

3rd INTERNATIONAL CONFERENCE on Sustainable Solid Waste Management

PROMOTION OF SYMBIOTIC NETWORKS FOR INDUSTRIAL WASTE THROUGH THE USE OF A DEVELOPED PLATFORM

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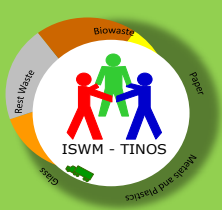
Prof. Maria Loizidou
National Technical University of Athens



Tinos Island
July 2015

Zorzios Ioannis Antonis
CLMS (UK) LIMITED



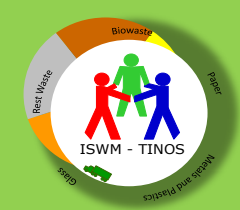


Industrial Symbiosis

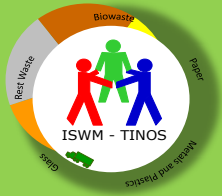
The sharing of services, utility, by-product resources and waste among industries in order to add value, reduce costs and improve the environment

What can a platform do towards industrial symbiosis?

- ✓ *Identifies opportunities of waste to become a resource.*
- ✓ *Uncovers the barriers for implementing waste exchanges and waste utilization.*
- ✓ *Provides substantial information on available waste types and quantities for exchange.*
- ✓ *Facilitates communication amongst million of industries and SMEs.*
- ✓ *Promotes resource efficiency.*



Building the data for the platform...



