



INDUSTRIAL SYMBIOSIS –

a sustainable way towards Circular Economy

B.BEERACHEE

DIRECTOR, SOLID WASTE MANAGEMENT DIVISION

MINISTRY OF ENVIRONMENT, SOLID WASTE MANAGEMENT &

CLIMATE CHANGE

Content of Presentation

- Overview of Solid Waste Management in Mauritius
- Cost of Waste Management
- Waste Management Options
- The Industrial Symbiosis Project
- The Way Forward



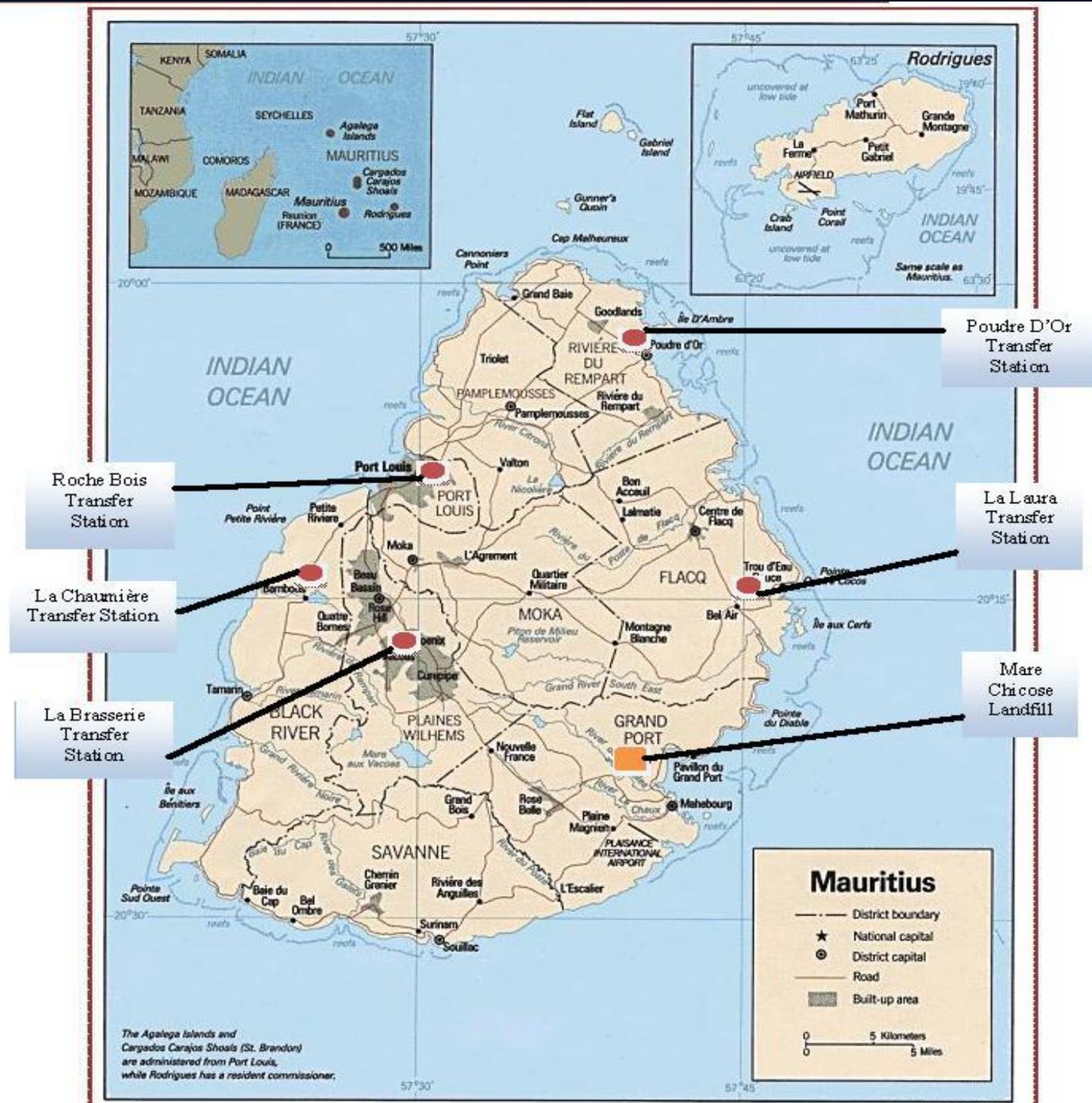


Waste Facilities

5 Transfer Stations

Landfill

Compost plant



Aerial View of the Mare Chicose Landfill





Sanitary Landfill: A contained structure





Waste disposal & compaction





