Featured Speaker

Seychelles Maritime Week 2024

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Savoy Seychelles Resort & Spa, Seychelles

HOSTED BY

STRATEGIC PARTNERS

CIRCULAR ECONOMY

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Transitioning Ports to a Circular Economy Where Waste is a Resource

Key elements of a Circular Transition:

Resource Efficiency:

Optimize the use of materials and energy to minimize waste and reduce resource consumption.

Waste Management:

Implement systems for recycling, reusing, and repurposing materials and waste generated during port activities.

Sustainable Design:

Incorporate circular design principles in infrastructure projects to enhance durability and adaptability.

Collaboration & Partnerships:

Engage stakeholders, including shipping companies, local communities, and government agencies, to foster collaboration on circular initiatives.

Innovative Technologies:

Utilize advanced technologies such as IoT, AI, and blockchain for efficient tracking, monitoring, and managing resources.

Circular Supply Chains:

Develop supply chains that prioritize the use of recycled materials and sustainable practices.

Education & Training

Provide training for port staff and stakeholders on circular economy principles and practices.

Waste Policy & Regulation:

Advocate for and comply with policies that support circular economy practices at local, national, and international levels.

Sustainability Metrics:

Establish metrics and KPIs to measure progress towards circular economy goals and assess the environmental impact.

Community Engagement:

Involve local communities in circular initiatives, promoting social responsibility and enhancing public awareness.

Transitioning to a Circular Economy where waste is a resource is not just about recycling.

We have a naïve view of recycling. It is not about arts and crafts…

We need to change our thinking to understanding the impacts and outcomes of **<u>waste as a resource</u>**.

CHANGE THE NARRATIVE:

Using waste as a resource delivers the following:

- Social upliftment
- Skills development
- Economic development
- Energy
- Water & wastewater
- Infrastructure & housing
- Manufacturing
- Food Security
- Climate Change mitigation

Developing a Waste Economy will allow us to achieve our Sustainable Development Goals and Nationally Determined Contributions

SDGs
Sustainable Development Goals

Getting the Basics right

Collection

We must develop **applications & markets** for collected material.

Waste “Management” is not the solution

Community Recyclers

Source separation

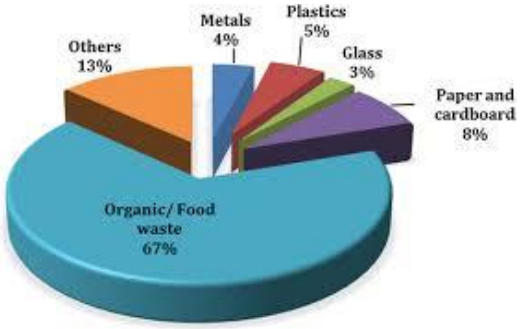
Clean-Ups

Waste Characterisation:

- We need to understand the waste streams. Not just at the port but assessing the supply chains to and from the port.
- We need to take a holistic "helicopter" view of the port in terms of its spatial relationship to the bigger population it serves
- We also need to understand the infrastructure with regards energy efficiency, energy usage and SHEQ requirements.

- Ports would have a complex waste stream characterisation:
  - Ship slops, bunker oil, bunker sludge, transmission oils and used motor oils
  - Large packaging – pallets, flow bins, barrels, crates, etc.
  - Product packaging waste – wrap, strapping, cardboard, etc.
  - General waste from operations (includes paper, cardboard, plastic, glass, cans, etc.)
  - Food waste and organic wastes (perhaps from declined exports or imports?)
  - Tyres and rubber conveyor belts
  - Batteries and e-waste
  - Sand & bulk loading sweepings…

How do we look at using different waste streams together?

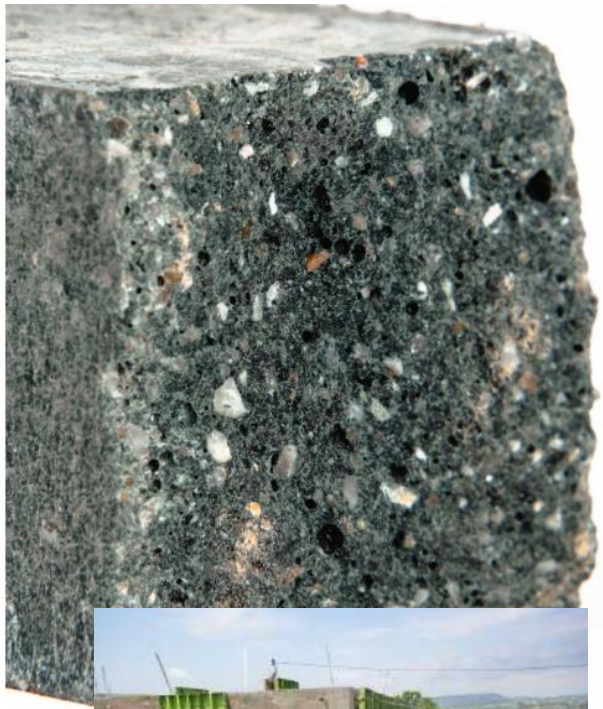


Infrastructure:

