‘The Potential of Biogas/AD in Bangladesh’

Organized by: Strathclyde University and LCEDN

Venue: Strathclyde University

Date: 02 May 2019

M A Gofran

Chairman

BBDF

About BBDF

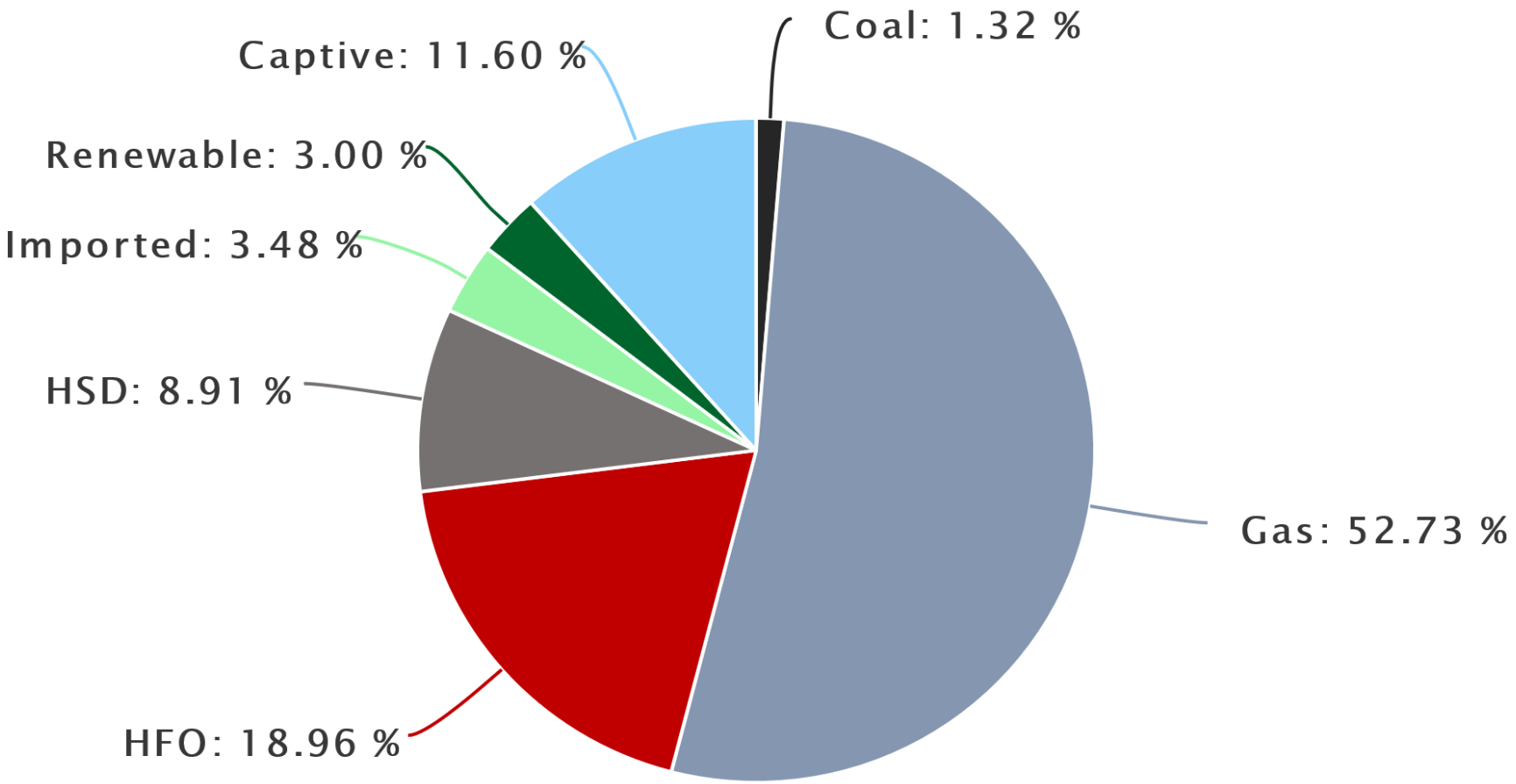
- Bangladesh Biogas Development Foundation(BBDF) established in 2008 as a forum of experts, stakeholders, users working in the field of biogas technology
- At present we have 185 members, of whom 142 are individuals and 43 institutional members
- We conduct research, organize workshop, seminar, opinion sharing meeting etc to draw attention of all towards biogas technology
- We assist government in preparing national policy documents on renewable energy, specifically on biogas technology
- Information dissemination

