



a world class African city



**COJ WASTE TO ENERGY INITIATIVES
4TH WASTE KHORO, DURBAN
14-16 OCTOBER 2013**

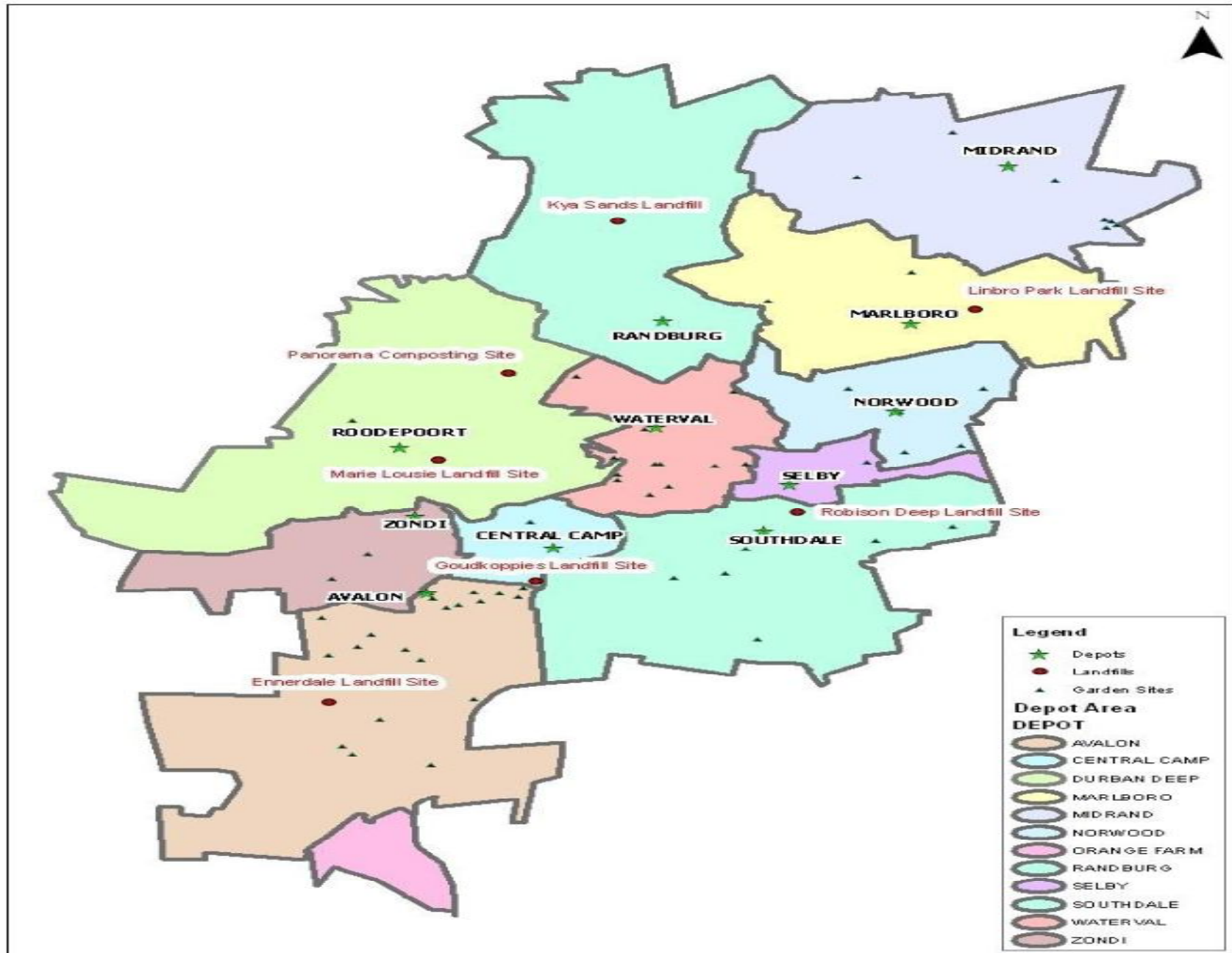
Presentation Layout

- **INTRODUCTION**
- **LFG PROCESS**
- **PROGRESS TO DATE**
- **BENEFITS OF THE PROJECT**
- **REQUEST BY ENEREG SYSTEMS**



Introduction

- Initiated in 2007
- Contract signed with EnerG Systems Joburg over 20 years to implement the project at no cost to the City
- Feasibility study was completed on 6 sites
- 5 were found to have enough gas to generate electricity
- Robinson Deep, Marie Louise, Goudkoppies,
- Linbro Park, Ennerdale



INTRODUCTION CONT.

