WASTE REDUCTION
Through Biogas & Awareness Improvement Program

A CASE STUDY IN PHNOM PENH
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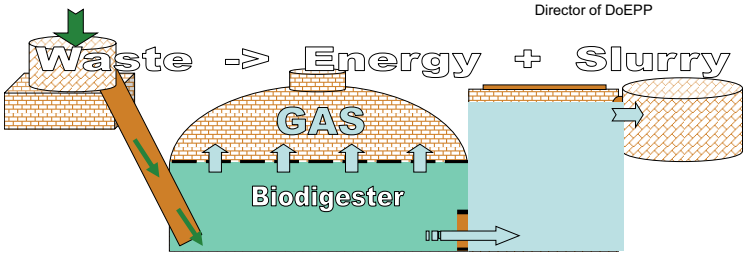
Director of DoEPP



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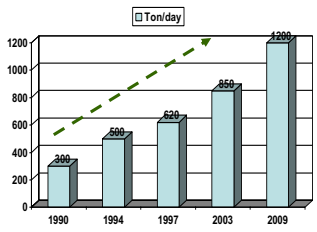
PROBLEMS



- Urban Waste increase constantly, especially organic waste, 60% of the whole, makes Mgt. pressure.
- Environmental pollution: Odor, Leakage and pest /flies habitats, effects to health.
- Land problem for city landfill, more dump more need.

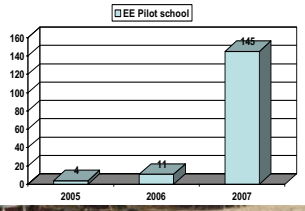
How to deal with?

History of PP SWM

- Handling waste: Collection-Disposal
  - by City Department,1979-1993
  - by investor PAD,1994-95
  - by local authority-Private sector- 6 months of 1995
  - by Local authority +investor EDC,1996-97
  - by combined local companies PSBK,1997-2002
  - by private contractor CINTRI, 2003-now
    - Industrial waste collection-Disposal: SaromTrading 2003-now
    - Dry Battery Waste collection-Disposal: DoEPP, 2007-now
    - Medical waste collection-incineration: Red-cross, 2008-now

Strategy 1: Aware for the next generation

- Change behavior
  - No Littering
  - Dispose waste in the right place
- Segregation
  - Valuable waste for increase school income.
  - Recyclable waste for use again and making some materials.
  - Compost-able waste for plantation.
  - Small waste number for landfill



Cont.

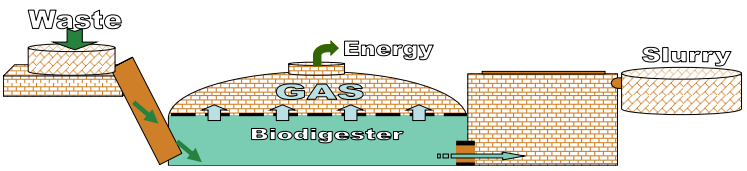
Srategy2: Awareness improvement in Community

- Reduce waste dumping amount at Landfill:
  - Organic waste from vegetable markets 10 to 15t/day makes the compost.
  - Slaughterhouse waste 8-10t/day produces biogas and slurry.
- Reduce households waste:
  - Using the compost bins.
  - Separation for valuable waste for sell and organic waste for biogas and slurry.
  - Dry battery waste for proper disposal.

What has been done, so far?

Introduction

- The current population growth, the urbanization of the country as well as its industrialization has resulted in a growing amount of solid wastes.
- Firewood is extensively used as a major source of energy, leading to deforestation.
- Many Cambodian people are economically or geographically inaccessible to electricity or fossil fuels for cooking.



For 3 ways solving

- Convert the slaughterhouse waste to dump as raw material at biogas centre.
- Used toilet and Kitchen waste as the raw material for biogas production.
- To make the proper use the of cow/pig dung for kitchen gas and good organic fertilizer.

CITYNET for Biogas target

- Building 22 m³ biogas 1unit for Community: Using slaughterhouse waste which disposed at the landfill so far, (combined-tech)
- Building 8 m³ biogas 1 unit for domestic used: Using kitchen and toilet waste (Srilanka-tech)
- Building 6 m³ 4 units for farmers: Using pig/cow dung waste which is use only for fertilizer.

Methodology

- Looking for appropriate technology at Local and International experts.
- The cow/pig dung units built by local work skills.
- Organic waste Units built by Help-o work skill in collaborate with Local workers.
- Establish the local work skills group.
- Organized the training seminar for Gov. officials for 2 days: Theory and Practice.

Looking for target owners

- Based on the study,in the rural areas 83% want to have the biogas unit, but 50% able to payback the cost and 60% having the biogas input.

- Due to an awareness compaign on the advantage of biogas unit, the villagers agreed to payback the construction fee as the firewood/LPG monthly cost (2.5$/month)

Looking for local technique

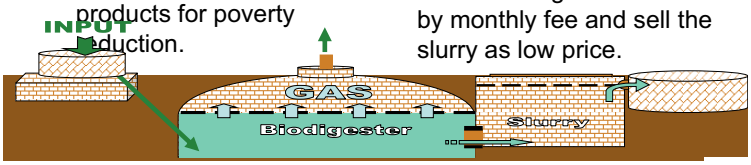
- The CITYNET project director , DoEPP officers, Srilanka experts come to visit the achievements of cow dung unit, local skills, at Kandal Province.
- The plant is favorite for the farmers.

