STANDING COMMITTEE ON ENERGY

8

(2005-06)

FOURTEENTH LOK SABHA

NON-CONVENTIONAL ENERGY SOURCES BIOMASS POWER/CO-GENERATION PROGRAMME AN –EVALUATION

MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES

EIGHTH REPORT

LOK SABHA SECRETARIAT
NEW DELHI

August, 2005/ Bhadrapada, 1927 (Saka)

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Presented to Lok Sabha on 25.08.2005

Laid in Rajya Sabha on 25.08.2005

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9. Shri Sudarshan Akarapu

INTRODUCTION

I, the Chairman, Standing Committee on Energy having been authorized by the Committee (2005-2006) to present the Report on their behalf, present this 8th Report (Fourteenth Lok Sabha) on the subject, "Biomass Power Co-generation Programme An -evaluation" The task of examining the subject, "Biomass Power Co-generation Programme An -evaluation" and preparing a report on the above subject was entrusted to a Sub-Committee – III of Standing Committee on Energy (2004-05).

2. The Sub-Committee held 3 sittings in all out of which 1 sittings were devoted to evidence of official witnesses..

3. The Committee wish to thank the representatives of the Ministry of Non-Conventional Energy Sources who appeared before the Committee and placed their views on the subject. They also wish to thank the Ministry of Non-Conventional Energy for furnishing the replies on the points raised by the Committee.

4. The Report was considered and adopted by the Committee at their sitting held on 23rd August, 2005.

5. For facility of reference and convenience, the observations and recommendations of the Committee have been printed in bold letters in the body of the Report.

GURUDAS KAMAT,
Chairman,
Standing Committee on Energy.

NEW DELHI,
August 23 , 2005
Bhadrapada 1, 1927 (Saka)

CHAPTER - I

INTRODUCTORY

1.1 Energy is a basic requirement for economic development. Every sector of Indian economy – agriculture, industry, transport, commercial and domestic, needs inputs of energy. The consumption of energy in all forms has been steadily rising all over the country. This growing consumption of energy has also resulted in the country becoming increasingly dependent on fossil fuels such as coal, oil and gas. Rising prices of oil and gas and potential shortages in future lead to concerns about the security of the energy supply needed to sustain our economic growth. Increased use of fossil fuels also causes environmental problems both locally and globally.

1.2 Fortunately, India is blessed with a variety of renewable energy sources, the main ones being biomass, the sun, wind and small hydropower. Municipal and Industrial wastes can also be useful sources of energy but are basically different forms of biomass.

1.3 The main advantages of biomass energy over the other renewable and conventional sources:

- Ability to produce `firm' power as compared to wind power whose capacity utilization factor in the country is between 17 – 18 per cent;
- Amenability to storage and use as per power demand;
- Broadly similar combustion characteristics as that of coal which may even enable partial co-firing;
- Less polluting when compared to fossil fuel.
- Generates additional employment through local collection, storage, handling and transportation of biomass for power projects.

Biomass as an Energy source

1.4 Biomass is renewable organic substance of plant and animal origin. It includes agricultural and forestry residues, animal and human wastes, urban and industrial wastes etc. Biomass resources are available locally within or around the villages and energy production distribution and provision of energy services can be managed by the village communities. Besides combustion for direct thermal applications, modern biomass

technologies can convert biomass to solid, liquid or gaseous fuels at improved efficiencies for thermal, mechanical and electrical energy production such as:-

- Charcoal, briquettes
- Liquid fuels such as vegetable oils, bio-diesel, ethanol from oil seeds, crop residues.
- Biogas from anaerobic digestion of animal and other organic wastes/residues.
- Producer gas through biomass conversion in small gasifers.

Biomass Potential and Resource Assessment

1.5 The annual generation of surplus agro residues and the wastes from forestry and plantations (principally rice husk, rice straw, bagasse, sugar cane tops and leaves, trash, groundnut shells, cotton stalks, mustard stalks, etc.) that can be utilized for generating power is estimated between 120-150 millions tonnes, which translates into a potential for about 16,000 MW grid-interactive power generation. In addition, there is an estimated potential of around 3,500 MW grid-interactive power generation through cogeneration in sugar mills in the country. The states having good potential for bagasse based cogeneration include Maharashtra, Uttar Pradesh, Tamil Nadu, Karnataka & Andhra Pradesh, while those having good potential for biomass based power generation include Andhra Pradesh, Tamil Nadu, Karnataka, Chhattisgarh, Bihar, Punjab, etc. The total estimated potential of Biomass Power in India is as under:-

(i) Power generation from plantations in 60 million hectares of wasteland at 70% PLF –100000 MW @ 1 MW/600 hectares.

(ii) Biomass based power generation from surplus biomass (crop and agro industrial residues excluding bagasse) – 16,000 MW.

(iii) Additional power generation through optimum bagasse cogeneration – 3500MW

1.6 As stated by the Ministry accurate information on availability of biomass in different parts of the country which could be made available for energy purposes, is a pre-requisite for promotion of commercial projects intending to use this biomass. With this in view during the Ninth Plan, the Ministry had sponsored 500 taluka level biomass assessment studies in 23 States to compile data on availability of biomass.

1.7 As an extension of this effort, a project for preparation of "Biomass Resource Atlas for India" has been jointly sponsored to Indian Institute of Science (IISc), Bangalore, and Regional Remote Sensing Service Centre (RRSSC), Bangalore, which aims at integration of the data on biomass availability obtained from taluka-level studies and from other reliable sources, with information on crop distribution pattern derived from GIS-based maps provided by RRSSC.

The Ministry's Programmes on Bio Energy

1.8 The Ministry of Non-Conventional Energy Sources have following programmes on Biomass energy:-

i. Biomass Energy and Co-generation Programme
ii. Energy Recovery from Urban and Industrial Wastes through combustion and biomethanation route.
iii. Village Energy Security based on biomass
iv. Biofuel for stationary, portable and transport applications.
v. Biogas for domestic use and power generation.
vi. Bio-energy Research, Design, Development Demonstration and Commercialization (RDDDC).*

*All RDDDC activity has been centralized under one development programme except for bio-fuels which is being dealt by another development group. Similarly, publicity for all programmes has been centralized under the information and publicity group.

Biomass Energy and Co-generation Programme:-

1.9 The Ministry of Non-Conventional Energy Sources is implementing Biomass Energy and Co-generation programme. This programme covers megawatt scale electricity generation from biomass through either direct combustion route (combustion of biomass in a boiler whose steam is used to run a turbine coupled to a generator) or gasification-gas turbine route and though the cogeneration route. Only surplus biomass is used for generation of grid-interactive electricity. The combustion route is being employed both in the biomass power and bagasse cogeneration programmes. The programme was initiated a

decade ago and achievements have since been made towards commercializing biomass/ cogeneration power.

1.10 With the advancement in technology for generation and utilization of steam at high temperatures and pressures, the sugar industry cannot only produce electricity and steam for its own requirements but can also produce significant surplus electricity for sale to the grid, using the same quantity of bagasse. If steam generation temperature/pressure is raised from 400^{o}C/33 bar to 485^{o}C/66 bar, more than 80 kWh of additional electricity can be produced for each tonne of cane crushed. The sale of surplus power helps a sugarmill to improve its viability apart from adding to the power generation capacity of the country, provided crushing season extends upto 180 days as against the average of upto 150 days. Long crushing duration is generally obtained in the coastal belt.

Biomass Energy and Co-generation Programme has two main components viz:

(a) Biomass Power/Cogeneration and

(b) Biomass gasification

(a) Biomass Power/Co-generation Programme

1.11 The overall objective of the Biomass power/co-generation programme is to catalyze commercialization of biomass based grid interactive power. The major activity under the programme is to promote deployment of biomass and baggase co-generation grid interactive power projects for MW-scale electricity generation.

(b) Biomass Gasifier Programme

1.12 Biomass gasification is the thermo-chemical conversion of organic matter into a gaseous fuel known as producer gas. The gas has low calorific value (1000-1200 kcal/Nm3), but it can be used for replacing diesel oil in engines for mechanical and electrical applications or for replacing other forms of conventional energy in heating applications. The gasifications route of conversion of biomass to useful energy has the advantage of higher process efficiency in small capacity range. The Ministry has been supporting development of biomass gasification technology for almost two decades and as

a result of these efforts, biomass gasification systems from 5 kW to 1000 kW unit capacity suitable for using a variety of biomass have been developed indigenously.

Objectives of the Programme

1.13 The main objective of the biomass gasification programme is to promote deployment of biomass gasification systems for different end uses.

The Committee have examined in detail the issue of exploitation of Biomass power and implementation of Biomass Energy and Co-generation Programme. These issues have been discussed in the subsequent chapters.

CHAPTER-II

BIOMASS POTENTIAL AND PRESENT STATUS OF UTILIZATION

2.1 Various studies have indicated that at least 150-200 million tonnes of Biomass materials, comprising agricultural and agro-industrial residues produced every year, do not find much productive use and can b made available for alternative uses. This quantity of Biomass has the potential to generate 15000-25,000 MW Power. In addition, biomass grown on wastelands, road and rail track site plantation etc. can also be used to generate electricity of the order of more than 70,000 MW. Thus, the total electricity potential from Biomass has been estimated at more than 1,00,000 MW.

2.2 When asked about the comparative picture of Biomass potential availability and Power being produced in some important countries, the Ministry referred the Encyclopedia of Energy, Elsevier Academic Publication 2004 and submitted the following details:

Country	Share of Biomass in energy mix (%)	Biomass Consumption (EJ/Year)	Biomass Power (TWh/Year)
BRAZIL	23.4	1.861	8.519
CHINA	18.7	9.271	1.963
THILAND	19.4	0.621	Negligible.
PAKISTAN	37.6	1.053	- do -
MEXICO	5.2	0.347	- do -
AUSTRALIA	4.9	0.234	- do -
CUBA	21.4	0.121	- do -

State wise Bagasse Cogeneration Potential is mentioned in the table given below:-

STATE	POTENTIAL, MW
Maharashtra	1,000
Uttar Pradesh	900
Uttranchal	100
Tamil Nadu	350
Karnataka	300
Andhra Pradesh	200
Bihar	200
Gujarat	200
Punjab	150
Haryana & Others	100
Total	**3,500**

The following table shows Bagasse Cogeneration Distribution of Sugar Mills in the country – Total Mills 551:

Sector	<2500 TCD	2500-4999 TCD	>5000 TCD
Private	43	90	35
Cooperative	113	169	23
Public Sector	48	15	1

2.3 When asked about the potential developed for Biomass co-generation by the different countries of world like Brazil, China, Thailand, Pakistan, Mexico, Australia, Cuba having good biomass potential, the Ministry of Non-Conventional Energy Sources submitted the following details:-

> "The total bagasse cogeneration potential in different countries of the world is estimated to be about 1,35,000 GWh/yr. This includes 38600 GWh/yr for Brazil, 29000 GWh/yr for India, 9400 GWh/yr for China, 7400 GWh/yr for Thailand, 5200 GWh/yr for Pakistan, 4500 GWh/yr for Mexico, 3600 GWh/yr for Australia and 3400 GWh/yr for Cuba. About 25% of this represents the captive power needs of the sugar mills and is already exploited but the remaining 75% representing surplus

power generation remains largely unexploited. For example, in Brazil 40 sugar mills use 1.2-1.5 GW of capacity for captive use and only 158MW for sale to grid. Although Australia has 37 sugar mills, no significant cogeneration activity was taken up until recently. However, a sugar mill has recently setup the first bagasse cogeneration project, which generates 180 GWh / year of electricity corresponding to about 40 MW at 50% PLF."