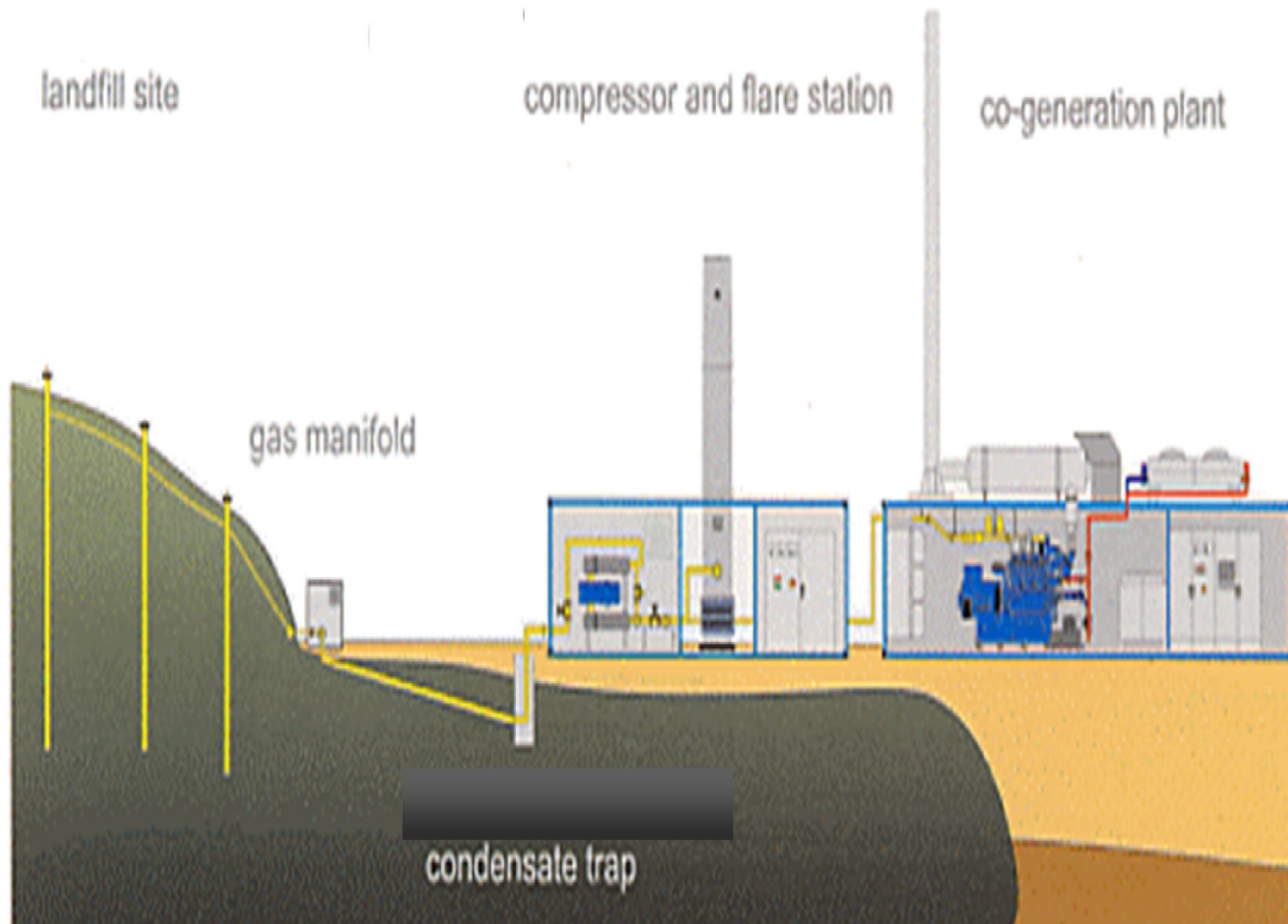
- Renewable energy generated from the project to be fed into the municipal grid, off-setting largely coal derived electricity.
- About 19MW will be generated from the project,
- Can power app. 12500 middle income households
- Largest project in SA

