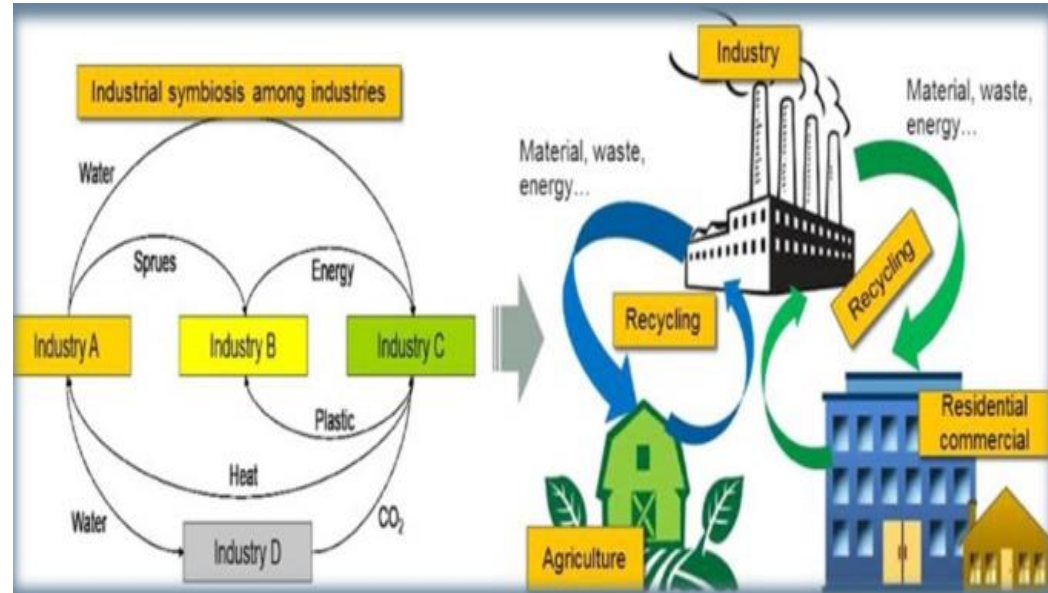
Facilitated Workshops



Web Platforms

From Industrial Symbiosis (IS) to Urban-Industrial Symbiosis (UIS)

- UIS connect different sectors and entities
- UIS Describe interlinkages between industries and cities



<https://www.sciencedirect.com/science/article/abs/pii/S0304380017302818>



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International Experience and Case Studies

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Chemonics Egypt
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industrial ecology solutions



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Industrial Symbiosis (IS) - In All Continents



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NISP® Delivers Impacts (England, 2005 - 2013)



Investments

£330million

Private Investment



Social Benefits

+ 10,000

Jobs Created or Safeguarded



Economic Benefits

£1billion

Additional
Revenue

£1billion

Cost Savings



Environmental Benefits

42 million tonnes

CO₂e Reduction

47 million tonnes

Diverted From Landfill

60 million tonnes

Virgin Resources
Saved

72 million tonnes

Industrial Water Saved

Case Studies – Aggregation Potential

Problem



20 wood producers
Main waste: Sawdust
/ Wood chips /
Boards from trunk
trimming

Solution



Producing
Medium Density
Fiberboard
(MDF) from the
waste

Savings



**Total
Resources:**
400,000
tonnes

Virgin forest:
2,500
Hectares



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Case Studies – New Policies New Opportunities

Problem



New policy in China banning the disposal of sewage sludge to landfill

Solution



Extracting protein from sludge for the manufacturing of protein products

Annual Savings



Cost : 66,500 USD
CO2 : 1.533 Tonnes
Sales: 10,000 USD
Waste: 180 Tonnes
Raw material: 180 Tonnes



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Case Studies – Innovation in Material

Problem



Hazardous dust from production of air conditioning units

Solution



The dust was reprocessed and used by Mil-Ver metals in their manufacturing process

Annual Savings



Cost : 48,800 USD

CO2 : 242 Tonnes

Hazardous Waste: 15 Tonnes



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Case Studies – Use What is Available

Problem



Dried sewage sludge
to landfill

Solution



Dried by solar and
air, used as coal
replacement in
cement
production due to
its high Calorific
value