2.4 The following table shows State-wise Biomass Power Projects Co-generation projects Capacity (as on 31.03.2005):

S. No.	State		Capacity Commissioned		Capacity under Implementation		
			(MW)		(MW)		
		No. of Projects	Biomass Power Proj.	Co-generation Projects	No of Projects	Biomass Power Projects	Co-generation Projects
1	Andhra Pradesh	49	194.2	73.05	18	70.25	55.71
2	Chattisgarh	2	11.00	--	5	51.00	--
3	Gujarat	--	05.00	--	--	--	--
4	Haryana	2	4.00	2.00	--	--	--
5	Karnataka	15	36.00	115.98	20	61.00	94.66
6	Madhya Pradesh	--	1.00	--	--	--	--
7	Maharashtra	9	3.50	32.50	8	6.00	69.80
8	Punjab	3	10.00	12.00	1	6.00	--
9	Rajasthan	1	7.80	--	4	29.10	--
10	Tamil Nadu	19	34.50	138.50	9	48.50	28.50
11	Uttar Pradesh	1	--	73.00	8		64.30
		101	**302.5**	**447.03**	**73**	**271.85**	**312.97**

2.5 As informed by the Ministry, the cost of electricity generation from Bagasse based cogeneration projects varies between Rs. 2.50 and 3.00 per kwh depending upon site conditions. In case of biomass power projects, the cost of generation is between Rs. 2.50 and Rs. 3.50 per kwh.

2.6 In the same context the Committee observed that the schemes for Biomass cogeneration are concentrated in a few States namely Andhra Pradesh, Tamil Nadu and Uttar Pradesh and wanted to know that why the other sugar producing states like Punjab and Maharashtra have not taken up the programme in a big way, the Ministry stated the following reason:-

"In Maharashtra, a majority of the cooperative sugar mills have limited potential to raise loans because of poor financial and liquidity positions. Further, the viability of bagasse cogeneration projects depends upon various factors including length of crushing season which must be a minimum of around 180 days, crushing capacity of sugar mills, which should not be less than 2500 tpd etc.. These factors are also not very favourable in Punjab as the crushing season is not long enough to sustain economic bagasse cogeneration of power."

Targets and achievements under Biomass Power and cogeneration Programme

2.7 The Ministry of Non-Conventional Energy Sources has been implementing Biomass Power and Co-generation Programme for the last 10 years. Over these years, more than one hundred biomass power and cogeneration projects aggregating to 750 MW have been installed in the country for feeding power to the grid. In addition, around 70 biomass power and cogeneration projects aggregating to 585 MW of electricity are under various stages of implementation. Bagasse cogeneration projects in sugar mills includes 58 projects with installed capacity aggregating to 450 MW and 34 projects under implementation aggregating to 312 MW. The States which have taken a leadership position in implementation of cogeneration projects include Andhra Pradesh, Tamil Nadu, Karnataka and Uttar Pradesh, while for biomass power projects, the leading States are Andhra Pradesh, Karnataka and Tamil Nadu. The Ministry of Non-Conventional Energy Sources has an aim of achieving renewable grid power of 10,000 MW, including 3000 MW bio energy based grid power, during the 10^{th} and 11^{th} plan periods corresponding to 10% of the additional grid-interactive power generation installed capacity expected during the said period.

2.8 The overall objective of the programme is to catalyze commercialization of Biomass based grid interactive power.

Biomass power and Cogeneration future strategy of the Ministry is as under:-

- Mapping the potential for energy plantation.
- Linking energy plantations with power generation in order to ensure sustained supply as also to fully harness the potential of waste-lands.

2.9 When the Committee specifically asked about the efforts made by the Ministry to achieve the objective of programme, MNES stated in a written reply as under:-

- Resource Assessment was carried out at taluka and district levels to estimate surplus biomass material. The work on preparation of a Biomass Resource Atlas for India is under progress.
- Guidelines were formulated and issued to States for announcing a policy for buy-back, wheeling, banking and third party sale of renewable power, including biomass/cogeneration power. As a result, twelve of the major potential States announced conducive policies for biomass power/cogeneration projects.
- Simultaneous dialogue was initiated with financial institutions for providing loans to biomass power/cogeneration projects.
- Central Financial Assistance (CFA) in the form of capital subsidy was provided for setting up projects utilizing high pressure boilers in sugar mills under the cogeneration programme.
- CFA was provided for promotional activities such as business/interaction meets, training for sugar mill engineers, professional/technical services by consultancy firms and state nodal agencies for involvement in promoting biomass power/cogeneration projects.
- Many private sector sugar mills have taken up bagasse cogeneration projects. Most sugar mills in the cooperative sector are unable to make bankable proposals on account of their adverse financial and liquidity positions.
- As a result, biomass power/cogeneration projects of 750 MW installed capacity have been achieved as on 31.3.2005 comprising 303 MW biomass power and 447 MW bagasse cogeneration projects. Projects aggregating 585 MW are under implementation.

2.10 The following table show the physical and financial targets and achievements during the 9th and 10th Plan periods:-

A. PHYSICAL (in MW)

Ninth Plan		Tenth Plan					
		2002-03		2003-04		2004-05	
Target	Ach.	Target	Ach.	Target	Ach.	Target	Ach.
314	295.30	100	102.63	125	129.50	125	136.10

B. FINANCIAL (Rupees in crore)

Ninth Plan		Tenth Plan					
		2002-03		2003-04		2004-05	
BE	Ach.	BE/RE	Ach.	BE/RE	Ach.	BE/RE	Ach.
82.30	74.50	19.28/ 16.78	16.78	18.00/ 16.50	11.95	14.54/ 12.54	6.22

2.11 During the course of evidence the Secretary, Ministry of Non-Conventional Energy Sources admitted that the potential of Energy from Biomass cogeneration was very vast but the targets fixed were low. Secretary further stated…

> "One of the major problems, of course, is that as far as biomass conversion outside the Bagasse domain is concerned, the real breakthrough came in 2002. By the end of 2002, 100 per cent producer gas run engines became a reality. Till 2002, it was all dual fuel system. Today, the dual fuel system is not viable because the price of diesel is so high that nobody is going to go for it."

2.12 When asked about State-wise physical achievements, Ministry of Non-Conventional Energy Sources submitted the following information:-

State/UT	Achievement (MW)	
	9th Plan	10th Plan (2002-05)
Andhra Pradesh	100.20	166.05
Chattisgarh	11.00	--
Gujarat	0.50	--
Haryana	--	2.9
Karnataka	74.60	76.38

Madhya Pradesh	--	1.9
Maharasthra	15.50	11.5
Punjab	2.00	10.9
Rajasthan	--	7.8
Tamil Nadu	51.50	67.9
Uttar Pradesh	40.00	26.5
Total	**295.30**	**368.23**

2.13 When the Committee enquired about the state-wise physical and financial targets and achievements.

The Ministry have stated….

"State-wise targets are not fixed under the biomass power programme as this activity is driven by private investment, which depends on a host of factors including entrepreneurial activity in the state, surplus biomass potential and the price of electricity fixed by the state regulators."

2.14 While going into the details of future strategy of the Government regarding Biomass Power and Cogeneration, when the Committee wanted to know about the latest position of development of Biomass Resource Atlas based on Biomass resource assessment in different regions of the country, the Ministry submitted the following reply:-

"The first phase of development of the Atlas for entire country has been completed using satellite based remote sensing data (RSD) obtained from the Regional Remote Sensing Service Centre, Bangalore (Indian Space Research Organization) and data from the biomass assessment studies conducted at the taluka level with support from the ministry. The model results are undergoing validation. Efforts are being made to ensure distribution of a stand-alone computer application package to a few selected State Nodal Agencies/ potential entrepreneurs during the last quarter of the current financial year.

The second phase relating to web based application is under development in which a higher resolution RSD and survey data at the district level from biomass resource assessment studies are being used. The web-based package would be hosted by the National Informatics Centre (NIC), Government of India."

2.15 During the course of evidence when the Committee enquired about the time when the map will be available to the potential users, the head of the programme replied as under:-

> "Stand alone computer application package will be available by the end of this financial year. Presently the model results need validation. The second phase where the higher resolution data will be matched that would be the next two years exercise. Thereafter, it will be available on web for the entrepreneurs and others through NIC. So, the project would complete by the end of March, 2007. The first package based on the low resolution data should be available by the end of this financial year and it would be made available through state nodal agency and some of the entrepreneurs for testing and trial purposes."

2.16 Ministry of Non-Conventional Energy Sources have informed that as per the advice of Sub-Committee III of the Standing Committee on Energy during the course of evidence held on 18.07.2005 efforts are being made to make the package already prepared for 8 States *viz* Andhra Pradesh, Bihar, Karnatka, Kerala, Maharashtra, Orissa, Tamil Nadu and Uttar Pradesh available on a web server during the next three months. The work relating to web based application involving higher resolution data and survey data at district level is expected to be completed by 31.03.2007.

2.17 The Committee observe that Biomass is renewable organic material derived from trees, plants, crops or from human, animal, municipal and industrial wastes. Woody Biomass is derived from forests, plantations forestry residues while other sources provide non-woody Biomass. Fortunately, India is blessed with a huge potential of Biomass. Moreover, Biomass resources are available locally within or around the villages and energy production, distribution and provision of energy can be managed by the village communities. The Committee also note that the total estimated Biomass power potential in India is above 1 lakh MW. This includes 16,000 MW grid interactive power from surplus agro residues and wastes from forestry and plantations, 3500 MW through bagasse co-generation and 1 lakh MW from plantation of 60 million hectares of wasteland. The Ministry of Non-Conventional Energy Sources has been implementing Biomass Power and Cogeneration Programme since 1994. The Committee note that over these ten years, only 101 Biomass Power and Cogeneration projects aggregating to 750 MW have been installed in the country and 73 projects aggregating to 585 MW are under various stages of implementation. This includes 58 Bagasse Cogeneration Projects aggregating to 450 MW and 34 Projects under implementation aggregating to 312 MW. The Committee are not at all satisfied with the present slow approach of the Government in tapping the huge Biomass potential available in the country. The Government have fixed a target that 10% of the additional grid interactive power generation capacity should come from renewable sources during the 10^{th} and 11^{th} Plan periods, which is 5.5% at present. Bio-energy can make significant contribution in achieving this target. More efficient modern Biomass technologies have the potential to alleviate poverty, improve health, reduce drudgery of women and children, increase productivity, create employment and generate incomes in rural areas, thereby reducing rural to urban migration. The Committee at this stage feel a

need that renewable energy including Bio-energy should now be brought into mainstream for meeting/supplementing the energy demands in urban and rural areas. The Committee, therefore, strongly recommend that the Government should now evolve an effective implementation strategy for Biomass Power Cogeneration Programme for maximum exploitation of Biomass resources of the country with an objective to make Biomass energy available at an affordable price to the common man.

