



EIE-06-256 REEPRO



# **Promotion of the Efficient Use of Renewable Energies in Developing Countries**

**Training equipment data sheet**

**Data sheet No.: 2**






**Authors**

COMPED

May, 2009

<b>Type of Equipment:</b> (tick off the type)	PV		Solar Thermal		Biomass to Energy	
					✓	
<b>Name:</b>	<b>COMPED</b>					
<b>Location of the equipment:</b>	COMPED training centre, Dang Kor district, Phnom Penh					
<b>Year of purchasing:</b>	2009					
<b>Operator:</b> (Name and address)	Mr. Chhun Thoen, staff at COMPED training centre					
<b>Planner:</b> (Name and address)	COMPED, Dangkor district, Phnom Penh					
<b>Detailed description of the installation:</b> (technology, function, benefit for training, etc. max 150 words)	<p>It is a biodigester constructed by NBP (National Biodigester Programme) in Cambodia. There are 2 plants, which one is for displaying the function and benefit of biodigester for cooking and lighting of a family living at COMPED training centre, and another one is a cross-cut view of the biodigester for showing visitors about the inside view of the plant from the inlet to outlet</p> <p>These equipments are mainly for training display for the 3 levels of REEPRO project and other relevant visitors.</p> <p>It is useful for training that COMPED can not only give the theoretical knowledge of biodigester but also participants can realise about the application, function and process of the biodigester.</p>					
<b>Generated Energy service:</b> (tick off the energy type)	electricity	heat	gas	light		
			✓	✓		
<b>Power output of installation:</b> (kWel, m <sup>3</sup> biogas, kW th, etc.)	4 m <sup>3</sup> biogas					
<b>Financing*</b> (tick off the financing type)	private investment	loan	donation	grant		
				✓		
<b>Investment costs in US\$*</b>	2623.68 USD					
<b>Maintenance costs in US\$*</b>	95.08 USD					
<b>Savings*</b>	N/A					
<b>Energy sale income in US\$*</b>	N/A					
<b>Comments</b>	It was the first time for NBP to construct a cross-cut of biodigester. There was a collapse of one wall of the cross-cut digester during storm rain. For the straight wall, one should use steel reinforcement.					
<b>Pictures and graphics</b>	Biodigester and cross-cut biodigester					

\*Only when the equipment is used permanently

Biodigester	
Cross-cut biodigester	
Cow stable	
2 cows	
Function and process of biodigester were explained and have cross-cut view to have better understanding on the procedure inside the plant.	

Benefit and usage methods were given by REEPRO TOT to participants of REEPRO Training level 1 on Feb 17<sup>th</sup>-20<sup>th</sup>, 2009.



On 30<sup>th</sup> April, 2009, COMPED has introduced the cross-cut biodigester and explained the principle idea behind the construction and compared and exchanged the idea with a member of BORDA-COMPED partners from Germany, the Philippines, Indonesia and Vietnam. BORDA has developed also a biodigester for treatment of black wastewater from toilet (organic wastewater).



COMPED has explained and checked the outlet materials (slurry) is more condensed compared to the one developed by BORDA due to input materials are different.



**Possible practical exercises on Biodigester**

**Level 1 and 2– Biodigester size selection**

1. Purpose of this exercise

Purposes of exercises were instructed to the participant how to discuss with owner for some requirement and fill some information for biogas plants then choosing biogas plant size

2. Performance

Participants fill the information form step by step then complete with example exercise about each biogas plant size by having some basic assumption:

- Type of animal and its manual production
- Cow manure need according to different plant size
- household members: Need 0.2-0.3 m<sup>3</sup>/day
- HRT= 40 day
- Gas requirement of different biogas applicants

Exercise questions are:

- Plant size?
- Daily manure need?

Formula:

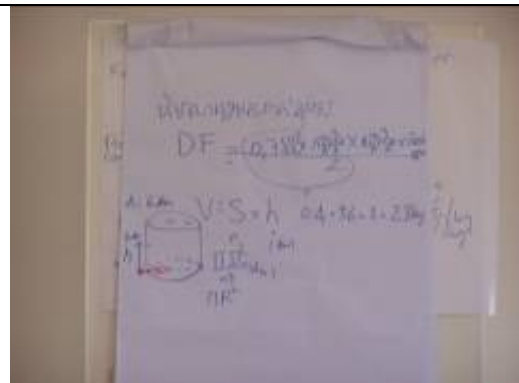
- $HRT = \text{mixture volume} / \text{needed daily manure}$
- $\text{Bio-dige. Size} = \text{mixture volume} + \text{gas volume}$
- In general,  $\text{Gas volume} = 25\% \text{ bio-dig. volume}$



**Instruction and fill how to collection requirement information and choosing biogas plant size**



Plant size calculation presentation



Cow manual need calculation

3. Results

All participants are quite good experience with practice exercise. The training provided knowledge and chance to exchange their experience. Another important thing is that all of them can calculate by themselves with the size of the proposed biogas plants and requirement.

### Level 1-2 – Quality Control and Complete Regulation Form

#### 1. Purpose of this exercise

Purposes of exercises were checked with quality of biogas plant and gas leak after construction and correct some mistake in the past for complete regulation form.

#### 2. Performance

- For Biogas plant control after construction we measure with model biogas plant by allow the standard biogas plan that used by NBP.
- Complete some information that related to the biogas leak before measure the slurry for control with gas leak problem.
- Complete exercise with the regulation form to enhance the knowledge for participants to fill regulation form before start to construct the biogas plant.



How to measure



Gas leak check



NBP regulation

#### 3. Results

Result of exercises during training all participants were absorbed the new knowledge for correcting biogas plant, gas leak check and how to complete the form.