About Bangladesh

- It is surrounded by India, Myanmar and Bay of Bengal
- Independence: 1n 1971
- Area: 147,570 sqkm (2014)
- Population 164.7 million (2017), 8th populous country
- Per capita income: $1,516 (2017)
- Per capita electricity consumption: 310 kWh
- % of people living in the urban: 35%
- Population density: 1,155/sqkm
- Temperature: 6-40 degree C

Electricity Generation Mix

Source: HCU



Total Power Generation Capacity = 18,973.51 MW

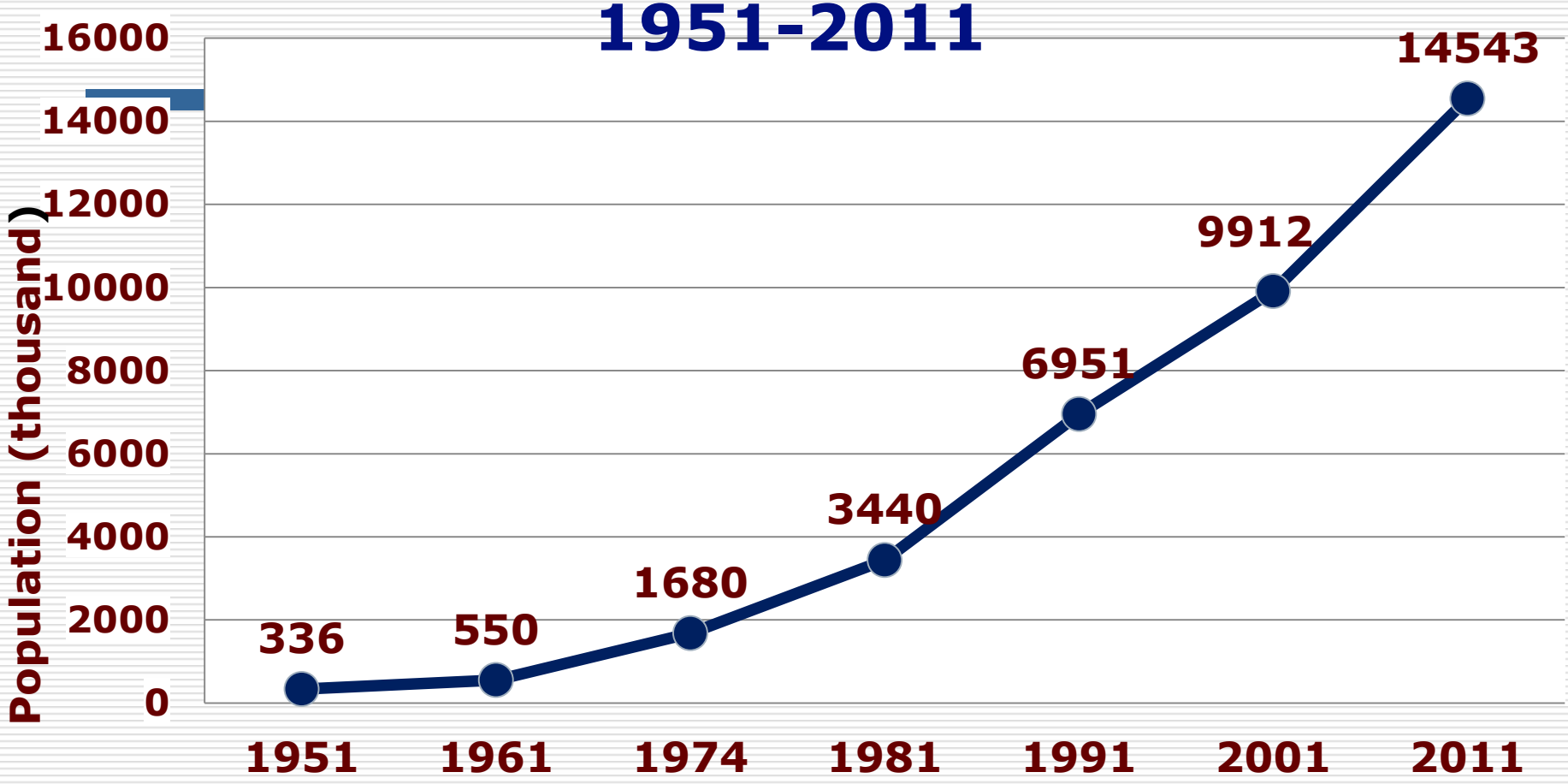
Status of Renewable in Bangladesh

in MW

Technology	Off-grid	On-grid	Total
Solar	291.48	49.77	341.25
Wind	2	1.18	3.18
Hydro	-	230	230
Biogas to electricity	0.68	-	0.68
Biomass to electricity	0.4	-	0.4
Total	294.56	280.95	557.51

Source: SREDA

Dhaka: Population Over Time 1951-2011



In 1951 only 336,000 people would live in Dhaka, which increased to 17 million and generating 25,000 tons of waste/day. Biogas technology can use it as a source of energy and fertilizer ensuring health and environment