2.18 The Committee note that the private developers face a number of problems in setting up Biomass projects like firm assessment on availability of Biomass and ensuring its supply to the project, uncertainty on tariff to be fixed by SERCs and evolving technology of biomass gassification systems etc. The Committee desire that these problems should be resolved on priority and in a time bound manner.

2.19 The Committee specifically note that India has very good Bagasse cogeneration potential which can generate 3500 MW power. Out of this, only 450 MW projects have been installed and 312 MW projects are in pipeline. The Committee are surprised to note that in the State of Maharashtra out of the potential of 1000 MW, Bagasse Co-generation projects of 32.5 MW only have been commissioned so far and projects of 6 MW are under implementation. Similarly the Bagasse potential of other States like U.P., Tamil Nadu, Karnatka, Andhra Pradesh, Bihar, Gujrat and Punjab has also been poorly utilized. The Committee are concerned to note that the main hurdles in the programme exist in the fact that in some states particularly in Maharashtra, the sugar mills are in the cooperative sector and they face difficulties in limited access to funds and also in raising equity component of the investment in the programme. Also, there is heavy management risk in the projects as the cooperative sector is subject to frequent changes in the management and perception of risk in the Biomass Cogeneration Projects is high. The Committee feel that industrial Co-

generation has in the past not received adequate attention, as cheap power and fuel were abundantly available. However, with increasing tariffs and unreliable supply of grid power, there is considerable opportunity for the industrial sector needs to tap the potential for producing electricity and thermal energy in the Co-generation mode. In this direction the Bagasse Co-generation programme can play a pivotal role. The Committee welcome the initiative taken by the Government by requesting the Maharashtra Energy Development Agency (MEDA) to constitute a high level Committee for identifying and suggesting measures for rapid implementation of Co-generation projects in cooperative sugar mills in the State and desire that they should persuade MEDA to prepare a Report in the shortest possible time. The Committee also desire that after examining the Report the Government should prepare a specific package of incentives containing capital as well as operative subsidies for cooperative sugar mills in Maharashtra and other States. The Committee may be apprised of the time-frame fixed in this regard.

2.20 The Committee also find that the capacity under implementation in the various Biomass projects in the various states is relatively lower than the capacity commissioned. Although the Ministry have sufficient information on the potential available in the states for Biomass Power and Cogeneration programme, the capacity under utilization is quite low. The Committee are constrained to note that state wise physical and financial targets are not fixed and therefore, comparative data on the targets and achievements are not available. The Committee are not convinced with the reasoning given by the Ministry that State-wise targets are not fixed under the Biomass Power Programme as this activity is driven by private investment, which depends on a host of factors including entrepreneurid activity in that state, surplus Biomass potential and the price of electricity fixed by the state

regulators. The Committee in their 31st Report on the Electricity Bill, 2001 (Thirteenth Lok Sabha) had recommended that the states should be encouraged to procure at least 5% of their Energy demands from renewable sources and the limit of the same should be raised to 10% by the end of 11th Plan in phases. Similar objectives/targets have been fixed by the Central Government also. The Committee, therefore, desire that Ministry of Non-Conventional Energy Sources should assess state-wise potential of Biomass and also fix the targets accordingly for every year for a balanced exploitation of Biomass potential available in each State. The Committee desire that the Government should also collect full data of power generation through biomass/cogeneration mode by private developers in various states so as to know the actual progress. For this purpose, there is a need to develop a better coordination with the State level Nodal agencies engaged in the field of Non-Conventional Energy Sources, responsible for promotion and development of private sector projects. The Committee feel that fixation of National targets for procurement of energy demands from renewable sources would help in better exploitation of our Non-Conventional resources.

2.21 The Committee note that Ministry of Non-Conventional Energy Sources have a goal to achieve renewable grid power of 10,000 MW including 3000 MW Biomass Grid Power by the year 2012. They have a target of 700 MW for the Tenth Plan i.e. by 2007 and rest 2300 MW will have to be achieved during 11th Plan period. Out of the target of 700 MW only 370 MW has been achieved during the first three years of the current plan. The Committee feel that the target of energy from Biomass is very low under the situation when the country has such a huge Biomass potential. Now, that 100% producer gas run engines have become reality, it should be easy to obtain higher targets/ exploitation from Biomass sources. Efforts should be made to make this engine cost effective and popularize

the same for mass utilization. The Committee, therefore, desire that the Ministry should suitably enhance their targets of Biomass Power generation and also generate a suitable action plan for the same, for the remaining two years of the current Plan and 11th plan to achieve the goal of 3000 MW Biomass grid power by the year 2012.

2.22 The Committee are happy to note that the Government have taken initiatives for preparation of 'Biomass Resource Atlas for India'- based on Biomass resouce assessment studies in different regions of the country. Ministry have informed that first computer application package based on low resolution data will be available by the end of this financial year. It would be made available through state nodal agencies and some of the entrepreneurs for testing and trial purposes. The second phase where the higher resolution data and survey data will be matched and project is proposed to be completed by March, 2007. The Committee feel that such an important data should be made available on website of the Ministry after the completion of first phase itself. The Committee however desire that the Ministry should ensure the total reliability of the data supplied.

CHAPTER-III

INCENTIVES AND FINANCING FOR BIOMASS POWER PROJECTS

3.1 The promotion of Biomass based power generation in the country is being encouraged through conducive policies at the Central and State levels. A number of policy initiatives have been introduced for encouragement to commercial exploitation of Biomass potential since 1993. Incentives include sales tax and excise duty exemption, reduced customs duty, accelerated depreciation etc. Electricity Regulatory Commissions set up in the States of Tamil Nadu, Andhra Pradesh Karnataka and Maharashtra have also noted the relevance of these technologies and hence announced policies for purchase/ wheeling/ banking of power generated from Biomass power/ cogeneration projects.

(A) Incentives to Private Sector Biomass Power Generation Projects

3.2 Biomass Power Programme is mainly driven by private investment - Private Sector projects based on forestry and crop residues, energy plantations, and forestry / agro industrial residues for generation of 1MW and higher levels of power are provided subsidy. The primary objective of the subsidy is to motivate potential entrepreneurs to invest in this sector. The following table shows the details of the existing subsidy and that proposed from 2005-06:

Central Finance Assistance for Bagasse Cogeneration Projects:

S. No.	Bagasse Co-generation	Pressure Configuration	Interest Subsidy
1.	**Projects by Cooperative/Public/ Joint Sector Sugar Mills**	**40 bar & above**	**3%**
		60 bar & above	**4%**
		80 bar & above	**5%**
		100 bar& above	**6%**
2.	**Projects in IPP Mode in Cooperative/Public / Joint Sector Sugar Mills**	**60 bar & above**	**2%**
		80 bar & above	**3%**
		100 bar& above	**4%**
3.	**Projects by Private Sector Sugar Mills**	**60 bar & above**	**1%**
		80 bar & above	**2%**
		100 bar& above	**3%**

Central Finance Assistance for Biomass Power Projects:

S. No.	Biomass power project category	Pressure Configuration	Interest Subsidy
1.	Direct combustion, cogeneration, including captive power projects	60 bar & above	2%
		80 bar & above	3%
2.	Atmospheric gasification, including captive power projects	--	2%
3.	Projects with MW-Scale 100% Producer Gas Engines	Capital Subsidy of Rs.1.00 Cr./MW	
4.	Advanced biomass gasification projects	Capital Subsidy of Rs.1.00 Cr./MW	

3.3 Several other incentives are available to the entrepreneurs for setting up biomass/cogeneration projects. These include:

(i) Sales tax and excise duty exemption

(ii) 80% accelerated depreciation in the first year

(iii) Customs duty concession

(iv) Tax holidays on income from the power projects, etc.

(v) Exemption from local sales tax in some States.

(vi) Preferential tariffs in most potential States.

3.4 While giving the details about the subsidy being provided under Biomass/ Cogeneration Programme the Ministry of Non-Conventional Energy Sources submitted the following details:-

> "To begin with under the Biomass Power/Cogeneration programme, capital subsidy was provided to bagasse cogeneration projects and biomass power projects. Thereafter, interest subsidy was introduced till 2004-05, depending upon the boiler configuration. Several difficulties were experienced in implementing the interest subsidy scheme as it extends upto ten years and the procedure was becoming more cumbersome and time consuming. Therefore, a one time subsidy scheme is proposed for 2005-06 as it is simple to implement and monitor and assures that the subsidy is released only when the project is made operational as per DPR parameters. The financial outgo per MW almost remains unchanged."

3.5 The Ministry have stated the latest position about subsidy as under:-

"Subsidy is now proposed to be released to the concerned financial institution which would reduce the loan by an equivalent amount as pre-payment of loan by the developer. In case the project is set up by a developer through its own resources, the CFA would be released to the developer directly. However, the government sector projects would continue receiving CFA linked to physical progress of the project. The scheme is proposed to be operated through IREDA and will replace existing schemes for support to grid interactive renewable power generation projects. The quantum of CFA per Megawatt (MW) is proposed to be reduced with increase in capacity taking in to account the factor of economies of scale. Higher CFA is proposed to be given to projects to be set up in special category States. The CASE has recently approved the following pattern of CFA for biomass power projects:

Programme	Special Category States (NE Region, Sikkim, J&K, HP & Uttaranchal)	Other States
Biomass power projects	Rs.25 lakh X (C)^0.646	Rs.20 lakh X (C)^0.646
Bagasse Co-generation	Rs.18 lakh X(C)^0.646	Rs.15 lakh X (C)^0.646
Biomass power using Advanced Technologies	Rs.1.2 crore X(C)^0.646	Rs.1.0 crore X C)^0.646

C: project capacity in MW ^: raised to the power."

3.6 When asked about the status of implementation of the subsidy schemes, the Ministry stated during oral evidence:

"A formal study has not been made so far to evaluate the impact of incentives. However, it is observed that incentives provided under the programme have acted as a catalyst to encourage sugar mills and biomass power project developers to take up projects."

They further clarified in their written replies…

"Although there is no proposal to make a formal study of the impact of CFA under the programme, the Ministry makes assessments from time to time based on feedback received from various stakeholders. Further, the Ministry has requested the Maharashtra Energy Development Agency (MEDA) to constitute a High Level Committee for identifying and suggesting measures for rapid implementation of cogeneration projects in cooperative sugar mills in the state. The committee is expected to recommend, among other things, a package of incentives for co-operative sugar mills in Maharashtra , which could serve as a model for the country.

Since the inception of the programme, the Ministry has been providing various types of incentives such as Central Financial Assistance (CFA) for projects in sugar mills in different sugar producing states as also for biomass combustion based power projects in biomass surplus states. It may be mentioned that these initiatives have helped in introducing high pressure/ high temperature steam generation technology in sugar mills. As a result 750MW capacity as on 31.3.05 comprising 303MW biomass power and 447MW bagasse based cogeneration has been set up in the country and projects aggregating 585 MW are under implementation"

3.7 The provisions of Biomass power/cogeneration programme are applicable to promoters in all sectors including the private sector. The same level of CFA is admissible to government as well as private/joint/cooperative sector projects. No special dispensation is being provided to the private sector in these projects. Majority of Biomass power/Bagasse cogeneration projects are being taken up by private sector.

