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ISWA 2024

WASTE TO WEALTH: SOLUTIONS FOR A SUSTAINABLE FUTURE

15 - 18 Sept | CTICC, CAPE TOWN



INTERWASTE

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Waste Water- Effluent Treatment Sustainable Solutions

Moipone Maseko
Interwaste (Pty) Ltd



National and Global Water Risk

South Africa consume an estimate of 237 liters of water per person per day

Climate change , South Africa receives a mean annual precipitation of 497mm/year, almost 50% less than the global average of 860mm/year leading to more frequent and severe droughts and floods.

The current Global water demand is 20-25% and expected to grow more than 30% in the next 30 years

It is estimated that 70 million of treated clean drinkable water in South Africa is lost daily due to poor infrastructure-water leaks

Both Global and South African water are interconnected, and immediate and coordinated efforts are necessary to ensure water security for future generation.

The Need to Diversify Water Mix

Importance of Diverse Water Sources

Diverse water sources contributes towards mitigating risks associated with climate change, population growth, and environmental degradation.

Social and Community Inclusion

Incorporating diversity, equity, and inclusion (DEI) principles in the water sector is essential for effective management. Engaging a diverse workforce and community stakeholders leads to better representation and more innovative solutions to water challenges

Diversity in water sources and management is crucial for addressing various challenges related to water supply, quality, and sustainability



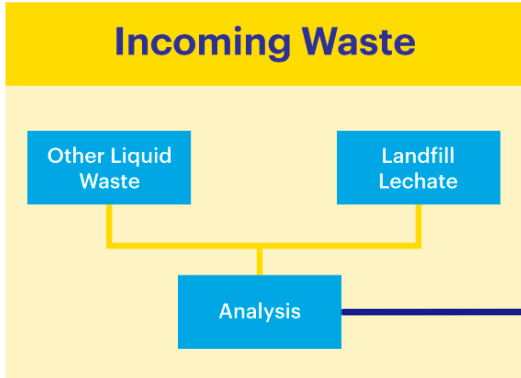


**Effluent
Treatment
Plants-Circular
Economy
Solutions**



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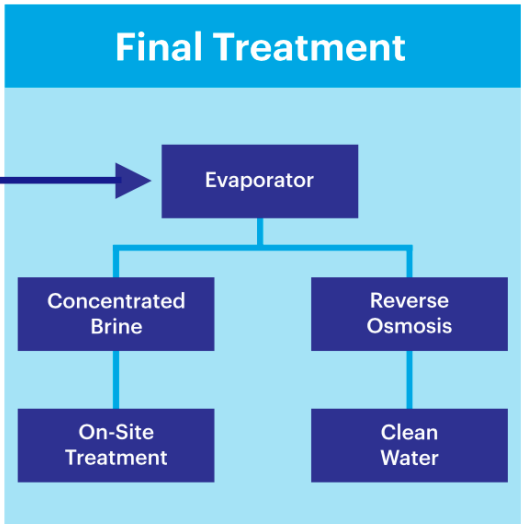
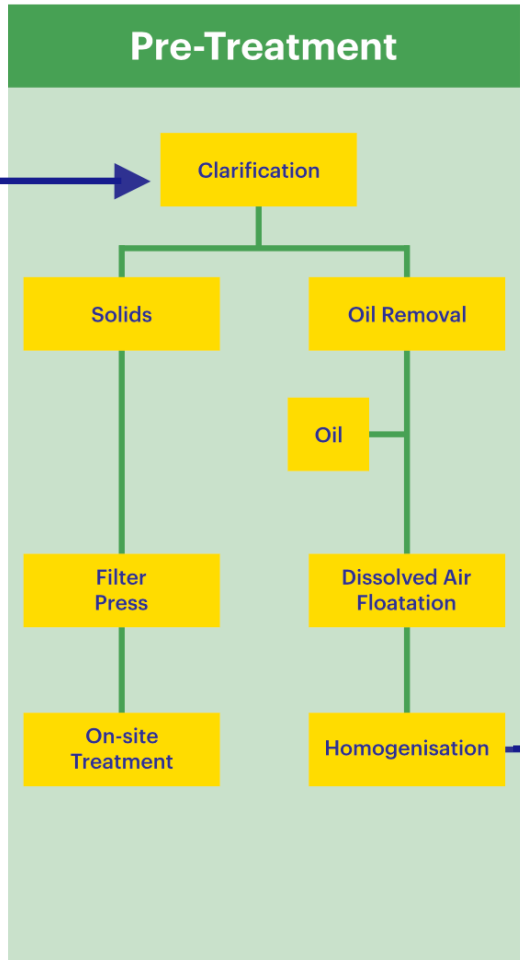




Process Benefits

The ETP was specifically designed prioritising sustainability and local context. It offers invaluable benefits, particularly as South Africa is ranked amongst the top 20 most water-scarce countries globally. Some of the key environmental, social and economic benefits include:

