Ministry of New and Renewable Energy

International Dissemination Workshop on

"***Promotion of Biogas Up-gradation and Bottling in India & EU***"

at

IIT Delhi

from

22nd – 23rd August, 2013

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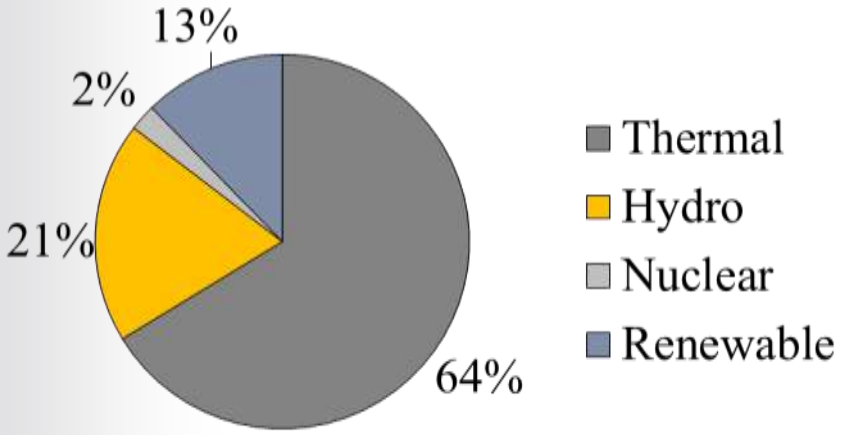
Director

MNRE

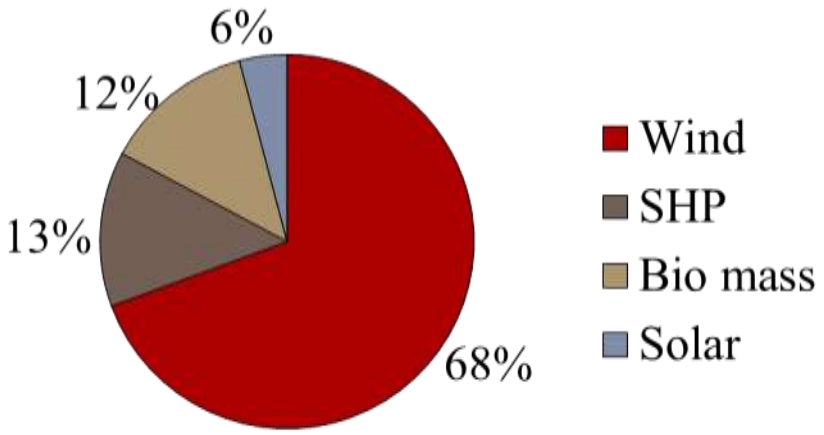
www.mnre.gov.in

Indian Status in Renewable Energy

Power Installed Capacity = 2,26,299MW



Total Installed RE Capacity = 28,709 MW



Thermal 1,53,187 MW	Hydro 39,623 MW	Nuclear 4,780 MW	Renewable 28,709 MW

Wind 19,565 MW	Small Hydro 3,686MW	Bio mass 3,602MW	Solar 1,759 MW

Renewable Energy at a Glance in India

Sl. No.	Source/system	Estimated Potential	Achievement as on 30th June, 2013
I	**Power from renewables**		
(A)	***Grid –interactive renewables power***	***(MW)***	***(MW)***
1	Wind power	45195	19564.95
2	Biomass Power (agro residues and plantations)	16881	1264.80
3	Bagasse cogeneration	5000	2337.43
4	Small Hydro power (upto 25MW)	15000	3686.25
5	Energy recovery from waste (MW)	2700	96.08
6	Solar photovoltaic power	50 MW/sq. km.	1759.44
	Sub Total (A)	**84776**	**28708.95**

Renewable Energy at a Glance in India

Sl. No.	Source/system	Estimated Potential	Achievement as on 30th June, 2013
(B)	***Captive/combined heat and power/distributed renewable power***		
7	Biomass cogeneration (non-bagasse)	-	474.84 MW
8	Biomass gasifier	-	159.77 MWeq
9	Energy recovery from waste	-	115.57 MWeq
10	SPV systems (>1kW)	-	131.86 MWp
11	Aero generator/hybrid systems		2.11 MW
12	Watermills/Microhydel	-	10.65 MWeq (2131 Nos.)
	Sub Total (B)	**-**	**894.80 MW**
	Total (A+B)	**-**	**29603.75MW**
II	**Remote village electrification**	-	9160.00 village/hamlets