3.8 When the Committee specifically inquired whether the Government have analyzed the factors responsible for undertaking Biomass Power Projects despite giving several fiscal and other incentives MNES submitted the following reply:-

"The fiscal and financial incentives provided to biomass power projects are limited to CFA depending upon the boiler configuration of each project which amounts to a fraction of the project cost. Fiscal incentives are available such as sales tax and excise duty exemptions, accelerated depreciation, customs duty concessions, tax

holidays on income from the power projects, etc. and exemption from local sales tax in some states.

3.9 The main factors which are responsible for limiting the response for undertaking biomass power projects are:

- Collecting and transporting surplus biomass resources in the command area to the project site.
- Surplus Biomass has not been a traded commodity."

(B) Participation of Banks and Financial Institutions

3.10 The Ministry have stated that at the time of inception of the programme in 1993-94, guidelines were issued to states to announce policies for buy-back, wheeling, banking, third party sale of power from renewable energy sources, including biomass/cogeneration power. As a result, twelve potential states have conducive policies for taking up biomass power/ cogeneration projects. Central Financial Assistance (CFA) in the form of capital subsidy has been provided for setting up projects utilising high-pressure boilers in sugar mills under the co-generation programme. Further, CFA was also provided for promotional activities such as business/ interaction meets, training for sugar mill engineers, professional/ technical services by consultancy firms and state nodal agencies for their involvement in promoting biomass power and cogeneration projects. These initiatives have helped in establishing a sizeable biomass power/cogeneration capacity in the country. Financial Institutions too agreed to providing loans for biomass power/cogeneration projects. Initially only IREDA provided loans to such projects. FIs such as PFC, HUDCO, NCDC, IDBI and scheduled banks have started providing loans to such projects. The Department of Food & Public Distribution also agreed to giving funds from the Sugar Development Fund (SDF) for bagasse based cogeneration projects. The SDF Act 1982 has been amended in 2003 to provide loans at an even lower rate of interest to bagasse cogeneration projects.

3.11 When asked about the major constraints faced by private developers, the Ministry stated that the major constraints faced by private developers are:

(i) Obtaining a firm assessment on availability of biomass as also ensuring risk free supply to the project.

ii) Uncertainty regarding tariff to be fixed by SERCs in some potential states.

iii) The technology of biomass gasification is still to be fully established in a commercial mode. However, the combustion route technology is available.

3.12 Due to this, the Ministry have stated that commercial users hesitate in investing large resources. However, the Ministry continues its efforts to improve acceptability of this technology through technology development, cost reduction, demonstration, training and awareness creation and package of financial incentives in the form of subsidies to further motivate users.

3.13 The Committee appreciate to note that with an objective to reduce interest burden of Biomass based Power projects, MNES has been providing subsidy for Government as well as private projects at the same level. The earlier interest subsidy scheme for commercial projects is proposed to be modified to one time subsidy support to the commercial projects. The subsidy is for making repayment of term loan provided to the developers by the Financial Institution. The subsidy will be released after successful commissioning and commencement of commercial generation from the project, to the Financial Institution. The Committee are however, surprised to note that no formal study has so far been made to evaluate the impact of earlier incentives given for Biomass Power and Cogeneration Programme since its inception. The Committee feel that these incentives have not shown the desired results in attracting private sector and corporate sector in Biomass Power Projects. There is a need for an intensive evaluation of incentives being given for these programmes. The Committee therefore, recommend that the Government should conduct a formal study to analyze the impact of various incentives and subsidy schemes with a view to prepare separate incentive/subsidy proposals and policy measures for Biomass power projects in Government private and cooperative sectors. The Committee desire that SC/ST and other backward classes should be covered proportionately in the package. The Committee also desire that this exercise should be completed before the finalisation of budget proposals for 2006-07.

3.14 The Committee note that the Ministry of Non-Conventional Energy Sources are encouraging the setting up of grid interactive Biomass based power projects through non-government investment. Now most capacity addition is being achieved through private investment. The State Nodal Agencies are responsible for promotion and development of private sector projects by way of providing necessary clearances, allotment of land and

facilitating power purchase agreements etc. SERCs are determining tariffs by taking its account fee submissions of all stakeholders. The Committee are happy to note that leading Financial Institutions like PFC, HUDCO, NCDC, IDBI and scheduled banks have started providing loans to Biomass Power Cogeneration Projects. The Department of Food and Public Distribution has also agreed for giving funds from Sugar Development Fund for Bagasse based cogeneration projects at lower rates. The Committee, desire that Government should take initiatives to convince the Financial Institutions and banks about the importance and viability of Biomass based power projects by showing their determination in developing the latest technology. R&D efforts for cost reduction, future planning policy and tariffs etc. The Committee also urge the Government to take up the matter with Financial Institutions and banks to evolve simplified procedures for quick disposal of loan application for Biomass based power projects.

3.15 The Committee also desire that the Ministry should stress upon the State Govts. to announce entrepreneur friendly schemes for buy-back, wheeling and third-party sale etc. so that more and more private investment can be attracted to the Biomass/Cogeneration Power. The Committee also feel that incentives like Sales Tax & excise exemptions, accelerated depreciation and Tax holidays etc. should continue for the present to encourage the private investment.

CHAPTER-IV

RESEARCH & DEVELOPMENT IN THE BIOMASS POWER / CO-GENERATION

4.1 The R&D component of the Biomass Power and Cogeneration Programme as stated by the Ministry aims at upgradation of the existing biomass conversion technologies, improve capacity utilisation, and develop more efficient and cost effective new technology routes. In pursuance of this aim, a Ministry sponsored R & D project on "Strategic Development of Bio-energy" was taken up by the Combustion, Gasification and Propulsion Laboratory (CGPL) of the IISc, Bangalore. The main objectives of the first phase of project, which concluded during the year, were development of biomass gasification systems for electricity and thermal applications; development of 100% producer gas engines; introduction of large systems for industrial captive use; preparation of technical documentation packages for applications of biomass gasifiers ; etc.

4.2 Among the salient achievements of the project have been demonstration and commercialization of 100% producer gas engines of upto 300 KW capacity; development and commercial installation of biomass gasifier systems of upto 1 MW capacity for electricity generation and of upto 5 MW capacity for thermal applications; development of a process for extraction of silica from rice huck ash; development of a biomass drying system for use in biomas gasifiers; etc. The group has also filed nine patents over the years in India and abroad. The technology has been licensed to four commercial entities. During the year, the second phase of the project was approved for a period of 3 years to carry forward the research work of the first phase and expand the know-how base to actual field requirements. The main objectives proposed to be achieved during the second phase is to develop packages for industrially applicable power generation/thermal systems using biomass fuels and opening up related technologies for large-scale dissemination and commercialization.

4.3 The thrust of the activities will be on optimizing developed systems; design engineering improvements for large-scale use in industry; and developing practical applications leading to expanded use of biomass gasification systems.

4.4 The Ministry have stated CGPL will also be performing the role of an apex and referral institution to train target groups, develop performance and manufacturing standards, and guide test centers proposed to be set up with the support of the Ministry at various locations in the country.

4.5 As informed by the Ministry a multi-institutional co-ordinated project on "Advanced Biomass Gasification" (ABG), Bangalore was successfully completed during the year. Development and testing of the high pressure gasifier coupled with gas turbine engines for generation of power has been demonstrated with contributions from all the four participating institutions, namely Indian Institute of Technology (IIT), Chennai; Indian Institute of Chemical Technology (IICT), Hyderabad; Bharat Heavy Electrical Ltd. (BHEL), Trichy and Indian Institute of Science (IISc), Bangalore. Various parameters related to these tests namely the gas composition, pressure, temperatures and biomass consumption were recorded and analysed. Similarly the gas quality in terms of Tar and Particulate matter was examined. The control system for governing for gas turbine operations was build and successfully tested.

Research & Development (R&D) Activities

4.6 Achievements of R&D

(i) Achievements made under the R&D projects completed during 2002-03 to 2004-05 are given below:

- Application based biomass gasification technology has been developed and is being tested for Rice Mills, Cold Storages, Textile Mills, Plywood Industries, Steel Re-rolling Mills, Tea/Coffee Drying Units, Tube and Tyre Manufacturing Companies, Brick Kilns, Ceramic Industries, Cremetoria, etc.

- Under the "Advanced Biomass Gasification" (ABG) project, a high pressure gasifier coupled with gas turbine engine has been tested for generation of power

by Indian Institute of Technology (IIT), Chennai; Indian Institute of Chemical Technology (IICT), Hyderabad; Bharat Heavy Electrical Ltd. (BHEL), Trichy and Indian Institute of Science (IISc), Bangalore.

(ii) Status of on-going R&D projects is given below:

S. No.	Name of the Project	Institution	Achievements/Status
1.	Design and Development of Clean-up Systems for Biomass based Producer Gas (Power Generation Applications – I.C. Engines and Gas Turbines)"	IIT, Bombay	Attempt has been made to remove tar. Characterization of size and distribution of particulate matter is being made.
2.	Decentralised power generation through carbonization & gasification of Cashew Shell	Institute of Energy Studies, Chennai	Two-stage approach is being developed. An active batch type drum charring unit has been fabricated for carbonizing cashew shells. A 5 kWe gasifier coupled with 100% gas engine is being tried.
3.	Design and development of a laboratory scale fluidized bed gasifier for conducting parametric studies with various agro-residues.	SPRERI, Vallabh Vidya Nagar, Gujarat	All the components of the fluidized gasifier have been fabricated/procured and assembled. Performance of sub-systems is being evaluated.
4.	Conversion of SPRERI's Functional Prototype of 250,000 kcl/hr Open Core Groundnut Shell Gasifier into a Production Prototype	SPRERI, Vallabh Vidya Nagar, Gujarat	The gasifier system has been installed and commissioned in November, 2004. Trials are in progress.
5.	Development and testing of low cost membrane filters from biomass ash for hot gas clean up of producer gas for gasifier based power plants and treatment of waste matter	TERI, New Delhi	Biomass ash based membrane filter has been developed and is being tested under controlled condition. Experiments for treatment of waste water are also in progress.
6.	Development, field testing and demonstration of gasifier system for areca nut processing in Assam	TERI, New Delhi	Designing of gasifier system for areca nut processing unit has been completed and trial runs are in progress.
7.	Development of Technology for drying industrial products utilizing eco-friendly biomass gasifier	MPUAT, Udaipur	The system has been designed, fabricated and installed. Data obtained from trial runs are being evaluated.
8.	Development and study of a CZZ kiln for ceramic brick manufacturing	MKU, Madurai	Two kilns have been constructed for performance evaluation.

(iii) List of identified thrust areas is given below:

- Development of fluidized bed gasification systems especially for low capacities.
- Development of a multi-biomass gasification system.
- Development of cost effective engines for 100% producer gas operation in 10-30 KW range by modifying the existing diesel engine designs or modifying automotive spark ignition engines, etc.
- Development of Safety Controls and Instrumentation packages for biomass gasifier linked IC engine systems.
- Development of load sharing and load control systems in multi-point use (thermal + electrical) gasification system.
- Development of applications such as direct gas fired absorption chillers for cold storage, industrial drying, grain dryers, absorption type air conditioners, etc.
- Development and standardization of techniques for firing different biomass materials along with conventional fuels (Co-firing) in industrial boilers.
- Standardization of operation techniques for biomass power projects for high plant load factors.
- Establishment of best practices for high efficiency of biomass use in power projects.
- Development of techniques for more efficient handling and feeding of biomass materials in biomass power projects.