Gas well drilling





Gas capture & flaring



Gas to Energy : 3 Engines x 1.15 MW from LFG





Construction of Capping, surface water drain & grassing



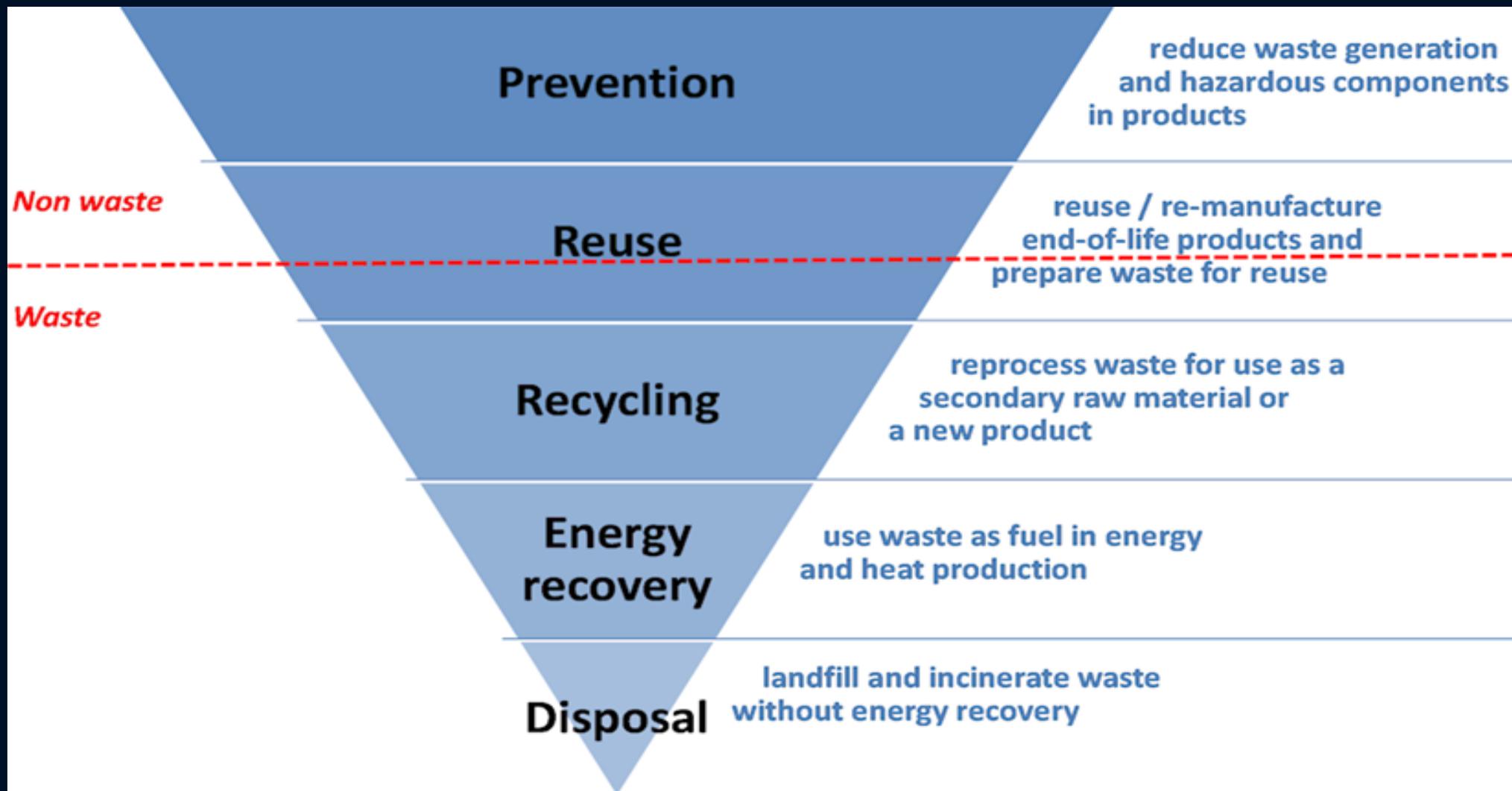
Waste Management Challenges

- More than 500,000 T /a. Rising waste quantities (about 2-3 % p.a) and by year 2030 will reach 650,000T/a;
- Rising costs of waste management . Rs 2500 /T to Rs 3260/T including curbside collection, transfer station and landfilling;
- Unsustainable consumption of land for landfilling (~3Ha p.a) ;
- Currently, rate of recycling is on the low side 3-4% and low quantity of recyclable wastes for proper recycling business;