About Biogas Technology?

- Raw materials are locally and easily available
- All hazardous organic waste are the raw materials of biogas
- Huge potential with increasing trend
- Systems are decentralized and can reach the remote and rural
- Climate of Bangladesh is favorable for biogas production
- Anaerobic process of biogas production kills pathogen, reduces disease and improves environment.
- The residue from biogas plant is valuable organic fertilizer.
- It is therefore called 3 in one

Use of biogas

Use of bio-slurry

Technology used so far in Bangladesh

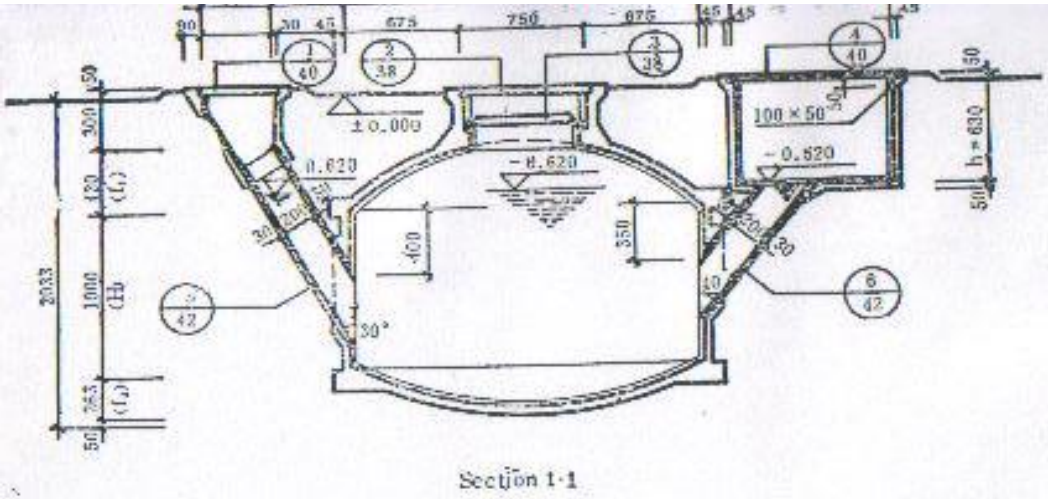
- 1972: Indian floating dome model
- 1992: Chinese fixed dome model
- 2006: IDCOL fixed dome model
- 2009: Chinese portable fiberglass Kunming model
- 2011: 'Mita' portable fiberglass Bangladesh model
- 2011: Commercial biogas plant by Chinese experts
- 2012: Chinese portable fiberglass Hongi model