Barriers to R&D efforts

4.7 When the Committee specifically enquired about the various barriers identified by the Government in implementation of the Biomass Power/ Cogeneration Programme, Ministry of Non-Conventional Energy Sources submitted the following details regarding technical barriers:

- Problem of erosion of boiler tubes when certain types of biomass are fired.
- Adequate availability of biomass for grid interactive power generation has been a problem in some states.
- Inadequate surplus biomass resource data
- Need to develop test and standardize megawatt scale biomass gasifier systems and effective cooling & cleaning of producer gas systems.

4.8 For lower capacities, a gasifier is a better option subject to the following technical constraints:

- Development of 100% gas engines for firing producer gas.
- Development of gasifer for multi-fuel applicability.

4.9 R&D effort has focused on development of biomass gasification systems. Milestones achieved by the various R&D projects are given below:-

- Development of biomass gasifier systems from 3 kWe to 1000 kWe unit capacity using woody/ non-woody/ powdery biomass.
- Conversion of upto 300 kW capacity dual fuel engine to 100 % producer gas engine.
- Gasifiers for different end-uses/ industries, such as, rice mills, cold storages, textile mills, tube & tire manufacturing units, steel re-rolling mills, tea/coffee drying units, brick kilns industries, ceramics industries, etc. have been developed and promoted.

4.10 The following efforts are being made to solicit project proposals which have been finalized in consultation with user industries, entrepreneurs and others as stated by the Ministry.

- Development of low capacity fluidized bed gasification systems.
- Development of 100% producer gas engines in 10-30 kW range.
- Development of Safety Controls and Instrumentation packages for biomass gasifier linked IC engine systems.
- Development of load sharing and load control systems in multi-point use (thermal + electrical) gasification system.
- Standardization of operation techniques for biomass power projects for high plant load factors.
- Development of techniques for more efficient handling and feeding of biomass materials in biomass power projects.
- Developing gas cleaning systems for gasifiers.

4.11 Industries are being encouraged to take up R&D projects on a cost sharing basis.

Gasifiers manufactured by Indian companies have been exported to USA, Europe, Latin America, Australia, Asia and Africa.

Biomass gasification based power generation

4.12 Regarding the technology of Biomass gasification systems, the Ministry have informed.

> "Based on technology developed with this Ministry's support, a grid connected Biomass Gasifier Power Generation Project of 1 MW capacity using 100% producer gas engine, has been commissioned in 2004 at Coimbatore. This project is expected to demonstrate an option for electricity generation through biomass on a MW scale. Under the Biomass Gasifier Programme, it is proposed to provide financial incentives @ about Rs.95.00 lakh per MWe for such projects.
>
> R&D activities are continuing at the Indian Institute of Science, Banglore, Indian Institute of Technology, Mumbai, Sardar Patel Renewable Energy Research Institute, Vallabh Vidya Nagar, Gujarat, and Anna University, Chennai, for reducing the cost of gasifier systems as well as improving efficiency and standardization of various equipment, improving gas cooling and cleaning system, developing safety and control system, etc. Further cost reduction could be achieved through production economies of scale."

4.13 Details of budget provided for R&D in the field of Biomass Co-generation and Combustion and Gasification Technologies during the last three years are given below:

(Rs. in crore)

Year	Actual Expenditure
2002-03	3.74
2003-04	2.60
2004-05	2.46

A Budget Estimate (BE) of Rs.4.00 crore has been provided for the purpose for 2005-06.

4.14 Regarding the expenditure on R&D the Ministry have stated:-

"The major heads for release of funds are grants-in-aid to State Nodal Agencies, R&D institutions for R&D activities, preparation of resource assessment studies, interest/capital subsidy for commercial biomass power/cogeneration projects and "Other Charges" for taking up promotional activities including business/interaction meets, training programme etc.

The difference in actual expenditure and BE/RE figures during 2003-04 was primarily on account of withholding release of financial assistance to many mature biomass power/cogeneration projects at the end of the financial year in Karnataka due to cancellation of PPAs earlier signed by the State Government. Similarly during 2004-05, the actual expenditure is less than the BE and RE as the above issue could not be resolved and also due to the unforeseen cut/restriction of expenditure imposed by the Ministry of Finance."

Bio-fuels as an Energy Source

4.15 The role of the Ministry of Non-Conventional Energy Sources regarding biofuels is related to changing characteristics in order to mimic those of diesel as also development of prime movers that can be run on such fuels.

4.16 Work relating to other different aspects of bio-fuel development is being dealt with by different Ministries / Departments / institutions.

4.17 In this context, it is stated that the Planning Commission had prepared a Report on the Development of Bio-fuels whereafter it was decided that the Ministry of Rural Development (MORD) would be the nodal Ministry for processing recommendations made in the Report. A major recommendation of this Report is the launching a Mission on Biodiesel with a special focus on *Jatropha curcas* to be planted in 4 lakh hectares of land. In this regard, MORD has got a Detailed Project Report (DPR) prepared through The Energy & Resources Institute (TERI). This DPR is reported to be under consideration of the Planning Commission for their in-principle approval.

4.18 The focus of the Ministry has been on developing technologies for the conversion of vegetable oils to biofuels and on bio-diesel engines. Some R&D / demonstration projects supported by the Ministry in this regard at IIT Delhi and IIP Dehradun include:

- producing bio-diesel from non-edible oils such as *Jatropha curcas* oil and *Karanja* oil.
- determination of physico-chemical properties of bio-diesel and blended fuel and field trails on diesel cars with bio-diesel operation.

4.19 Four biofuel pilot demonstration projects have also been initiated in December 2004 in four selected villages to demonstrate the use of non-edible vegetable oils for meeting the entire energy needs of lighting, agricultural operations and other community based stationary applications and to study various techno-economic parameters.

The Ministry have stated during evidence…

"So, there is going to be a little slow movement in the direction of utilization of bio diesels. We also do not have bio diesels available in very large quantities. We have decided very tentatively in the Ministry that wherever it is power generation, by using stationary engines, using bio fuels, we should go into it in a big way. No, there is a large field, which I wanted to place before you, and that is the total captive power domain in the country. The captive generation of power is almost 30,000 MW. Various industries are using it in that mode. Half of that comes from diesel. So, here you have 15,000 MW capacity in which diesel is to be displaced by using biomass. We have very large field in form of it."

4.20 The Committee note that modern Biomass conversion technologies provide us an opportunity to use Biomass feed stocks for production of all three kinds of fuel i.e. gaseous, liquid and solid. Established technologies for Biomass combustion, cogeneration and anaerobic digestion are available. Recent developments in pyrolysis and gasification have further added advantages for using Biomass more effectively not only for heat and electricity generation but also for transport and chemicals production. The Committee, however, feel that there are various barriers in technology development. The main barriers include inadequate reliable regional data and availability of agricultural residues, lack of coordinated approach in finalizing technology i.e. of combustion/ gasification/ cogeneration for a given kind of feed stock, capacity and use, lack of standard specifications and inadequate testing facilities for Biomass furnaces, biolers gasifiers and meagre budget support for R&D to pilot to demonstration to first of a kind of commercial scale plant. The Committee, therefore, desire that Ministry of Non-Conventional Energy should take time-bound initiatives for standardization of technology/systems for Biomass production, harvesting handling, storage and preprocessing, development and finalization of advance combustion/gasification/cogeneration technology for different kinds of feedstocks and development and demonstration of gas engines and micro-turbines for using Biogass and producer gas. The Committee also desire that Ministry should take concrete initiatives for development of standard specifications and testing protocol for selected technologies in collaboration with Bureau of Indian Standards. The Committee also recommend that testing and certification mechanism should be strengthened and the Government should establish institutions for testing and certification.

4.21 The Committee note that a lot of work has been done in developing small capacity Biogas production units and Biomass gasifiers and industrial scale Biomass furnaces, boilers, dual fuel engines etc. With the increase in the use of natural gas, now industry has started manufacturing gas compressors and producer gas engines. The Committee desire that the R&D efforts should now be concentrated to develop and implement selected co-coordinated projects with target to develop demonstrable technology packages having potential for wider adaptation. The Committee also desire that Government should prepare a detailed programme for setting up of pilot and first of a kind commercial scale units to demonstrate indigenously developed technology packages and develop confidence of industries concerned. The Committee further desire that in preparation of such programme/ project the participation of users stakeholders should also be ensured.

4.22 The Committee strongly feel that the budget support being given for R&D in Biomass sector is very small. The Committee note that during 2002-03 only an about of Rs. 3.74 crores was spent which came down to Rs. 2.60 and Rs. 2.46 crores during 2003-04 and 2004-05 respectively and for the year 2005-06 an amount of Rs. 4 crore has been allocated. This all shows a very poor attention of the Government towards the R&D projects in the field of Biomass Cogeneration, Combustion and Gasification Technologies. The Committee consider this poor funding for R&D projects responsible for very slow progress in development of Biogas and Biomass gasifier technology during last one decade. The Committee are surprised to note that as against American Budget of U$ 80 million for R&D in the year 2005, India is spending very small amount of Rs. 4 crore on R&D projects. The Committee therefore, desire that Ministry of Non-Conventional Energy Sources should undertake a detailed review of R&D projects and deployment of

programmes by involving industry stakeholders also for getting better results in future. The Committee also desire that R&D budget should be enhanced sufficiently so that R&D projects in development of Bio-energy do not suffer due to non-availability of funds.

4.23 The Committee note that bio-fuels have been considered as most preferred alternative to petrol and diesel particularly in the transport sector. The MNES have initiated a programme on bio-fuels for transportation since 2002-03. The focus of the programme is to develop the technology for converting vegetable oils, mainly non-edible oils, to bio-fuel and promote the use of these bio-fuels in automobile sector after taking care of different aspects of the conventional diesel/petrol engines. The Committee are happy to note that Ministry have taken up a scheme on Bio-fuel Demonstration Projects in rural areas for implementation initially in four villages to demonstrate the use of non-edible vegetable oils for meeting the entire energy needs of lighting, agricultural operations and other community based stationery applications and to study various techno-economic parameters. The Committee recommend that the ministry should first of all undertake detailed non-edible seed resource assessment study to know the potential of such seed production in each agro-climatic zone. After that, they must prepare a time-bound programme for extending similar bio-fuel demonstration projects covering more and more villages in all States of the Country. In Committee's view, a large number of activities are to be taken up under bio-fuel programme, therefore, the Ministry should also prepare a National Policy on bio-fuels with the participation of the concerned stakeholders and institutions working in the field of bio-fuels. Since this programme involves major R&D efforts at this stage, the Government should provide separate budget as per requirement of the projects to be undertaken during the coming years.

4.24 The Committee note that there is a mission to launch a Mission on Bio-diesel with a special focus on Jatropha Curcas to be planted on a large scale to produce bio-diesel from non-edible oils. The Committee desire that special incentives be given to the farmers to encourage them to take up the plantation of Jatropha Curcas and maximum area should be covered. Village Panchayats and Gram Sabhas should be involved in the programme and should be monitored closely to make it a success.

CHAPTER-V

OTHER SCHEMES UNDER BIOMASS POWER PROGRAMME

(A) Village Energy Security through Biomass

5.1 The Ministry has taken up test projects on Village Energy Security under which mostly bio-energy based systems will be deployed in conjunction with small hydro or otherwise to meet the total energy requirements of cooking, lighting and motive power of a village in an efficient, reliable and cost effective manner. The projects would be environment-friendly and create avenues for local employment, thus improving the quality of life and leading to overall sustainable development.