Waste Categorisation

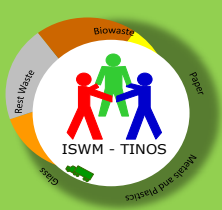
Waste Statistics

Regulation
574/2004/EC

List of Waste

Decision
2002/532/EC

**Usual
Terminology**



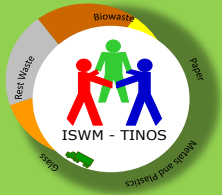
Waste Categorisation

Waste Statistics I



LEVEL 1



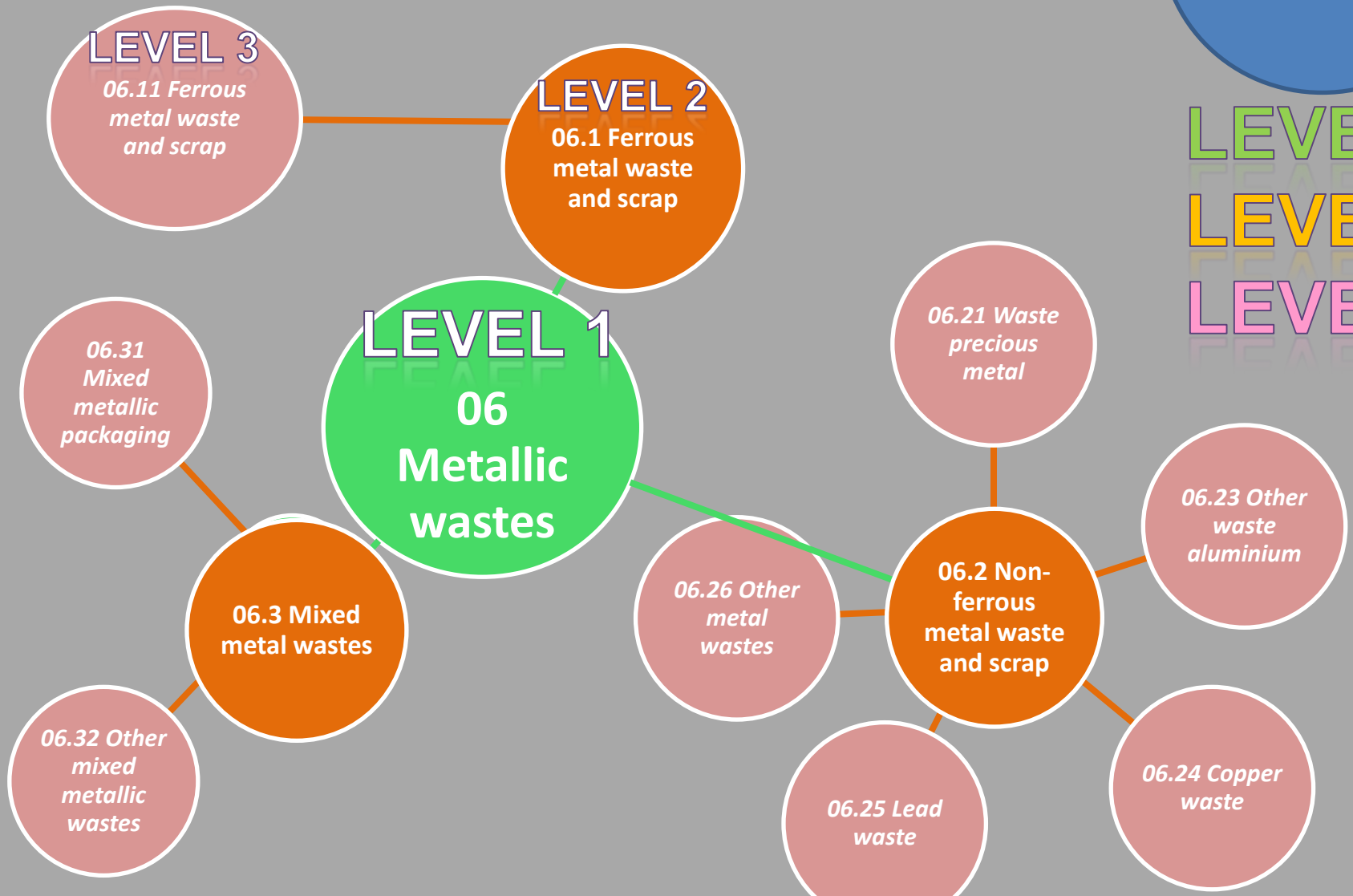


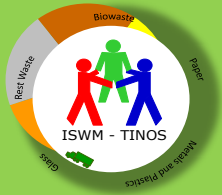
Waste Categorisation

Waste Statistics II

Waste Statistics

- LEVEL 1
- LEVEL 2
- LEVEL 3





Waste Categorisation

List of Waste



Decision 2002/532/EC

01 WASTES RESULTING FROM EXPLORATION, MINING, DRILLING, AND CONCENTRATION OF MINERAL AND METALLIC ORES AND CONCENTRATES OF METALS

02 WASTES FROM AGRICULTURE, HORTICULTURE, AQUACULTURE, FORESTRY, HUNTING AND FISHING, FOOD WASTE AND PREPARATION

03 WASTES FROM WOOD PROCESSING AND THE PRODUCTION OF PANELS AND FURNITURE, PULP, PAPER AND CARDBOARD

04 WASTES FROM THE LEATHER, FUR AND TEXTILE INDUSTRIES

05 WASTES FROM PETROLEUM REFINING, NATURAL GAS PURIFICATION AND PYROLYTIC TREATMENT OF COAL

06 WASTES FROM INORGANIC CHEMICAL PROCESSES

07 WASTES FROM ORGANIC CHEMICAL PROCESSES

08 WASTES FROM MANUFACTURE, FORMULATION, SUPPLY AND USE OF COATINGS (PAINTS, VARNISHES), ADHESIVES, SEALANTS AND PRINTING INKS

09 WASTES FROM THE PHOTOGRAPHIC INDUSTRY

19 WASTES FROM WASTE MANAGEMENT FACILITIES, OFF-SITE WASTE WATER TREATMENT PLANTS & THE PREPARATION OF WATER INTENDED FOR HUMAN CONSUMPTION AND INDUSTRIAL USE

