

# **WTE TECHNOLOGIES: BOTTLENECKS IMPEDING ADOPTION ON SA LOCAL MUNICIPALITIES**

**GAMUCHIRAI MUTEZO**

**MPHIL ENERGY AND DEVELOPMENT STUDIES**

**ENERGY RESEARCH CENTRE (UCT)**

**13 JULY 2015**



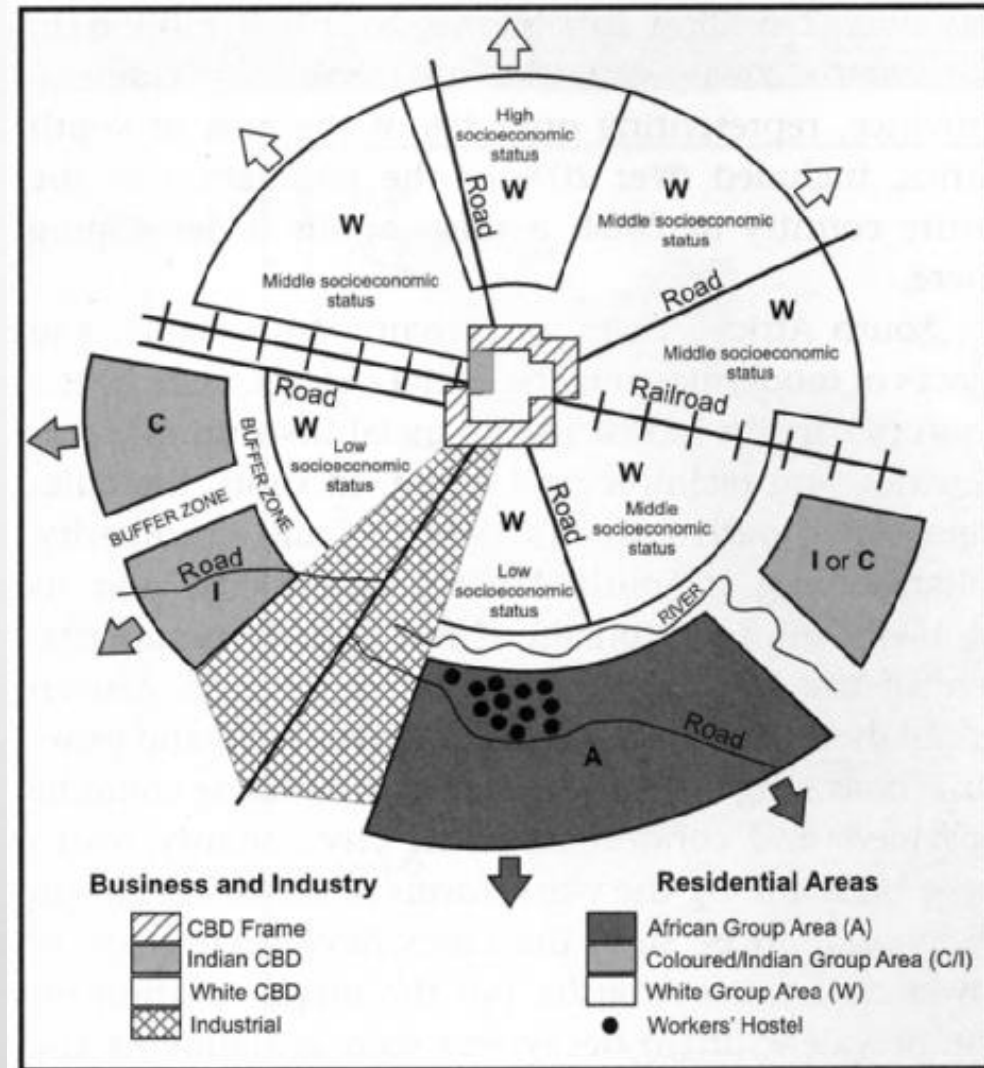
# CONTENTS

1. Introduction
2. Problem Statement & Research Objectives
3. Research Objectives
4. Literature Review
5. Research Methodology
6. Results and Discussion
7. Q&A

# 1. INTRODUCTION

- Although bad, level of planning during apartheid was detailed & impactful;
- Deprived the marginalised from basic services - segregation through natural & man-made barriers;
- Integrating challenges: geographical, financial capacity for infrastructure & utilities;
- Challenge of Energy Shortage & Waste Management
- Role from this perspective??