5.2 Regarding the time schedule for implementation of Village Energy Security Programme, the Ministry have stated…

> "To begin with, a limited number of test projects on village energy security will be taken up. Depending on the outcome of the test projects a programme on village energy security might be drawn up."

5.3 As stated by the Ministry that detailed Village Energy Plans (VEPs) will be prepared that will include assessment of the energy demand and the locally available renewable resources. An optimal technology package will then be arrived at to meet the total energy needs in a sustainable manner. The energy production systems could comprise biogas plants based on dung or leafy biomass, biomass gasifiers coupled to 100% producer gas engines and/or biofuel run pumpsets. Based on the availability of local resources, biogas and biofuel could also be used for meeting the electricity needs.

Regarding Village Energy Plans, the Ministry have stated…

> "The detailed proposals include a Village Energy Plan under the test projects. The village energy plan is prepared through interaction with the

village community and contain information on available local resources, demand for various energy services, and the configuration for the energy production system. While no specific time schedule has been laid down, a time period of 2-3 months is required for preparation of a village energy plan."

5.4 The projects involve active community participation. They will be planned and implemented by Village Energy Committees (VECs) set up by the Gram Panchayat through a Gram Sabha Resolution. Forest Departments, Rural Development Departments and NGOs will be involved as facilitators to assist the Village Energy Committees in planning and implement the test projects. They will also help to resolve issues about land required for plantation and sustainable supply of feedstock in the form of wood, oilseeds and other biomass material. The energy services are to be owned and maintained by the village community.

Regarding village Energy committees, the Ministry informed…

"Village Energy Committees have been set up under the 17 test projects that are under implementation. Village-level meetings are organized by implementing agencies and facilitators for generating awareness and apprising about the benefits from such projects such as energy production, employment and income generation, removal of drudgery particularly among women, clean environment and sustainability. Their active participation is also sought in planning, implementation and subsequent management of the projects. Audio-visual aids are used to create awareness. Visits of committee members to other successful project sites are also planned."

5.5 The Ministry have informed that 90% of the capital cost of the test projects will be met through a Central grant subject to a benchmark of Rs. 20,000/- per beneficiary household for meeting the total domestic and community energy requirements. The balance 10% towards the capital cost is to be mobilized by the community/implementing agency/State Nodal Agency.

Regarding the budget provisions, the Ministry further clarified…

> **"**It is proposed to provide central financial assistance of Rs.3.00crore/ MW for promoting biogas power projects. A scheme for promotion of distributed biogas power generation projects has also been formulated"

5.6 The test projects will be closely monitored by the concerned State Nodal Agency (SNA), and the feedback generated will be utilized in developing a larger operational programme for remote, tribal and forest fringe villages.

5.7 On the same steps already some issue which the Committee enquired about the initiated/ going to be initiated by the Ministry to meet the requirements of biomass for different biomass power plants and whether the Ministry was contemplating to take up the matter with the Ministry of Environment and Forests to promote energy plantation in the degraded forest land of the country. MNES informed the Committee as under:

> "A Conference on Renewable Energy for Rural Areas was convened on 26th July, 2004 at Vigyan Bhawan, New Delhi. Senior officials of the District Rural Development Agencies (DRDAs) and Forest Departments of various States/ UTs, concerned Central Ministries including MOEF, Planning Commission, State Government Departments and Nodal Agencies attended this conference. The conference focused on the accelerated deployment of bio-energy systems in rural areas to provide the energy needs of cooking, lighting and motive power. The focus of the discussions included promotion of energy plantation in the degraded forest land of the country. 24 Test Projects are being set up in different parts of the country."

<u>Remote Village Electrification</u>

5.8 The Remote Village Electrification is a separate programme for provision of electricity services whereas the village energy security test projects aim at provision of all energy services. The two programmes therefore are separate although some components might be common. So far biomass gasification systems have been sanctioned for electrification of 42 villages.

5.9 Regarding the efforts being made by the Ministry to prepare detailed Village Energy Plans the Ministry have stated…

> "210 preliminary proposals for the test projects on Village Energy Security have been received from 12 States, namely, Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttaranchal and West Bengal. Of these, 92 proposals that were found to be in accordance with the Guidelines were short-listed for preparing detailed proposals including Village Energy Plans for setting up the test projects. 55 detailed project proposals containing Village Energy Plans have been received from 8 States. So far, 24 test projects have been sanctioned in three States."

5.10 When asked about the energy plantation being taken under these projects, the Ministry submitted the following details:-

> "Energy plantations are an integral part of the Test Projects on energy security in villages. Under these projects plantations of fast growing fuelwood species and non-edible oilseed bearing trees will be taken up in degraded/waste land available in and around the selected villages. 24 test projects have so far been sanctioned for remote villages in three States, viz., eleven in Madhya Pradesh, seven in West Bengal and six in Rajasthan. In all these projects energy plantations will be undertaken so as to ensure a sustainable supply of Biomass for the energy production systems. The projects have been initiated in Madhya Pradesh and the plantation activity is being taken up in all the projects. The electricity production unit has been installed in one of the projects. "

5.11 Regarding the setting up of Village Security Communities the Ministry give the following information.

(i) Village Energy Committees have been set up in 17 test projects under implementation in Madhya Pradesh and Rajasthan as Sub-Committees or Standing Committees of the Gram Panchayat as per the relevant provisions of the State Panchayat Raj Act and Rules in this regard. The Committees have been set up through a Resolution of the Gram Sabha and have been notified by the Gram Panchayat. The Committees are in the process of being set up in the 7 test projects taken up in West Bengal.

(ii) The test projects are being implemented by the Gram Panchayats through facilitation by the Forest Departments / Zila Parishads / Non-Governmental Organisations (NGOs). The Village Energy Plans are prepared with participation of the local community taking into account the available resources and their total energy requirements.

(iii) Training and awareness generation are important components of the test projects. Training of the villagers who will run the biomass power generating equipment is being done through the suppliers and the NGOs. Visits of the Village Energy Committee members to other biomass gasifier based projects are also being arranged to generate awareness and impart knowledge on the working of the systems. A five year warranty and an Annual Maintenance Contract (AMC) for the energy production systems has also been incorporated in the terms and conditions of supply of the equipment.

5.12 Regarding the guidelines issued for selection of the villages to be covered under the scheme the Ministry have stated…

"Guidelines for planning and implementation of the test projects have been circulated to the states. Proper selection of villages is critical for the success of the test projects. Therefore, the Guidelines for identification and selection of villages for the test projects have also been provided. The basic

criterion for the selection of a suitable village is that it should have a conducive environment for the implementation of such test projects. The village identified should be remote, preferably tribal and/or forest-fringe. The selected village should have adequate availability of fallow, common or uncultivated non-grazing land for raising plantations. A cohesive and progressive social structure is also an important requirement. The selected village should have households ranging from 25 to 200, and should be identified in consultation with forest, tribal and rural development departments / agencies.

5.13 The Ministry have further informed that to begin with, a limited number of test projects on village energy security are proposed to be taken up to demonstrate the techno-economic parameters, provide operational experience, mobilize local communities and firm up the institutional arrangements. Depending on their success, a larger operational programme could be formulated by the Ministry. Biomass gasification systems are also being installed under the Remote Village Electrification Programme of the Ministry. A time frame of one year is envisaged for completion of the test projects on village energy security.

5.14 During the course of evidence the Secretary explained about the number of villages under the Villages Energy Security Programme…

"What happened was that our Commission for Additional Sources of Energy had approved that we may take up 200 villages. Within the Ministry there was a re-thinking on the number and the number was finally fixed that let us first install 25 and see what happens. Accordingly, 24 villages were sanctioned in March last year as against a target of, let us say, 200 with a restricted number of 25. We could have done more. We could have sanctioned more. But some proposals had to be returned to the States because they had not fulfilled all the conditions. Out of these 24 sanctioned, one village has already gone on stream. There power is being generated for the first time in 50 years. That village is getting electricity. They are going to buy fuel wood from the forest depots at the rate of Rs. 500 per tonne.

People are going to pay for that power. They are having an arrangement where two to three boys have been trained and the people who have supplied the equipment have also stationed somebody who will be available there for some time. We hope that during this financial year, under this programme, we can take up another 70 to 80 such cases and by the end of this financial year we will have something like 50 to 60 online and functioning. There is a lot of things to learn from that because you are going to do plantation, you are going to have biogas plant and you are also going to save on the fuel wood which is being consumed by some families. It is an internal supply chain that has to work properly. The village would have to prove that it can handle this programme. There is a lot to be learnt from this. But there is a feeling that perhaps this is going to be the future line of action as we enter the Eleventh Plan. As far as remote village domain is concerned, the results are encouraging."

5.15 The Ministry have also informed about the Biomass gassification systems.

"So far biomass gasification systems are reported to have been commissioned in around 28 villages and are reported to be in operation as per the information received from the State Nodal Agencies of various States. However, no specific evaluation survey has so far been carried out.

Many of the Ministry's programmes for the promotion of renewable energy are implemented in the states by State Nodal Agencies which in turn coordinate with various State Government agencies and Departments, including the State Electricity Boards/ Power Departments."

5.16 The Committee are happy to note that Ministry of Non-Conventional Energy Sources have evolved a concept of providing energy security in villages mainly through biomass. The objective of the Village Energy Security Projects is to go beyond mere electrification per se by meeting the total energy requirements of villages including cooking, lighting and motive power with full participation of the local communities including women. It will also create avenues for employment generation, full participation of local communities and environmental improvements leading to overall sustainable development. The programme has the potential to generate 15 million jobs in rural areas. The Committee note that Test Projects are being taken up in remote villages and hamlets that are not likely to be electrified through coventional means with emphasis on forest fringe and tribal villages. The energy production systems would comprise biogas plants based on dung and leafy biomass, biomass gasifiers coupled to 100% producer gas engines and bio-fuel run pump sets. The Committee feel that projects based on poultry droppings, like the one working at Nammakal, Tamil Nadu, should also be encouraged in other states. The Committee note that 210 preliminary proposals for Test Projects on Village Energy Security have been received from 12 States. Out of this 92 proposals were short-listed for preparing detailed proposals. Ministry have received 55 detailed village energy plans from 8 States. Out of this 24 projects have been sanctioned in three States i.e. Madhya Pradesh, Rajasthan and Uttar Pradesh. The Committee feel that these Test Projects should have been spread in all parts of the country for getting better experience and results. The Committee, therefore, desire that Government should sanction the projects in different states. They should also persuade the other States to submit such proposals so that Test Projects may be distributed evenly in all agro-climatic regions and results may come out in the proposed period of one year.

5.17 The Committee observe that Test Projects would be undertaken by a Village Energy Committee formed by the Gram Sabha and notified by the Panchayat and facilitated by

implementing agencies such as District Rural Development Agencies (DRDAs), forestry departments and NGOs with technical inputs overall coordination and monitoring by the State Nodal Agencies. A high level Steering Group has been constituted to provide overall guidance for the implementation of Test Projects. It is proposed to take up about two lakh villages, consisting of 1.73 lakh forest fringe villages and about 25,000 remote unelectrified villages, total investment would be 40,000 crore. The Committee therefore, want that role of NGOs in such projects should be well defined & monitored closely to check the misuse of the huge funds released under this programme for the benefits of poor villagers. The Government should issue strict guidelines in this regard. The Committee also desire that Forest departments should certainly be associated in selection of forest fringe villages and plantation of fast growing oil seed bearing trees for getting better results.