- Circular solution achieving 80-90% recovery of clean water for re-use placing less burden on fresh water sources and preventing environmental contamination
- Increased social welfare by promoting cleaner environments and safe guarding water resources for communities
- High levels of safety and compliance including alignment to legislative ban of liquid waste to landfill disposal
- Economically sustainable by circular design and efficient use of resources
- Leading solution creating new skills and employment opportunities



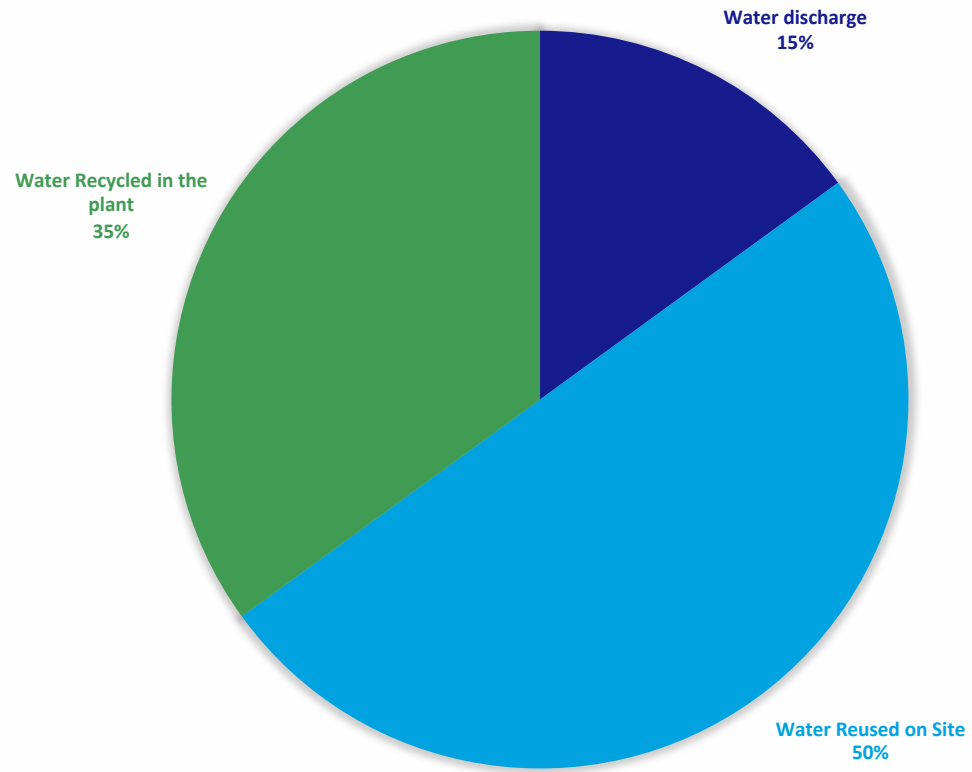
Clean Water for Re-Use

- Clean water recovery of 80-90% of incoming product
- Water re-use primarily for onsite operations and option to discharge to replenish local water systems
- High quality water recovered – exceeds the Department of Water and Sanitation standards for safe discharge



