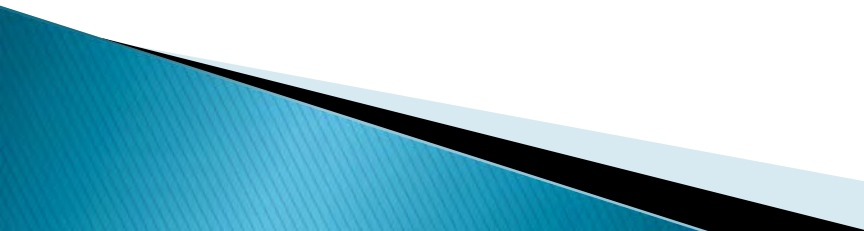


Overview of biogas market in South Africa

Gracia Munganga
GreenCape–Waste Economy Sector Manager

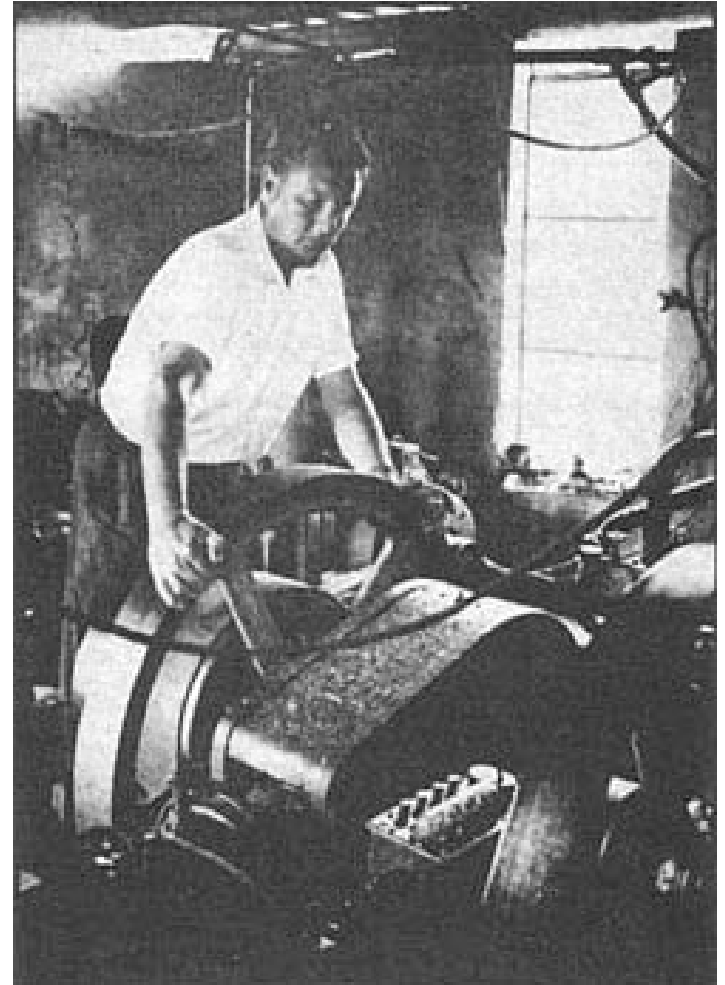
30.10.2013

Overview

- ▶ Introduction
 - ▶ Historical challenges
 - ▶ The case for biogas/bio-energy in SA
 - ▶ Types of biogas systems in SA
 - ▶ Current industry challenges
 - ▶ Upcoming projects
 - ▶ List of biogas companies in SA
- 

Introduction

- ▶ Biogas (Anaerobic digestion) is not a new technology. First industrial use dates back to 1895 in England (McCabe et al., 1967)
- ▶ In SA, John Fry (biogas pioneer) experimented AD of pig manure in 1957!!
- ▶ AD was introduced in waste water treatment facilities in 1980s (350/867 WWTPs registered for AD).
- ▶ Biogas has several advantage i.e. carbon sequestration, sustainable waste management solution for organic waste & energy source.