Other building products from waste: Fly Ash, Tailings & Slag

Cheap, Strong, Rapid Building Method

Circular economy innovations for the concrete and construction industry



Geopolymer foam

90%

CO_2 emissions reduction
compared to cement production

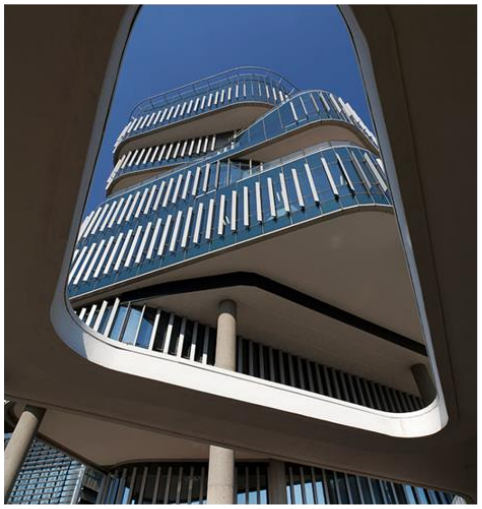
90%

of reused material
in our end products

Solid geopolymers

This is not research – this is real…

59%

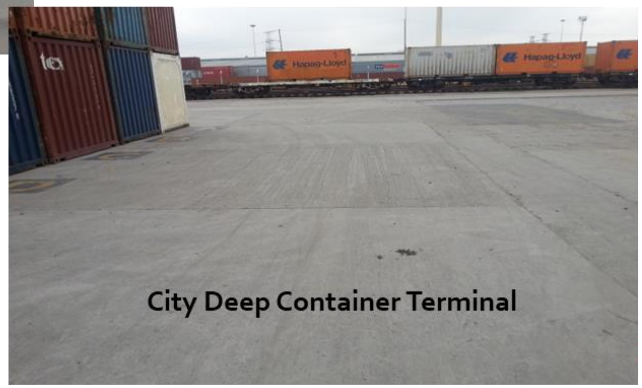


102 Rivonia, GP

Louriesfontein Wind Farm

91.5%

Carbon Emissions Reduction %



92,7%

Solving the Plastic Waste Issue with Proven Affordable Tech

Problematic dirty plastics to fuels or building products…

40% dirty waste plastic 30% crushed glass, 30% recycled grit

Oil waste opportunities

Sludge and Slops

Lube oil

Waste engine oil

We do the calculations – you do the math…

Waste Oil Processing Unit

Variables	Values
Rand Dollar exchange rate	R 15,23
Targeting oil needed per day	25000
reactor processing speed 150kgs P/H	10008
Purchase Price of the Oil	R 2,00
Yield Rate from Oil	80%
Cleaning agents P/L fuel produced	R 1,00
Low sulphur Fuel Oil	R 7,00
Electricity Costs in Office costs	R -
	R -
burner fuel from off spec fuel produced	R -
Days operated per month	30
Monthly service fee	R -
Annual Escalation	5%
Cost of Unit with distillation	R 16 845 000,00

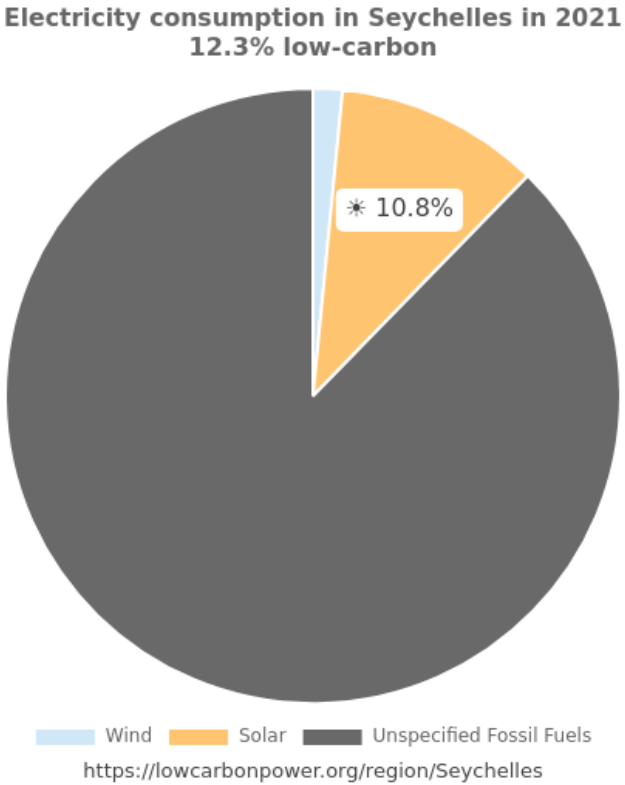
	Per day	Per month
Total Plastic Kgs	25000	750000