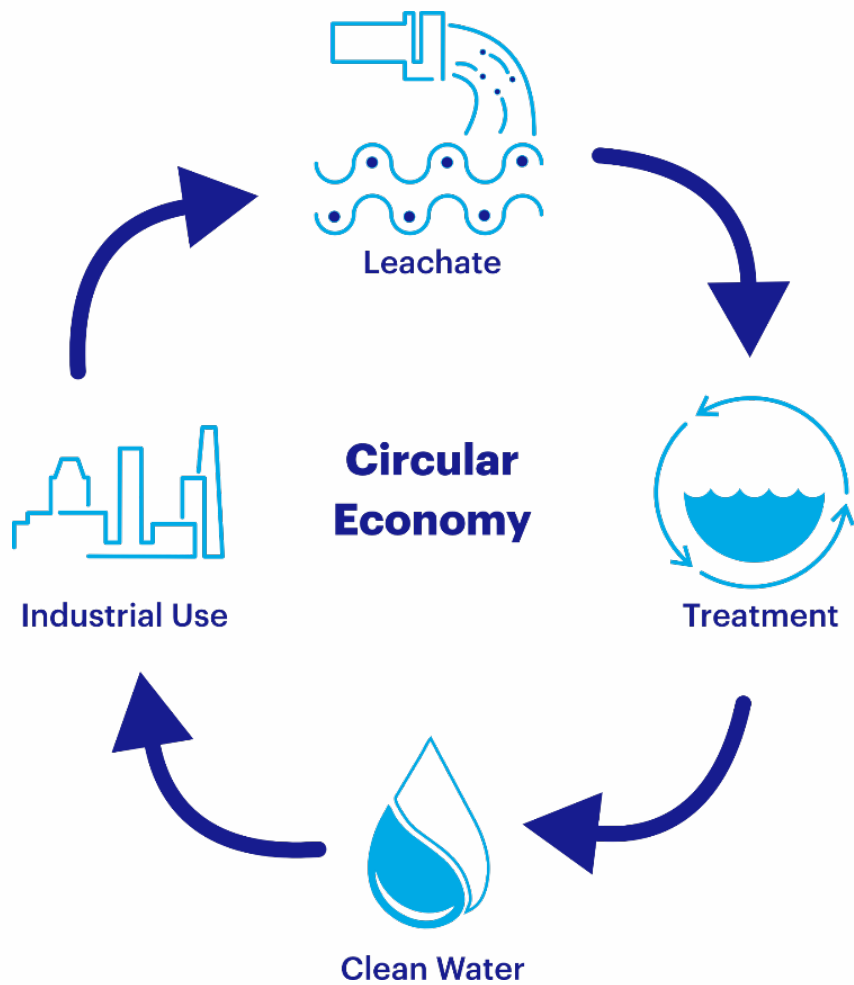
Water Recovery, Recycle and Reuse

Interwaste Group- Effluent Treatment Plant present a significant opportunities to implement circular economy principles and recover valuable resources.



- Circular solution achieving 80-90% recovery of clean water for reuse placing less burden on fresh water
- Capacity to process 43 million litres p.a. Recovery of 80-90% as clean water
- Sustainable solution for leachate and liquid waste
- Aligned to regulations and strategy
- Leading solution creating new skills and employment opportunities





Regulatory compliance

- Aligned of liquid waste to landfill disposal
- Supports market and client needs

Autonomy

- 100% autonomous for own leachate management
- Managing full circle of our operations
- Commitment to the circular economy

Circular Economy

- Benefits environment, communities and protects precious natural resources
- Aligned to Group's strategy and sustainability goals

Thank You!

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Prospects for WtE In S.A.

Bradley Thorpe, Pr. Sci. Nat.
GM : Technical Services, Interwaste (Pty) Ltd.
South Africa

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Presentation Outline

- Drivers towards the adoption of 'Waste to Energy' (WtE) in South Africa
 - South African Energy Crisis
 - South African Landfill Airspace Crisis
 - National Waste Management Philosophy and Legal Regime
- Local Opportunities
- An International Perspective: WtE as part of a holistic waste management model
- An International Perspective: Incineration with energy recovery
- Concluding Remarks



**Drivers for the
adoption of
'Waste to Energy'
in South Africa**

A South African Energy Crisis

- Loadshedding is (or perhaps was?) a part of daily life
 - 2008 to early 2024
 - Impacting our personal lives, but also Business continuity and sustainable economic growth
- Eskom sitting with a significant debt (R400bn + in 2023)
- Insufficient and aging generation infrastructure
- Significant reliance on non-renewable energy sources into National capacity -
 - 82.2% (Coal, Diesel & Gas, Nuclear and Imports) – predominantly Eskom
 - 17.8% (Wind, Solar PV & CSP, Hydro, pumped storage and 'Other') – predominantly IPPs (CESES; Stellenbosch University, Q2 2024)



What is the plan?

- Turnaround plan for Eskom
- Further cross border procurement proposed
- SAPP (Zambia, Botswana & Mozambique)
- Expansion of the REIPPP Programme
- Easing administration around the licensing of wind & solar projects

What role can WtE play in this proposed turnaround?

A South African Landfill Airspace Crisis

- Gauteng is the industrial and economic heartland for South Africa
 - Pre-Feasibility Study for the Proposed Regional Integrated Waste Facility 'Ecopark' in Gauteng (August 2023: GDARD)
 - At present, landfill airspace (capacity) in the Gauteng Province is being depleted at a rapid rate, and most municipal landfills in the province are left with ≤ 5 -10 years of remaining airspace, based on current consumption rates
 - CoT's last licensing and development of a landfill was in 1998
 - CoJ landfills will be closed within five (5) years
 - CoE landfill airspace is limited in the north of the city
- Municipal focus on increasing recycling activities to prolong landfill airspace and effect the hierarchy of waste waste management
- Many municipal landfills (not All!) operated very poorly and / or are un-lined
- With a rapidly diminishing landfill airspace in many metros and municipalities, what is the role and Business Case for WtE in S.A?