20 MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR) INCLUDING SEPARATELY COLLECTED FRACTIONS

LEVEL 1

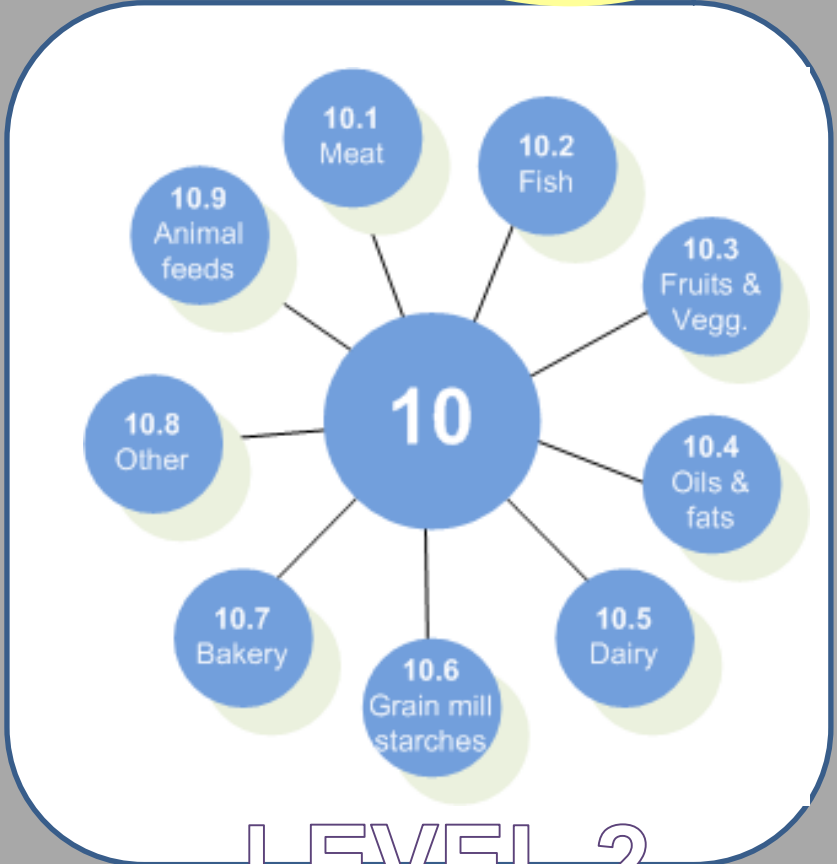
Waste Categorisation

Industrial Terminology

Usual Terminology

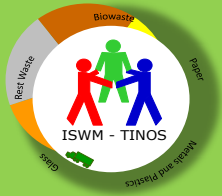
LEVEL 1

- 10 • *Manufacture of food products*
- 11 • *Manufacture of beverages*
- 12 • *Manufacture of tobacco products*
- 13 • *Manufacture of textiles*
- 14 • *Manufacture of wearing apparel*
- 15 • *Manufacture of leather and related products*
- •
- 31 • *Manufacture of furniture*
- 32 • *Other manufacturing*



LEVEL 2

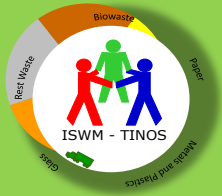
<http://aepo.ypeka.gr/>



Industrial Symbiosis Platform

The Industrial Symbiosis Knowledge Graph...





Industrial Symbiosis Platform

What is a graph?

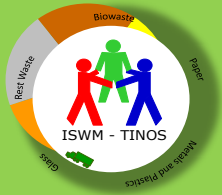
- A graph is an abstract representation of a set of objects where some pairs are connected by links.



