EKURHULENI METRO MUNICIPALITY

WASTE MANAGEMENT SERVICES
DEPARTMENT

Divisional Head Strategic Planning:
Eugene Hlongwane
2010
3.45 billion urban dwellers out of a world population of 6.9 billion

2030
5 billion urban dwellers out of a world population of 8.3 billion

2050
6 billion urban dwellers out of a world population of 9.2 billion
WASTE MANAGEMENT

- Landfill is the best practiced method of waste disposal in South Africa and around the world in developing countries.

- A LANDFILL is a site for the disposal of waste materials by burial and is the oldest form of waste treatment.

- Waste disposal at a landfill site is:
  - Confined to as small an area as possible
  - Compacted to reduce their volume
  - Covered (usually daily) with layers of soil

- Landfills are a significant source of methane – a GHG

- Leachate is produced - liquid that contains suspended solids and other chemical as water passes through the waste at a landfill site.
INTEGRATED WASTE MANAGEMENT VALUE CHAIN

- **Economic Drivers:**
  - Develop a Green Industry strategy & plan.
  - Establish a Green Industry Development Council.
  - Attract new Smart & Green industries.
  - Develop enabling & catalytic infrastructures.
  - Generate green Jobs
  - Green Procurement.
  - Carbon credit.
  - Small Business Development.
## OPERATIONAL LANDFILL SITES

<table>
<thead>
<tr>
<th>Nr</th>
<th>Name</th>
<th>Site Classification</th>
<th>Service Areas</th>
<th>Years Left</th>
<th>Current tons per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Weltevreden</td>
<td>G:L:B-</td>
<td>Eastern Region Benoni, parts of Brakpan &amp; Boksburg</td>
<td>25</td>
<td>1000</td>
</tr>
<tr>
<td>2</td>
<td>Rietfontein</td>
<td>G:L:B+ Co-disposal De-listed materials &amp; Liquids</td>
<td>Eastern Region Nigel, Tsakane, Kwa-Thema &amp; Springs</td>
<td>20</td>
<td>950</td>
</tr>
<tr>
<td>3</td>
<td>Rooikraal</td>
<td>G:L:B-</td>
<td>Southern Region Katlehong, parts of Germiston &amp; Boksburg</td>
<td>21</td>
<td>1000</td>
</tr>
<tr>
<td>4</td>
<td>Simmer &amp; Jack</td>
<td>G:L:B-</td>
<td>Southern Region Parts of Boksburg, Germiston &amp; Bedfordview</td>
<td>7</td>
<td>1000</td>
</tr>
<tr>
<td>5</td>
<td>Platkop</td>
<td>G:L:B- disposal of asbestos powder/solids</td>
<td>Southern Region Alberton, Tekoza, Vosloorus &amp; part of Katlehong</td>
<td>35</td>
<td>400</td>
</tr>
</tbody>
</table>
Weltevreden ~ 2008
WASTE STREAM VOLUMES

Tonnages - All Sites

- (2009-2010)
- (2010-2011)
- (2011-2012)
- (2012-2013)
CLOSURE LANDFILL SITES

- 11 “closed” landfill sites of which 8 are formally rehabilitated: 30 year monitoring and rehabilitation program after closure.

<table>
<thead>
<tr>
<th>Name of Site</th>
<th>Rehabilitated</th>
<th>Rod / Permit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigel</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Deep Levels (Kwa-Thema)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Wadeville</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sebenza</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Chloorkop</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tembisa</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Southern Dumping Site</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Alberton</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bullfrog Pan</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Zuurfontein</td>
<td>No (Planning Phase)</td>
<td>No</td>
</tr>
<tr>
<td>Brakpan</td>
<td>No (Planning Phase)</td>
<td>No</td>
</tr>
</tbody>
</table>
Rehabilitated landfill site - Sebenza
The Green Economy will address the financial crisis and the climate crisis

“To address climate change we need an energy revolution, a wholesale change in how we power our societies. Economists agree as well: The hottest growth industry in the world is renewable energy”.

“Global investment in zero GHG energy will reach $19 trillion by 2020”. Ban Ki Moon, Secretary General of the UN

SO . . .
WHAT IS LANDFILL GAS?

Waste deposition

Decomposition

Landfill gas production: \( \text{CH}_4 \)

- Methanogenesis
- Optimal moisture for bacteria to flourish
- Optimal temperature for bacteria to flourish

DANGEROUS GASES
GAS WELL FIELD INSTALLATIONS

7. Perforated well pipes

8. Wellhead

9. Installation of compound Knock-out pot

10. Casting of generator slab
Aerial view: vertical wells & conveyance lines

- Well
- Connector
- Ring Main
- Condensate knockout installed

Installation of conveyance lines

Left: Aerial view- Large enclosed Flare
Simmer & Jack: 3000 Nm3/h
Weltevreden: 2000 Nm3/h
Rooikraal: 2000 Nm3/h
Rietfontein: 1300 Nm3/h
LANDFILL GAS USE?

Gas production

Gas collection

Gas utilisation

Natural gas hybrid vehicle and gas pipeline.
LFG-to-Electricity

Schematic Layout of Landfill Gas-to-Electricity Scheme
LFG-to-Electricity

• Potential – minimum 4 MW between the four landfills.
• Equivalent to the supply of power to approximately 2800 homes
348678 tonnes of CO2 equivalent reduced

• Annual greenhouse gas emissions from 72,641 passenger vehicles

• CO$_2$ emissions from the electricity use of 47,974 homes for one year

• Carbon sequestered by 8,940,462 tree seedlings grown for 10 years
Other LFG projects in SA

- South Africa currently has only five landfill gas to energy projects registered with the Clean Development Mechanism (CDM).

<table>
<thead>
<tr>
<th>CDM approved LFG to energy projects</th>
<th>Owner of project</th>
<th>Carbon savings estimated per year (tonnes CO$_2$-e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ekurhuleni Landfill gas recovery project</td>
<td>Ekurhuleni Municipality</td>
<td>243 629</td>
</tr>
<tr>
<td>Alton Landfill gas to electricity project (private landfill site)</td>
<td>ENER-G</td>
<td>70 000</td>
</tr>
<tr>
<td>EnviroServ Chloorkop Landfill gas recovery project (private landfill site)</td>
<td>EnviroServ</td>
<td>188 000</td>
</tr>
<tr>
<td>Durban Landfill gas to electricity project - Marrianhill and La Mercy Landfills</td>
<td>Ethekwini Municipality</td>
<td>69 000</td>
</tr>
<tr>
<td>Durban Landfill gas to Electricity Project - Bisasar Road Landfill</td>
<td>Ethekwini Municipality</td>
<td>352 000</td>
</tr>
</tbody>
</table>

http://www.urbanearth.co.za/articles/slow-uptake-landfill-gas-energy-projects-sa
ENVIRONMENTALLY FRIENDLY APPROACH

• Emission reductions
• Better air quality
• Reduce odours
• Reduce global warming effect
• Alternate/greener energy source
• Job creation in green economy sector
Waste to Energy
WASTE TO ENERGY PROCESS
Import of waste as reported by Germany, in tonnes, 2001

Total imports represent 1 015 193 tonnes

The arrows are proportional to the volume of imported waste.

Source: Basel Convention
Utilisation

Electricity generation from engines
By-products to landfill or end use product

Waste operations
Collection
Recycling etc

Energy production
op’s & maintenance

Waste to Energy
Thank you