LFG Process

- A combination of vertical gas wells and horizontal gas collectors are installed in the waste mass.
- A network of piping connects the wells to the gas carrier main which is connected to a two stage blower which places a vacuum on the waste
- Pulling the gas from the waste into the gas management compound and delivering it to the flare where the gas is combusted earning Carbon Credits,

LFG Process Cont.

- Methane 21 times more harmful in its effect on global warming than Carbon Dioxide,
- Converted into Carbon Dioxide through the combustion process.
- Electricity Generators will be installed and will supply gas as fuel and generate electricity which will be connected into the local electricity distribution grid.



PROGRESS TO DATE

- EIA conducted in 2008 and authorization received in 2010
- Construction at Robinson Deep completed and was commissioned in May 2011
- Construction at Marie Louise completed and commissioned in April 2012
- 64 wells installed at Robinson Deep and 28 in Marie Louise
- Registration as a CDM with UNFCCC was finalized in December 2012

PROGRES CONTINUED

- Daily pumping rate of gas at Robinson Deep is at 1400 cubic meters per hour
- Carbon credits are being recorded and will be sold to the carbon market
- The remaining sites will commence after signing of PPA with potential buyer
- Improvement in air quality in two sites

PROGRESS CONTINUED

- Negotiations with CP to sign a PPA are at advanced stage,
- Submitted application to DOE through IPP process
- IPP will be pursued as an alternative should CP not sign a PPA

BENEFITS OF THE PROJECT

- Social benefits
- Reduced odours (Robinson Deep and Marie Louise)
- Employment opp.
- Generate revenue for the city
- Introduce Green Electricity
- Contribute to electricity stability

BENEFITS CONTINUED

- Environmentally friendly project
- Less concentration of methane gas
- Compliance with license conditions
- Sustainable development
- Improved landfill airspace
- Fewer complaints on bad odours
- Compliance with Waste Act
- Compliance with the City's IWMP and GDS 2040 (Shift to low carbon economy)



a world class African city



- **ALTERNATIVE WASTE TREATMENT TECHNOLOGY PPP PROJECT**



a world class African city

Contents

- Background
- Need for the Project
- Project Definition
- Project History & Progress
- Key Lessons learned
- Funding

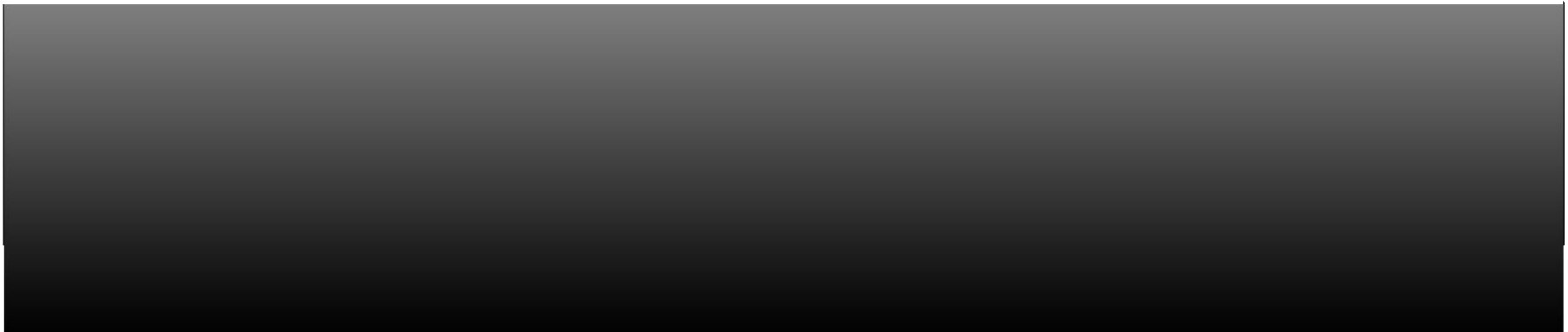




a world class African city

What Project?