- UNSORTED clean wastes – inadequate legislative framework
- Small Islands Developing States have their own challenges to set up & run recycling businesses.



Sustainable Waste Management Hierarchy

Source: OECD, 2018- OECD, 2018. Municipal waste ([//data.oecd.org/waste/municipal-waste.htm](http://data.oecd.org/waste/municipal-waste.htm))



Waste Characterization by manufacturing sector required

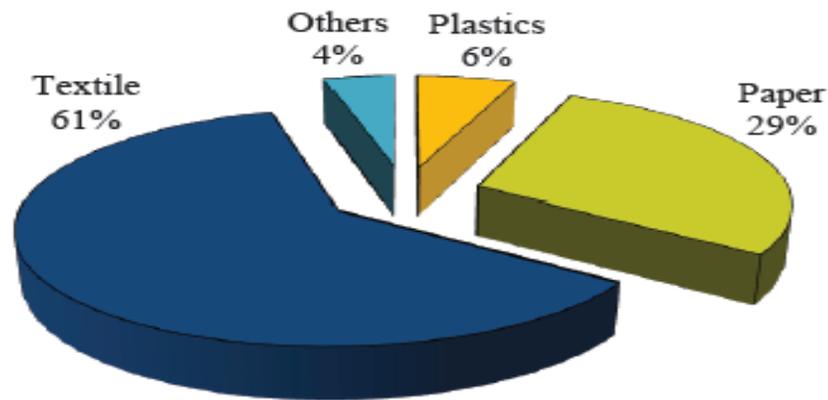


Figure 4-20a: Industrial wastes.

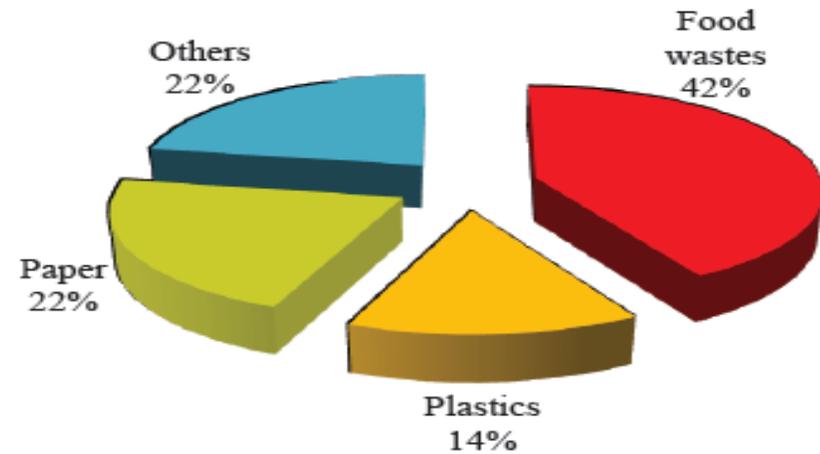


Figure 4-20b: Commercial wastes.