Annual Savings

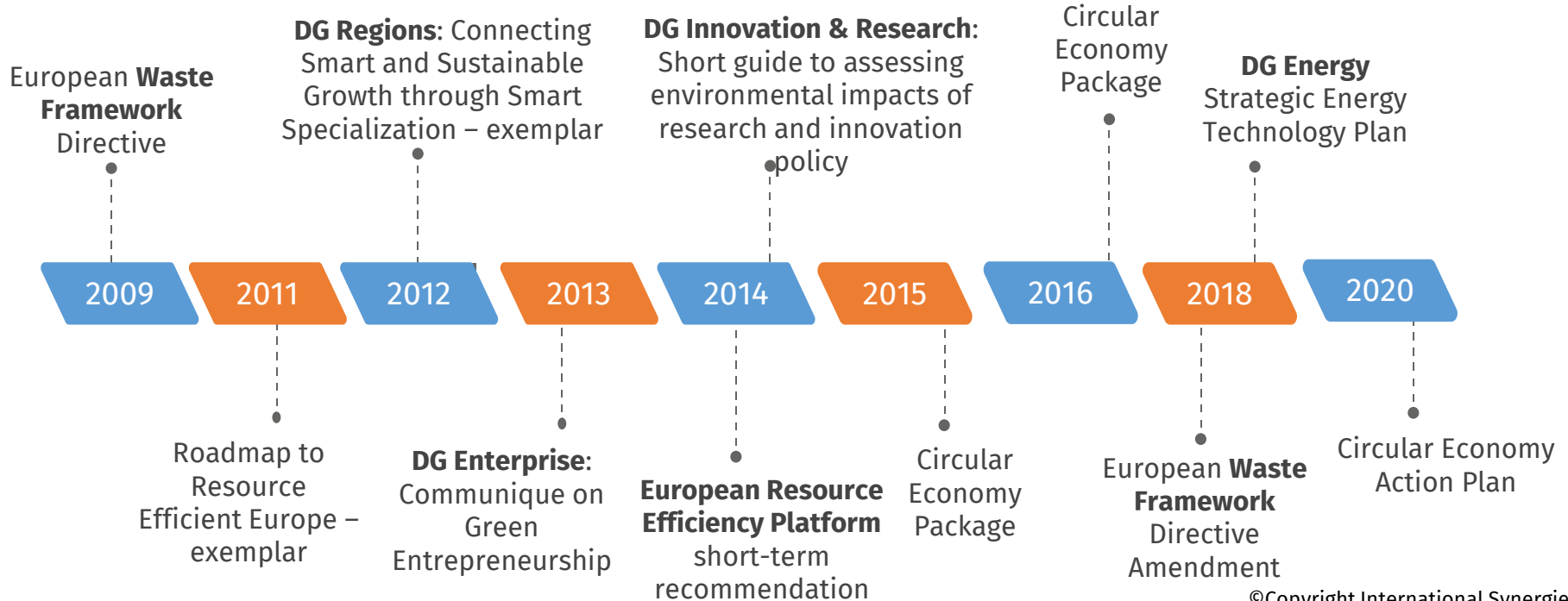


Waste : 7,000 tonnes
CO2 : 9,500 Tonnes



Policies and Lessons Learnt

Continuous Policy Development is Needed



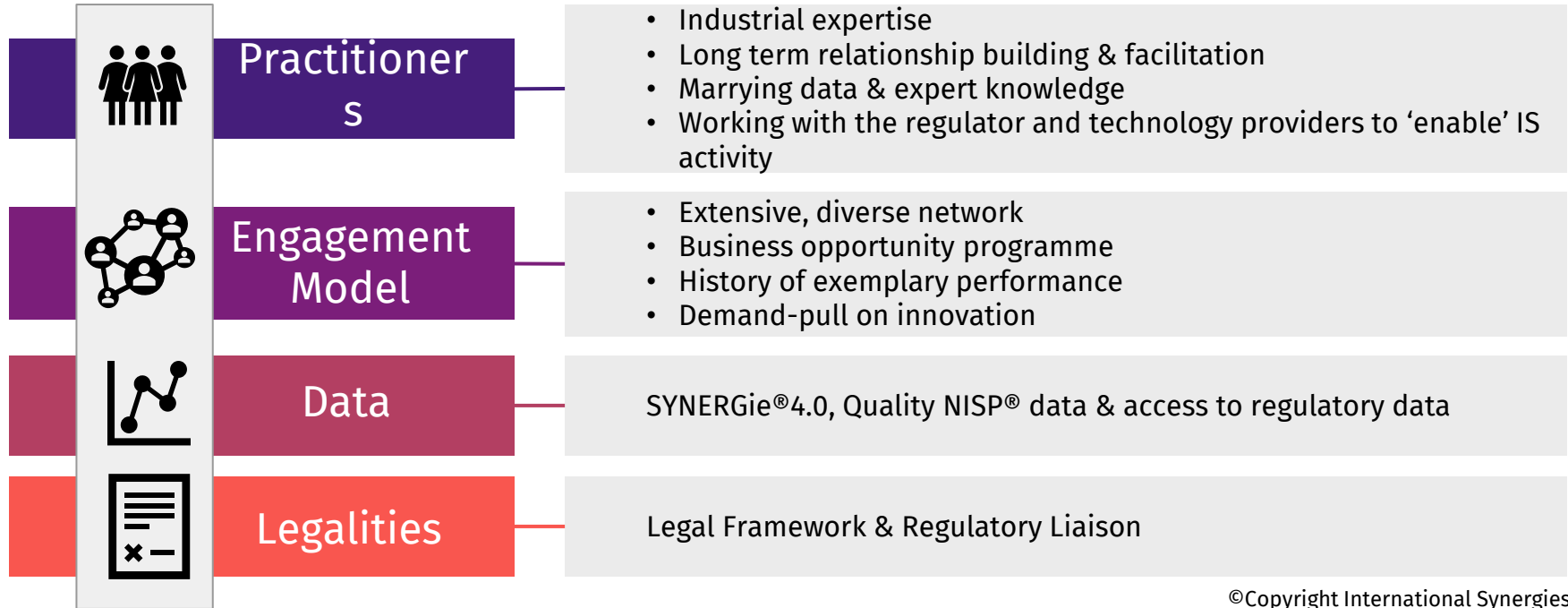
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Continuous Policy Development is Needed

- Enhance waste management practices in the EU
- Transition to sustainable material management
- Promote circular economy principles
- Establish closed-loop systems
- Prioritize replicable practices of industrial symbiosis



Lessons Learnt - Success Factors



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Q&A



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Industrial Symbiosis Experience in Egypt

Nehal Muhamed
Chemonics Egypt Consultants

Industrial Waste Exchange (IWEX) Programme

- First waste mapping took place in 2015 (Chemonics Egypt in 10th of Ramadan)
- First platform developed and launched in 2017
- 8 Symbiosis workshops implemented



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IWEX Platform Features

- Possibility to add/display waste available for purchase
- The possibility of requesting the displayed waste/materials
- Browse lists of waste/materials offered and required by type and industrial area.