Renewable Energy at a Glance in India

Sl. No.	Source/system	Estimated Potential	Achievement as on 30th June, 2013
III	***Decentralized energy systems***		
13	Family-type biogas plants	120 lakh nos.	46.7 lakh nos.
14	SPV street lighting system	-	226459 nos.
15	SPV Home lighting system	-	866179 nos.
16	SPV lantern	-	910504nos.
17	SPV pumps	-	7495 nos.
18	Solar water heating-collector area	140 million m^2	7.07 million m^2
19	Solar cookers	-	6.64 lakh
20	Wind pumps	-	1420 nos.

Renewable Energy Status in the World

Sl. No.	Programme	Country ranks in the World
1	Biogas Utilization	2nd
2.	Wind Power	5th
3.	Photovoltaic Production	7th
4.	Small Hydro	5th
Note - Renewable Energy contribute to about 13% of the total power installed		

Implementation of Biogas Programmes in India

- National Biogas and Manure Management Programme (NBMMP).
- Biogas Based Distributed/Grid Power Generation Programme.
- Technology Demonstration on Biogas Bottling (BGFP).
- R&D Programme
- Large size biogas plants based on urban and industrial waste for Power Generation

Biogas

- Clean low carbon technology
- Efficient management and conversion of organic wastes into clean renewable biogas and organic fertilizer source
- An energy source for cooking, lighting and other applications like refrigeration, electricity generation and transport applications
- Provide high quality organic manure with soil nutrients which improves its fertility required for sustainable production and productivity

Potential of Biogas Plants in India

Cattle Dung based biogas and bio-manure Potential:

- Cattle population : 304.00 million

- Dung collected : 1520.00 million kg/day
(@ 5kg per cattle per day)

- Estimated Biogas Generation : 60.80 million m^3/day
- Estimated LPG equivalent: 28.00 million kg/ day
- Biogas manure: 1140.00 million ton/day

Achievement of Biogas Plants in India

- Family type biogas plants: 4.67 million nos. (39%)
- Medium size biogas plants for electricity generation: 198 nos. (3.2 MW)
- Medium size biogas plants for Generation, Purification & Bottling of biogas: 08 nos. (13700 M^3)
- Large size biogas plants based on urban and industrial waste for power generation : 123 nos. (156.11 MW) (12.69 lakh m^3 biogas)

Central Financial Assistance for biogas programmes in India (Pro.)

Sl. No.	Type of Plant	CFA in `
1.	Family type biogas plants	4,000 - 14,700 per plant
2.	Medium size biogas plants for power generation (upto 250 KW)	30,000 - 40,000/KW
3.	Large size biogas plants based on urban and industrial waste for power generation & others.	0.20 to 2.00 Cr./MW

Biogas Bottling Technology Demonstration Projects – Objectives / Benefits

- The introduction of bottled biogas would result in better fuel availability.
- Creation of a marketing network & business model for biogas-organic manure plants.
- Separation and bottling of CO_2 would further improve viability of bio-manure plants.
- Improving socio-economic conditions.
- Reduction in GHG emissions.

Main components of Biogas-Bottling Project

- Slurry/ Feed-stock preparation system.
- Digester
- Biogas Purification System.
- Biogas bottling System
- Slurry Handling System.
- Bio manure, packaging etc.