Object (Vertex, Node)

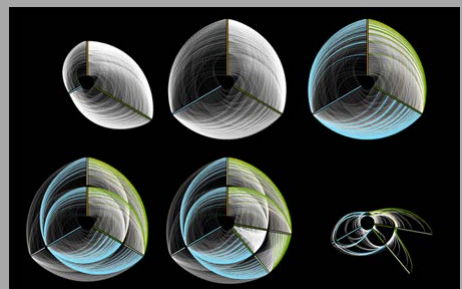
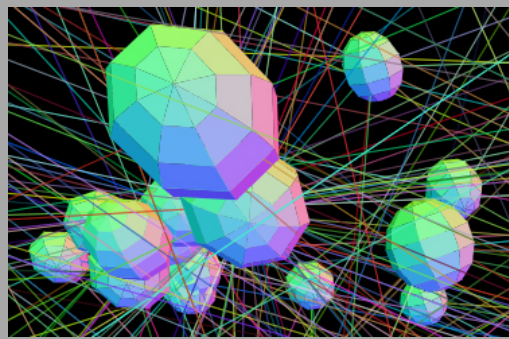
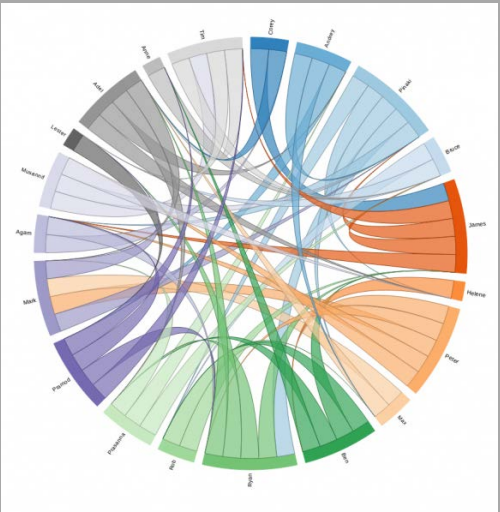


Link (Edge, Arc, Relationship)



Industrial Symbiosis Platform

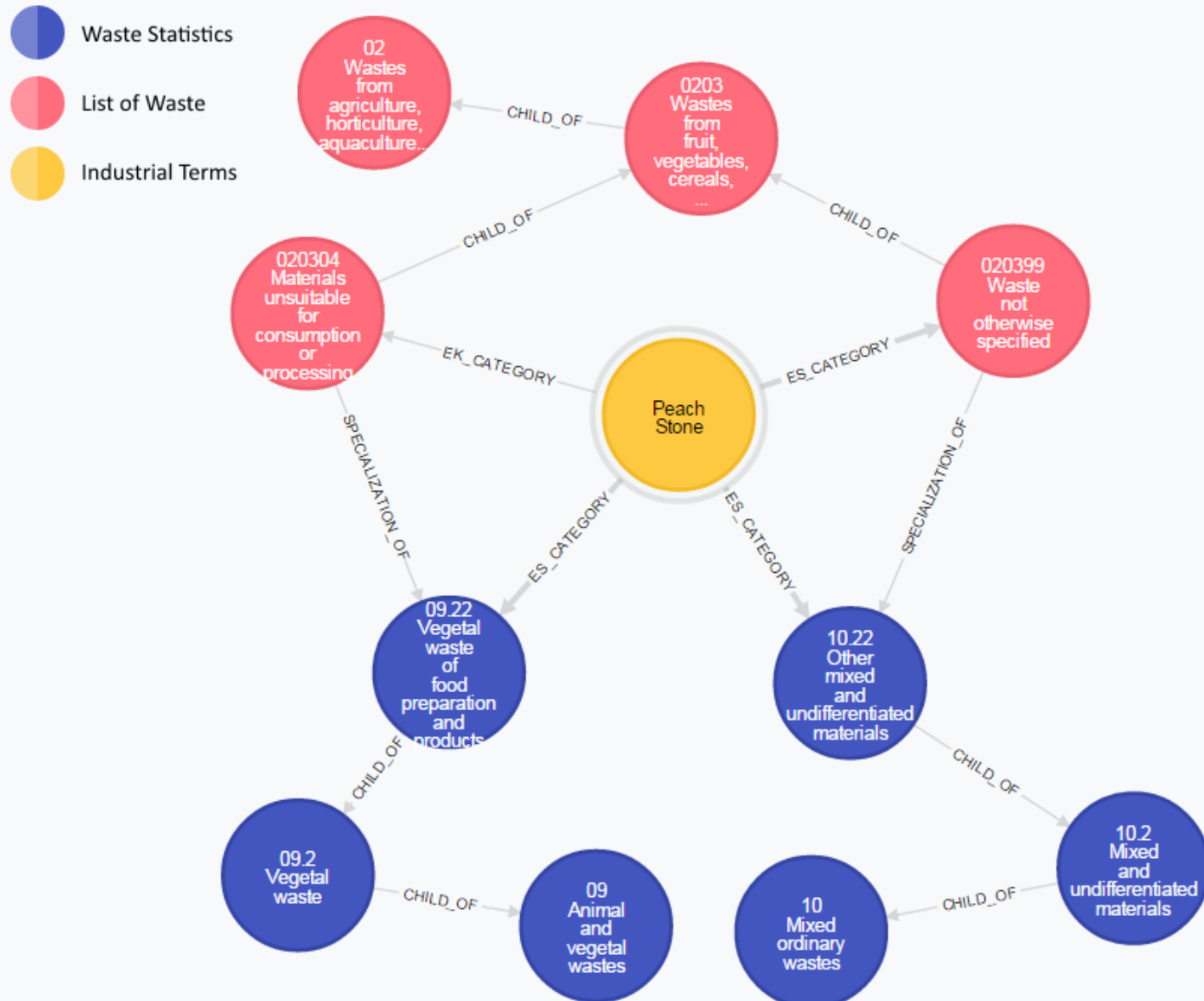
What does a graph look like?