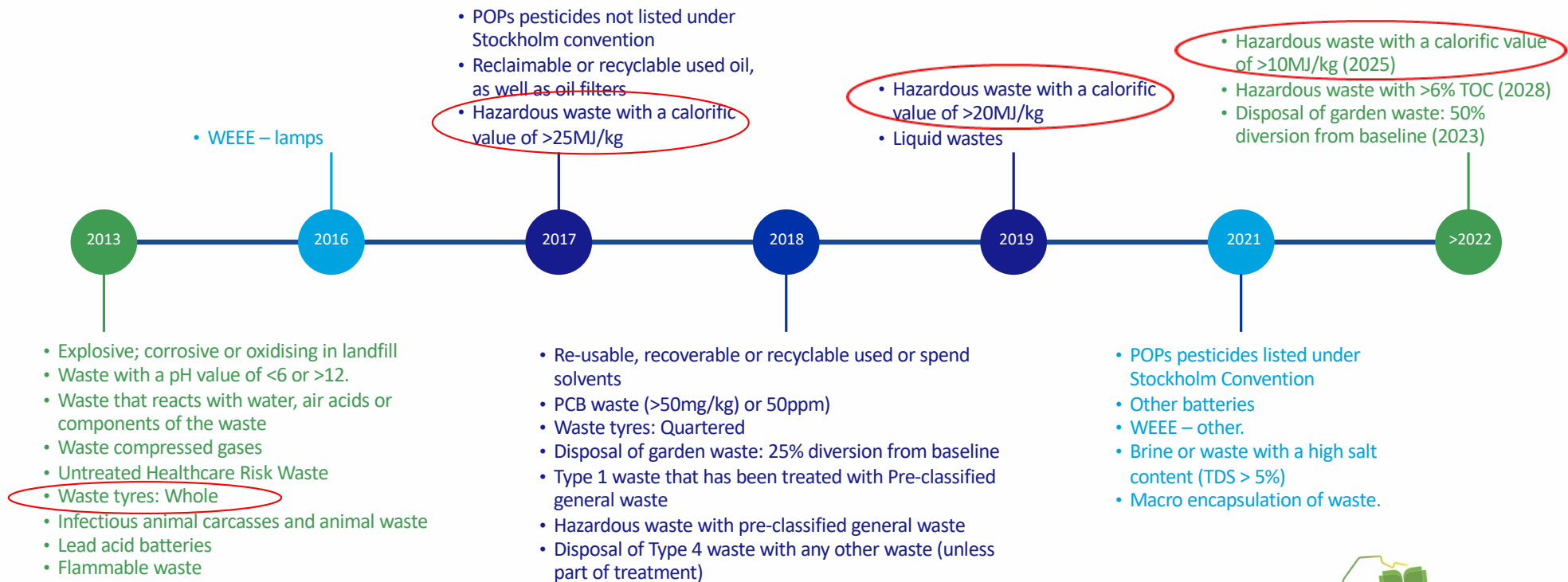
South African Legal Regime / Philosophy



- Strong focus on landfill diversion and implementation of the waste hierarchy
 - For example –
 - General Duties under Section 16 of the Waste Act (2008)
 - Waste Classification and Management Regulations (2013)
 - National Norms and Standards for the Disposal of Waste to Landfill (2013)
 - National Pricing Strategy for Waste Management (2016)
 - Waste Exclusion Regulations (2018)
 - Extended Producer Responsibility (EPR) Regulations (2020)
 - Organic Waste Composting- and Treatment Norms and Standards (2021/2022)
- Powers for Regulatory enforcement
 - Key focus of the current National Waste Management Strategy
- The above legislation has been a driver to WtE associated initiatives in S.A.
- Where is the Country now i.t.o. WtE?
 - Largely driven by waste volumes into the cement sector as a 'fossil fuel' substitute
 - Pyrolysis
 - Anaerobic digestion
 - Biomass fuel boilers
- No large-scale Municipal- and / or Industrial Waste to Energy Plants at present in S.A. with commercial energy recovery