Indian Floating Dome Model: 1972

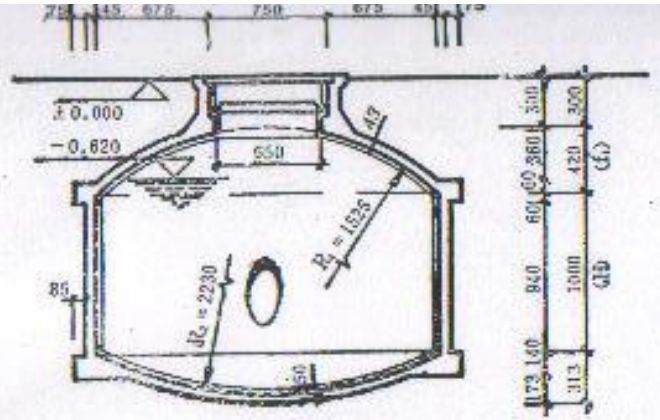
Problems with Indian Floating Dome Model

- Can’t be shifted when needed
- Leakage form in steel dome
- Not cost effective
- Highly dependent on skilled manpower
- Takes long time to construction
- Can’t be constructed during monsoon

Chinese Fixed Dome Model: 1992

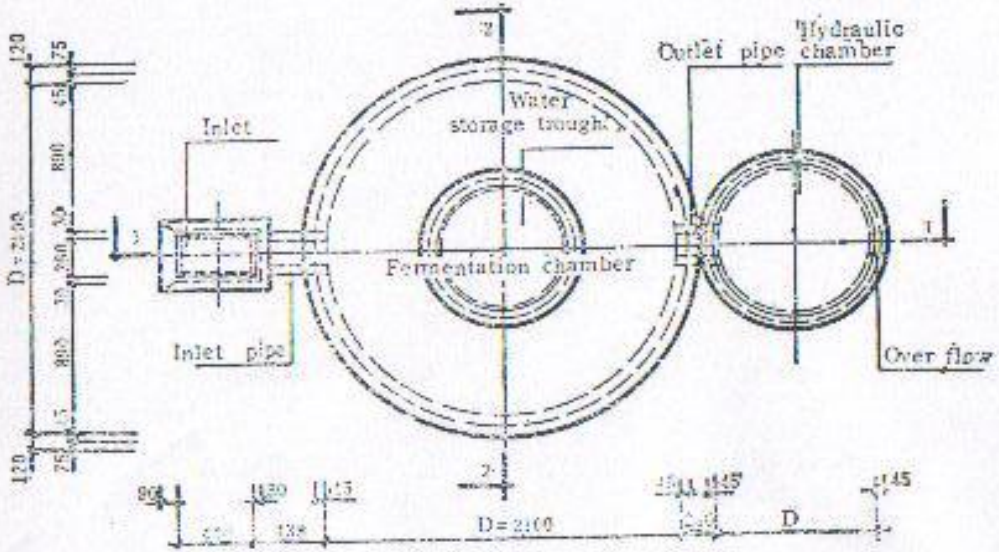


Section 1-1



Section2-2

Fig. 2-14 4 m³ cylinder-shaped hydraulic biogas digester (Unit: mm; similarly hereinafter)



Plan

IDCOL Fixed Dome Model: 2006

Problems with Chinese Fixed Dome Model

- Can’t be shifted when needed
- Highly dependent on skilled manpower
- Takes long time to construction
- Can’t be constructed during monsoon