30 ton per day plant			
Quantity	Equipment	Cost	Total Costs
1	25000L oil processing plant	R 4 900 000,00	R 4 900 000,00
1	Oil Receiving Tanks 10000L	R 300 000,00	R 300 000,00
3	50000 Steel tank	R 150 000,00	R 450 000,00
1	Bunding containment areas	R 450 000,00	R 450 000,00
0	40 foot containers	R 75 000,00	R -
1	Installation costs	R 650 000,00	R 650 000,00
0	Plastic shredder	R 750 000,00	R -
1	Lab set up	R 1550 000,00	R 1550 000,00
1	Weigh Bridge	R 250 000,00	R 250 000,00
1000	Plastic storage shed	R 5 500,00	R 5 500 000,00
0	Reactor and plastic processessing buildi	R 5 500,00	R -
0	Conveyer systems to reactors	R 100 000,00	R -
0	Admin and entrance security building	R 6 500,00	R -
30	Exit admin building and First Aid office	R 6 500,00	R 195 000,00
1	Water storage plant	R 150 000,00	R 150 000,00
1	Power generation plant	R 350 000,00	R 350 000,00
0	Roads and parking Paving	R 250,00	R -
1	Water cleaning system	R 150 000,00	R 150 000,00
0	Food and recreational area	R 8 500,00	R -
2	Fire control systems	R 750 000,00	R 1500 000,00
1	CCTV and alarm system	R 120 000,00	R 120 000,00
0	Purchase Land	R 1000,00	R -
1	Travel costs	R 330 000,00	R 330 000,00
	Total Equipment and Set up Costs		R 16 845 000,00
R 15,23	Rand Dollar exchange		$ 1 106 040,71

30 Ton System Costs							
Oil volume	Collection costs	total cost of materials	Catalyst	Electricity	Burner Fuel	Labour costs	Total run costs
25000	R 2,00	R 50 000,00	########	R -	R -	R -	R 70 000,00
						Fuel produced Litres	20000,00
						Selling price	R 7,00
						Total value of fuel	R 140 000,00
						GP per run	R 70 000,00
						Cost of unit ex Vat	R 16 845 000,00
						Working Days to recover costs	322,15
						Months to recover costs	10,74
						Earnings per month	R 2 100 000,00

Small-Scale Waste Gasification…

- Residual waste, mixed waste or biomass waste can be used in small gasification units
- Waste gasification modular at 220 kW, 500kW and 1MW output modules
- <5-year RoI based on $0.12/kWh
- Need to change mindset to move away from large Capex WtE systems and linear lock-in
- Systems can be fully financed with Power Purchase Agreements (PPAs)



Plastic is Energy:

Crude

Energy Balance

42.3 MJ/kg

6t per t CO_2e

Plastic

46.4 MJ/kg

Coal average is 25 MJ/kg

Landfill

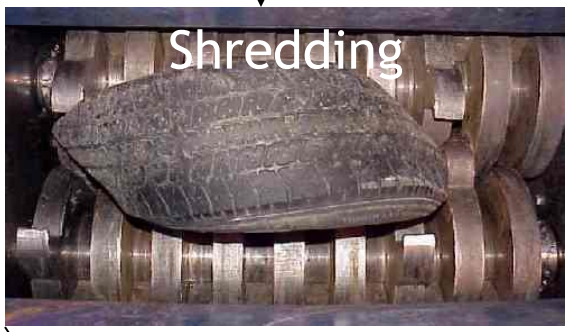
3t per t CO_2e

REALITY:

- Plastic currently 9% of crude production
- Reduced demand in crude
- Industry spending $400 Bn in new plastics production. Increase in 40% plastic production in 10 years