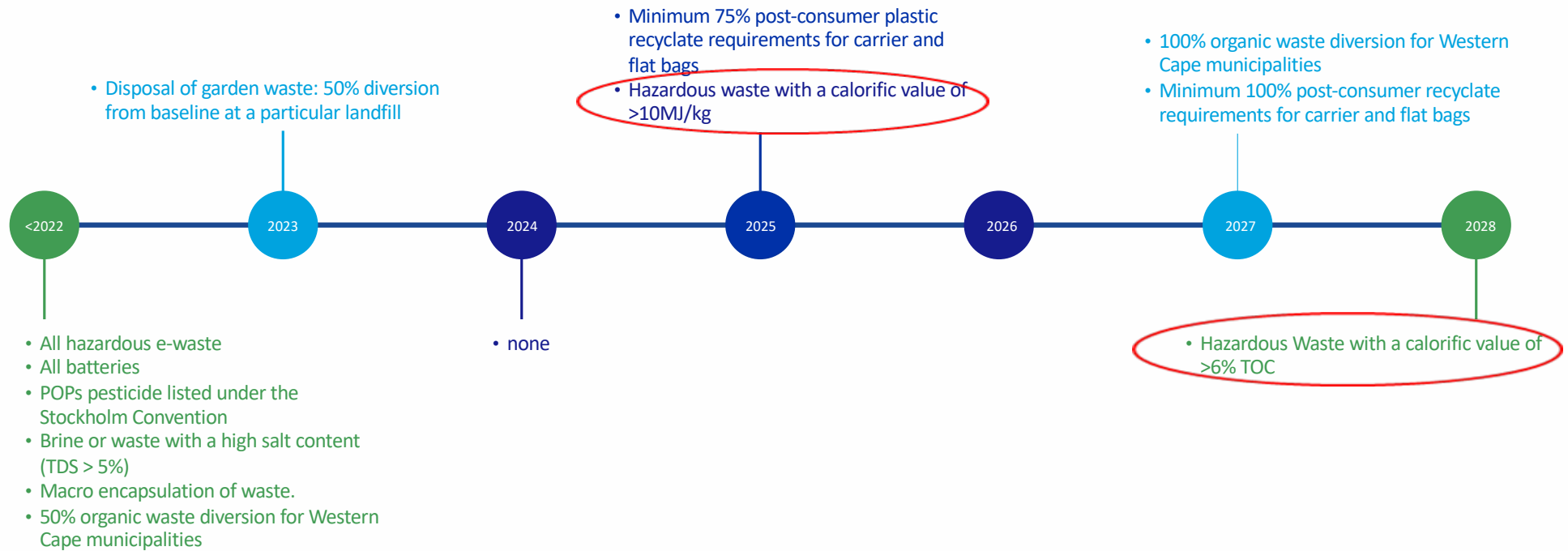
South African Legal Regime / Philosophy

Waste restrictions prior 2022

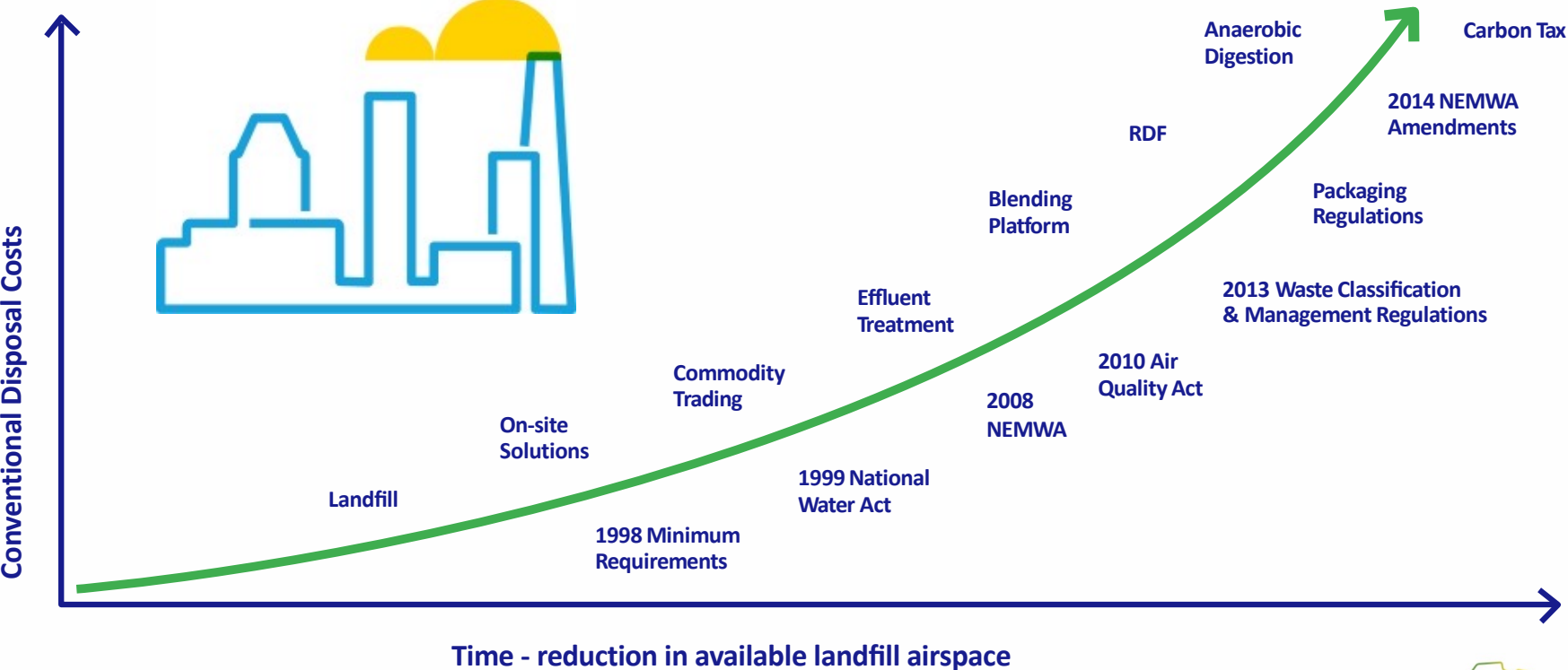


South African Legal Regime / Philosophy

Waste restrictions 2022 onwards



South African Legal Regime / Philosophy

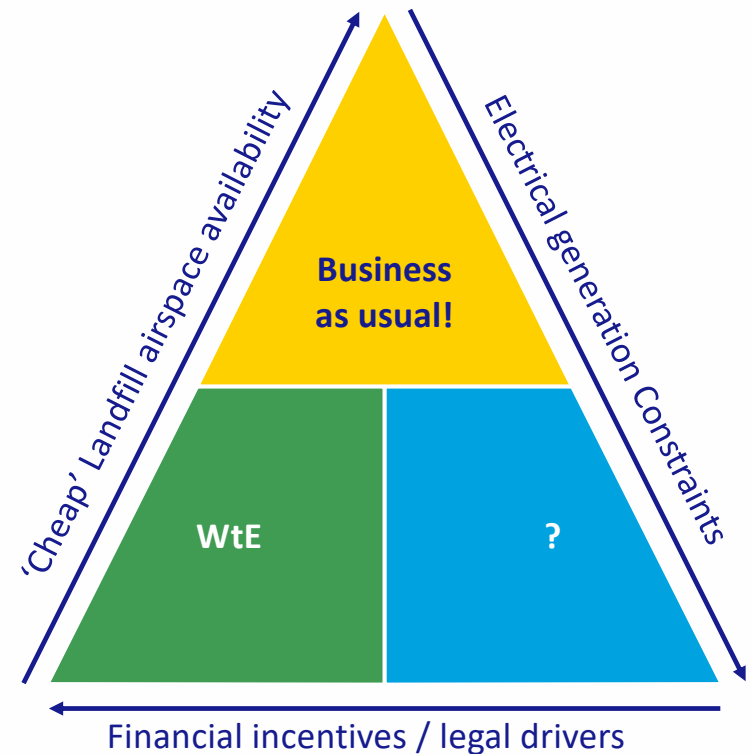




**Local
Opportunities
for WtE**

Local Opportunities for WtE

- Opportunity to supplement current electricity generation capacity, while meeting Regulatory expectation and alleviating landfill airspace pressures
 - Domestic and industrial waste mix
- Recyclables should be recycled!
 - Current recycling and recovery programmes should be continued and supplemented
- Landfill disposal costs are often artificially low (or non-existent)
- Landfill disposal costs will increase for domestic waste in time
 - Pressure on current airspace
 - Distance from available municipal airspace
- Financial premiums/incentives for the generation of energy from waste?
 - Role within the REIPP Programme
- Further Regulatory development to drive WtE?





**An International WtE
perspective:
Changé, as an
integrated model for
waste management**

An International WtE Perspective: 'Changé'