- Browse a list of some investment opportunities for waste exchange by industrial sector and waste type.



المواد المطلوبة	المواد المتاحة
عرض قوائم المواد المطلوبة	عرض قوائم المواد المتاحة
اضف المخلفات المطلوبة	اضف المخلفات المتاحة

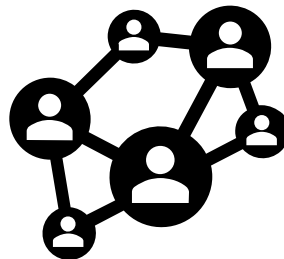
Building Waste (0) مخلفات البناء	Batteries (5) بطاريات	(Appliances (stoves, fridges, etc (6) الاجهزة (الغواش, التلاجات, الخ)
Compostable and food Wastes (0) مخلفات السماد و الغذاء	Chemicals (12) المواد الكيميائية	Cartridges (0) حراطيش
Fluorescent Tubes/CFLs (3) النابيب الفلوريسنت/المصابيح	Dyes / Inks (1) الصباغ/الاحبار	(Computers/Electronics (E-waste (4) اجهزة الكمبيوتر/التقنيات(مخلفات)
Industrial/Other Equipment (3) معدات صناعات اخرى	Glass (0) الزجاج	Furniture (2) اثاث
Motor Oils/Greases (3) زيوت المحركات/شحوم	Metals (4) المعادن	Metal Sludges (1) الحمأة المعدنية
Paints/Coatings (0) الدهانات/طلاء	Others (8) اخرى	Oils and Waxes/Food and Other (0) زيوت و شمع/الغذاء و اخرى
Pharmaceutical Wastes (0) المخلفات الصيدلانية	Pesticides/Herbicides/Agricultural Chemicals (0) المبيدات الحشرية/المبيدات/التسميمات الزراعية	Paper/Cardboard (5) ورق كرتون
Textiles (15) المنسوجات	Solvents (1) المذيبات	(Plastics/Composite packaging (e.g. Tetrapak (8) البلاستيكية/الحبة وتغليف مركب (مثل تترا باك)
Wood (8) خشب	Tyres/Rubber (3) اطارات / المطاط	Textiles/Leather (0) المنسوجات / الجلود