5.18 The Committee also feel that if the projects of Biomass Co-generation are to be taken up on a large scale at the village/ district level, proper training of the people, who will handle the equipment of Biomass Co-generation, is required. The Committee, therefore, desire that Diploma level courses should be started in the polytechnics in the various states covered under the programme with the help of Ministry of HRD & State Governments.

5.19 The Committee note that Village Energy Security through Biomass Programme relates to villagers. There is a lack of awareness about such an important scheme. The Committee, therefore, desire that Government should take up extensive awareness generation and training programmes in prospect villages for local communities who will run the Biomass Power generating equipment. They also desire that similar programmes should be arranged for Government functionaries, local NGOs, entrepreneurs etc. to prepare a good team of facilitators.

(B) Accelerated Programmes for development of projects for energy recovery from urban wastes.

5.20 According to a recent estimate about 42 million tonnes of solid waste (1.15 lakh tonnes per day) and 6000 million cubic metres of liquid waste are generated every year by

our urban population. This translates to a potential for generation of over 1700 MW of Power from urban wastes in the country. The Ministry of NCS has estimated potential of Municipal Solid Waste (MSW) for conversion energy for next fifteen years as under:-

Period	Projected MSW Generation (in TPD)	Corresponding Power Generation (in MW)
2007	148000	2550
2012	215000	3650
2017	304000	5200

MNES is implementing a programme on Energy Recovery from Urban Wastes with the following objectives:-

(i) To harness the available potential of MSW to energy

(ii) To promote the setting up of projects for recovery of energy from urban wastes, and

(iii) To create conducive environment for the development and implementation of waste to energy projects.

5.21 The most widely used waste-to-energy technologies are based on biological on thermal processes. Biological process involves biomethanation of biodegradable fraction of waste for producing methane-rich biogas, which can be used as fuel for generating electricity. Thermal process involves combustion of organic waste as fuel with evolution of heat energy for generation of power. Advances in thermal conversion involve destructive heating of organic materials with a limited supply of oxygen (gasification) or without any oxygen (pyrolysis) to produce a combustible gaseous product consisting of simple hydro-carbons and hydrogen.

5.22 Three projects for energy recovery from Municipal Solid Wastes with an aggregate capacity of 17.6 MW have been set up at Hyderabad, Vijayawada and Lucknow. Other urban waste projects include a 1 MW project based on cattle manure at Ludhiana, a 0.5 MW project for generation of power form biogas at sewage treatment plant at Surat, and a 150 KW plant for vegetable market and slaughter-house wastes at Vijaywada. Another 300 KW project based on vegetable market waste is under commissioning at Chennai.

5.23 Some of the aforesaid demonstration projects for energy recovery from a variety of urban wastes, namely vegetable market waste, slaughterhouse waste and cattle/ cow-dung

have been set up under a UNDP / GEF assisted project on Development of High Rate Biomethanation Processes. Under the Accelerated Programme for Energy Recovery from Urban Wastes, it is proposed to encourage development of small-scale projects in towns/cities based on the successful implementation of demonstration projects.

5.24 A scheme for the Accelerated Programme has been prepared .Modalities proposed for this Programme were discussed with various stakeholders, including State Governments, Nodal Agencies, Financial Institutions, Manufacturers, Consultants, Developers, etc. during a Brainstorming Session organized by the Ministry on 17th June 2005. Project Reports will be formulated as per the provisions of the scheme. The main features of this scheme are as under:-

(i) Promotion of projects for power generation from MSW

(ii) Development in a fast track mode of projects through public private partnership for specific cities.

(iii) Provision of Project Development assistance of a maximum of Rs. 10 Lakh per project for fast track projects.

(iv) Project development will include:-

- (a) Assessment of quality and quantity of wastes
- (b) Identification of project site
- (c) Preparation of waste collection and transportation plan
- (d) Finalization of power purchase agreement
- (e) Development of bankable project with Feasibility Report and detailed Project Report
- (f) Preparation of bid document for inviting bids
- (g) Firming up of means of project finance
- (h) Obtaining all statutory clearances for the project and
- (i) Providing assistance and supervision during execution and commissioning.

(v) Provision of attractive incentives in the form of Capital subsidy through FIs / banks for making MSW based project financially viable and remunerative. Capital subsidy upto Rs. 1.5 crore per MW for fast track project based on combustion of RDF and upto Rs. 2 crore per MW for projects based on biomethanation is proposed.

(vi) The scheme shall be implemented by Municipal Corporations, other Urban Local Bodies, Government Institutions and private developers having technical and managerial capabilities for implementing such projects.

5.25 The States of Andhra Pradesh, Karnataka, Kerala, Haryana, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh have announced policies for promotion of waste-to-energy project in their states.

Regarding the difficulty faced in financing the projects based on urban wastes, the Ministry have stated…

> "The difficulties faced in financing projects for energy recovery from urban wastes include high capital cost of projects, higher risks and lack of awareness, etc. It is now proposed to provide 50% of the subsidy as contribution towards equity for improving the financial viability of such projects, after disbursement of the first installment of loan. An Information Package for energy recovery from urban wastes is also being prepared for raising awareness levels on various technological options, technology providers, consultants apart from case studies on different project types. A scheme has also been prepared for generation of electricity from cow dung."

5.26 During evidence the representative of the Ministry informed that at present there was a problem regarding urban waste conversion into Energy. The representative stated…

> "As far as urban waste conversion to energy is concerned, we are just now facing one problem when the matter is before the Supreme Court. The Supreme Court has ordered that the Government of India should not sanction any subsidy at all for waste to energy projects. They have said about all kinds of wastes to energy projects. We are trying to argue in the Supreme Court that at least those projects which are based on the direct combustion of Biomass, at least that part should not be held back. The is being worked out. We have two projects, one is at Vijayawada and one is a Hyderabad. One which is involved with biomethanation is at Lucknow. This unfortunately has come to a standstill. We have said that their orders are fine but we are struggling. We have had an ambitious programme this

year onwards. But there is going to be a delay in waste to energy as far as urban centers are concerned. ”

5.27 The representative further informed the Committee that the project at Lucknow was facing problems regarding new foreign technology. The basic problem being the segregation of Municipal Waste. The Municipal Waste were not according to the standards as required by the plant. Regarding the Waste-to-Energy project at Lucknow, the Ministry further informed:

“…The 5 MW project based on biomethanation technology installed at Lucknow is presently shut down due to some operational problems arising from quality of waste being supplied by the Lucknow Nagar Nigam (LNN) and possible inadequacies of the segregation system installed at the project for separating biodegradable organic matter from the garbage supplied to the plant by LNN.

Feeding of MSW to the plant commenced in August 2003, and was gradually increased by October 2003. About one MW of power was generated in October 2003, against the rated capacity of 5.9 MW. Some modifications were carried out in the waste segregation system of the plant and measures were taken to improve the quality of waste delivered at the project site. This resulted in achieving a power generation level of 1.50 MW for a few months. Thereafter, the power generation kept on decreasing and was in the range of 0.4-0.7 MW only. As the operational issued could not be resolved between the promoter and LNN, the promoter closed down the plant in December 2004. These issues are yet to be resolved despite high level interventions by the Ministry. It is understood that IDFC, who have provided loan for the project, have initiated action to identify other promoters for taking over the plant.”

5.28 The Committee note that at present there is a potential for generation of over 1700 MW of power from urban wastes in the country. Out of this, only three projects with an aggregate capacity of 17.6 MW have been set up at Hyderabad, Vijaywada and Lucknow.

The Committee note that the project at Lucknow has come to a standstill due to its the inability to get waste material and management related problems. The Committee desire that such issues should be resolved at the earliest to start the functioning of Lucknow Project. The Ministry should also try to resolve the objections of Hon'ble Supreme Court regarding other Waste to Energy projects so that the ambitious programme to establish many more such projects does not suffer.

5.29 The Committee are happy to note that as per the need of the hour and as desired by them in their 5th Report on Demands for Grants 2005-06, the Ministry have prepared an Accelerated Programme for promotion of projects for energy recovery from urban wastes and promotion is proposed to be done in fast track mode. The Committee are also satisfied with the proposed incentives in the form of capital subsidy upto Rs. 2 crore through FIs / banks for making MSW, financially viable and remunerative. The Committee find that the most important step is firming up of potential for urban, industrial and commercial wastes for specific urban centers and industrial units. For this purpose, the Ministry should prepare a time-bound programme in consultation with State Governments, major municipal bodies, government institutions and private developers to know the quantity and quality of urban wastes in all the major cities. The Committee also desire that States should be persuaded to implement MSW (Management and Handling) Rules 2000 at the earliest as this will facilitate setting up of projects based on MSW. The Committee also note that only the States of Andhra Pradesh, Karnataka, Kerala, Haryana, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh have announced policies for promotion of waste-to-energy projects in their states. The Committee, therefore, desire that other States should be asked to formulate and announce similar policies for supply of

waste of desired quality and quantity at project site and facilities for evacuation and purchase of power generated from such projects in their States.

5.30 The Committee observe that all the Waste-to-Energy projects are to be developed through public private partnership. The Committee find that lack of awareness may be one of the main hurdles in attracting private sector participation in the projects. The Committee, therefore, desire that Government should undertake extensive awareness creation and wide publicity programme to attract private investment for this sector and to harness the potential in a time-bond manner. The Government should also take initiatives to convince FIs/Banks for getting projects developed and making easy financing available for Waste-to-Energy projects.

(C) Promotion of Bio-Energy In the Islands

5.31 The Ministry has prepared a detailed feasibility report in association with Anna University, Chennai for taking up biomass power projects in Lakshadweep Islands utilizing residues of coconut trees abundantly available in Islands. The feasibility report is under consideration of Islands Administration/CEA for taking up power projects of appropriate capacities in different potential Islands.

5.32 A team of MNES officers visited A&N Islands in May, 2005 to finalize an action plan for various renewable energy systems, including biomass based power systems to meet power needs of the A&N Islands. The team identified the following action point with respect to biomass power:

(i) DPRs submitted by IISC Bangalore for biomass power systems at South Andaman, Little Andaman and Great Andaman to be considered for approval.

(ii) Further study to be taken up for assessment of biomass power potential at little Andaman, Car Nicobar and Katchal.

(iii) Setting up of biomass based copra driers to be considered at all Islands.

(iv) The vast quantity of biomass waste generated due to tsunami in Car Nicobar and posing disposal problem may be gainfully utilized for power generation through either direct combustion or gasification systems; systems of about 500 kW capacity to be considered for immediate installation in the first phase.

5.33 Technical Guidance and assistance for translating the above action points to prepared detailed project proposals for implementation by the A&N Administration is being arranged by the Ministry.

Regarding the present status of Biomass programme in the Islands, the Ministry have stated…

> "At the instance of this Ministry a project report has been prepared by Anna University for utilizing biomass from coconut residues for power generation in different Islands of Lakshawadeep. In the six islands surveyed, no biomass fired copra driers are used. Only initial drying of copra in the open sun is carried out. Subsequent drying is done on the mainland. A similar study was conducted for the A&N islands. However, the A&N administration has been advised to conduct a fresh study in the light of the changed post Tsunami situation."