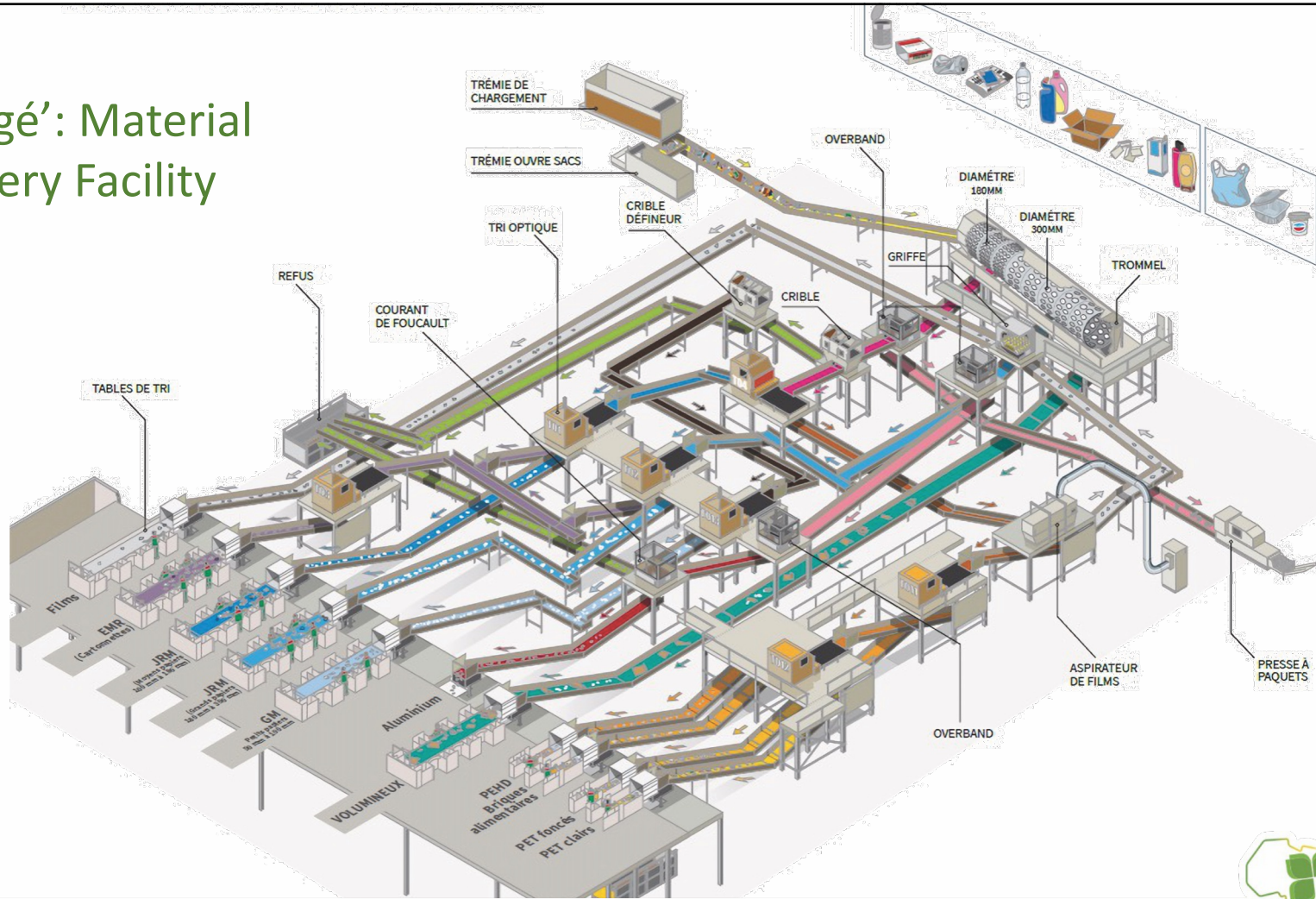
'Changé Overview

Primary Activities

- Sorting center – Materials recovery
- Energy production unit - Energy recovery
- Non-hazardous waste landfill
- Hazardous waste landfill



'Changé': Material Recovery Facility



Changé : Material Recovery Facility



Changé : Waste to energy

Biogas recovery:

- Electricity production (equivalent to the consumption of a city of 45 000 inhabitants)
- Production of thermal energy (co-generation) for the dehydration of alfalfa for a Mayenne agricultural cooperative called DESHYOUEST (a historical partner since 1998)

Waste to energy:

- Production of a solid Refused Derived Fuel (RDF) that can be used as a substitute for fossil fuels. Our RDF supplies the Urban heating network of the city of Laval



Changé : Waste to energy

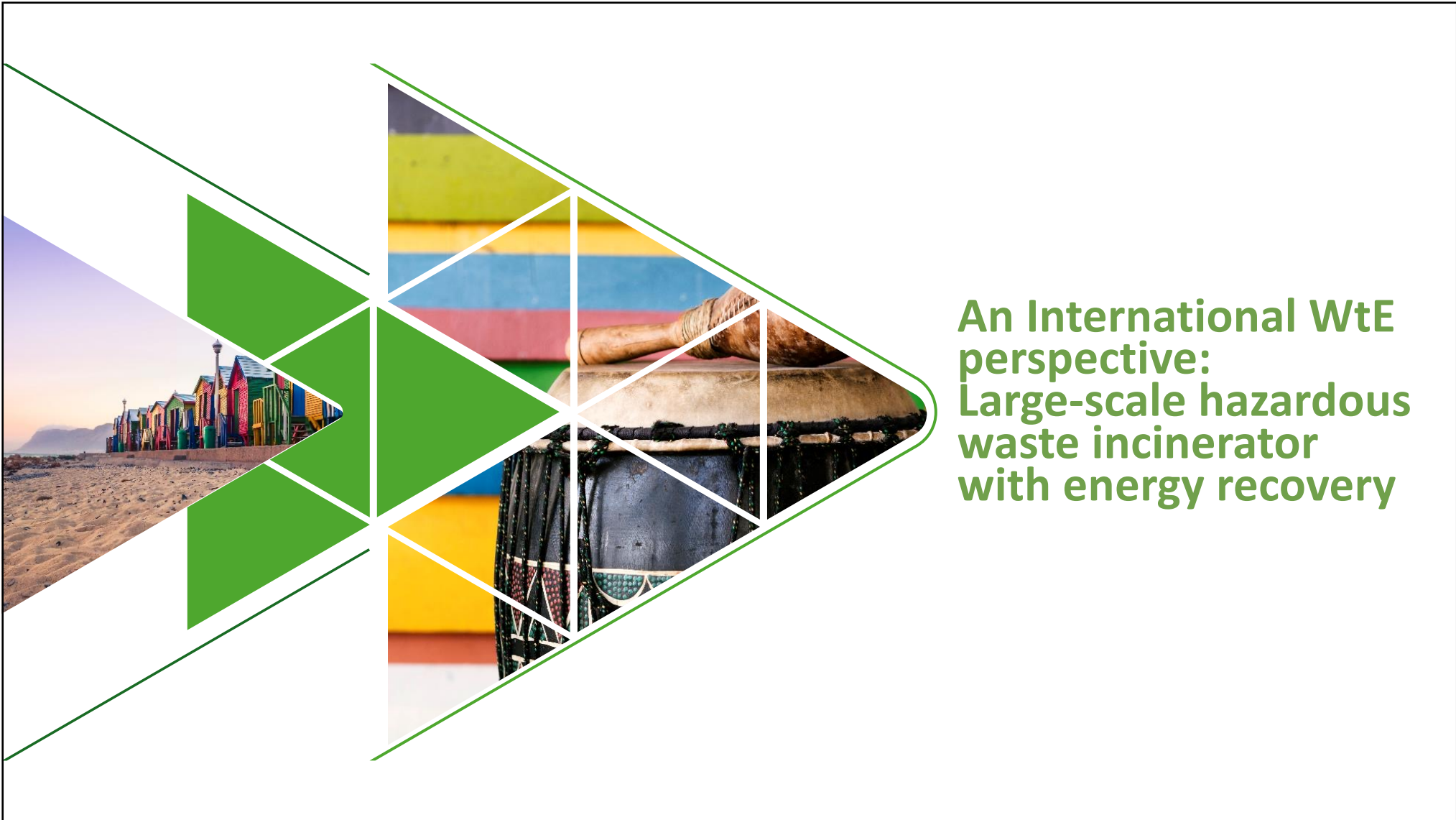
First RDF Facility of Urban Heating Network in France

