WASTE ECONOMY WORKSHOP

OVERVIEW OF SANEDI WASTE TO ENERGY PROJECTS

RIVER CLUB GOLF COURSE
MOWBRAY, CAPE TOWN

26 MARCH 2014

SANEDI’s mandate is derived from the authority and obligations set out in the following policies, legislation and constitutional requirements.

- The following specific plans, directives and public announcements which reinforces SANEDI’s responsibilities
- Strategic Plan of the Department of Energy
<table>
<thead>
<tr>
<th>STRATEGIC OUTCOMES</th>
<th>PROGRAMMES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All/Crosscutting</strong></td>
<td>1. Corporate Governance and Administration</td>
</tr>
<tr>
<td>Enable well informed and high confidence energy planning, decision-making and support policy* development</td>
<td>2. Applied energy research and demonstration including sub-programmes for:</td>
</tr>
<tr>
<td></td>
<td>• Advanced fossil fuels including Carbon Capture and Storage</td>
</tr>
<tr>
<td></td>
<td>• Clean Energy Solutions</td>
</tr>
<tr>
<td></td>
<td>• Smart Grids</td>
</tr>
<tr>
<td></td>
<td>• Green Transport</td>
</tr>
<tr>
<td></td>
<td>• Working for Energy</td>
</tr>
<tr>
<td></td>
<td>• Data and Knowledge Management</td>
</tr>
<tr>
<td>Support accelerated transformation to a less energy and carbon intensive economy</td>
<td>3. Energy efficiency programme</td>
</tr>
<tr>
<td>Foster a culture of energy efficiency and more rational energy use</td>
<td></td>
</tr>
</tbody>
</table>
WORKING FOR ENERGY PROJECTS
ORIGINS OF THE WORKING FOR ENERGY PROGRAMME

- Mandate of the Department of Energy.
- Set in a predominantly grid based environment of the National Electrification Programme.
- Set to demonstrate the application of renewable energy to address energy poverty in far flung areas.
- Flows from the Working for Water Programme’s removal of invasive and alien species programme for energy production.
- Essential element of job creation drive of Government under the incentivised Expanded Public Works Programme (EPWP).
- Targeting the youth, women, people with disabilities.
- Focusing in rural areas (and low income peri-urban areas).
The Working for Energy Programme is aimed:

- **Applied Research**
  - Research into the availability and sustainability of renewable energy resources in targeted areas (rural areas and low income urban areas);
- **Demonstration of Renewable Energy Technology Applications**
  - Biomass to energy initiatives from invasive alien plants and bush encroachment;
  - Production of charcoal derived in an environmentally friendly manner from invasive alien plants and grasses;
  - Biomass to bioenergy (biogas) derived from agricultural waste for rural and non-municipal commercial application
  - Development of mini-grid hybrid and smart grid systems fed from various renewable based resources;
  - Mini-hydro systems and run-of-river schemes for non-grid applications.
  - Solar powered electricity generation systems for small scale and minigrid based systems.
  - Waste to energy from municipal and non-municipal solid waste and sewage treatment facilities;
  - Small wind generation for non-grid applications, and
  - Other alternative fuel sources for low cost housing, space heating, cooking and water heating.
MANDATE OF THE WORKING FOR ENERGY PROGRAMME

Energy Saving Initiatives

- Energy management planning and methodology framework for social facilities, homes and SMME businesses, including solar passive design;
- Thermal efficiency and energy management for the development and installation of biomass insulation and other materials for application in poor or rural households, subject to SABS approval;
- Energy management planning methodology and framework for the provision of energy (and water saving technologies, water loss management and leakage monitoring and control as part of energy saving initiatives).
- Research studies for energy poverty eradication, sustainable feedstock provisions and alternative fuel sources for low cost housing’s low carbon space heating, cooking and water heating.

- Working for Energy Outreach
# ORIGINAL WORKING FOR ENERGY PROJECTS

## Incentivised Projects

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioenergy Cluster</td>
<td>Eastern Cape (Alice, Fort Cox and Melani Village)</td>
<td>Fort Cox-Reticulation Incomplete Melani Village-leaking outlet tank</td>
</tr>
<tr>
<td>Bioenergy Cluster</td>
<td>Western Cape (Phillipi)</td>
<td>Insufficient Biomas Unworkable mobile gas transportation system. Relook at sustainable biomass supply options</td>
</tr>
<tr>
<td>Greening of Robben Island</td>
<td>Western Cape</td>
<td>Canned</td>
</tr>
<tr>
<td>Bioenergy to Power</td>
<td>Bela-Bela</td>
<td>No PPA, No revenue</td>
</tr>
</tbody>
</table>
## CURRENT WORKING FOR ENERGY PROJECTS

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Purpose</th>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioenergy Cluster Repairs</td>
<td>Generation and utilisation of biogas for thermal applications</td>
<td>Eastern Cape (Alice, Fort Cox and Melani Village)</td>
<td>Work In Process</td>
</tr>
<tr>
<td>Bioenergy Cluster</td>
<td>Generation and utilisation of biogas for thermal applications</td>
<td>Western Cape (Phillipi)</td>
<td>Work in Process</td>
</tr>
<tr>
<td>Greening of Robben Island</td>
<td>Reduction in the dependency of diesel for offshore applications</td>
<td>Western Cape</td>
<td>Canned</td>
</tr>
<tr>
<td>Bioenergy to Power (Bela Bela)</td>
<td>Electricity generation from biogas Reticulation of biogas for domestic use</td>
<td>Bela-Bela</td>
<td>Challenged</td>
</tr>
<tr>
<td>Melani Village Biogas Expansion</td>
<td>Generation and utilisation of biogas for thermal applications</td>
<td>Melani Village, Eastern Cape</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Illemebi District Biogas project</td>
<td>Generation and utilisation of biogas for thermal applications</td>
<td>Illemebi District, KwaZulu-Natal</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Mpfuneko Biogas Project</td>
<td>Generation and utilisation of biogas for thermal applications</td>
<td>Mpfuneko, Giyani, Limpopo</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>
## CURRENT WORKING FOR ENERGY PROJECTS