IWEX Platform - in Numbers



370

Registered
Companies



570

Offer to
buy/sell
waste

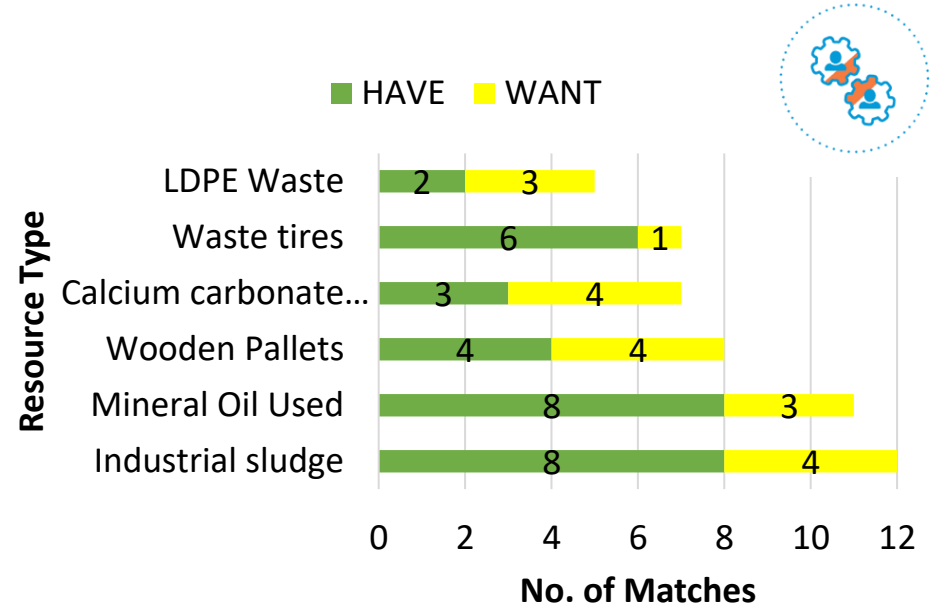


169

Commercial
transaction

Industrial Symbiosis in Ain Sokhna 2018

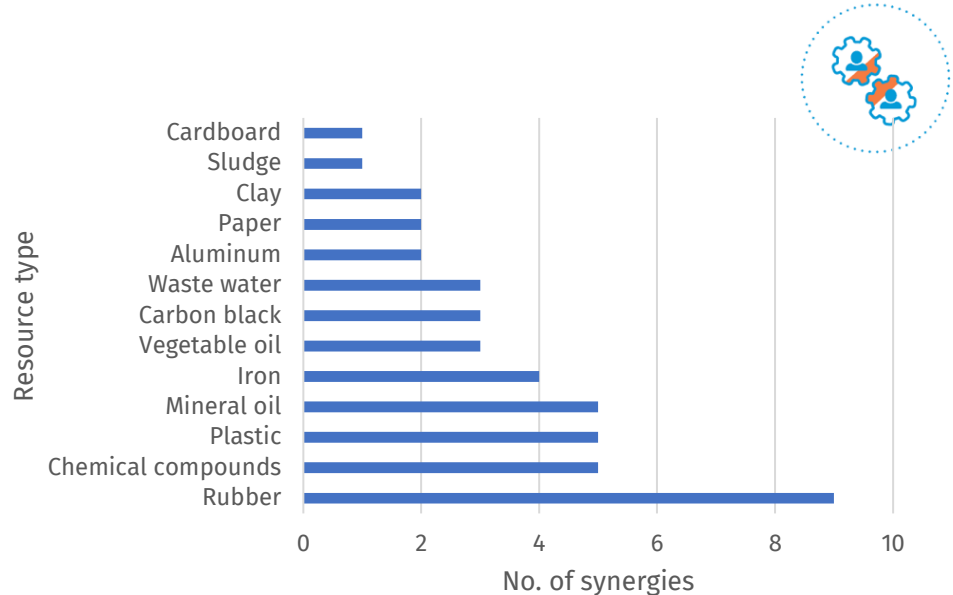
- Total No. of Matches = 248
- Total No. of attendees = 27
- An example for successful alternative for industrial waste
- Increased added value and profitability through buying and selling waste



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Industrial Symbiosis in Ain Sokhna 2023

- Total No. of Matches = 183
- Total No. of attendees = 42
- A real example for IS in action
- Imagine how many potential deals per each company and sector!