Waste to Energy

- Production of solid RDF used as a substitute for fossil fuels
- Supplying Laval's urban heating network since 2017
- 10km of round-trip network
- 6400 heated housing equivalent
- Supply of heat to the Déshyouest agriculture cooperative
- 20-year agreement with local municipality

Energy unit: Power 22MW





**An International WtE
perspective:
Large-scale hazardous
waste incinerator
with energy recovery**

Seche: Tredi Salaise-sur-Sanne



Seche: Tredi Salaise-sur-Sanne

Key Figures

The most important thermal treatment facility with energy recovery of industrial waste

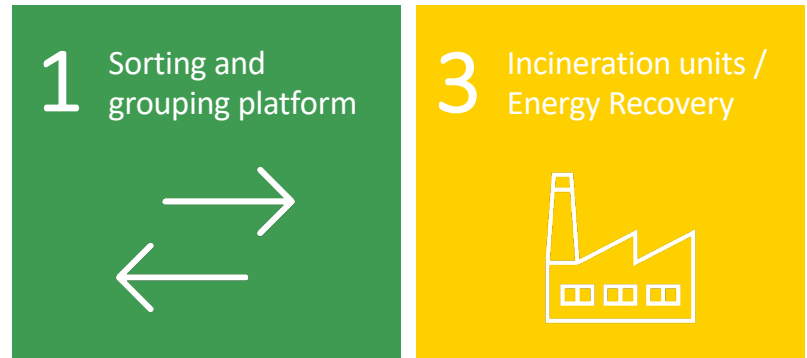
- One of the largest hazardous waste incinerators with energy recovery in France
- Authorised annual capacity of 294, 000 tons
- Produces steam for provision to 16 local manufacturers
- Treats domestic waste from surround towns
- Treats all types of hazardous and non-hazardous solids, liquids and sludges
 - Containing sulfur and chlorine
 - Can manage reactive, toxic, potentially infectious medical waste and / or malodorous waste



Seche: Tredi Salaise-sur-Sanne

A multi-treatment channel facility

- 4 complementary treatment units
 - 3 incineration units with energy recovery
 - Four incineration lines
 - Broad spectrum of acceptance
 - Sealed injection system for complex waste
 - Pipeline connections with the nearby chemical platform
 - 1 integrated sorting and grouping platform
 - Household hazardous waste and diffuse hazardous waste
 - Complement to the service offer
 - Short economic cycle
 - 90% of waste disposed on site.





Concluding Remarks

Concluding remarks

- A continuing landfill airspace and / or energy crisis in South Africa will improve the Business Case for large-scale WtE projects in S.A.
- WtE to play a role as part of an integrated, holistic, waste management model
- WtE is expensive (Capex / Opex)
- A Move to large-scale, commercial, WtE may require a regulatory push and further incentivization
- Sufficient precedent and experience Internationally – integrated WtE facilities



Thank You!

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