NEW HORIZONS WASTE TO ENERGY

ATHLONE MUNICIPAL AND ORGANIC WASTE to ENERGY
VISION

Going *Zero to Landfill.*

Converting *Waste to Energy.*

Improving *Social* and *Environmental Resilience.*
PROJECT OBJECTIVE

- Produce **bio-CNG** for sale as gaseous fuel
- Produce **food grade liquid carbon dioxide**
- Produce recyclable **plastic, paper, metal and glass**
- Produce **Refuse Derived Fuel (RDF)**
- Produce **organic fertiliser**
- All from organic and **Municipal Solid Wastes**
HISTORY

Project originally developed by **Farm Secure**
 Obtained by Clean Energy Africa (CEA) **7 years ago**
 JV formed by **CEA** and **Waste Mart**

Waste Mart is waste contractor using 88 Trucks to collect general waste on a daily basis all over Cape Town

Project is **PRIVATELY** developed and project financed with debt from the **IDC**.
REGULATORY HURDLES

✓ Environmental authorisation for digestion
✓ Electricity production - NA
✓ Waste management license
✓ Fertiliser production – testing and certification
✓ Major Hazardous Installation registration
✓ Road transport of compressed gasses
✓ Registration as a biogas producing site with NERSA
New Horizons Waste to Energy
Project Owner

Owned by Waste Mart and Clean Energy Africa

Waste Mart
Waste Supplier

Waste Mart is a 30 year old waste management contractor based in Cape Town and is contracted to supply the waste to the plant

Fountain Civil Engineering
EPC Contractor

The long term technical partner of the project and main turnkey Engineering, Procurement and Construction contractor for the project.

Fountain Green Energy
O&M Contractor

Subsidiary of Fountain Civil Engineering who are the EPC contractor on the project
The Offtakers

Avison
Compost offtaker
Owned by Waste Mart and Clean Energy Africa

Afrox
Gas offtaker
Subsidiary of Fountain Civil Engineering who are the EPC contractor on the project

Waste Mart
Recyclable offtaker
Waste Mart is a 40 year old waste management contractor based in Cape Town and is contracted to supply the waste to the plant

TBD
RDF offtaker
Cement kilns and thermal project under development. Currently landfilled or stored
Electricity vs Gas use

• Electricity
  • Generation license required over 1 MW
  • Energy sale price of 61.47 c/kWh in CoCT
  • REIPPP risks and process (100c – 77c/kWh)

• Technology choice
  • Thermal – heat, steam and electricity
  • MBT and AD – recyclables, commodity chemicals, solid fuel and compost

• Waste value dependencies
  • Calorific value
  • Putrescible organic concentration
  • Contamination
Electricity vs Gas use

• 1 Nm³ of biogas at 60% methane is 20 MJ or 5.6 kWh
• Conversion to electricity only converts 39% of this into usable energy. 1 Nm³ = 2.2 kWe.
• CHP allows for up to 85% recovery
• 1 Nm³ of biogas equals
  • CH₄ = 0.02 GJ = 0.43 kg
  • CO₂ = 0.74 kg
• With a processing cost this can be converted into products that are worth more than the income through electricity sales.
## Electricity vs Gas use

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Price</th>
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<tbody>
<tr>
<td>Parafin</td>
<td>R233</td>
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<tr>
<td>LPG</td>
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<td>Electricity</td>
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<td>Solid Fuel</td>
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<tr>
<td>Charcoal</td>
<td>R120</td>
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<tr>
<td>Coal</td>
<td>R31</td>
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</table>
Inputs

- 480 tons of MSW and WTW per day.
- 63 tons of POW per day

World Bank international average
Income

- Waste tipping fees 40-50% of income
- Sales of gasses 35-45% of income
- Other 5-10%
  - Organic Fertiliser
  - Recyclables
Products

Organic fertiliser

• Degraded food material to form a compost like product.
• Dewatered to ~30% solids.
• 100 tons per day produced.
• Analysed on a frequent basis for macronutrients, micronutrients and contaminants.
• Perfect for soil remediation and lawn farming
Products

Bio CNG

• Compressed to 250 barg
• >95% methane
• Moved from site with compressed gas trailers
• Pressure reduction at clients for thermal use
Products

CO₂

- EIGA standard 99.998% CO₂
- 24bar, -17 deg C
- Bulk buffer storage capacity
- Used for dry ice, industrial cleaning, & refrigeration
Products

Recyclables

- Glass, Metals, Plastics, Cardboard and Paper – cleanliness is important
Products

Solid fuel - RDF

- Higher calorific value than unsorted MSW
- Reduced organics, metals, bulky material
- Mostly unrecyclable plastics, textiles and paper
Consumes 600 tons of waste per day

Produces 760Nm³/h Bio-Methane

Produces 18 tons CO₂ per day

Produces 100 tons organic fertiliser per day

RDF solid fuel – Up to 200 tons per day

Recyclables max 20 tons per day

Consumes 600 tons of waste per day

Produces 100 tons organic fertiliser per day
Plant sections

- RDF
- Recyclables
- Fertiliser
- Anaerobic Digestion
- Gas processing
- MRF
Based on preliminary waste characterisation information and market pricing for commodities, the opportunity is identified in 2010.

Development
EIA’s, offtake agreement negotiations and site visits to reference technologies are undergone.

Contracting
Contracts finalised with off-takers, suppliers and contractors.

Construction
24 month construction window including tests after completion.

Commissioning
As part of commissioning digester seeding, waste management optimisation and offtake initiation unveils some need for optimisation.

Operations
Long term production for >20 years.
Q&A