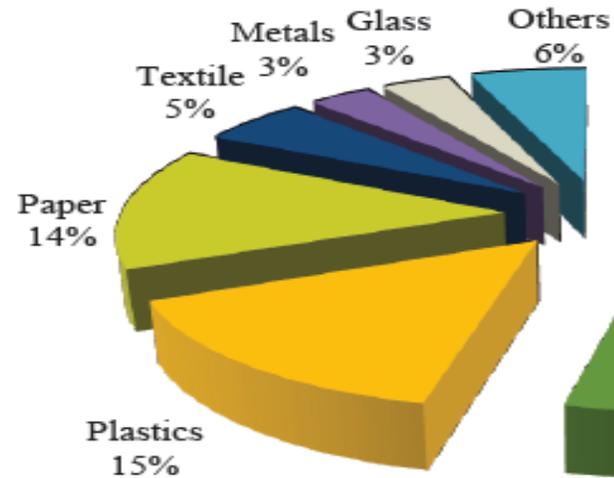


Figure 4-20c: Domestic wastes



What is being recycled

- Metals (ferrous & non ferrous) collected & exported
- PET bottles Other plastics :Polyethelyne (PE) and Polypropylene (PP)
- Chemicals- waste exchange mechanism
- Paper & Cartons baled and exported;
- Motor oil collected & recycled;
- Cooking oil collected & exported;
- Wood mixed with plastics to produce planks
- Glass Struggling.