Biogas Digester design and sizing suitable for multi –feed stock

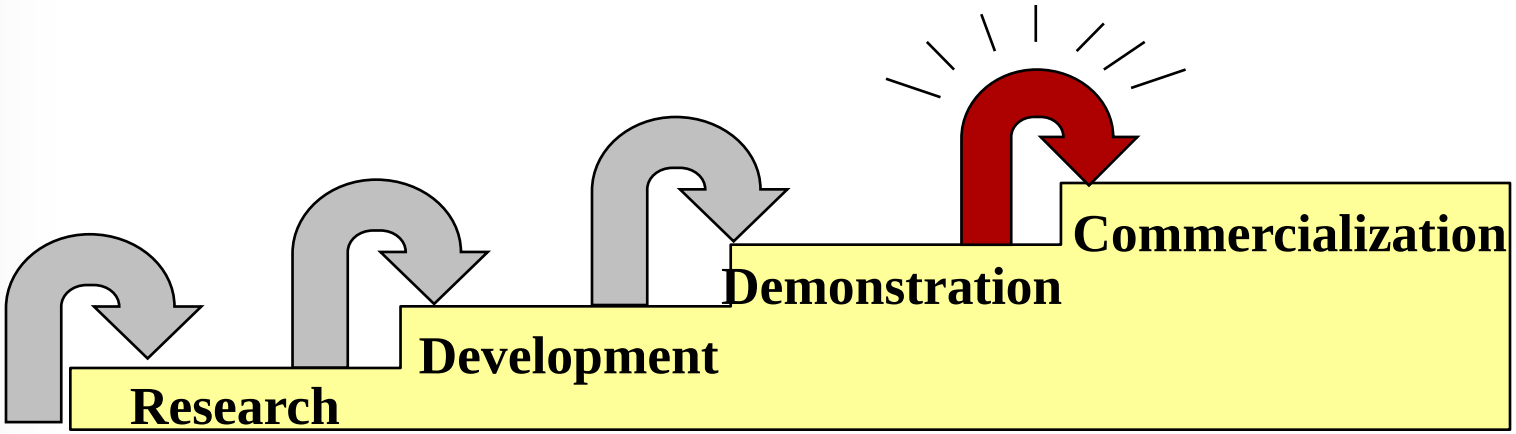
- Up flow Sludge Anaerobic Blanket (USAB)
- Modified USAB
- Completely Mixed
- Fixed Bed
- Plug Flow
- CSTR
- BARC-NISARGRUNA
- Any other

Biogas Purification Technology

- Water scrubbing – using low/high pressure
- Biological Scrubbing
- Chemical scrubbing
- Membrane separation
- Pressure Swing Adsorption, Molecular sieves
- Cryogenic Separation

MNRE's Approach

Programmes are directed towards developing sustainable energy options in a systematic manner



Details of Biogas Bottling projects sanctioned

Sl. No.	Year of sanction	No. of project sanctioned	Capacity of the plants (M^3/day)	Project Cost (` in Crore)	CFA (` in Crore)
1	2009-10	3	2100	3.26	1.79
2	2010-11	5	4600	6.94	3.80
3	2011-12	7	24416	31.22	12.68
	Total	**15**	**31116**	**41.42**	**18.27**

Indian Standard on Biogas (Biomethane)- specification IS 16087 : 2013

Sl. No.	Characteristic	Require ments	Method of Test, Ref to.
1	CH_4, Percent, *Min*	90	IS 15130(Part 3): 2002
2	Moisture, mg/m^3 *Max*	16	IS15641 (Part 2): 2006
3	H_2S, mg/m^3 *Max*	30.3	ISO 6326-3: 1989
4	$CO_2+N_2+O_2$, Percent, *Max (v/v)*	10	IS15130 (Part 3): 2002
5	CO_2, Percent, *Max (v/v),* (*When intended for filling in cylinders)*	4	IS15130 (Part 3): 2002
6	O_2, Percent, *Max (v/v)*	0.5	IS15130 (Part 3): 2002

Commissioned Biogas Bottling projects

Sl. No.	Year of sanction	Name of organization	Capacity of the plants (M^3/day)	Estimated production of CBG (Kg/day)
1	2009-10	Ashok Biogreen Pvt. Ltd., Nashik (Maharashtra)	500	200
2	2009-10	Anand Energy, Abohar (Punjab)	600	240
3	2010-11	SASK Energy, Muktsar (Punjab)	1000	400
4	2010-11	Maltose Agri Products Pvt. Ltd., Doddaballapur (Karnataka)	1000	400
5	2010-11	Shashi Energies, Fatehabad (Haryana)	600	240
6	2010-11	Option Energy Pvt. Ltd, Hissar(Haryana)	1000	400
7	2010-11	Singla Bio-Energy Dist. – Sri Ganganagar (Rajasthan)	1000	400
8	2011-12	M/s Spectrum Renewable Energy Pvt. Ltd., Warananagar, Kolhapur (Maharashtra)	8000	3200
		Total	**13700**	**5480**