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Purpose</th>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greening of Tshireleco High School</td>
<td>Demonstrate renewable energy usage even in urban areas</td>
<td>Galeshewe, Kimberly</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Greening of TYGERKLOOF High School</td>
<td>Demonstrate renewable energy usage boarding facilities</td>
<td>Vryburg, North West</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Greening of Robben Island</td>
<td>Reduction in the dependency of diesel for offshore applications</td>
<td>Western Cape</td>
<td>Canned</td>
</tr>
<tr>
<td>Bioenergy to Power (Bela Bela)</td>
<td>Electricity generation from biogas</td>
<td>Bela-Bela</td>
<td>Challenged</td>
</tr>
<tr>
<td>Greening of Emerging Farmers Facilities</td>
<td>Demonstrate renewable energy usage even in urban areas</td>
<td>Limpopo, Northwest, Gauteng</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>
ILLEMBE-NDWEDWE BIOGAS

ENERGY INNOVATION FOR LIFE
MPFUNeko BioGas Project - Limpopo

Project Name: Mpfuneko Rural Domestic Biogas Project

Project Description: Providing 55 households with Ready-to-Cook Biogas

Implementing Agent: Mpfuneko CS

Energy Innovation for Life
MINIMISATION OF DEFORESTATION - MPFUNEKO
USAGE OF BIOGAS - MPUNEKO
FORT COX BIOENERGY PROJECT – ESTABLISHMENT OF THE ORGANIC GARDEN

ENERGY INNOVATION FOR LIFE
FORT COX COLLEGE PRODUCTIVE ORGANIC GARDEN

ENERGY INNOVATION FOR LIFE
WASTE TO ENERGY-PIG WASTE BELA BELA
Renewable Energy Conversion Project

Biogas from vegetation & household waste

Retro-fit of Solar Water Heating

2 x Concentrated Solar Plant

Energy Efficiency & Solar Power & LPG for transport services

Wind and Wave Energy

Retro-fit buildings with EE Technology

Project developed as a public/private partnership.

SAVINGS OF DIESEL = R450K month

Reduced dependency on diesel generators
BIO-WASTE TO PORTABLE BIOGAS PHILLIPI PROJECT WESTERN CAPE

ENERGY INNOVATION FOR LIFE
BIOMASS TO ENERGY

- Renewable energy production and utilization for low income communities.
- Creation of Green Jobs and contribution to the new growth path
- Skills Development

Biomass Production value added goods and production of fuel pellets

Various forms of Biomass and Waste to Energy initiatives

ENERGY INNOVATION FOR LIFE
GREENING OF FACILITIES
GREENING OF GAUTENG SCHOOLS

ENERGY INNOVATION FOR LIFE
MUNICIPAL WASTE TO ENERGY
MUNICIPAL WASTE

SEWERAGE TREATMENT PLANTS

- There is no concerted effort to rehabilitate the Bio-digesters in MSWTPs
- There is no beneficiation of biogas produces

EXISTING SOLID WASTE / LANDFIL SITES

- There is potential to harvest and beneficiate biogas from landfill sites.

NEW SOLID WASTE / LANDFIL SITES

- Not designed for landfill gas extraction
- Waste separation at source

OTHER WASTE

- Waste tyres (Pyrolysis)-REDISA
POTENTIAL USES

- Public Transportation
- Electricity generation (own generation or distribution)
- Heat generation (industrial, commercial and domestic)
SOLID WASTE TO ENERGY - COGENERATION

ENERGY INNOVATION FOR LIFE
MODEL OF A SOLID WASTE TO ELECTRICITY PLANT (RWE-ESSEN)
RWE-TIPPING SITE
BOILER COMBUSTION CHAMBER
Income for Waste to Energy Facilities
  – Preferential PPA on electricity produced
  – Tipping fees
  – Bi-products
    – Gypsum
    – Bio-fertilisers
    – I
STANDARDS AND REGULATIONS

No National Standards on Biogas
  – Quality
  – Residual gasses (CO2, NOx, Sox)
No National Standards on Biogas installations
Currently LPG standards are being used.
Biogas Platform established by DoE with GIZ
The working for Energy Programme is part of the EPWP, and has the following objectives:

- Promotion and advocacy of green technologies
- Skills development
- Job Creation
- and empowerment of vulnerable groups (Youth, women and people with disabilities).

In future, the Working for Energy Programme will also look at:

- Collaboration with INEP to determine suitable new and renewable energy options for hot and arid areas such as the Northern Cape;
- Green Village Initiatives (Water-food-energy nexus)
- Waste to Energy Options
- Solar Refrigeration
- Solar PV paints
PARTNERSHIPS

The SANEDI work is intertwined with the mandates of other Stakeholders.

There is a need to formalise ties with all working in the applied research and demonstration space.

Stakeholder engagement process is being developed.
THANK YOU

ENERGY INNOVATION FOR LIFE