The general scope of this project is to provide the City of Johannesburg with a waste treatment technology facility/s, that will accept 500 000 tonnes of municipal solid waste per annum through a "design-build-finance-maintain-operate-transfer" public private partnership (PPP) model in order





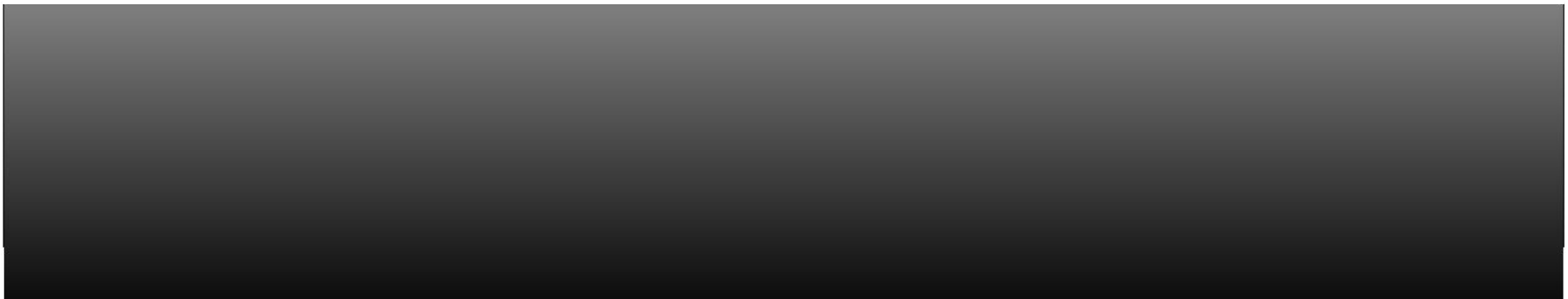
a world class African city

Why the Waste Treatment Facility?

-To provide a sustainable solution to reducing waste to landfill

Why PPP?

-To secure the substantial initial capital funding required for the project





a world class African city

Background

COJ is a Metropolitan Municipality which:

- ❑ Comprises an area of approximately 1646 km²,
- ❑ Population of over 3.8 million.
- ❑ Johannesburg is the commercial and economic hub of South Africa and the African continent.
- ❑ The City contributes approximately 47% to the provincial economy and 17% toward national economic growth.



a world class African city

Background

Waste Management Facts:

- Municipal waste serviced through Pikitup, a municipal owned entity
 - Over 700 000 service points per week
 - 119 informal settlements serviced daily through community based private contractors
 - Street sweeping; 24/7 in inner city, daily in other high density areas and main routes, weekly in suburb
 - 4 permitted landfill sites
 - 150 Compactors
-