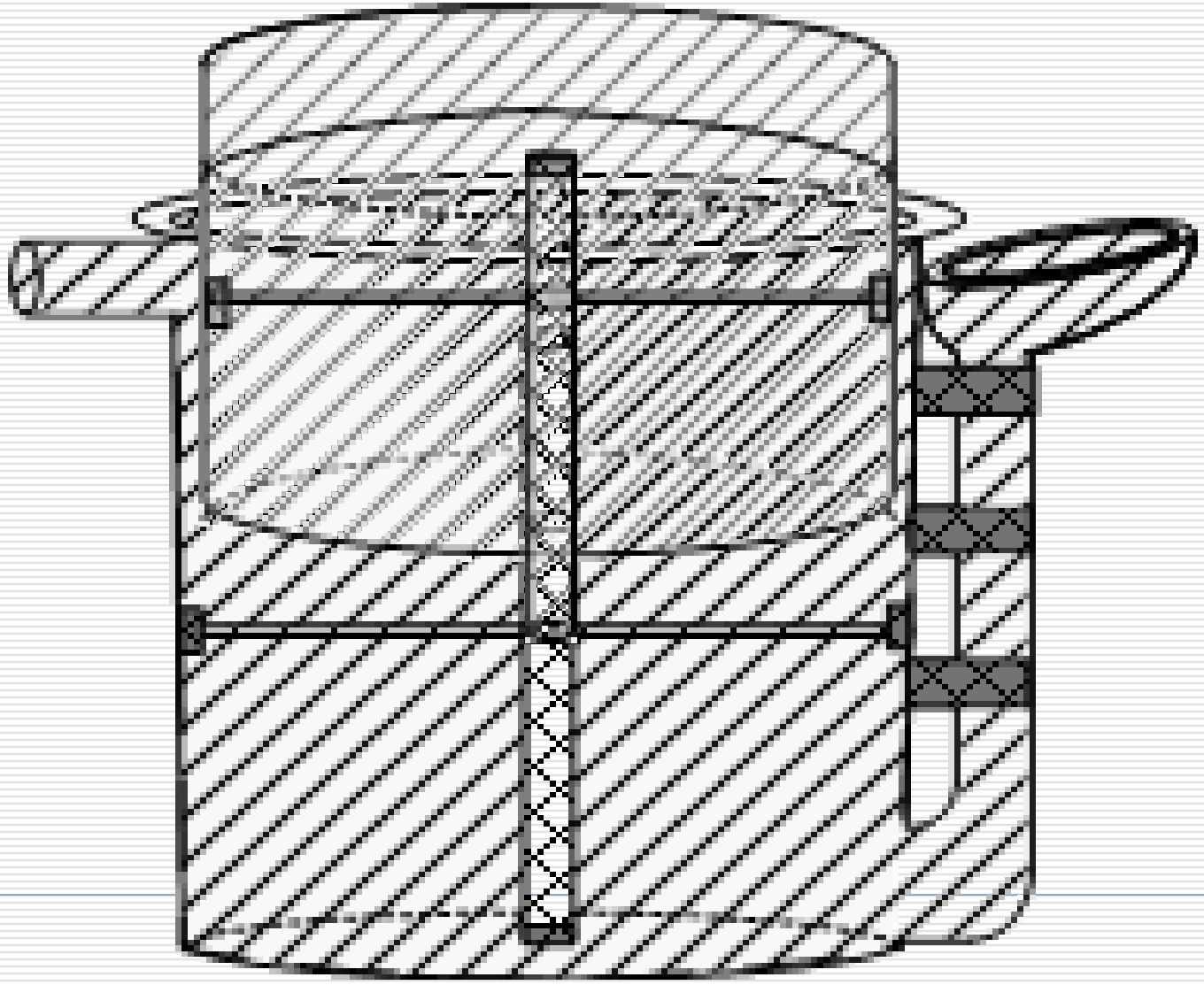
Chinese Portable Fiberglass Kunming Model-2009

- High cost
- Can't construct during monsoon

‘Mita’ Portable Fiberglass Bangladesh Model: 2011

- **Could meet all needs**
- **Deserve attention of all**

How Mita Works?



