Programmes and Policies of Govt. of India for Promotion of Biomethanation Technology for Recovery of Energy

by

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Deployment of Renewable Power in the India

- MNRE – the Nodal Ministry of Govt. of India responsible for All Matters related to Renewable Energy. It's function is to Support Development, Deployment and Promotion of Renewable Energy in the country

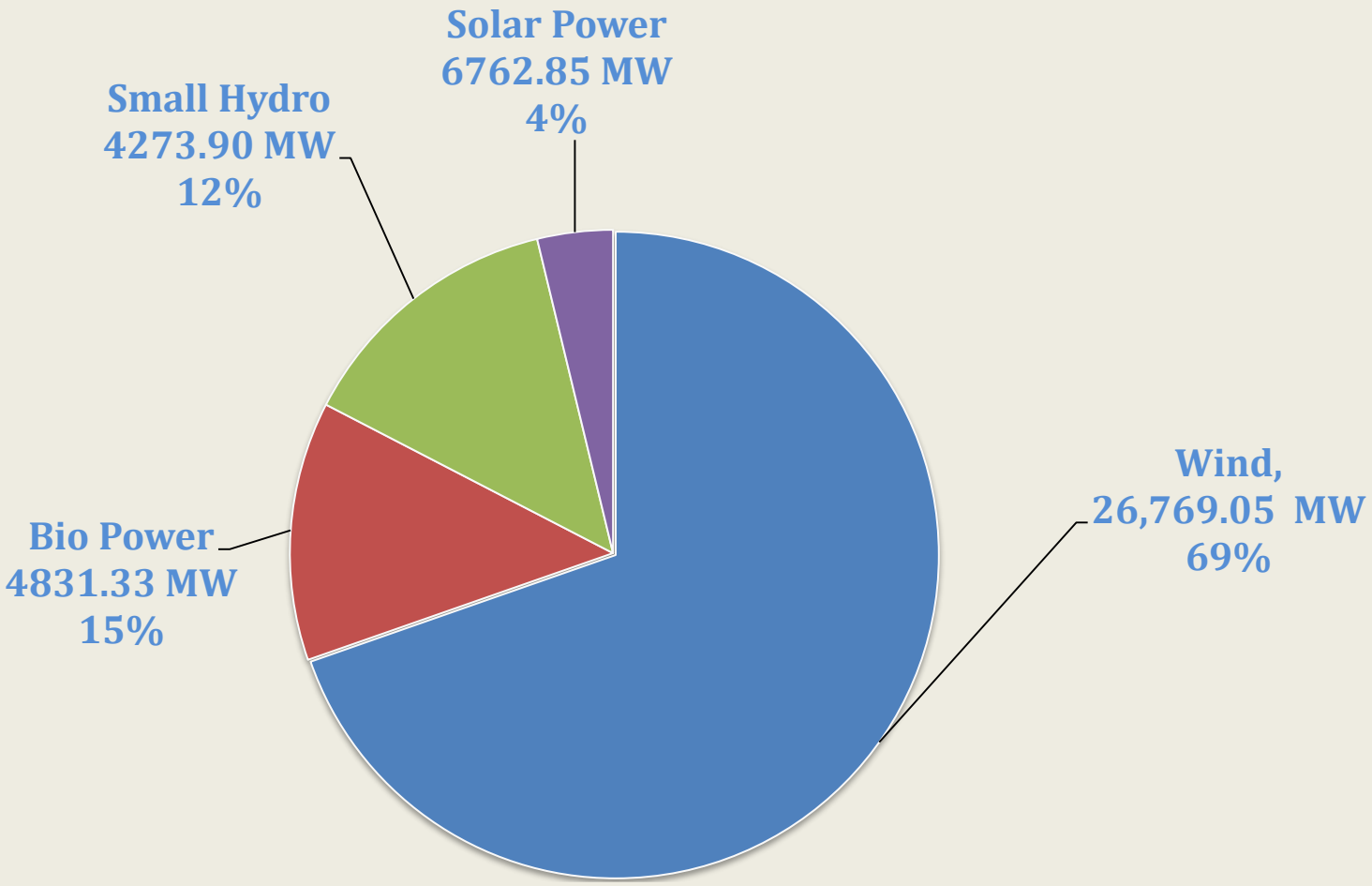
- Total Installed Capacity of Power Generation - 302833.20 MW

- RE based Power as on 30 April 2016 - 42,849.38 MW

- Contribution of RE Power - over 15.6%

- If we take large hydro under RE - 35%

Indian Renewable Energy at a Glance - Total Installed capacity 42,849.38 MW



Renewable Energy: Credentials

- Harnessed 20% of the estimated potential;
- 5th Position in overall RE Capacity Installations;
- 2nd largest number of CDM projects;
- 2nd largest number of installed Biogas plants;
- 5th largest Wind installed capacity; and
- 6 Million decentralized systems in use.