Picture appeared in the Farmers Weekly (1970s)

Introduction (ctd.)

SA has experienced limited market penetration for biogas

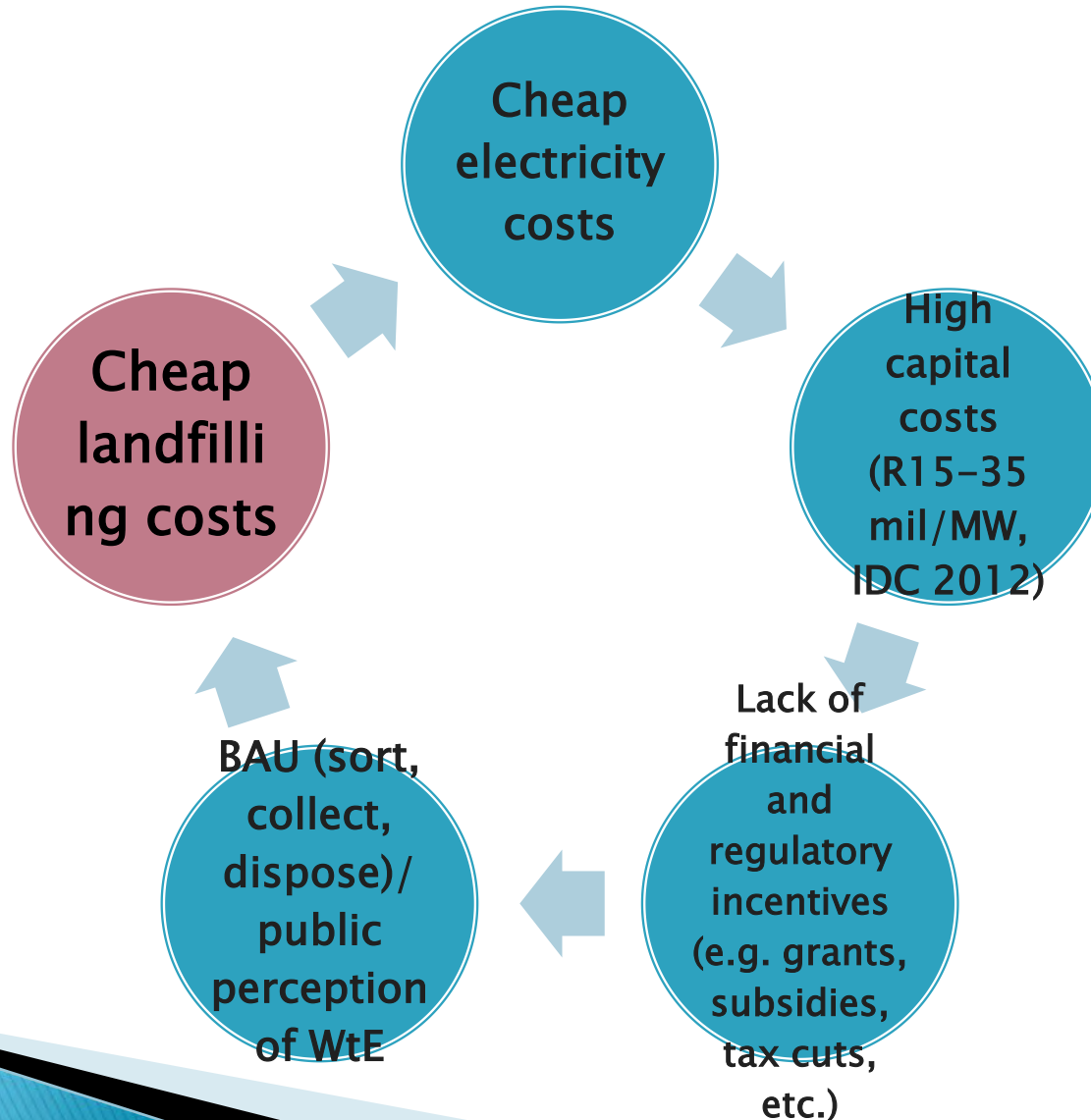
- E.g. there are ~1000 commercial plants built a year in Germany
- There are 12 million in India, 600 in Uganda versus only **300** in SA (Engineering news, 2013)