Commercial Biogas Plant by Chinese Experts: 2011

Biogas Plant Running 260KW Generator

Chinese Portable Fiberglass Hongi Model -2012

Status of Biogas in Bangladesh (SREDA-2019)

Organization	Period	# installed
BAU	1972-1973	5
EPCD	1982-1984	300
BCSIR	1976-Today	30,000
LGED	1986-Today	5,000
Grameen Shakti	2005-Today	8,000
IDCOL	2006-Today	50,000
M/o Youth	2006-Today	27,000
Others	1972-Today	5,000
Total	-	125,305

Experiences of Biogas initiatives in Bangladesh

- All initiatives in the past are project approach. When project is over, there is none to ensure aftersales service. As a result, many plants are not in operation.
- There is no coordination among the actors. Different organizations are using different designs and different financial models.
- In Bangladesh, there are many research organizations having enough infrastructures and scopes for conducting R & D. Most of these are either under-used or unused.
- Although biogas technology has multiple benefits, but in Bangladesh, it is highly neglected due to lack of awareness.

Potential of Biogas in Bangladesh

- Cattle : 25 million
- Dairy farms : 150,000 nos.
- Poultry farms : 200,000
- City waste : 25,000 ton/day
- Agriculture waste : 20million acres
- Maize : 800,000 acres
- Industrial waste : Huge
- Energy crop : ?

BBDF Research on Maize Silage (2018)

- Maize cultivation in Bangladesh increasing rapidly due to its multiuse, less irrigation cost, high production :
  - 1997-1998 : 65,000 tons
  - 2008-2009 : 730,000 tons
  - 2015-2016 : 2,750,000 tons
  - At present 800,000 acres of land under maize cultivation.

- In 2018, BBDF conducted research with the financial support from Practical Action, to see the biogas potential of maize silage
  - BBDF found that, maize produces 20tons of biomass/acre/crop, that can produce 2,000 cubic meter biogas.
  - The findings of our research have been discussed in a workshop held on 14 February 2019 in presence of Chairman, SREDA.

BBDF Research on Dry-digestion (2019)

- There are mainly two technologies now in practice for biogas production i.e wet digestion and dry-digestion.
- In Bangladesh, all the biogas plants are of wet-digestion technology
- Some organizations tried to introduce dry-digestion technology, but failed. This has created a negative attitude about the dry-digestion technology
- With the financial support SREDA, BBDF is now conducting a research on dry-digestion technology
- The project is expected to be completed within next six months

Experience of Slurry Utiliztion

- **Biogas is produced through an anaerobic process. As a result, bio-slurry is fully bacteria free.**
- **Bio-slurry, if goes to the field, becomes plant feed and if goes to the pond, becomes fish feed.**
- **There is a general consensus that, bio-slurry is no less costly than biogas. But in practice use of bio-slurry is highly discouraging**
- **BBDF and GERBIO (Germany) jointly conducted a study in 2016 to see the performance of commercial biogas plants and found that, 80% bio-slurry is wasted.**

About National Guideline on Biogas Technology

- Realizing multiple benefits of biogas, government decided to prepare national guideline on biogas technology
- On 16 August 2017 a 18 member committee has been formed to develop the guideline
- The committee developed a draft guideline on 8 October 2018
- The guideline has been approved on 11 April 2019 in a national level workshop in presence of policy makers, stakeholders and experts.
- Very soon, the guideline will be notified in national gazette

Recommendations

- There are some research organizations in Bangladesh like BAU, RDA, BCSIR, BLRI, Practical Action etc, having enough facilities for conducting R & D, but remains under-used or unused. LCEDN with local support from BBDF may initiate formation of a country level common platform (CP) at SREDA exclusively for biogas research.

- Law dictates development. It costs little, but benefits a lot. LCEDN with local support from BBDF may initiate preparation of a 'Draft National Renewable Energy Act' for Bangladesh and ensure its ownership by SREDA

- LCEDN will provide necessary support to CP for conducting comprehensive assessment of country's biogas potential including city waste based and develop National Biogas Program to achieve SDG 30.

THANK YOU