Ongoing Programmes of the Ministry

- Grid Interactive and Off Grid / Distributed Renewable Power;
- Renewable Energy for Rural Applications;
- Renewable Energy for Urban, Industrial and Commercial Applications;
- Research, Design & Development for New and Renewable Energy; and
- Strengthening of Institutional Mechanism for enhanced Deployment and Creation of Public Awareness

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Ongoing Programmes of the Ministry

Human Resource Development Programme

- Renewable Energy Chairs – IITs, NITs, Univ.;
- National Renewable Energy Fellowship;
- National Solar Energy Fellowship;
- Technician Training Programme;
- Supporting Innovation, Incubation & Entrepreneurship (created Indian Fund for Sustainable Energy(INFUSE) at IIMA; and
- Support for up gradation of Lab and Library.

Technical Institutions

- National Institute of Solar Energy ;
- National Institute of Wind Energy;
- National Institute of Bio- Energy;
- Alternate Hydro Energy Centre, IIT Roorkee;
- Biomass Research Centre, IISc. Bangalore;
- Solar Energy Corporation of India; and
- Indian Renewable Development Agency

Estimated Potential, Installed and Proposed Capacity Addition of Renewable Power in India

Source	Estimated Potential (in MW)	Cumulative Achievement as on 30.03.2016 (in MW)	Proposed Capacity Addition by 2022 (in MW)
Wind	100,000	2676.05	60,000
Small Hydro	25,000	4273.90	5,000
Bioenergy	18000	4946.33	10,000
Solar	>1,00,000 20-50MW/Sq. m	6762.85	100,000
Total	> 1,94,880	42752.21	1,75,000

Jawaharlal Nehru National Solar Mission (JNNSM)

Launched in 2010, aimed for the following by 2022

- deployment of 100, 000 MW grid connected power
- 2000 MW of off-grid applications including 20 million solar lights;
- 20 m sq. meters of solar thermal collector area

Overall Objectives of the Mission

- achieve grid parity by 2022
- develop eco system for increase domestic solar manufacturing capacity and capability
- develop trained manpower
- support R & D

Energy Access- Present Status & Projections

Present Global Scenario

- 1.3 billion people have no access to electricity and 2.7 billion people rely on biomass and traditional fuels for cooking; and
- More than 95% of these peoples are either in Sub Saharan Africa or in Developing Asia and 84% are in rural areas.

Developing Asia

- Over 1.9 billion people in developing Asia still rely on traditional use of biomass for cooking;
- 855 million people rely on Fire Wood, Animal Dung and Agricultural Residues for cooking and heating; and
- More than 100 million each in Bangladesh, Indonesia, Pakistan and Myanmar without access to clean cooking facilities.

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Energy Access – Present Status & Projections