a world class African city

Project Need

1. National Environmental Management: Waste Act (2008)

2. National Waste Management Strategy (2010)

3. Growth and Development Strategy (2011)

1. CoJ Integrated Waste Management Policy (2011)

2. CoJ Integrated Waste Management Plan (2011)

3. Waste By-laws

1. Pikitup Waste Management Services Plan

2. AWT Feasibility Study



a world class African city

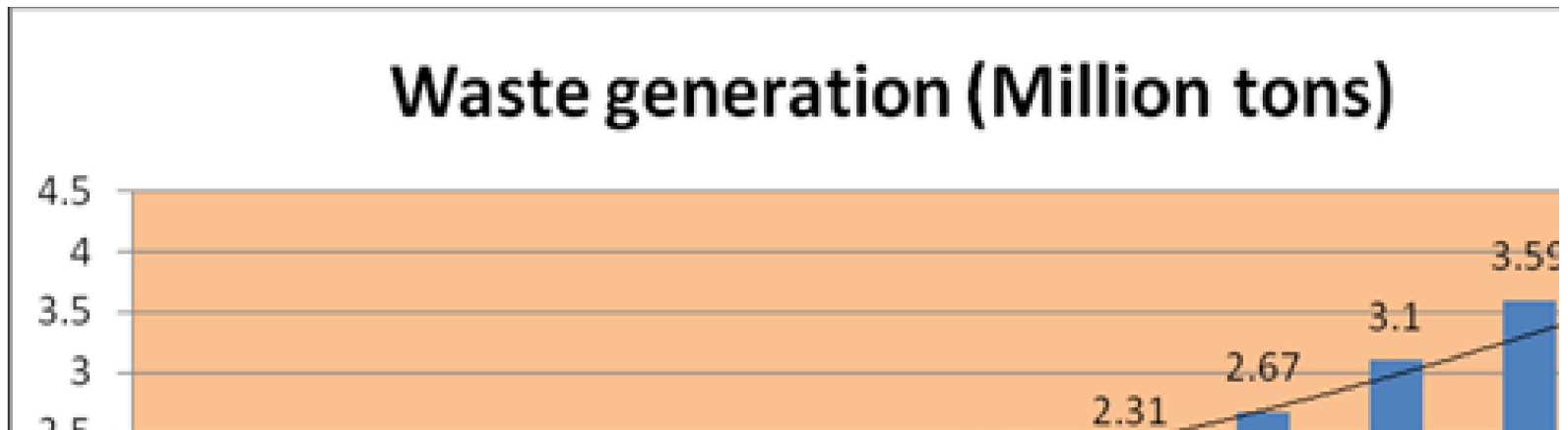
Project Need

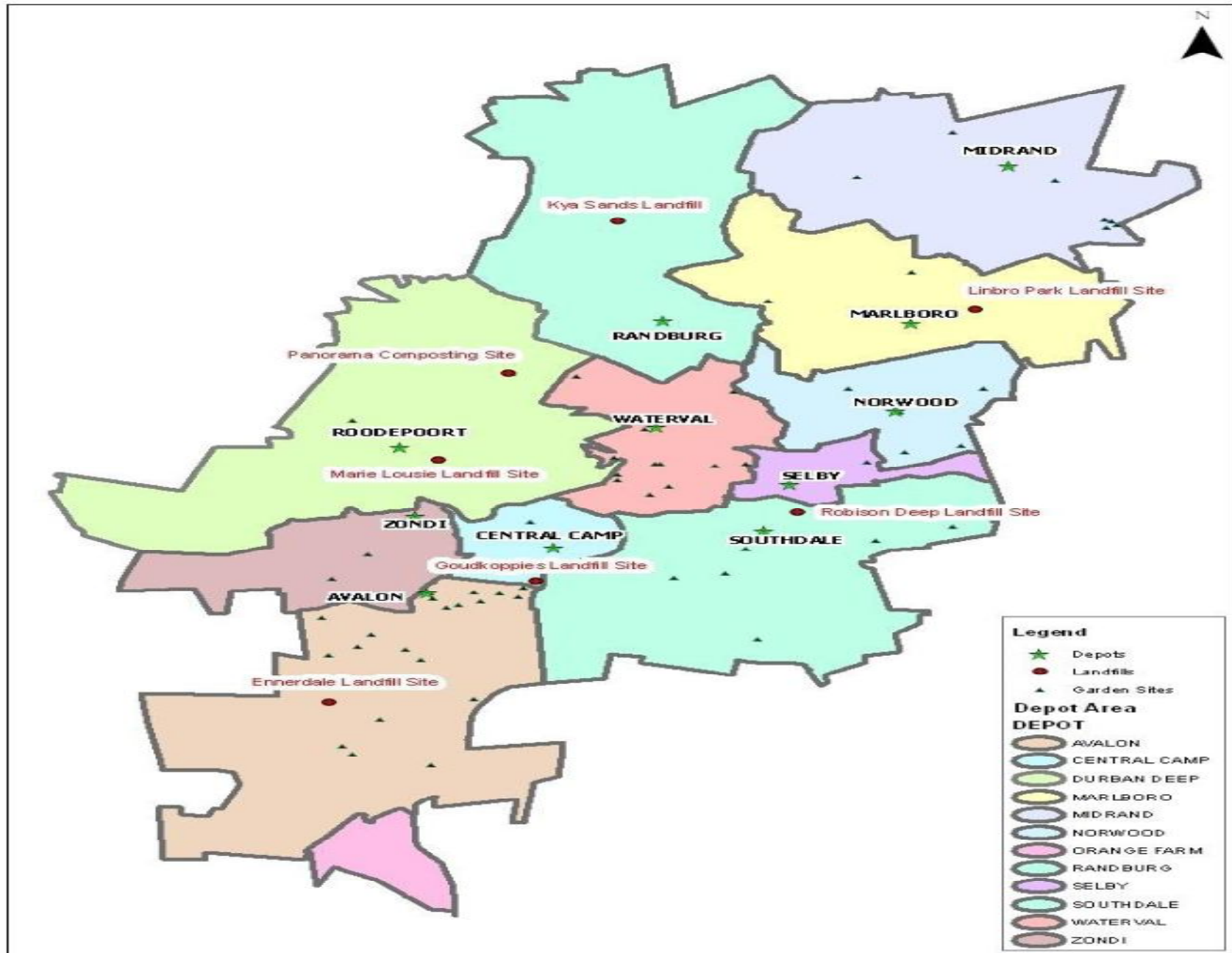




a world class African city

Project Need





Legend

- ★ Depots
- Landfills
- ▲ Garden Sites

Depot Area

DEPOT

- AVALON
- CENTRAL CAMP
- DURBAN DEEP
- MARLBORO
- MIDRAND
- NORWOOD
- ORANGE FARM
- RANDBURG
- SELBY
- SOUTHDALE
- WATERVAL
- ZONDI



Current Pikitup Initiatives

- Separation at source (currently in 56000 households)
- 45 Garden sites accepting green waste & recyclables
- 1 Composting plant
- Partnership with private recyclers (including trolley brigade) and Material Recovery Facilities (including composting)
- Landfill extensions and acquisition of land for new landfill in the North (with 50 years airspace)



a world class African city

Project Definition

What innovative funding mechanisms exist to fund Municipal Solid Waste Management infrastructure requiring substantial initial capital investment, particularly with current own funding limitations?