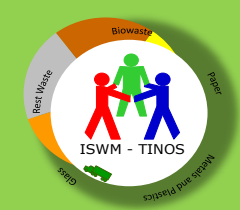




Industrial Symbiosis Platform

Our Knowledge Graph Database



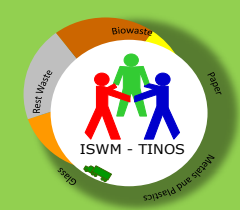


Industrial Symbiosis Platform

How is the Graph populated?

The graph is populated with:

- Waste categories
- Feedstock categories
- Resources (Waste and Feedstock)
- Industries
- People
- Synergies between companies
- ...

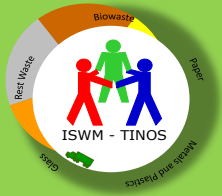


Industrial Symbiosis Platform

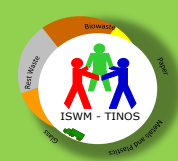
Finding Resource matches

The matching algorithm is evaluated against the data in the graph and takes into account:

- Relationships between the graph nodes
- *Distance* between nodes
- Physical Distance between Companies
- Quantities (required and available)
- Rate of waste production
- ...



The platform...



Industrial Symbiosis

[Home](#) [Statistics](#) [Organizations](#) [Resources](#) [About Us](#) [Contact](#) [Q](#)

BECOME A MEMBER OF OUR COMMUNITY

THIS IS WHAT YOUR BUSINESS NEEDS

REGISTER TODAY!



Participate

Put your Organization,
Sites and Resources on the map



Save time

Save time locating resources and
checking for compatibility and availability



Get smarter

Get insights on
ways to improve your activities

1 Register your Organisation

Go through our online process of registering your organisation and look for members of our network nearby.

2 Categorize your waste

Take advantage of our advanced categorization of waste and resources to make it easy for others to find what you have.

3 Browse our database

Browse through our database of waste and resources and look for ways to improve your business.



