



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

M.L. Bamboriya

Director

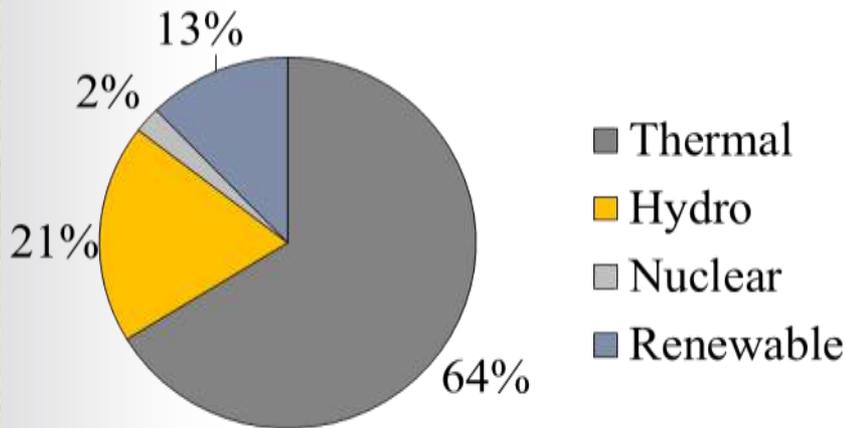
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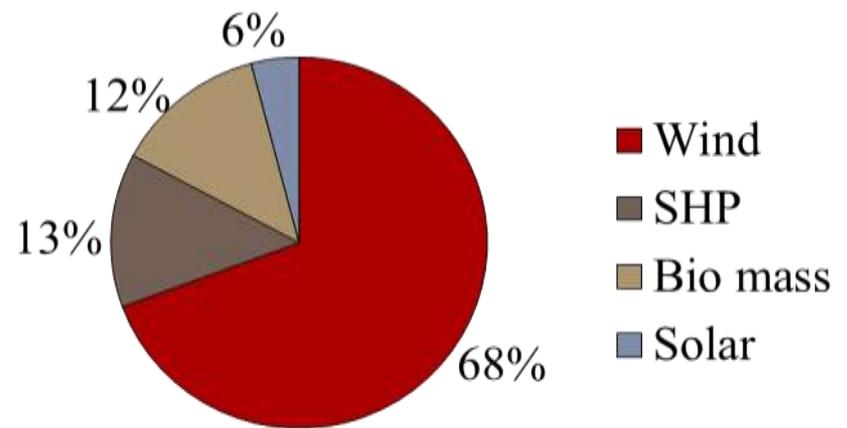


Indian Status in Renewable Energy

Power Installed Capacity = 2,26,299MW



Total Installed RE Capacity = 28,709 MW



Thermal	Hydro	Nuclear	Renewable	Wind	Small Hydro	Bio mass	Solar
1,53,187 MW	39,623 MW	4,780 MW	28,709 MW	19,565 MW	3,686MW	3,602MW	1,759 MW



Renewable Energy at a Glance in India

Sl. No.	Source/system	Estimated Potential	Achievement as on 30 th June, 2013
I	Power from renewables		
(A)	<i>Grid –interactive renewables power</i>	(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 30 th June, 2013
(B)	<i>Captive/combined heat and power/distributed renewable power</i>		
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 30 th June, 2013
III	<i>Decentralized energy systems</i>		
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	2 nd
2.	Wind Power	5 th
3.	Photovoltaic Production	7 th
4.	Small Hydro	5 th

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 m³/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 M³)
- Large size biogas plants based on urban and industrial waste for power generation : 123 nos. (156.11 MW)
(12.69 lakh m³ biogas)



Central Financial Assistance for biogas programmes in India

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 CO₂ 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



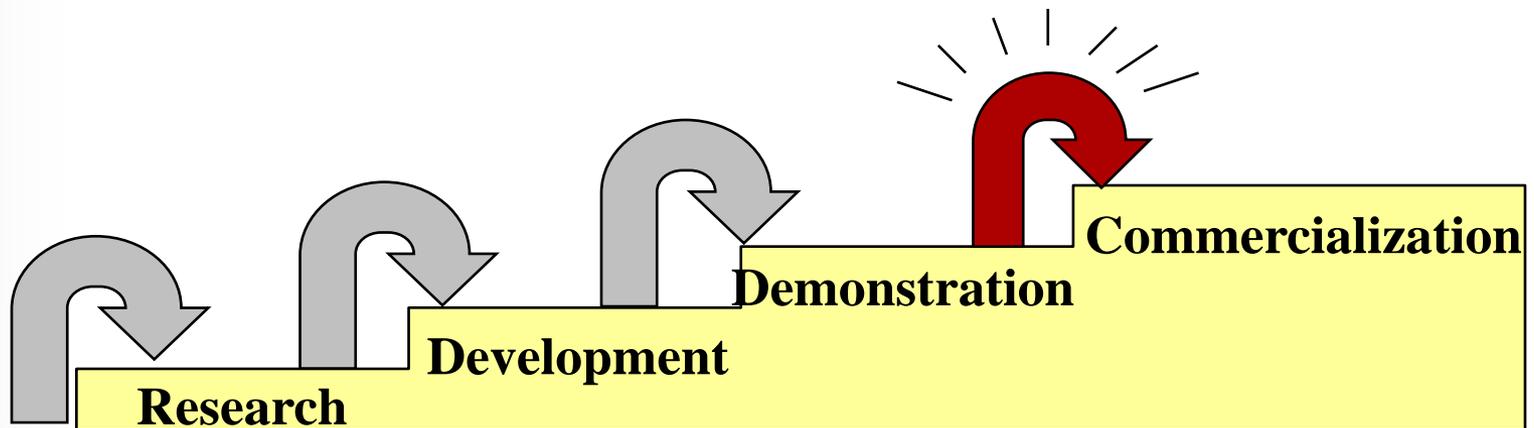
Biogas Purification Technology

- 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	Requirements	Method of Test, Ref to.
1	CH ₄ , Percent, <i>Min</i>	90	IS 15130(Part 3): 2002
2	Moisture, mg/m ³ <i>Max</i>	16	IS15641 (Part 2): 2006
3	H ₂ S, mg/m ³ <i>Max</i>	30.3	ISO 6326-3: 1989
4	CO ₂ +N ₂ +O ₂ , Percent, <i>Max (v/v)</i>	10	IS15130 (Part 3): 2002
5	CO ₂ , Percent, <i>Max (v/v)</i> , (When intended for filling in cylinders)	4	IS15130 (Part 3): 2002
6	O ₂ , Percent, <i>Max (v/v)</i>	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 Sask Energy, Village-Najabt Kukarian, P.O.-Lubaniawali, Tehsil & Dist. – Muktsar (Punjab)



सत्यमेव जयते



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



सत्यमेव जयते



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



सत्यमेव जयते



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



CBG used in mid day meal scheme for cooking purposes



**CBG used in plastic tank manufacturing industries
for heating purposes**



Organic Manure



सत्यमेव जयते



ORGANIC/BIO MANURE USED IN LIQUID FORM



सत्यमेव जयते

Thank You