Waste Management Landscape, SA

- Landfill is the most common way of disposal (highest recycling rate/landfill diversion ~14%)
- No separation at source for waste collection—only practiced in certain areas as pilot projects (2 bag system)

Historical challenges



The case for a strong biogas / bioenergy industry in SA

Changing regulatory framework

South Africa's energy crisis & power outages in 2008 rising electricity costs (Eskom application to NERSA → 12% per year over the next 5 years)

South Africa ratified the Kyoto protocol and committed to reduce GHG emissions (34% reduction by 2020, 45% by 2030)

Introduction of the carbon tax between 2015–2019 (~R12–R48/tonnes) / Carbon labelling for farmers produce in the European market

Government incentives for renewable energy applicable to biogas projects

Eskom Industrial Demand Side Management (IDM)/Standard Offer Programme (SOP) rebate programme (R10 mil/MW)

Grants from the Department of Trade and Industry (DTI)'s Manufacturing Competitiveness Enhancement Programme (MCEP)

Loans from the Industrial Development Corporation (IDC) Green Energy Efficiency Fund (GEEF, prime less 2%) in partnership with KfW

Increasing waste management costs (the National Environmental Management: Waste Act, 59 of 2008 act)

Increasing gate fee/amending the definition of waste will fast-track the process.

Waste Minimization & Separation at Source (e.g. garden waste & Waste Tyres)

Speculation that organics might be banned from landfill in the next 5 years /Abattoirs

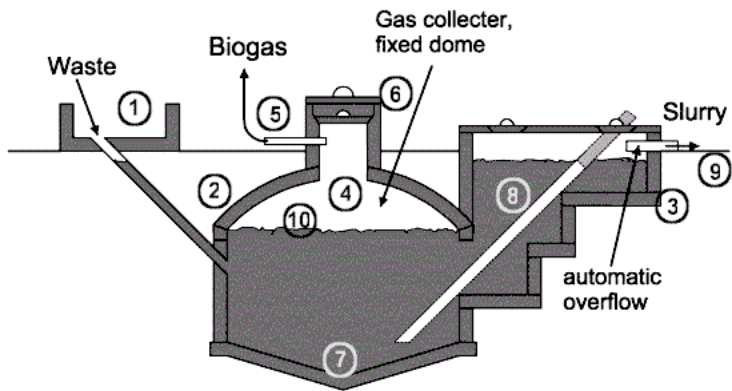
Types of biogas installations in South Africa

- ▶ Domestic/residential digesters
 - Most common installations in South Africa
 - PVC digester
 - Concrete digester
 - Plastic bag (biobag digester)
 - Application—cooking, lighting & sanitation
 - Residential, rural areas (schools, villages)

Domestic digesters



Dome digester (concrete)



BiogasPro-Agama

Biobag50, Dicla, Tarlton (BiogasSA,2012)



Small scale/medium-commercial digesters

- ▶ Defined as biogas systems between 25–250 kW (biogas-info, 2013)
- ▶ Use of gas directly/generation of electricity
- ▶ Target market:
 - conference/community centres,
 - small commercial facilities e.g. abattoirs, dairy factories, farms, etc.