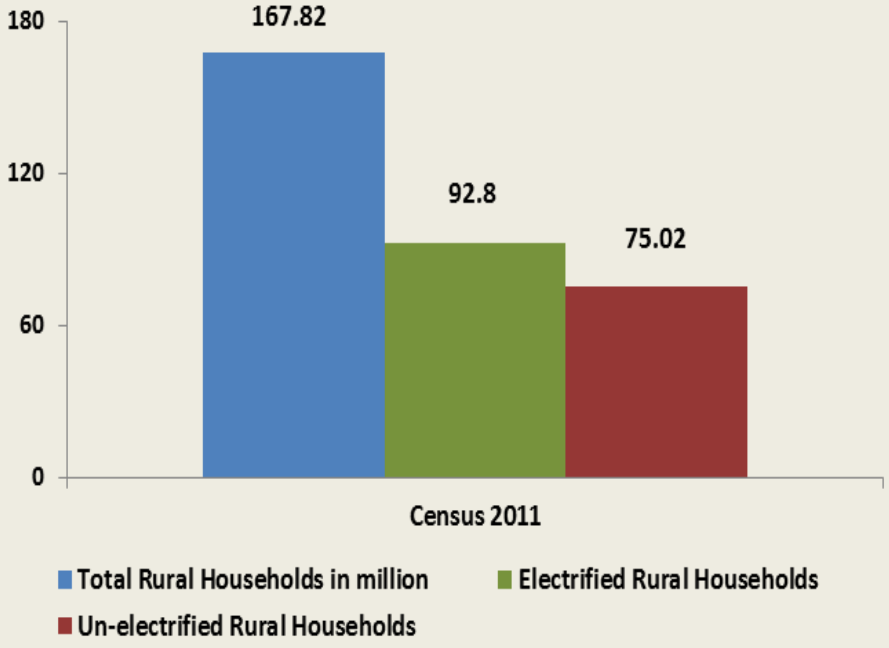
Projection 2030

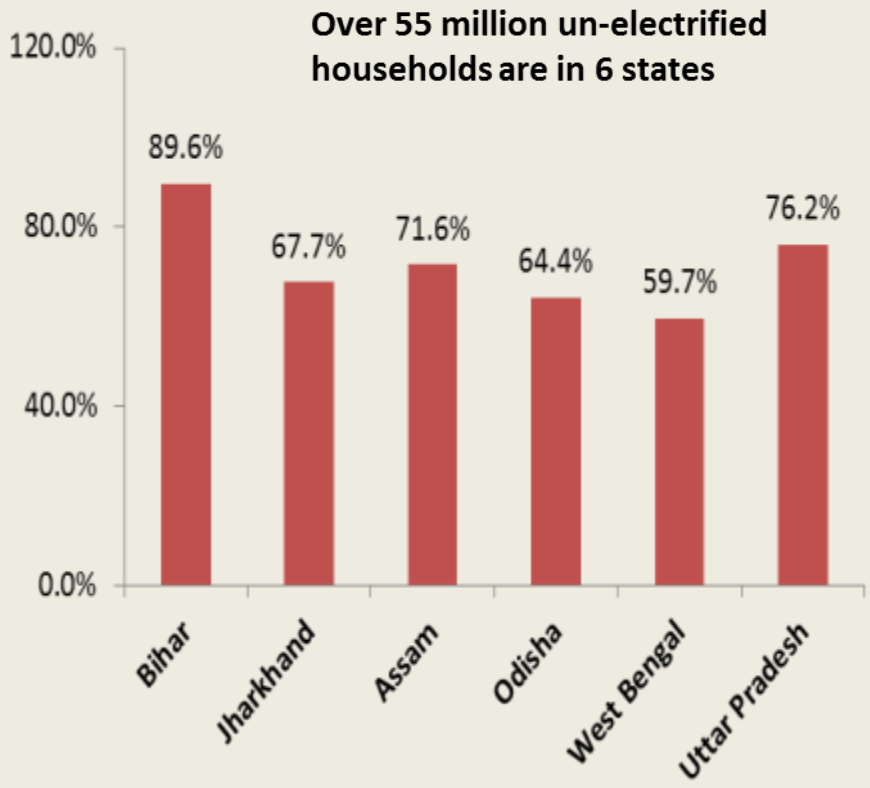
- 1.0 billion people expected to be without electricity (likely world population : 8 billion); and

- 2.7 billion will remain without clean cooking facilities.

In absolute terms, Projections suggests that the situation is not likely to change by 2030 in spite of huge efforts for providing reliable and affordable clean cooking fuels in rural areas.