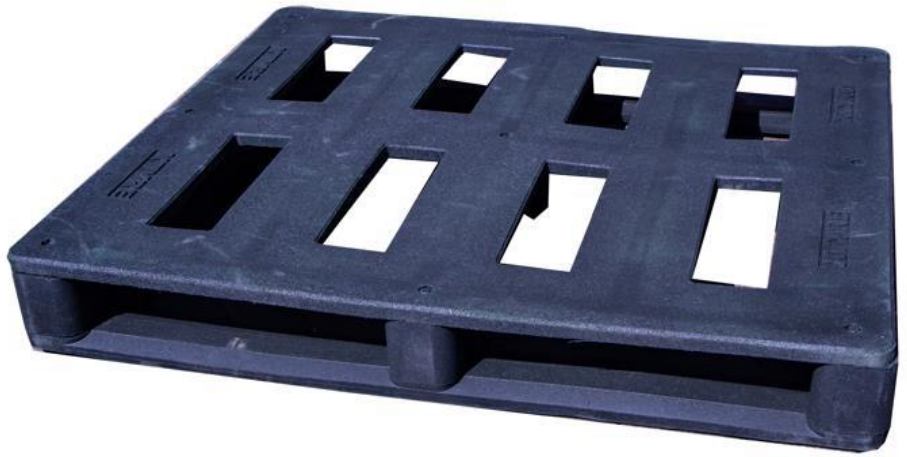
Keep tyres in the logistics chain…

- Tyres (and conveyor rubber) can be processed and converted to pallets – ideal for perishables and cold-chain.
- 56% lower carbon footprint than wood pallets
- Fully repairable and recyclable
- 3-10 ton tested spread weight
- Integrated RFID



Remove steel & Fiber

NEW PRODUCTS



Glass Recycling

Blend & re-melt

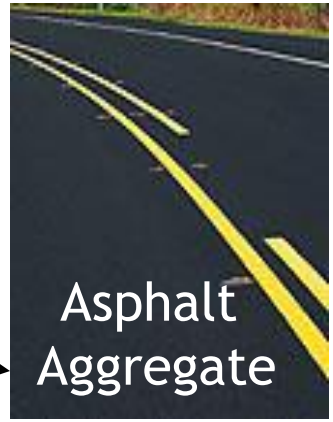
Ceramics & Tiles

Tumbled Landscaping

New Glassware

Kitchen Counters

Crush & sort

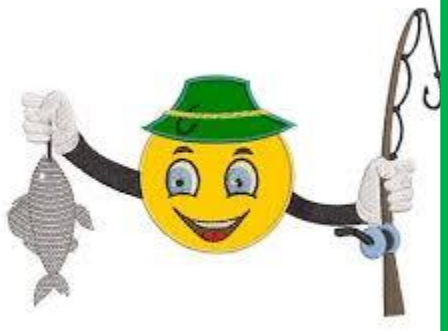


Asphalt Aggregate

Water Filtration

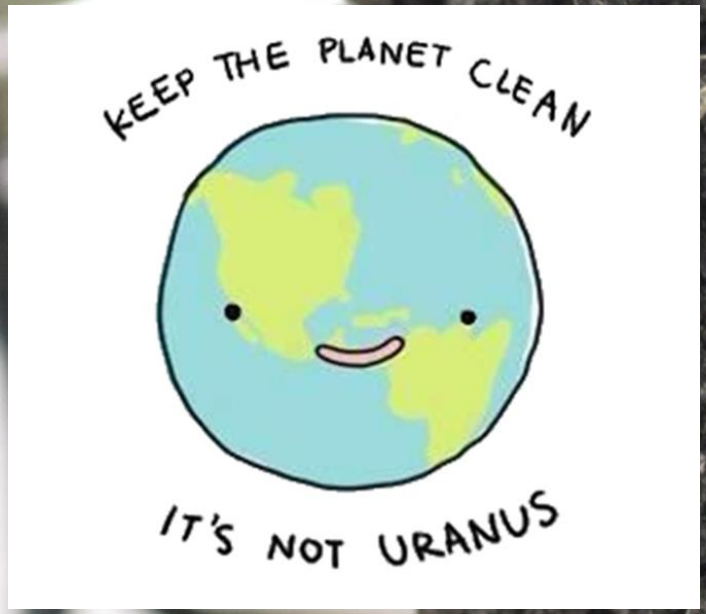
Biodiversity & Ecological function

- Ports represent highly transformed marine ecosystems, yet through biologically sensitive design and management, can sustain thriving biodiversity.
- Key barriers to this are presented by the infrastructure designed for economic means, dredging requirements and pollution – not just visible plastics and waste, but more from pollution by chemicals, oils and sewerage management.
- Circular transition is aimed at reducing negative impacts to water quality and marine biodiversity, but this is the realm of the next speaker, Steven Weerts…



My own selfish focus is to ensure art-lure species fishing in ports will be a sustainable option in the future…

Thank You !!



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