Industrial Symbiosis Platform

Categorizing Waste

Home > Resources > Add Resource

Add a new Resource

Step 1: Categorize your waste

Peach stone

Go!

Choose one of the following...

Vegetal waste of food preparation and products

By Waste Statistics

In List of Waste

- 09 Animal and vegetal wastes
- 09.2 Vegetal waste
- 09.22 Vegetal waste of food preparation and products

- 02 Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing
- 02.03 Wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation
- 02.03.04 Materials unsuitable for consumption or processing

Other mixed and undifferentiated materials

By Waste Statistics

In List of Waste

- 10 Mixed ordinary wastes
- 10.2 Mixed and undifferentiated materials
- 10.22 Other mixed and undifferentiated materials

- 02 Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing
- 02.03 Wastes from fruit, vegetables, cereals, edible oils, cocoa, coffee, tea and tobacco preparation and processing; conserve production; yeast and yeast extract production, molasses preparation and fermentation
- 02.03.99 Waste not otherwise specified

Waste types 3 to 4 of 7 total

« 1 2 3 4 »

Cancel Proceed to the NEXT step >

Step 2: Resource Information



Home > Resources > Add Resource


Add a new Resource

🔍 Step 1: Categorize your waste

📄 Step 2: Resource Information



Title

 Hazardous

Valid From 

Valid To 

Min Delivery Quantity 

Max Delivery Quantity 

Unit of Measurement ▼

Processing Capacity 

Processing Pattern ▼

Processing Cost 

Cancel

< Back

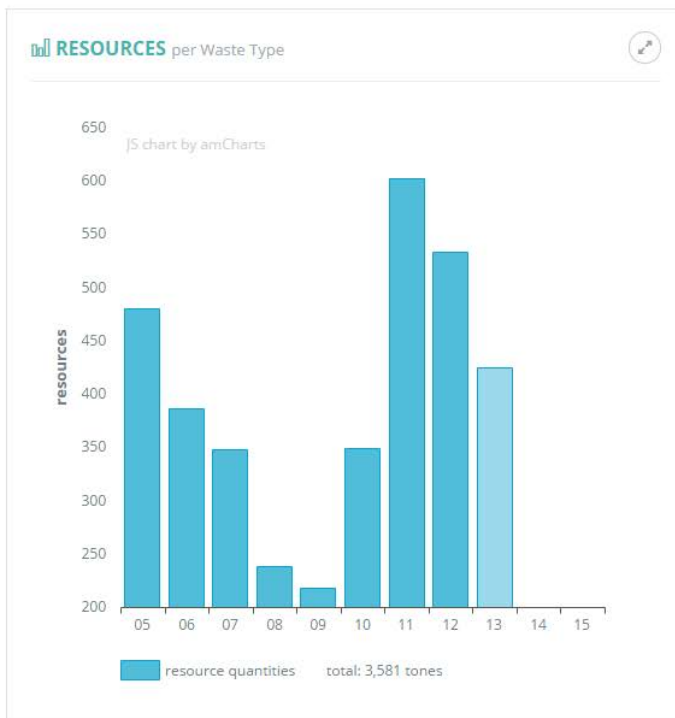
FINALIZE your resource >

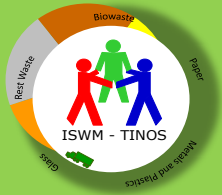


Industrial Symbiosis

Home > Statistics

Network Statistics

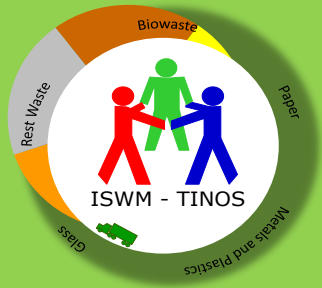




Industrial Symbiosis Platform

Arsenal of Technologies





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THANK YOU!



Tinos Island
July 2015

CLWS