What about Labour ? Logistics? Used Water for cooling ? ¹⁷

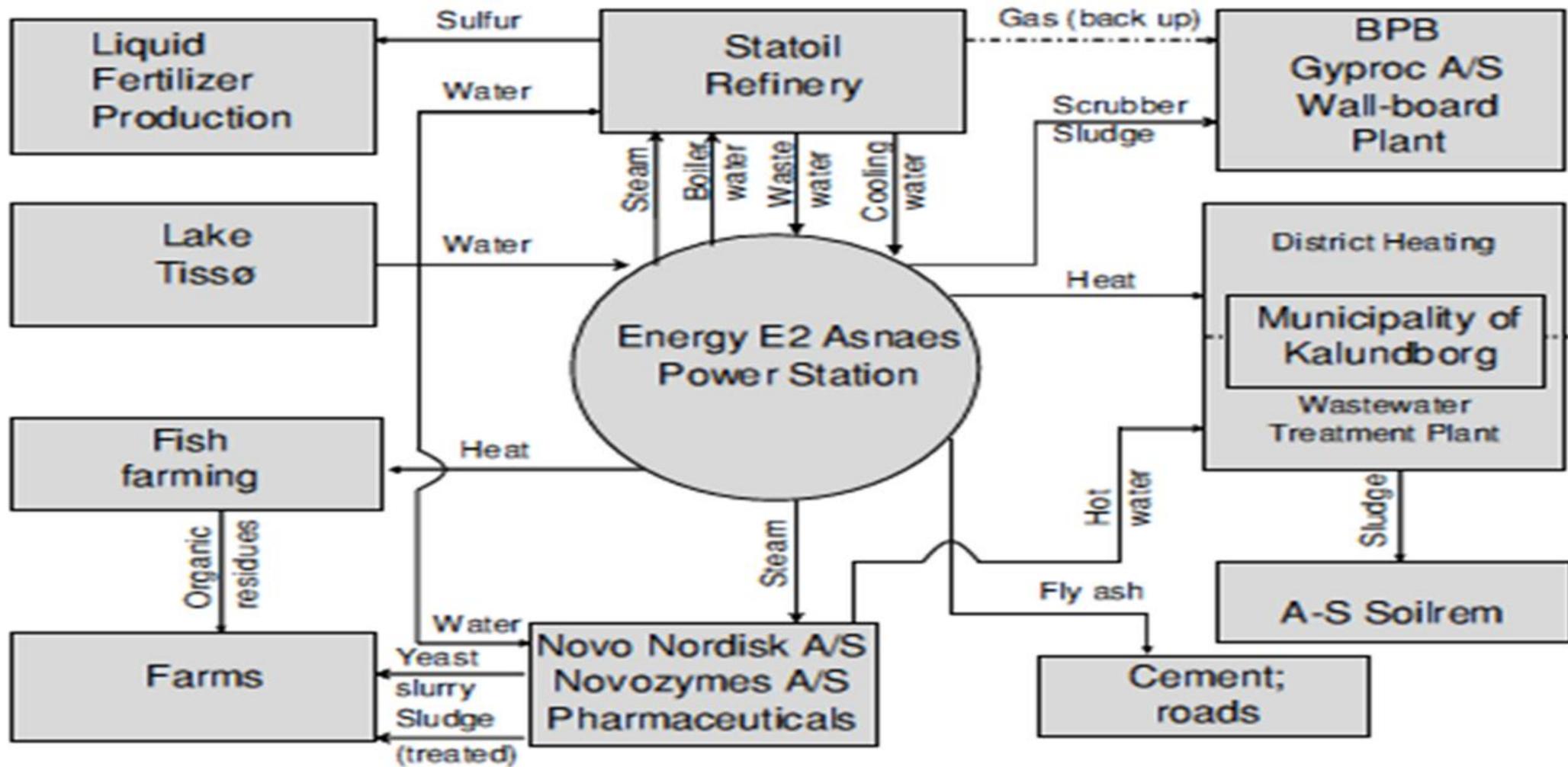
Fundamentals of Recycling

- WASTE is considered as a RESOURCE
- Waste , if CONTAMINATED , is a waste ,...not a resource
- Larger quantities and clean waste/resources is likely to make recycling business feasible
- Ministry now has a New Strategy on waste management with focus on recycling

SO WHAT IS INDUSTRIAL SYMBIOSIS ?

- Industrial Symbiosis is an innovative waste management tool based on the fact that waste is a **useful resource and is tradable**.
- Industrial Symbiosis - an association between two or more industrial facilities or companies in which the wastes or by-products of one become the raw materials for another
- Basically to connect the HAVES and the WANTS : type, quantity, frequency
- Industrial Symbiosis – collective approach to competitive advantage through the physical exchange of waste / materials, energy, water and/or by-products, or the shared use of assets, logistics and expertise

IS in KALUNDBORG, DENMARK



SWITCH AFRICA GREEN PROJECT 2018

- SWITCH Africa Green (SAG) project developed and funded by the European Union and implemented by United Nations Environmental Programme (UNEP) in collaboration with United Nations Office for Project Services (UNOPS) and UNDP .
- This project brings to support six African countries namely Mauritius, South Africa, Ghana, Uganda, Burkina Faso and Kenya
- SWMD implemented the project in Mauritius
- The project aimed at greening businesses in the Manufacturing Sector in Mauritius, with focus on sustainable waste management based on Industrial Symbiosis

Expected Outcome

The training of the MSMEs

- reduced waste disposal costs , improved MSME revenues and resource productivity,
- less carbon emissions and industrial pollution,
- creation of green jobs and improved corporate image, and
- improved environment for local communities.

Outcome of SAG project on IS in 2018

- **Capacity Building of Enterprises: Around 106 MSMEs** / some big enterprises were trained through 4 Capacity Building Sessions (more than 250 SMEs invited)
- **POOR RESPONSE** , Many SMEs not interested . Time , low amount of waste , low cost of waste management,

Impact

- From the total of 72 participating firms in Mauritius (34 from Rodrigues were more interested but very small scale),
- 49% were involved in the exchanges in Mauritius

Outcome of SAG project on IS in 2018

- 4,387 tons/yr of wastes from diverse industrial sectors, including symbioses for wood wastes, plastic wastes, textile wastes and coal ash to be diverted away from the landfill.
- Typical example : P'tit Sale –fish bone with flesh
- Total saving of around USD 350,000 on waste management costs by diverting the waste from landfill and a saving of around USD 290,000 by replacing the virgin raw materials by waste.
- CO₂ emission savings of around 2,488 (CO₂eq) ton/yr.

Industrial Waste Cost Structure Review Report , March 2022

- Cost of waste management
 - For Individual companies : 0.012% to 0.70% of turnover
 - Per Manufacturing sector and per Enterprise size: 0.06% to 0.32% of turnover

TURNOVER for SMEs, Rs	Cost of waste Management, Rs		
	.032%	0.72%	Average
3,000,000	9,600	21,600	15,600
5,000,000	16,000	36,000	26,000
10,000,000	32,000	72,000	52,000
20,000,000	64,000	144,000	104,000
40,000,000	128,000	288,000	208,000
50,000,000	160,000	360,000	260,000

What will enable Industrial Symbiosis?

- Availability of reliable Information on Resources ? Haves and Wants?
- Forum to share data – a common platform ? Eg Decheteque
- From Mare Chicose Landfill- disposal by Generators can be uploaded on our website
- Central Statistics Office
- Industrial Waste Audit report – Industrial Wastes
- Observatoire de L'Environnement
- Sharing of information – MCCI/ BM to its members

Need for resources to be traded / exchanged / re-circulated in the system and diverted from landfill

Thank you for your attention.

Q & A