Community Biogas Construction

Objective:

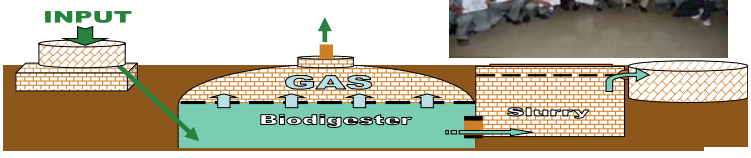
- Using slaughterhouse waste 8-10t/d which is disposed at the landfill so far,
- Placing the slurry more nearest to the farmers as fertilizers.
- Improve the agricultural products for poverty reduction.

- Community contributed the land for construction.
- The cost for construction bearing by CITYNET.
- Raw material: mobilized cow dung, first and using slaughterhouse waste.
- Products supply: 5 households gas for kitchen by monthly fee and sell the slurry as low price.



Awareness Improvement

- The Training seminar on Biogas construction operation and its maintenance.
- 34 participants received the certificate.
- The session was instructed by Help-o Experts and chaired by the vice governor.



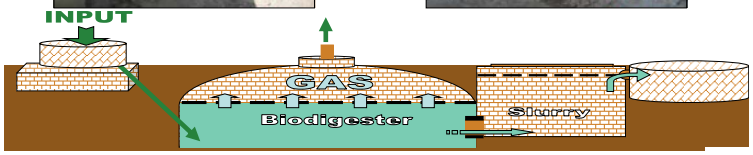
Skill workers group preparation

- The Cambodian skill workers were instructed by Srilankan Skill worker , by using body language in helping hand.

The construction Result for 8m³ Unit

- The 8m³ unit for toilet and kitchen waste owned by Mr.OEUR was celebrated by the authority.
- Nowadays he said : before I spent for 16 US$/month for LPG gas, now the cost for buy additional cow dung is 0.50 US$/week only.

Cow dung units owners

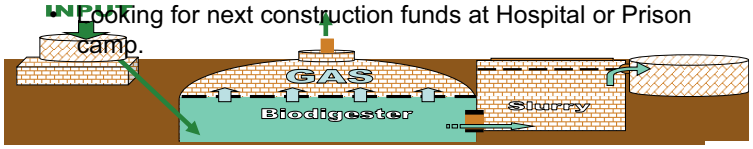


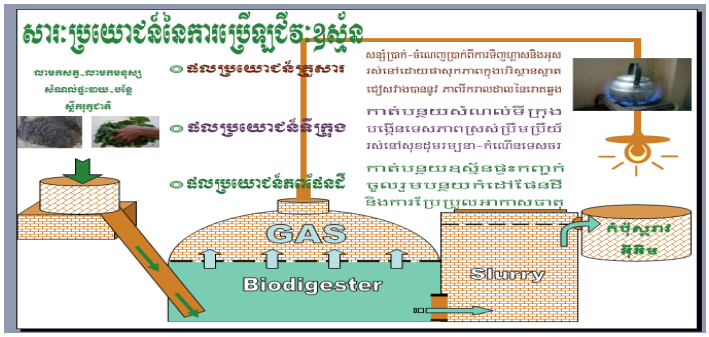
Duration of Energy consumption

Digester size(m^3)	Stove (hour)	Lamp (hour)
4	3-4	8-10
6	5-6	12-15
8	7-8	16-20
10	9-10	21-25
15	14-15	28-32

Expected Results

- 17 tones of Cow/Pig dung be used as the primary raw material.
- 60 tones /year of the organic waste (Kitchen, backyard, human& animal dung) to be used as raw material for biogas.
- 182 tones/ year of slaughterhouse waste to be converted for Biogas and organic Fertilizer.
- 10 households having Gas for kitchen and lighting.
- 500 Tones/year of slurry to be used for organic fertilizer, improving the farming products, improving life living.
- Looking for next construction funds at Hospital or Prison camp.





3 benefits from using Biogas: 1/ For Family: save money from LPG cost or firewood, Living in sanitary area=Clean homeland. 2/For City: reduce urban waste, city landscape , harmonizing and tourist growth. 3/ For Planet: Reduce firewood used, greenhouse gas, global warming & Climate change.

Biogas Lesson Learned

- DIFFICULTY
  - Technology
  - Lack of funding
  - Language barrier
- PERFORMED
  - Improve capacity
  - Mobilize and improve work skills.
  - High level commitment
  - Community participation
  - Ownership strategy
  - Mutual benefit

Conclusion

- 3Rs: Reduce Reuse Recycling or More Rs
  - Its Easy to talk but difficult to carryout
  - Its depend on many factors:
    - The legislation/ local ordinance
    - Leader/ decision maker commitment
    - Awareness and commitment of the people
    - Participation: Public-Private-People
    - Mutual beneficiary

Target for 2010

- Conducting the penalty measure inline with awareness improvement
- Encourage the segregation activities at the 05 Pilot Markets.
- Introduce hotels and hospitals to apply the good management on organic waste and hazardous waste
- Enforce the slaughterhouse to proper waste management
- Improve the dry Battery collection and disposal.
- Construct Biogas units for solving the waste problems at landfill, Hospital and appropriate locations.

Thank you
for your attention