How2Guide for Bioenergy
Waste-to-energy and Biogas

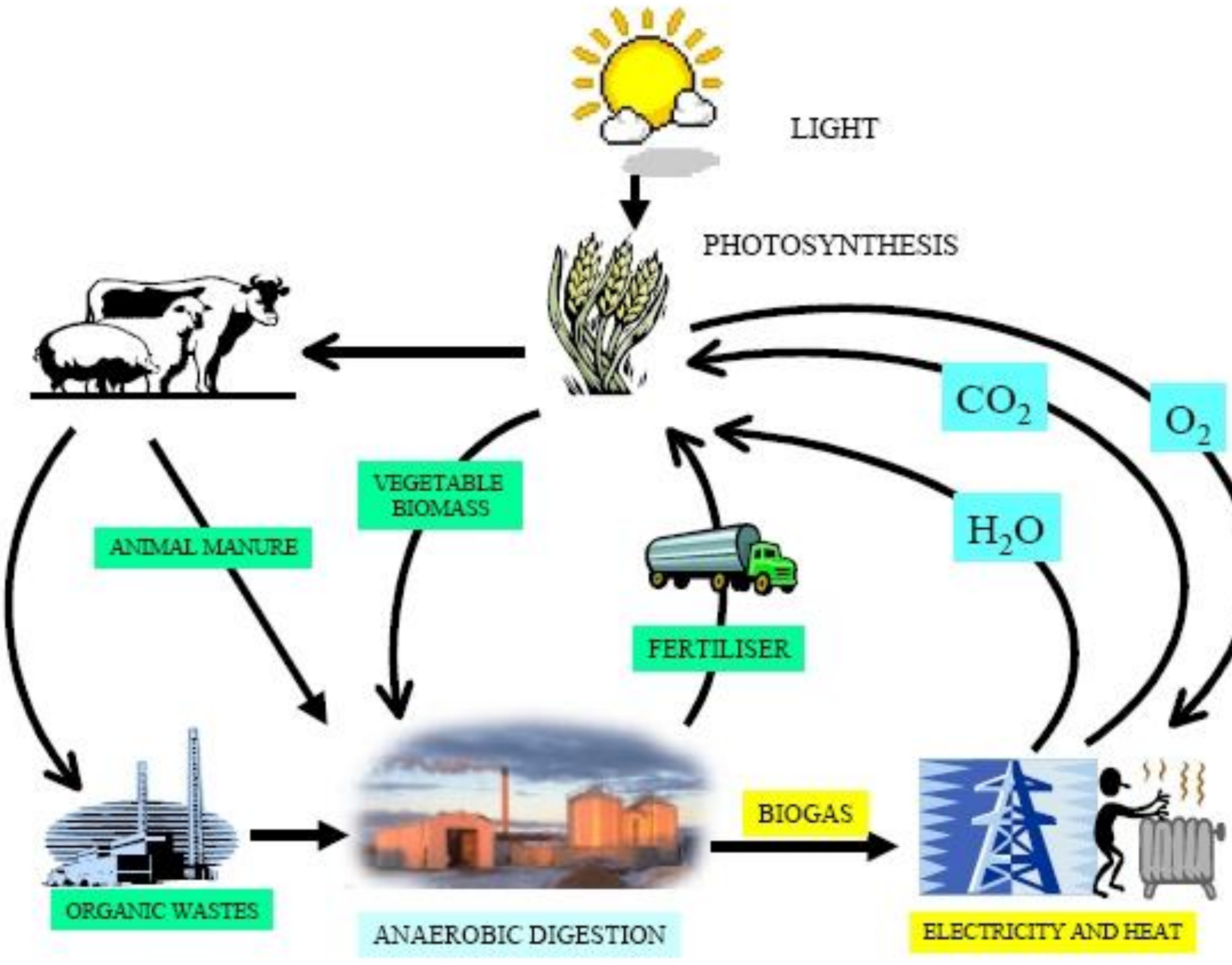
Barriers & Opportunities for Biogas in South Africa

29 April 2014

Presented by: Mark Tiepelt

SABIA
SOUTHERN AFRICAN BIOGAS INDUSTRY ASSOCIATION

WASTE & ENERGY PRODUCTION CYCLE



BIOGAS IN SOUTH AFRICA vs WORLD:

For all intents and purposes there is NO biogas industry in South Africa

There are less than 400 digesters in the whole of SA!