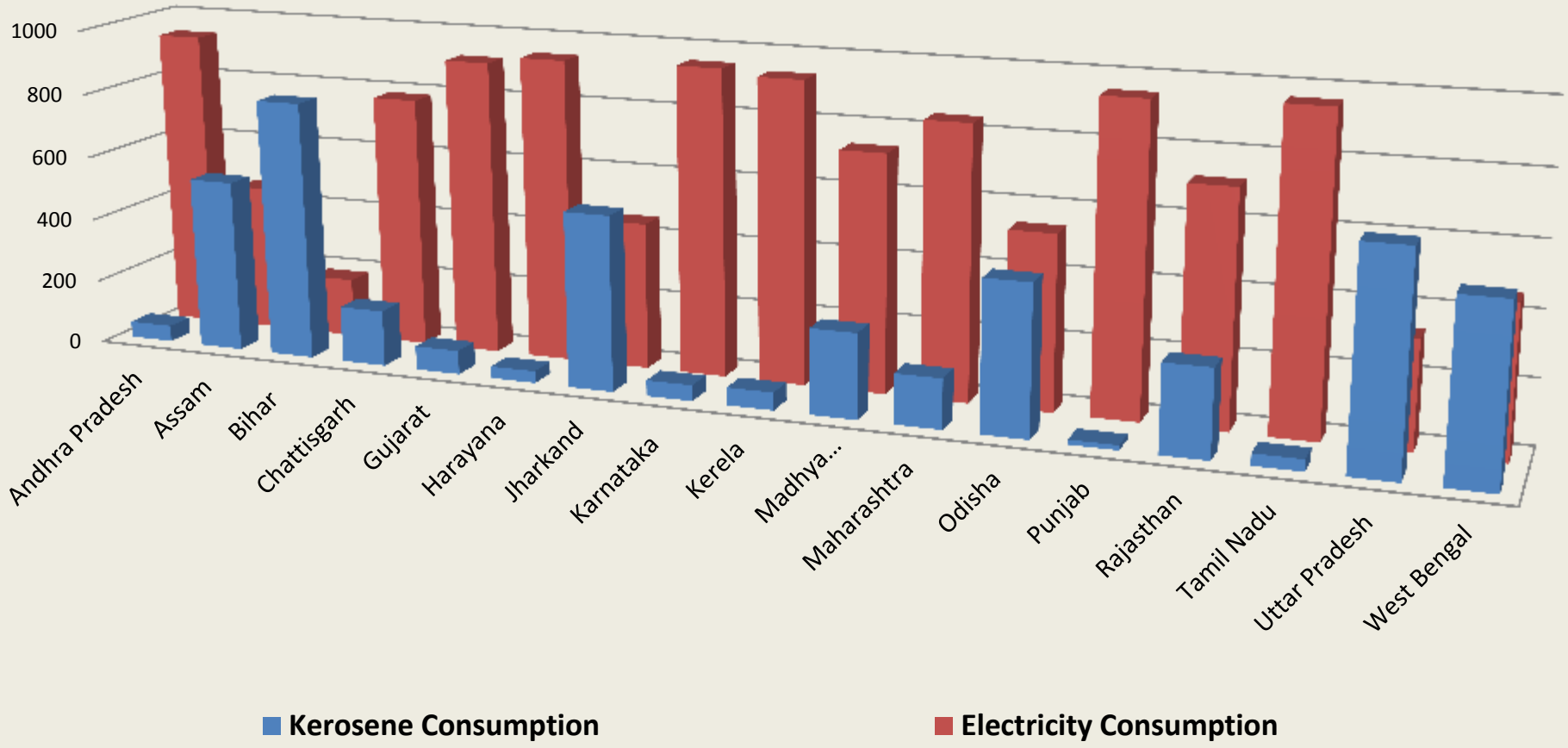
Status of Electricity Access in India





Electricity Access in India

Per 1000 distribution of Rural HH in each State by primary source of energy used for lighting.



Energy Access in India –Present Status & Projections

- **Since early 1950s, concerted efforts have been made to address the Energy Access Issues.**
- **GOI initiated several Policy Initiatives with significant progress in extending the National Grid and 'Off – Grid' / 'Decentralised Distributed Generation' models.**
- **Yet, around 400 million people (40% of the rural households) in India have no access to reliable power supply.**
- **149 million use kerosene based lighting devices – HURRICANE Lantern and WICK Lamps.**
- **800 million people rely on Fire Wood, Animal Dung and Agricultural Residues for cooking and heating.**
- **Projections suggest not much change to take place in numbers by 2030.**

Technological Options

Thermo-chemical Conversion

- **Combustion** - Direct Combustion of Solid Fuels for Steam or Power
- **Gasification** - Process that converts Solid Fuel to Gaseous Fuel (Producer Gas) which can be used to generate power or heat applications
- **Pyrolysis** - Pyrolysis /Bio Oil and Char

Crop residues - Paddy Straw, Cotton Stalks, Mustard Stalks, Corn Cobs, Sugar Cane Trash, bagasse, Rice Husk, Ground Nut Shells, Forest Residues, Dedicated Energy Plantation – bamboo, Prosopis Juliflora.

