INTEGRATED RESOURCE PLAN III, 2016 PUBLIC CONSULTATIONS 12 DECEMBER, 2016 SORTING THE BASELOAD

WHAT IS NEEDED TO ADD BIOGAS TO SUSTAINABLE ENERGY MIX?

By Yvette Abrahams
Department of Women and Gender Studies
University of the Western Cape

CONCUR WITH OTHER SUBMISSIONS

- OUTA SUBMISSION RE: FLAWS IN PUBLIC CONSULTATION PROCESS
- DEMOCRACY WORKS SUBMISSION ON IEP, IN PARTICULAR OUR INTERNATIONAL COMMITMENTS FOR CARBON EMISSIONS
- CSIR (AND OTHERS) RE: ARBITRARY CAP ON RENEWABLE ENERGY
- MACE SUBMISSION RE: NO NEED FOR NUCLEAR
- EIUG SUBMISSION ON THE NEED TO REVISIT DEMAND FIGURES
- PREVIOUS SUBMISSION ON MY PART (AS CGE) FOR IRP II: ON PRICE ELASTCITY OF DEMAND AS WELL AS MACROECONOMIC EFFECTS OF ELECTRICITY PRICE INCREASES
- REPEATED (AS WGS, UWC) FOR IRP 'UPDATE' 2014
- SAFCEI AND OTHER SUBMISSIONS ON NUCLEAR COSTING AND PROCESS ISSUES CONCERNING NUCLEAR

BIOGAS AS SOLUTION TO "BASELOAD PROBLEM"

- BIOGAS CAN BE COMPRESSED AND STORED
- 55 M SOUTH AFRICANS PRODUCE ABOUT 13 750 TONS OF SOLID WASTE/DAY
- AND A ROUGHLY EQUIVALENT AMOUNT OF COMPOSTABLE WASTE
- EQUALS 440 000 CUBIC M^2S/DAY (BROWN)
- AND 1 650 000 M^2S/DAY (GREEN)

http://www.seai.ie/Renewables/Bioenergy/Bioenergy_Technologies/Anaerobic_Digestion/The_Process_and_Techniques_of_Anaerobic_Digestion/Gas_Yields_Table.pdf

- 880 000 KWH.DAY (BROWN) + 3.3 GWH/DAY (GREEN)= 4.18 GWH/DAY

http://www.biogas-info.co.uk/about/biogas/

BIOGAS

TRYING TO CALCULATE LCOE FOR BIOGAS IS A LITTLE LIKE TRYING TO CALCULATE PRODUCTIVITY FIGURES FOR PERMACULTURE: BIOGAS PRODUCTION WILL ALWAYS BE SPECIFIC TO THE LOCAL MICROCLIMATE. FACTORS DETERMINING LCOE'S WILL BE

- **AVAILABILITY AND COST OF FEEDSTOCK**
- **TEMPERATURE**
- **PH. VALUE**
- **TECHNOLOGY USED**
- **FOR SIMPLICITY THIS PRESENTATION WILL IGNORE COMBINED HEAT AND POWER DIGESTERS, BUT FOR COMPARISON FOR EVERY KWH ELECTRICITY PRODUCED ABOUT 1.25 KWH HEAT IS PRODUCED**

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1. CAN ENOUGH BE PRODUCED?

Country	Year	Production Twh/Y	Of which wastewater	Percentage	Population In millions
Brazil	2014	0.613	0.042	7%	200
South Korea	2013	2.578	0.969	38%	50
Germany	2014	41.550	3.050	7%	80.6
Sweden	2013	1.686	0.672	40%	9.5
United Kingdom	2013	6.637	0.761	11%	64.1

N. Bachmann Sustainable Biogas Production In Municipal Wastewater Treatment Plants , International Energy Agency BioEnergy, 2015, pp. 4.

2. HOW MUCH WOULD IT COST?

LCOE EUROPE: R 2.13- R 3.39/KWH

ASSUMING COST OF R 0.40-R0.63/KWH FOR FEEDSTOCK AND EXCLUDING CHP

kost, christoph *et al* Levelized Cost Of Electricity Renewable Energy Technologies Fraunhofer Institut For Solar Energy Systems , 2013, pp.2.

LCOE US: R 0.86 – R 3.37/KWH (ALL TECHNOLOGIES EXCEPT CHP)

LCOE US: R 0.86 – R 2.15/KWH (DIGESTERS)

FEEDSTOCK COSTS INCLUDED.

International Renewable Energy Agency Working Pa per Volume 1: Power Sector Issue 1/5 Biomass For Power Generation, 2012

EG. CAPE TOWN (POPULATION 3.74 M.)

PRODUCES CA. 935 TON SOLID WASTE/DAY AND 29 920 M^3 BIOGAS PER DAY.

IF MIXED WITH EQUIVALENT AMOUNT OF FOOD WASTE, WOULD ADD CA. 112 200 M^3 BIOGAS/DAY.

Personal communication Agama Energy

YIELDS CA. 284 240 KWH/DAY

http://www.biogas-info.co.uk/about/biogas/

AT RANGE (INCLUDE COST AS TRANSPORTING GREEN WASTE)= CA. R 244 446.4 – R 963 573.6/DAY.

CURRENT COST OF SEWERAGE TREATMENT IN CT (OPERATING BUDGET):

3.306M/DAY

CAPITAL BUDGET: 2016-17 R 481 579M

//www.capetown.gov.za/en/Budget/Budget%20201617/Annexure%20A_1617Budget_May16.pdf pp. 65

I.E. SHOULD LEAD US TO A NEGATIVE ENERGY COST ☺