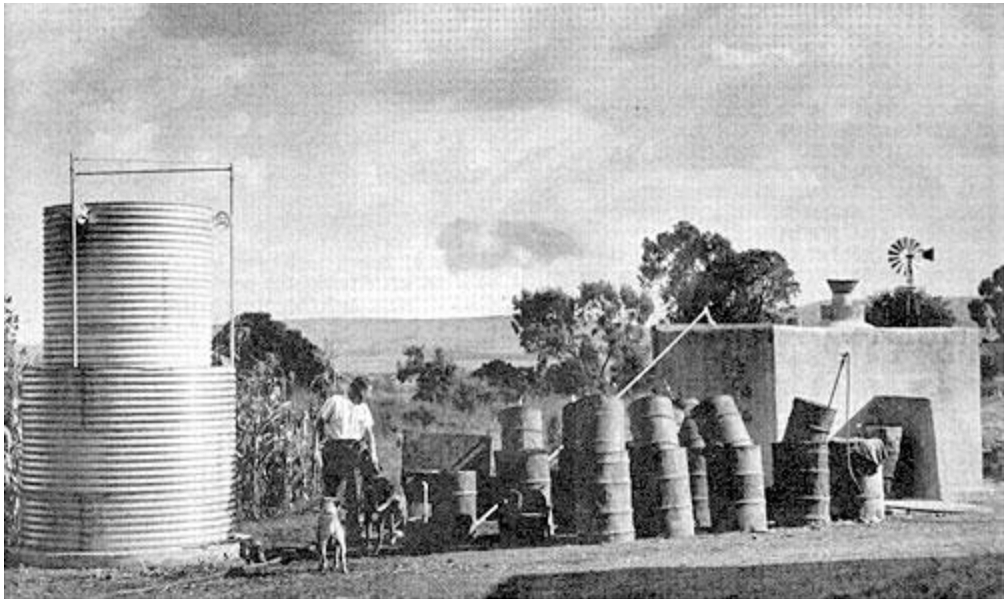
Approx 90% small scale domestic

China: 17 million
India: 12 million
Lesotho: 600

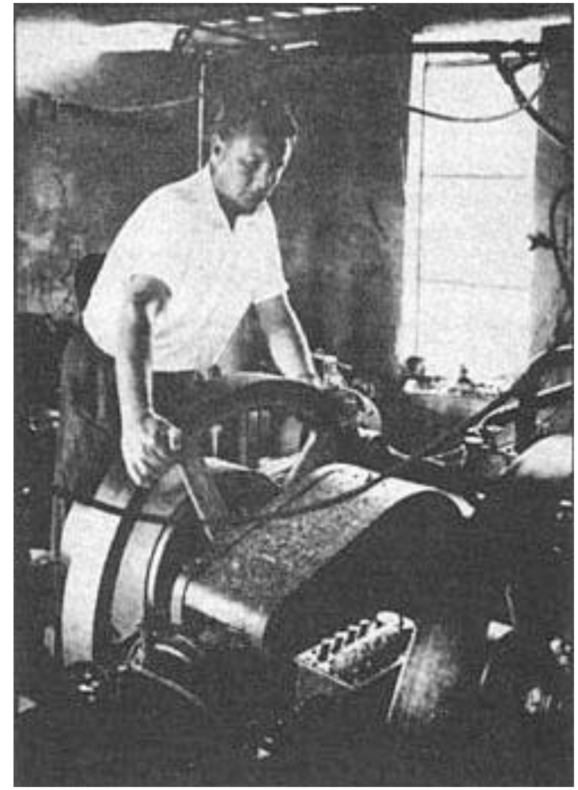
Germany: 7500 commercial digesters with installed capacity of 3.35GW (45 000 job opportunities)