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Success Story – Speaker

Content is in progress with the company

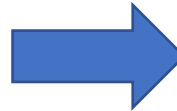
5-10min

Successful Deal Example

Sectors Have



Cement



- Feldspar
- Cement By-Pass



Sectors Want

Building &
Construction

Successful Deal Example

Sectors Have



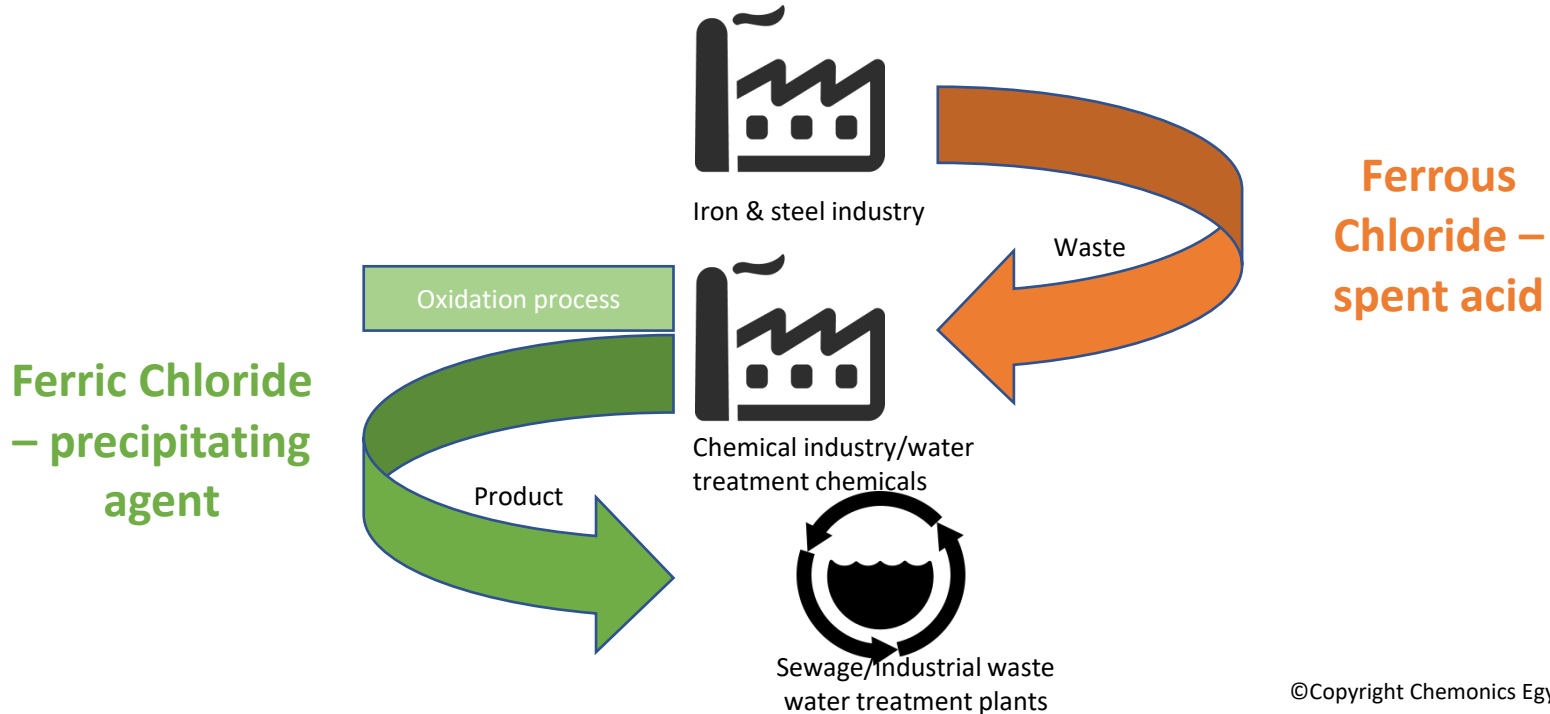
Sectors Want

Food



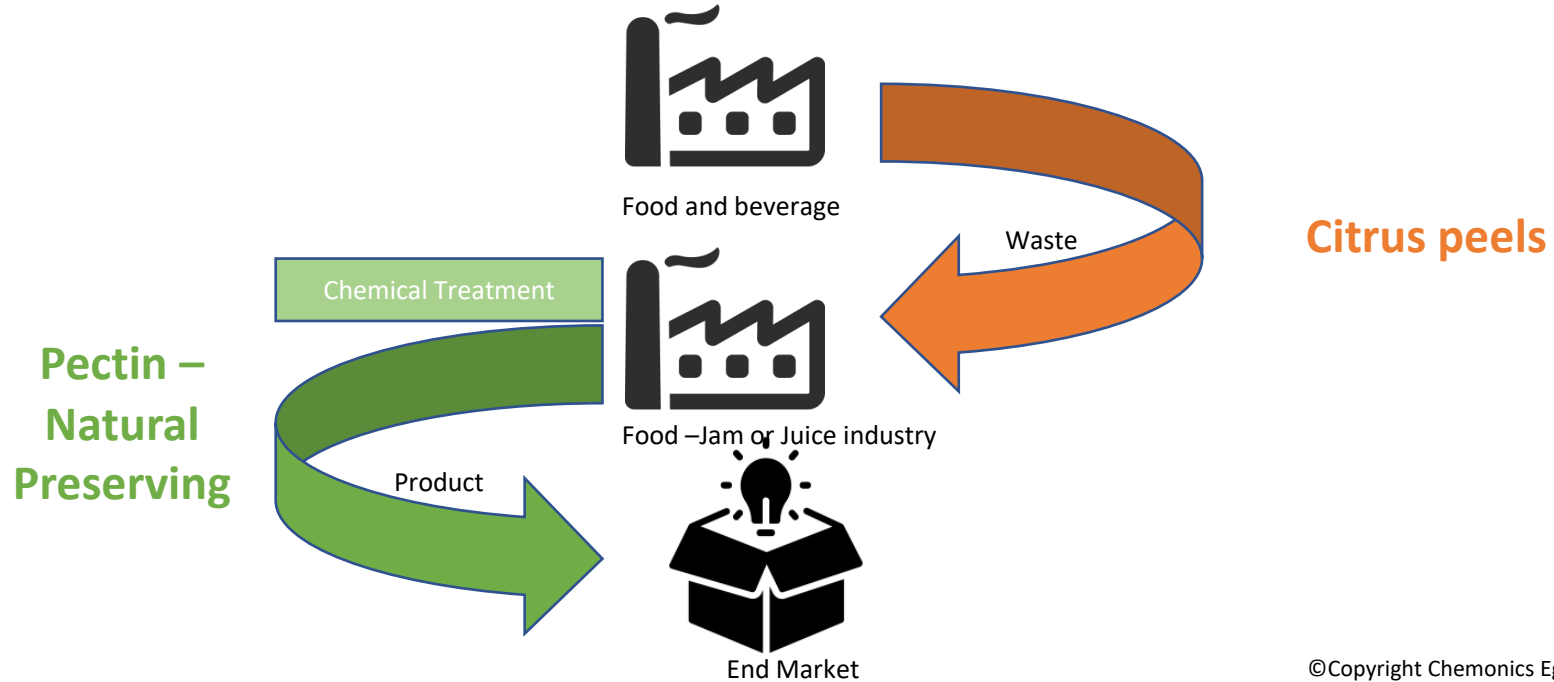
Recycler

Spent Acid from Engineering Sector to Sewage Water Treatment



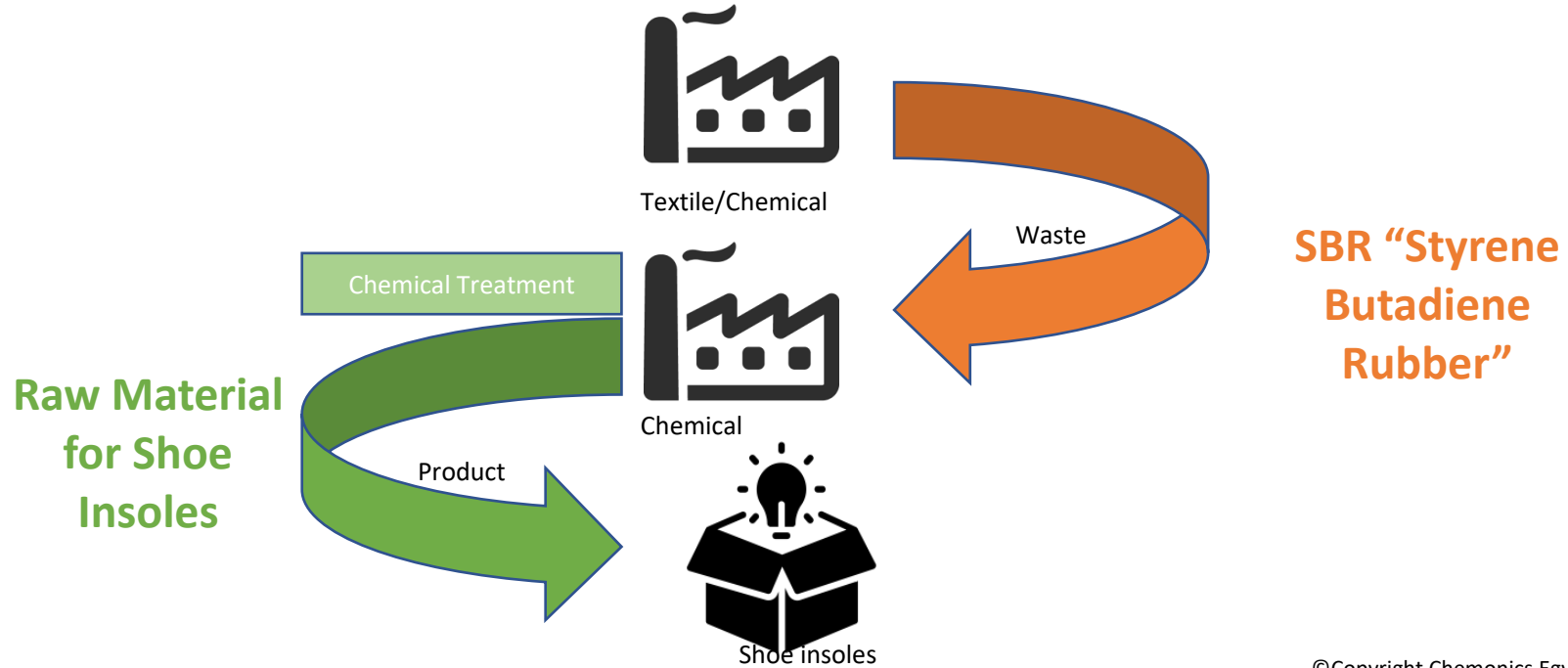