Example of small scale installations, SA

▶ CAE

- Humphries Boerdery outside Bela-Bela (30kW)

▶ iBERT

- Abattoir-Jan Kemdorp (iBERT 100 kW)
- Cullinan (190 kW)
- Robertson (150 kW)
- Jacobsdal (150 kW)



Large scale installations, SA (1)

- ▶ Large scale digesters (>250 kW): large facilities e.g. municipal solid waste, abattoirs, farms, wastewater treatment facilities, etc.
- Landfill gas (5CDM registered, ~8 more approx.)
 - Mariahill (Durban, 1 MW)– (2003–2010)
 - Bisasar (Durban, 6.5 MW)–2010



<http://www.dbnlandfillgas2elec.co.za/>

Large scale installations , SA (2)

- Chloorkop landfill gas project (EnviroServ, 2010)
- Ekhurleni landfill gas project (2010)
- Robinson Deep, City of Joburg (19 MW, 2011)



http://www.joburg.org.za/index.php?option=com_content&id=5497&Itemid=339

Large scale installations, SA (3)

- ▶ Biogas digester at SA breweries (SAB)
 - Alrode/UASB-2005
 - Newlands/UASB-2007
 - Rosslyn
 - Prospection
 - Ibhayi



<http://www.talbot.co.za/engineering/reference/>

Large scale installations, SA (4)

AD for industrial & municipal wastewater in SA

- Cape Flats biogas digester–dewatering sludge (2003)
- Ceres fruit farm–UASB digester, Veolia (1998)
- PetroSA (Biotherm, 4.2 MW–2008)
- Refurbished digester –Joburg Northern Works facility (1.2 MW) , 2013

Upcoming biogas projects

- Eastern Cape–EOI for 110 domestic digesters by SANEDI and Fort Hare (August 2013, KSEF)
- KZN (21 small scale/domestic installations–Engineering News,Oct 2013)
- Gauteng–iBERT (500 kW, Meyerton)
- Gauteng & Western Cape–Bio2Watt (3 & 2 MW)
- Gauteng–Lesedi 4.2 MW

Current industry challenges

Complex municipal procurement legislation

Municipal Financial Management Act & Municipal System Act (Section 78).

Difficult to secure long term agreement (>3 years) for the waste and to enter in Public Private partnerships (PPPs) with municipalities

Connection to the grid & low tariffs from the DoE (REIPPP)

Cap on bulk sale price to municipalities (« Eskom)

Low tariffs (i.e. 90 Rc/kWh & 94 Rc/kWh for biogas and landfill gas respectively vs. **R1.4-2.1 /Kwh in Germany for example**).

Minimum size of projects (1MW vs 400 kW in Germany)

Environmental and legal compliance

WtE projects trigger multiple environmental regulations (NEMWA, NEMA, NWA and NEMAQ)

Difficult zoning legislation to allow WtE project – difficulty in obtain land

Finance/Funding

High capital costs

Scope and benefits not always well defined and not clear between municipalities and investor(s).

Biogas companies in SA

(1)

		Type
Small Scale / Domestic-Residencial		
1	Agama	Small scale (domestic), manufacturer, project developer
2	BiogasSA	Project developer
3	Solek	Project developer
4	Trade Plus Aid	Project developer
5	CAE	Project developer, manufacturer
Medium-Large		
6	Bio2watt	Project developer, large scale (3 MW projects)
7	EnviroServ	Project developer, Manufacturer (EcoFuels)
8	Biogas Africa (Biogas Nord)	Project developer
9	Lesedi	Project developer-biomass (17MW) & biogas (3.8 MW)/ (large scale)

Biogas companies in SA (2)

10	Talbot & Talbot	Project developer, manufacturer (SAB digesters)
11	iBERT	Project developer
12	Prime Solutions	Project developer
13	Electrawinds	Project developer
14	Aerolog	Project developer
15	ENER-G	Project developer, landfill gas
20	Biotherm	Project developer, landfill gas
21	Veolia	Project developer (WWTPs)
21	CA Component	Genset Manufacturer
22	Ennovation	Project developer

End

Many thanks!



References

- ▶ McCabe,J; Eckenfelder,W. eds (1975). *Biological treatment of sewage and industrial wastes. Two volumes. New York: Reinhold Publishing.*
- ▶ <http://www.afrigadget.com/2010/06/09/solving-the-flexible-biogas-digester-problems/>