Public Private Partnerships

PPP Process





a world class African city

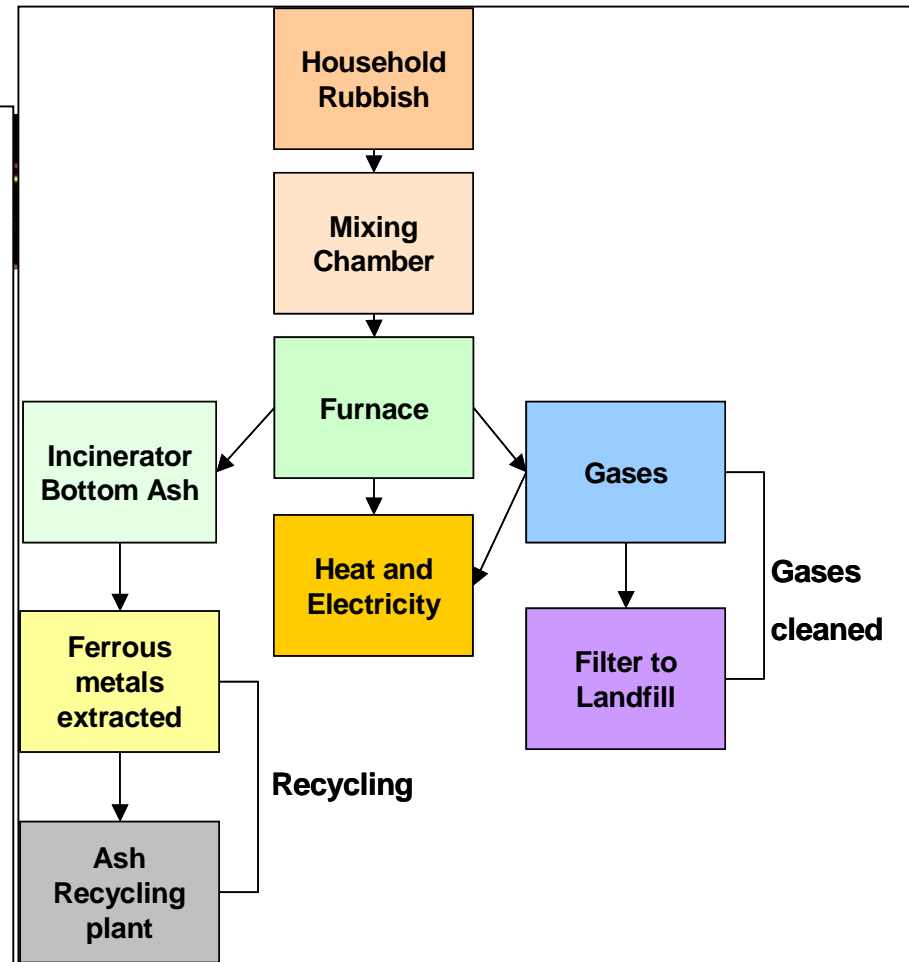
Feasibility Study

Summary on Technology Options

- There is no single-streamed solution: A host of treatment and sorting technologies are required to divert waste from landfill and increase material and energy recovery.
- A number of well-proven technologies exist
- The optimum combination of technologies for an integrated waste management system depend on the following key decision-making parameters:
 - Landfill diversion targets