The Apartheid City Model



# 2.PROBLEM STATEMENT

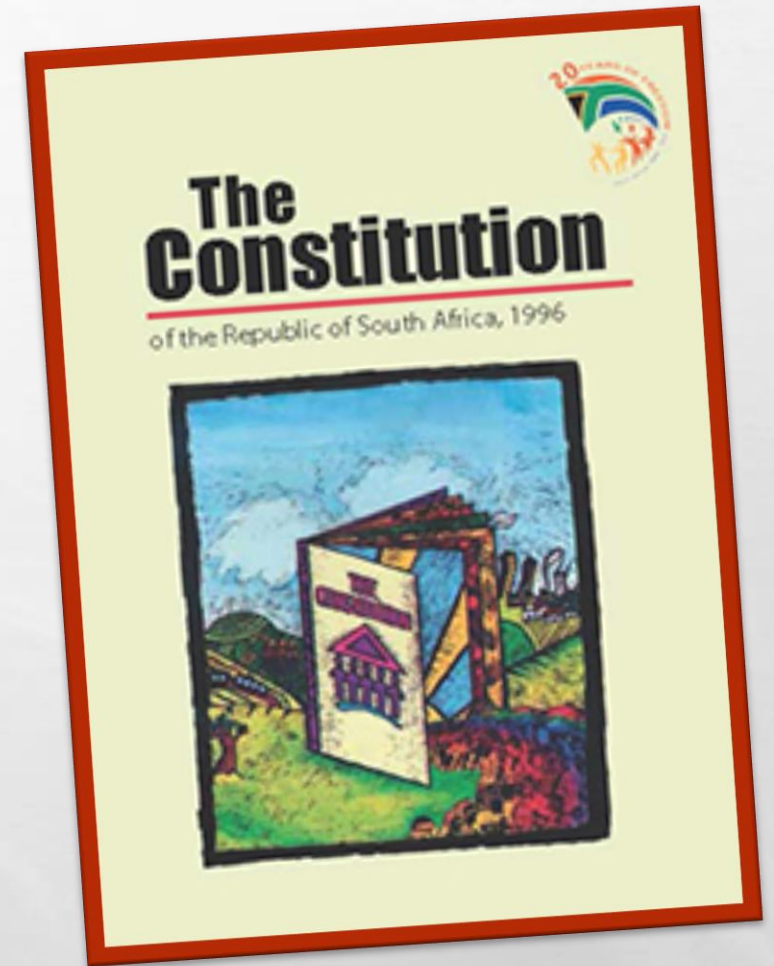
Development trends:

- Population growth
- Urbanisation
- Industrialisation

Energy demand bound to increase & more waste generation

Municipality = drive initiatives to address challenge (Chapter 4 of Constitution)

- “hit two birds with one stone” & implement **Waste-to-Energy Schemes**



# 3. RESEARCH OBJECTIVES

## Complete Objectives

1. Investigate existing waste management methods, challenges experienced and proposed interventions
2. Investigate whether local municipalities consider implementing waste-to-energy & the challenges they have encountered in the attempt;

## Presentation

3. 1. Investigate challenges experienced adopting existing/ proposed WtE interventions,
4. 2. Identify the most efficient and effective WtE technology that can be deployed by local municipalities.