Biological Conversion

- **Biomethanation / Anaerobic Digestion** - Bacterial Process that converts wet biomass to biogas and produces digested manure
- **Conventional Multistage Digester**
- **High Rate Digesters**

Urban Wastes Animal Manure, Poultry Droppings, Slaughterhouse Waste, Segregated Organic waste from MSW, Green Cellulosic Biomass and Energy Crops

Programmes to Promote Biogas Technology

- National Biogas and Manure Management Programme (NBMNP) - Plan Capacity 1-6 cubic meter per day.

- Biogas Power (Off Grid) Programme – Promotion of Biogas for Decentralised Power Generation (in the range of 3-250 kW) and for Thermal Applications.

- Energy Recovery from Urban, Industrial and Agricultural Wastes.

National Biogas and Manure Management Programme (NBMNP)

The key objectives of the programme are –

- To provide clean gaseous fuel mainly for cooking and lighting purposes.
- To provide organic bio-manure to reduce use of chemical fertilizers;
- To mitigate drudgery of rural women, reduce pressure on forests and accentuate social benefits;
- To improve sanitation in villages by linking sanitary toilets with biogas plants;
- To mitigate causes of climate change by preventing black carbon and methane emissions.

National Biogas and Manure Management Programmed (NBMMP)

Launched as NPBD in 1981. Renamed as NBMMP in 2002-03

- **Estimated Potential of Biogas Plants Nos. : 120 lakh**
- **Cumulative Achievement as on March, 2016 : 48.95 lakh**
- **Potential harnessed : 40.8 %**
- **Targets for current year (2016-17) : 1.0 Lakh**
- **Achievement in last year upto Feb. 2016 : 59759**

Year wise Target and Achievements in last 4 years under NBMMP

Year	Target	Cumulative Achievements	%
2012-13	135000	115377	85.46
2013-14	106000	83540	78.80
2014-15	11000	84882	77.17
2015-16	111000	59760	53.84

Central Financial Assistance (CFA) for Family Type Biogas Plants under NBMMP

Sl. No.	Central Financial Assistance (CFA) for different States / Regions and Categories	1 to 6 cubic meter capacity per day	
A.	Central Subsidy Rates Applicable (in Rs.)	1 Cubic Metre	2- 6 Cubic Metre
1.	NER States, Sikkim (except plain areas of Assam) and including SC and ST Categories of NE Region States.	15,000	17,000
2.	Plain areas of Assam	10,000	11,000
3.	Jammu & Kashmir, Himachal Pradesh, Uttrakhand, Niligiri of Tamil Nadu, Sadar Kurseong & Kalimpong Sub-Divisions of Darjeeling, Sunderbans (W.B.) and Andaman & Nicobar Islands.	7,000	11,000
4.	Scheduled castes / Scheduled Tribes of other than NE Region States including Sikkim & other Hilly States/regions as given in Sl. No.3 above.	7,000	11,000
5.	All Others	5,500	9,000

B.	Turn-Key Job Fee including warranty for five years and quality control (in Rs. per plant).	Rs.1500/- per plant for Fixed Dome Deenbandhu Type and Floating Gasholder KVIC type brick masonry models. Turn Key Job Fee also provided for biogas plants with prefabricated material involving part construction work either for digester or dome. No fee is provided for completely prefabricated/ manufactured plants such as Bag type plants with rubberized material or plants made of HDPE / PVC / fabric materials, as and when approved.
C.	Additional CFA for Toilet Linked Biogas Plants (in Rs. per plant).	1,200
D.	Administrative Charges – for physical target range of biogas plants (in Rs.)	
1.	100-3,000	1,00,000^
2.	3,001-7,000	10,50,000^^
3.	Above 7,001	24,50,000 *
E.	Training support per course (in Rs.)	
1.	Users Course	3,000
2.	Staff Course	10,000
3.	Construction-cum Maintenance / Refresher Course	45,000
4.	Turn-key Workers & Management Course for TKWs / RETs / SHGs/ Officials of SND/ SNA/Banks/FIs & Companies / Entrepreneurs.	75,000

E.	Support for Communication & Publicity as per the target range of Biogas Plants (in Rs.).	
1.	Up to 1,000	2,00,000
2.	1,001- 10,000	4,00,000
3.	More than 10,000	6,00,000
H.	Support for Repair of Non- functional Plants with the restriction of utilization of upto 5% of the annual outlay of the programme, earmarked for the year for the concerned SND/SNA/UT.	50% of the applicable central subsidy rate subject to sharing of 50% of the cost of repair by the respective beneficiary. Repair cost estimates for a non-functional biogas plant should not exceed the total subsidy amount applicable as per the size of the biogas plant. The proposal prepared by SNDs/SNAs and KVIC by bunching of such non-functional plants, requires prior approval of the Ministry (MNRE).