 - CO2 reduction / Environmental targets
 - Energy recovery and material recovery targets
 - Affordability targets (Capex, Opex, household levy /gate fee)
 - Procurement, ownership & financing strategy (risk allocation)

Project Definition

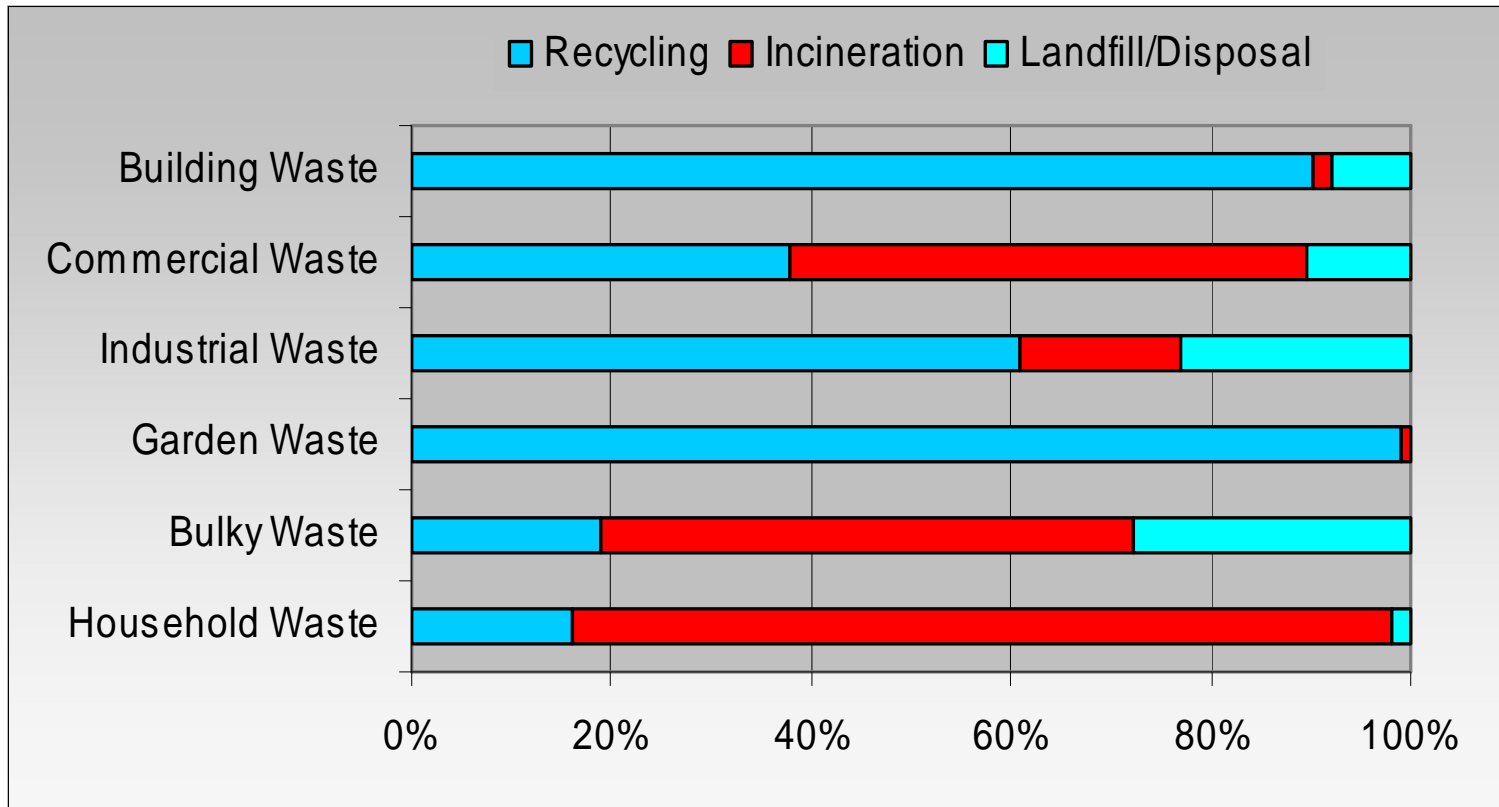
- **Thermal Treatment Technologies**
 - Incineration
 - Autoclaving
 - Emerging Thermal Treatment
 - Gasification
 - Pyrolysis
- **Biological Treatments**
 - Windrow Composting
 - In Vessel Composting
 - Anaerobic Digestion
- **Mechanical Biological Treatments (MBT) and Mechanical Heat Treatments**