# 4. LITERATURE REVIEW

## WM Practices in SA

- Collection, transportation, disposal
- DEA (2012) 108 mill tonnes of waste
- Mostly landfilled (affordable & simple)
- non-recyclable material (34%), construction and demolition waste (21%), organic waste (13%), metals (14%), paper (7%), plastic (6%), glass (4%) and tyres (1%)

Facility	Purpose
Materials Recovery Facility	Waste separation
Buy-back	Recycling and re-use
Transfer Station	Optimising transport system
Central Collection Points	Collection from inaccessible areas
Drop-off	Recyclables and builders rubble
Garden sites	Separate compostable waste

# 3. LITERATURE REVIEW...

## WtE Adoption in Africa

Country	City	Year	WtE Scheme	Power Generation
Mauritius	La Chaumiere	2013	Ultra High Temperature gasification	20MW
	North East & Central	2017		36MW
Ethiopia	Addis Ababa	2013	Anaerobic (landfill GtE)	50MW
Cameroon	Yaunde	Proposed	-	100MW
Kenya	Nairobi (Dandora)	Proposed	Anaerobic (landfill GtE)	70MW
Ivory Coast	Abidjan	2009	Anaerobic (landfill GtE)	30MW
Ghana	Accra	2014	Anaerobic (landfill GtE)	6MW
	Accra	2014	Anaerobic (landfill GtE)	10MW
Nigeria	Lagos (Olusunsun)	-	Anaerobic (landfill GtE)	25MW
<b>TOTAL (POTENTIAL) GENERATION CAPACITY</b>				<b>347MW</b>

## WtE Adoption in South Africa

Province	Municipality	Status	Capacity
Durban	eThekweni Metro Municipality	Procurement	7.5MW
Eastern Cape	Elundini Local Municipality	Negotiations	
Free State	Provincial Government	Inception	
Gauteng	City of Johannesburg	Procurement	1.1MW
Gauteng	City of Ekurhuleni	Negotiations	
Gauteng	Midvaal Local Municipality	Inception	
Limpopo	Greater Tubatse Municipality	Procurement	-
Mpumalanga	Thaba Chweu Local Municipality	Procurement	-
Western Cape	Overstrand Local Municipality	Financial Closure	
Western Cape	Cape Aghulus Local Municipality	Feasibility Study	
Western Cape	City of Cape Town	Feasibility Study	
Western Cape	Drakenstein Municipality	Feasibility Study	10MW
Western Cape	Stellenbosch Municipality	Feasibility Study	
<b>TOTAL GENERATION CAPACITY</b>			<b>8.6MW</b>

# 4. FACTORS INFLUENCING ADOPTION

1. Feedstock (or waste stream)

2. Technology Type

- Anaerobic Digestion
- Pyrolysis
- Mechanical Biological Treatment (MBT)
- Combustion (Incineration)
- Gasification

3. Operations, Maintenance & HR

4. Project Financing

## Benefits of WtE:

- Environmental issues (landfilling, pollution)
- Energy poverty (electricity, gas or heat)
- Waste minimisation strategy
- Cleaner and healthier human settlements
- Waste readily available – no depletion





# 5. RESEARCH DESIGN

## Exploratory Approach

- Mixed Approach (mostly qualitative and less quantitative)

## Population & Sample Size

- LM in Western Cape (24) but purposive sampling
- 3 LM for now

## Data Collection & Analysis

- Primary (interviews) and Secondary data
- Analyse according to objectives & themes



# 6. RESULTS & DISCUSSIONS

*Investigate challenges experienced adopting existing/  
proposed WtE interventions:*

- Low cost of landfilling
- Waste generation and classification
- Technologies
- Legislation & regulations
- Financing

*Identify the most efficient and effective WtE technology  
that can be deployed by local municipalities:*

- Anaerobic Digester
- Pyrolysis
- MBT?



# 6. RESULTS & DISCUSSION

## Recommendations:

1. Improve consistence of waste data
2. Explore additional financing options (Industrial Development Corporation (IDC), Municipal Infrastructure Grant (MIG))
3. Include WtE in IWMP (not necessarily electricity)
4. Include in IDP process for citizens' feedback
5. Involve related departments in feasibility studies

**THANK YOU**

**Q & A**