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Citrus Peels from Food Sector to Another Product to Food Sector



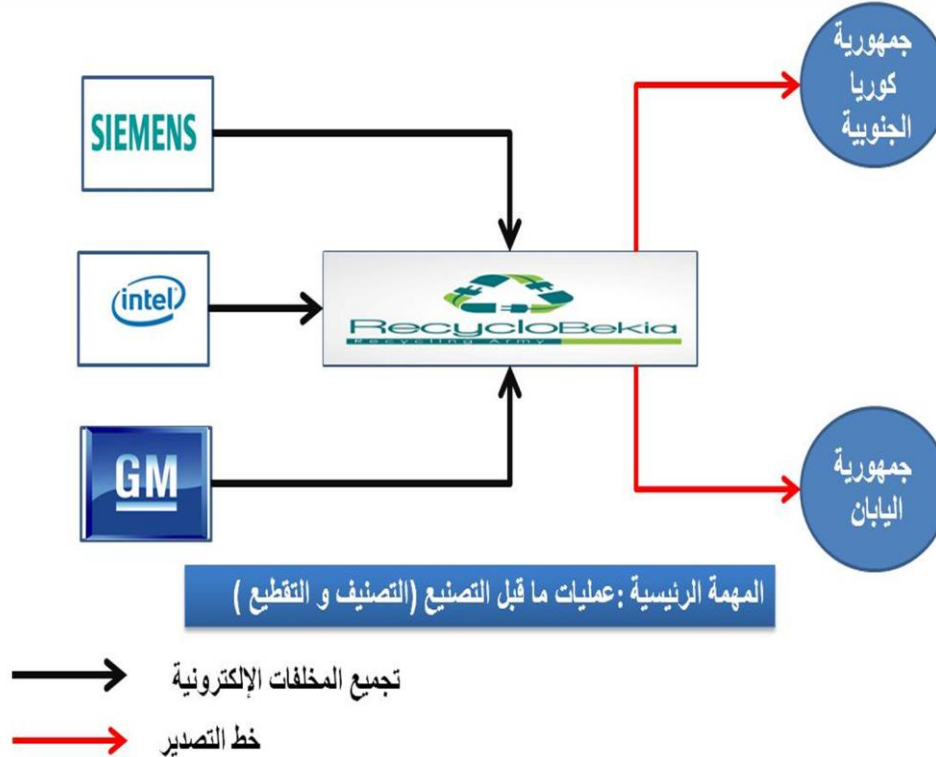
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SBR from Textile/Chemical Sector to Chemical Sector