BIOGAS POWER (OFF-GRID) PROGRAMME (BPP)

Objectives of the Programme

- Addressing electricity requirements in dairies, goshallas, farming, etc.
- Improving agriculture productivity due to use of bio fertilizer produced from these plants.

Biogas Plant Capacity

- Biogas power for decentralized applications in the capacity range 3kW to 250kW

- Utilisation of Biogas produced for thermal applications.

Type of Feedstock's

- Animal Wastes, Kitchen/Food Wastes, agricultural waste etc.

BIOGAS POWER (OFF-GRID) PROGRAMME (BPP)

Programme Implementation

State Nodal Departments / State Nodal Agencies KVIC, BDTC's and Technical Institutions.

Achievements

400 biogas power plants with power generation capacity of about 5.5 MW have been installed so far.

Training and Awareness Promotion

Financial assistance of Rs. 1.0 lakh per event for organising workshops / seminars / awareness programmes.

BIOGAS POWER (OFF-GRID) PROGRAMME (BPP)

Pattern of Central Financial Assistance

Power generating capacity	Biogas plant capacity	CFA/subsidy limited to the ceiling or 40 % of the cost of the system whichever is less.		Administrative/ Service Charges to SNAs/ SNDs /BDTC's and IAs.	
		Power Generation	Thermal applications	Power Generation	Thermal applications
3 to 20 kW	25 M3 to 85 M3	Rs.40,000/- per kW	Rs.20,000/- per kWeq	10 % of the CFA	10 % of the CFA
>20 kW upto 100 kW	Any combination of above plants or approved alternate capacity/design	Rs.35,000/- per kW	Rs.17,500/- per kWeq	Rs.1,00,000/-	Rs.50,000/-
>100 kW upto 250 kW	Any combination of above plants or approved alternate capacity / design	Any combination of above plants or approved alternate capacity / design	Rs.15,000/- per kWeq	Rs.1,50,000/-	Rs.75,000/-

BIOGAS POWER (OFF-GRID) PROGRAMME (BPP)

On Going Efforts

- ✓ **Evaluation of Performance of the systems installed in the field**
- ✓ **Technology Development Packages for efficient and cost effective biogas power generation**
- ✓ **Efficient engines with standard control panel**

Biogas Plant Designs

Top: Floating drum

Bottom:Fixed dome

A 3 M^3 Deenbandhu Biogas Plant under Construction in Jan 2015 at village –Panikhet, District - Kamrup, Assam

Biogas Unit at Sahyadri Hospital, Pune

- In operation since 2005
- Compact portable unit with aesthetic looks

Capacity	**100 kg/day**
Area	**3.5m x 3.5m**
Year	**2004-05**
Project Cost	**Rs. 4 Lac**
End Use	**Cooking in Canteen**


FEEDING
CHAMBER
Pre-fabricated, ready to install biogas plant

Kitchen Waste Biogas Plant

Magarpatta City, Pune

Capacity	2000 kg/day
Area	160 Sq.m
Year	2005-06
Cost	25.25 Lac
Payback	3.8 Years
End Use	Power Generation and Cooking

A 2 M^3 Solid-state Deenbandhu Biogas Plant at Kherwara, District- Udaipur, Rajasthan. ***Despite of Beneficiary having LPG connection, using Biogas as predominant fuel for cooking.***

Biogas Generator Running on 100% Biogas

Biogas from Napier Grass at Kolwan, Pune

Kolwan Site

Napier Grass Plantation

Biogas Digesters

Silage Experiment

Dry Digestion for Biogas Generation

Biogas based Electricity Production

- Dry digestion patented technology of Kirloskar
- Installed capacity: 25 kW
- 8 digesters of 50 m ^{3}/day capacity Feedstock: 7.5 tonnes/day Napier Grass
- Dedicated Napier Grass Plantation on 32 acres

Biogas based Electricity Production

- KVIC model
- 6 biogas plants
- Capacity – 40 m^3 and 80 m^3
- Feedstock – De oiled caked

Economic Impact - Electricity generates enterprise and enterprise fuels the demand for electricity

Thank You for Your Attention