Overview of biogas market in South Africa
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
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.
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)
Cheap electricity costs

High capital costs (R15–35 mil/MW, IDC 2012)

Lack of financial and regulatory incentives (e.g. grants, subsidies, tax cuts, etc.)

BAU (sort, collect, dispose)/public perception of WtE

Cheap landfilling costs
# 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)


## 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)

Biobag50, Dicla, Tarlton (BiogasSA, 2012)

BiogasPro–Agama
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)

http://www.ibert.co.za/projects.htm
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, 1MW)– (2003–2010)
  - Bisasar (Durban, 6.5 MW)–2010

http://www.dbnlandfillgas2elec.co.za/
Large scale installations, SA

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

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

- 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).
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<td><strong>Small Scale /Domestic-Residencial</strong></td>
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<tr>
<td>1</td>
<td>Agama Small scale (domestic), manufacturer, project developer</td>
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<td>2</td>
<td>BiogasSA Project developer</td>
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<td>3</td>
<td>Solek Project developer</td>
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<td>4</td>
<td>Trade Plus Aid Project developer</td>
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<td>5</td>
<td>CAE Project developer, manufacturer</td>
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<td><strong>Medium–Large</strong></td>
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<td>6</td>
<td>Bio2watt Project developer, large scale (3 MW projects)</td>
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<td>7</td>
<td>EnviroServ Project developer, Manufacturer (EcoFuels)</td>
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<td>8</td>
<td>Biogas Africa (Biogas Nord) Project developer</td>
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<td>9</td>
<td>Lesedi Project developer–biomass (17MW) &amp; biogas (3.8 MW)/ (large scale)</td>
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Many thanks!
References