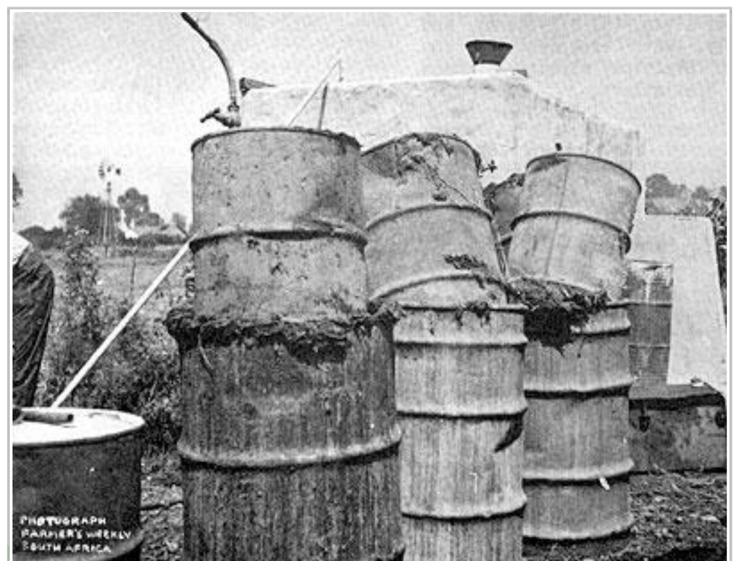
SABIA
SOUTHERN AFRICAN BIOGAS INDUSTRY ASSOCIATION

John Fry: Biogas Pioneer



Photograph appeared in a Farmers Weekly published in 1957!





SABIA
SOUTHERN AFRICAN
BIOGAS INDUSTRY ASSOCIATION

MULTIPLE BENEFITS OF BIOGAS:

Biogas plants do not ONLY produce electricity!
(Solar, wind & hydro produce only electricity)

- Sustainable waste management (abattoirs, manure, processing plants, cheese factories, breweries, etc)
- CHP (free thermal energy: heating AND cooling)
- Digestate is an organic compost (additional revenue stream)
- Potential of using CO_2 in green houses
- Carbon footprint/carbon neutrality
- Green jobs (5/MW compared to 0.9/MW for solar!)
- Skills transfer (introduction of new technology)
- Manufacturing potential (especially related to rural biogas)
- Rural beneficiation
- Vehicular biogas