Schematic diagram of Biogas bottling project at Shashi Energies

Cow dung

Agricultural waste

Biogas Purification system

Biogas Bottling System

Digester

Biogas storage (Balloon)

Compressed biogas in Cylinders

Liquid manure used in agricultural crops

Sweet making

Salient features of Biogas Bottling project installed at Shashi Energies, Tohana, Dist.- Fatehabad (Haryana) for the month of November, 2012

Particulars	Unit
Capacity	600 M^3/day
Project cost	Rs. 85.00 lakh
Biogas generated	16740 NM^3
Quantity processed	372 MT
Purified Biogas	9207 NM^3
Purified Biogas	6444 Kg
Purified Biogas Filled in Cylinders	805 Cylinders
Slurry / Manure	316 Ton

Feasibility of 600 M3/day biogas Bottling project at Shashi Energies, Fatehabad (Haryana)

Sl. No.	Particular	Amount (` in Lakh)
I	**Expenditure in one month**	
1	Raw Material	0.90
2	Electricity	0.50
3	Labor charges	0.35
4	Bank Loan & Interest	1.10
5	Miscellaneous	0.10
	Total	**2.95**
II	**Revenue Generated in one month**	
1	Compressed Biogas	3.86
2	Organic Manure	1.10
	Total	**4.96**
III	**Income in one month**	**2.01**
IV	**Pay back period – 4 to 5 Year**	

Required Statutory clearances/ permission

1. Petroleum and Explosive Safety Organization (PESO)
2. Pollution Control Board
3. Industries departments
4. Environmental Clearances
5. Local authorities
6. CLU
7. Any other (as may be required)

Biogas bottling project at Ashoka Biogreen Pvt. Ltd., Vill. - Talwade, Dist.-Nasik (Maharashtra)

Biogas purification system (PSA Technology) at Talwade, Nasik

Biogas purification system (Water Scrubbing) at Talwade, Nasik

Biogas drier system at Talwade, Nasik

Biogas compressor at Talwade, Nasik

CBG Dispensing system at Talwade, Nasik

Cascade of 20 cylinders of 80 ltr. Capacity each at Talwade, Nasik

Biogas Genset at Talwade, Nasik

Biogas bottling project at Anand Energy,Vill. - Kallatiba, Dist.- Ferozepur (Punjab)

Cylinder cascade and compressor unit at Anand Energy,Vill. - Kallatiba, Dist.- Ferozepur (Punjab)

Biogas bottling project at Sask Energy, Village-Najabt Kukarian, P.O.-Lubaniawali, Tehsil & Dist. – Muktsar (Punjab)

Biogas purification and storage system at Sask Energy, Village-Najabt Kukarian, P.O.-Lubaniawali, Tehsil & Dist. – Muktsar (Punjab)

Biogas bottling at Maltose Agri Products Pvt. Ltd., Village-Huskur, Post Aralumallige, Taluk-Doddaballapur, District-Bangalore Rural– (Karnataka)

Compressed biogas cylinders at Maltose Agri Products Pvt. Ltd., Village-Huskur, Post Aralumallige, Taluk-Doddaballapur, District-Bangalore Rural (Karnataka)

Biogas bottling at Shashi Energies, Vill.-Tohana, near Green Vally Public School, Ratiya Road, Tehsil.-Tohana, Dist.-Fatehabad (Haryana)

Biogas filling unit at Shashi Energies, Vill.-Tohana, near Green Valley Public School, Ratiya Road, Tehsil.-Tohana, Dist.-Fatehabad (Haryana)

Biogas bottling project at Option Energy, Shree Haryana Gaushala, Vill./block – Hansi, Dist. Hissar (Haryana)

Biogas bottling project at R.G. Organics, Industrial Area Birkoni, Tehsil & Dist.- Mahasamund (Chhattisgarh) - under trial run

Biogas bottling project at R.G. Organics, Industrial Area Birkoni, Tehsil & Dist.- Mahasamund (Chhatisgarh) - under trial run

CBG used in mid day meal scheme for cooking purposes

CBG used in plastic tank manufacturing industries for heating purposes

Plastic tank manufacturing unit

CBG used in sweet making

Organic Manure

ORGANIC/BIO MANURE USED IN LIQUID FORM

Thank You