a world class African city

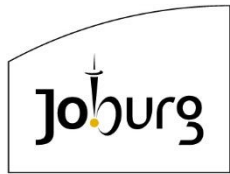
Global Perspective



In Denmark:

- 13 organic household waste composting plants
- 33 incinerators
- 120 garden waste composting plants
- ~5 biogas facilities
- ~15 major landfills
- ~20 inert landfills

Ref: COWI



a world class African city

Project Definition

Benefits of the Project:

- Reduction of waste going to landfill (500 000 tonnes diverted)
- Renewable energy (potential 35-60 megawatts)
- Revenue from sale of by-products (bioenergy, heat, recyclables)
- Potential to earn carbon credits
- Private party expertise & raising capital (R2-10 Billion)
- Job creation approximately 400 for waste recovery & 80 technical
- Strong localisation & Skills transfer
- Innovative solution - First in SA and Africa & first PPP for CoJ



a world class African city

Project History

Phase 1: Inception and Feasibility Study

Project Inception

- Project initiated in March 2008 through a Mayoral Committee & Council approval

Request for Expression of Interest

- Issued in June 2008; 23 RFIs received

Feasibility Study

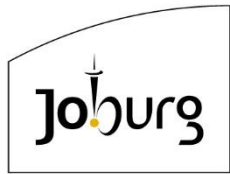
- Conducted and completed in line with PPP Process in July 2010

Treasury Views and Recommendations (TVRI)

- National Treasury & Provincial Finance issued the project with TVRI in August 2010

Consultation and Council Decision

- Public Consultation was concluded in October 2010
- 'In Principle' Council approval was obtained in November 2010



a world class African city

Project History

Phase 2: Procurement

The project has formally entered the procurements stage in line with PPP process

Appointment of a Senior Project Manager for this project – Oct 2011

Terms of Reference for the Request for Qualification (RFQ) finalised – Jan 2012

Treasury Views and Recommendations (TVR IIA) – Feb 2012

Issuing a Request for Qualifications (RFQ)- July 2012



a world class African city

Parallel Studies

- To strengthen the feasibility study

- High level site identification completed
- Shortlisting of 3 sites and detailed site assessment to follow

- To determine character and composition of the municipal solid waste
- To determine caloric value

EIA

Timeframes

Task/Activity	Duration
RFQ Bid Period	3 months
RFQ Evaluation	3 months
RFP Document Prep & Approval	5 months
RFP Bid Period	3 months
RFP Evaluation & Appointment	4 months
Contract Negotiations	10 months
Due Diligence & Financial close	2 months
Construction, Commissioning	± 24 months



a world class African city

Project Partners

Main Partners:

- National Treasury – Project development & funding
- EISD- Project Champion
- Pikitup

Also in the Steering Committee are:

- Gauteng Provincial Finance Department
- City Power
- CoJ Finance (Treasury)
- DED