SABIA
SOUTHERN AFRICAN
BIOGAS INDUSTRY ASSOCIATION

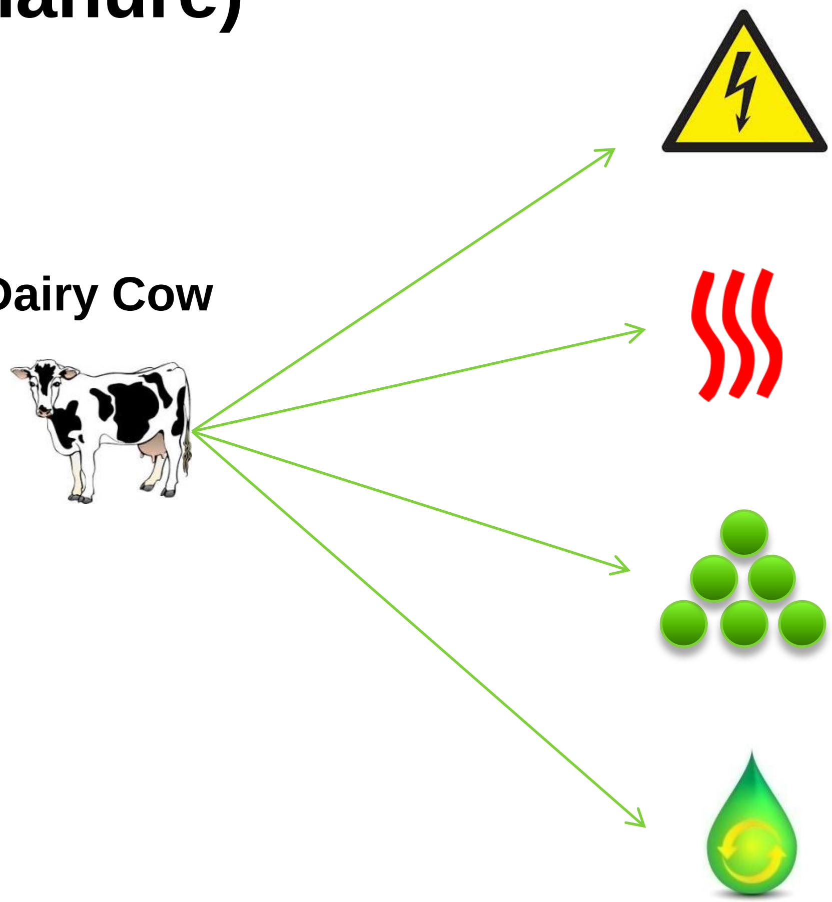
TYPICAL FEEDSTOCKS

- **Sewerage waste:** domestic, municipal, schools, hotels, etc
- **Food waste:** domestic & industrial/commercial, incl. fats and oils
- **Manure:** pig, cattle – dairy or feedlot, chicken, etc
- **Agricultural:** vegetables, fruit, maize, sugar cane, etc
- **Commercial:** abattoirs, cheese factories, breweries, wine estates, processing plants, fruit & veg packaging plants, etc

NOTE: SA commercial sector largely uninformed

Potenial benefit of a dairy cow (manure)

1 Dairy Cow



Electricity
790 kWh/Cow/Yr
Value @ R1/kWh = R790

Heat
1144 kWh/Cow/Yr
Value @ R0,25/kWh = R286

Solids
4 ton/Cow/yr
Value of Phosphate = R900

Liquid Effluent
14 ton/Cow/yr
Value of N,K = R1100

Potential value of ONE dairy cow ± R3 000

SABIA
SOUTHERN AFRICAN BIOGAS INDUSTRY ASSOCIATION

Study conducted by UCT on energy potential from Waste Water in SA

Wastewater		MWth	MWe
Domestic black water	**Municipal WWTP**	842	253
Animal husbandry	Feedlots (solids & liquids)	215	65
	Rural cattle (kraaled at night - solids only)	3445	1035
	Dairies (solid & liquid)	121	36
	Piggeries (solid & liquid)	715	215
	Poultry (solid only)	2976	894
	Red meat & Poultry Abattoirs (liquid waste only)	55	17
Olive production		4	1
Fruit processing	**Waste water only, no pulp or pomace**	68	20
Winery		3	1
Distillery	Grain, grape & sugarcane (molasses)	70	21
Brewery		17	5
Textile industry		22	7
Pulp and paper		100	30
Petrochemical waste		48	14
		8701	2613

Courtesy of: WRC Energy from Wastewater Feasibility Study
ESSENCE REPORTS compiled by UCT

SABIA
SOUTHERN AFRICAN BIOGAS INDUSTRY ASSOCIATION

ROUGH ESTIMATE OF MARKET VALUE

SECTOR		Number In SA	±Rm/Project	Total Value
Agriculture	Dairies (Housed)	*120*	1.8	216
	Dairies (Pasture based)	*500*	1	500
	Piggeries	*800*	0.8	640
	Feedlots (large scale)	*15*	10	150
	Feedlots (small scale)	*200*	1	200
	Vegetable farmers	*300*	8	2400
				4106
Packaging Plants	Fruit & Vegetables	*30*	8	240
Abattoirs		*50*	10	500
Food Processing	Meat, Bakeries, dog food, etc	*500*	10	5000
Wine Estates		*50*	6	300
Breweries		*10*	10	100
Cheese Factories		*30*	2	60
				6200

SABIA
SOUTHERN AFRICAN BIOGAS INDUSTRY ASSOCIATION

CURRENT STATUS OF BIOGAS INDUSTRY IN SOUTH AFRICA

POSSITIVES:

- Creation of SABIA (Southern African Biogas Industry Association)
- Establishment of the National Biogas Platform
- First national biogas conference sponsored by DoE & DBSA November 2013 – next conference in Sept 2014
- Full support from GIZ (biogas one of 2 main focus areas)
- Growing awareness on all levels of government

CHALLENGES:

- Lack of local experience
- Lack of understanding/appreciation of multiple benefits, especially compared to other renewables
- Excessively long approval processes (license, PPP, PPA, wheeling agreements, MFMA, etc)
- Possibility of being overrun by foreign companies
- Funding reluctances from banks due to perceived risk/ignorance

SABIA
SOUTHERN AFRICAN
BIOGAS INDUSTRY ASSOCIATION

METHANE POWER!!!

SABIA
SOUTHERN AFRICAN
BIOGAS INDUSTRY ASSOCIATION

QUESTIONS?

Contact: Mark Tiepelt

Email: chairman@biogasassociation.co.za
Web: www.biogasassociation.co.za