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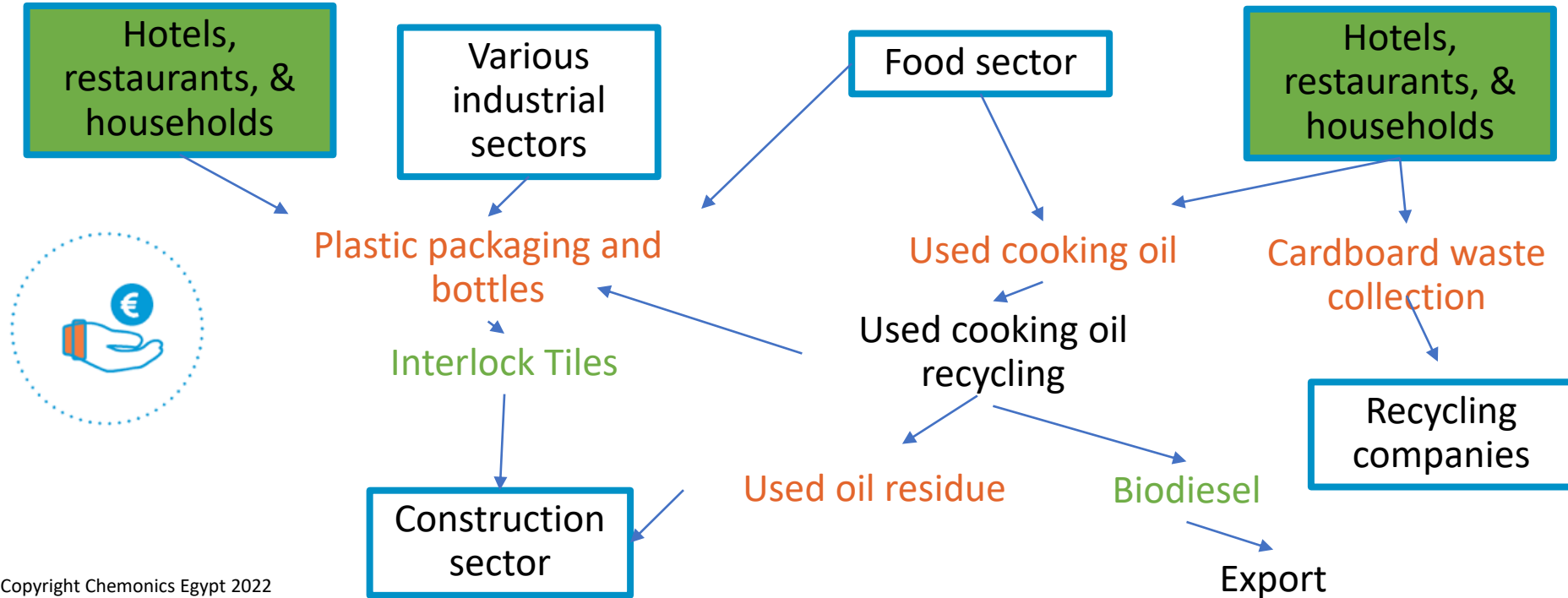
Wider Symbiosis Cases



Extended Symbiosis



Egyptian Success Stories in UIS



Lessons Learnt

- Difficulty in determining waste prices, which leads to difficulty in negotiation between the two firms
- There are no specific codes for the types of waste
- The importance of determining the physical and chemical properties of waste
- Technical support may be required to complete the exchange opportunity

Based on Chemonics
Egypt's database of
more than 30 successful
exchange transactions

Q&A



Thank You





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