5.34 The Ministry have further clarified in a reply

> "Project proposals are expected to be prepared by State/UT administration who have a full complement of staff for the same and submitted to this Ministry for approval. Ministry would continue to provide necessary technical guidance and assistance to the A&N Administration as and when required."

5.35 The Committee note that there is a huge potential of Bio Energy in the Islands where coconut tree residues are available abundantly. The DPRs submitted by IISC Bangalore for Biomass power systems at South Andaman, Little Andaman and Great Andaman are to be approved. The Committee further note that at the initiative of the Ministry a project report has been prepared by the Anna University for utilizing Biomass from coconut residues for power generation in different Islands of Lakshawadeep. The Andaman & Nicobar administration has been advised to conduct a fresh study in the light of the post Tsunami changed situation. The Committee hope that such studies would be completed in a short span of time so that the projects of Biomass could be taken up expeditiously in these Islands. The Committee desire that there should be an integrated approach to Power generation in the Islands exploring Biomass, tidal, solar and other forms of renewable energy. The Committee desire that a time-bound programme to implement these projects should be drawn up and sufficient funds should be earmarked in advance by union/state governments to avoid time & costs over-runs.

GURUDAS KAMAT,
Chairman,
Standing Committee on Energy.

NEW DELHI,
August 23, 2005

Bhadrapada 1 , 1927 (Saka)

STATEMENT OF CONCLUSIONS/RECOMMENDATIONS OF THE STANDING COMMITTEE ON ENERGY CONTAINED IN THE REPORT

Sl. No.	Reference Para No. of the Report	Conclusions/Recommendations
1.	2.	3.
1.	2.17	The Committee observe that Biomass is renewable organic material derived from trees, plants, crops or from human, animal, municipal and industrial wastes. Woody Biomass is derived from forests, plantations forestry residues while other sources provide non-woody Biomass. Fortunately, India is blessed with a huge potential of Biomass. Moreover, Biomass resources are available locally within or around the villages and energy production, distribution and provision of energy can be managed by the village communities. The Committee also note that the total estimated Biomass power potential in India is above 1 lakh MW. This includes 16,000 MW grid interactive power from surplus agro residues and wastes from forestry and plantations, 3500 MW through bagasse co-generation and 1 lakh MW from plantation of 60 million hectares of wasteland. The Ministry of Non-Conventional Energy Sources has been implementing Biomass Power and Cogeneration Programme since 1994. The Committee note that over these ten years, only 101 Biomass Power and Cogeneration projects aggregating to 750 MW have been installed in the country and 73 projects aggregating to 585 MW are under various stages of implementation. This includes 58 Bagasse Cogeneration Projects aggregating to 450 MW and 34 Projects under implementation aggregating to 312 MW. The Committee are not at all satisfied with the present slow approach of the Government in tapping the huge Biomass potential available in the country. The Government have fixed a target that 10% of the additional grid interactive power generation capacity should come from renewable sources during the 10^{th} and 11^{th} Plan periods, which is 5.5% at present. Bio-energy can make significant contribution in achieving this target. More efficient modern Biomass technologies have the potential to alleviate poverty, improve health, reduce drudgery of women and children, increase productivity, create employment and generate incomes in rural areas, thereby reducing rural to urban migration. The Committee at this stage feel a need that renewable energy including Bio-energy should now be brought into mainstream for meeting/supplementing the energy demands in urban and rural areas. The Committee, therefore, strongly recommend that the Government should now evolve an effective implementation strategy for Biomass Power Cogeneration Programme for maximum exploitation of Biomass resources of the country with an objective to make Biomass energy available at an affordable price to the common man.

2.	2.18	The Committee note that the private developers face a number of problems in setting up Biomass projects like firm assessment on availability of Biomass and ensuring its supply to the project, uncertainty on tariff to be fixed by SERCs and evolving technology of biomass gassification systems etc. The Committee desire that these problems should be resolved on priority and in a time bound manner.
3.	2.19	The Committee specifically note that India has very good Bagasse cogeneration potential which can generate 3500 MW power. Out of this, only 450 MW projects have been installed and 312 MW projects are in pipeline. The Committee are surprised to note that in the State of Maharashtra out of the potential of 1000 MW, Bagasse Co-generation projects of 32.5 MW only have been commissioned so far and projects of 6 MW are under implementation. Similarly the Bagasse potential of other States like U.P., Tamil Nadu, Karnatka, Andhra Pradesh, Bihar, Gujrat and Punjab has also been poorly utilized. The Committee are concerned to note that the main hurdles in the programme exist in the fact that in some states particularly in Maharashtra, the sugar mills are in the cooperative sector and they face difficulties in limited access to funds and also in raising equity component of the investment in the programme. Also, there is heavy management risk in the projects as the cooperative sector is subject to frequent changes in the management and perception of risk in the Biomass Cogeneration Projects is high. The Committee feel that industrial Co-generation has in the past not received adequate attention, as cheap power and fuel were abundantly available. However, with increasing tariffs and unreliable supply of grid power, there is considerable opportunity for the industrial sector needs to tap the potential for producing electricity and thermal energy in the Co-generation mode. In this direction the Bagasse Co-generation programme can play a pivotal role. The Committee welcome the initiative taken by the Government by requesting the Maharashtra Energy Development Agency (MEDA) to constitute a high level Committee for identifying and suggesting measures for rapid implementation of Co-generation projects in cooperative sugar mills in the State and desire that they should persuade MEDA to prepare a Report in the shortest possible time. The Committee also desire that after examining the Report the Government should prepare a specific package of incentives containing capital as well as operative subsidies for cooperative sugar mills in Maharashtra and other States. The Committee may be apprised of the time-frame fixed in this regard.
4.	2.20	The Committee also find that the capacity under implementation in the various Biomass projects in the various states is relatively lower than the capacity commissioned. Although the Ministry have sufficient information on the potential available in the states for Biomass Power and Cogeneration programme, the capacity under utilization is quite low. The Committee are constrained to note that state wise physical and financial targets are not fixed and therefore, comparative data on the targets and achievements are not available. The Committee are not convinced with the reasoning given by the Ministry that State-wise targets are not fixed under the Biomass Power Programme as this

		activity is driven by private investment, which depends on a host of factors including entrepreneurid activity in that state, surplus Biomass potential and the price of electricity fixed by the state regulators. The Committee in their 31st Report on the Electricity Bill, 2001 (Thirteenth Lok Sabha) had recommended that the states should be encouraged to procure at least 5% of their Energy demands from renewable sources and the limit of the same should be raised to 10% by the end of 11th Plan in phases. Similar objectives/targets have been fixed by the Central Government also. The Committee, therefore, desire that Ministry of Non-Conventional Energy Sources should assess state-wise potential of Biomass and also fix the targets accordingly for every year for a balanced exploitation of Biomass potential available in each State. The Committee desire that the Government should also collect full data of power generation through biomass/cogeneration mode by private developers in various states. For this purpose, there is a need to develop a better coordination with the State level Nodal agencies engaged in the field of Non-Conventional Energy Sources, responsible for promotion and development of private sector projects. The Committee feel that fixation of National targets for procurement of energy demands from renewable sources would help in better exploitation of our Non-Conventional resources.
5.	2.21	The Committee note that Ministry of Non-Conventional Energy Sources have a goal to achieve renewable grid power of 10,000 MW including 3000 MW Biomass Grid Power by the year 2012. They have a target of 700 MW for the Tenth Plan i.e. by 2007 and rest 2300 MW will have to be achieved during 11th Plan period. Out of the target of 700 MW only 370 MW has been achieved during the first three years of the current plan. The Committee feel that the target of energy from Biomass is very low under the situation when the country has such a huge Biomass potential. Now, that 100% producer gas run engines have become reality, it should be easy to obtain higher targets/ exploitation from Biomass sources. Efforts should be made to make this engine cost effective and popularize the same for mass utilization. The Committee, therefore, desire that the Ministry should suitably enhance their targets of Biomass Power generation and also generate a suitable action plan for the same, for the remaining two years of the current Plan and 11th plan to achieve the goal of 3000 MW Biomass grid power by the year 2012.
6.	2.22	The Committee are happy to note that the Government have taken initiatives for preparation of 'Biomass Resource Atlas for India'- based on Biomass resouce assessment studies in different regions of the country. Ministry have informed that first computer application package based on low resolution data will be available by the end of this financial year. It would be made available through state nodal agencies and some of the entrepreneurs for testing and trial purposes. The second phase where the higher resolution data and survey data will be matched and project is proposed to be completed by March, 2007. The Committee feel that such an important data should be made available on website of the Ministry after the completion of first phase itself. The Committee however desire that the Ministry should ensure

the total reliability of the data supplied.

7. 3.13 The Committee appreciate to note that with an objective to reduce interest burden of Biomass based Power projects, MNES has been providing subsidy for Government as well as private projects at the same level. The earlier interest subsidy scheme for commercial projects is proposed to be modified to one time subsidy support to the commercial projects. The subsidy is for making repayment of term loan provided to the developers by the Financial Institution. The subsidy will be released after successful commissioning and commencement of commercial generation from the project, to the Financial Institution. The Committee are however, surprised to note that no formal study has so far been made to evaluate the impact of earlier incentives given for Biomass Power and Cogeneration Programme since its inception. The Committee feel that these incentives have not shown the desired results in attracting private sector and corporate sector in Biomass Power Projects. There is a need for an intensive evaluation of incentives being given for these programmes. The Committee therefore, recommend that the Government should conduct a formal study to analyze the impact of various incentives and subsidy schemes with a view to prepare separate incentive/subsidy proposals and policy measures for Biomass power projects in Government private and cooperative sectors. The Committee desire that SC/ST and other backward classes should be covered proportionately in the package. The Committee also desire that this exercise should be completed before the finalisation of budget proposals for 2006-07.

8. 3.14 The Committee note that the Ministry of Non-Conventional Energy Sources are encouraging the setting up of grid interactive Biomass based power projects through non-government investment. Now most capacity addition is being achieved through private investment. The State Nodal Agencies are responsible for promotion and development of private sector projects by way of providing necessary clearances, allotment of land and facilitating power purchase agreements etc. SERCs are determining tariffs by taking its account fee submissions of all stakeholders. The Committee are happy to note that leading Financial Institutions like PFC, HUDCO, NCDC, IDBI and scheduled banks have started providing loans to Biomass Power Cogeneration Projects. The Department of Food and Public Distribution has also agreed for giving funds from Sugar Development Fund for Bagasse based cogeneration projects at lower rates. The Committee, desire that Government should take initiatives to convince the Financial Institutions and banks about the importance and viability of Biomass based power projects by showing their determination in developing the latest technology. R&D efforts for cost reduction, future planning policy and tariffs etc. The Committee also urge the Government to take up the matter with Financial Institutions and banks to evolve simplified procedures for quick disposal of loan application for Biomass based power projects.

The Committee also desire that the Ministry should stress upon the

9.	3.15	State Govts. to announce entrepreneur friendly schemes for buy-back, wheeling and third-party sale etc. so that more and more private investment can be attracted to the Biomass/Cogeneration Power. The Committee also feel that incentives like Sales Tax & excise exemptions, accelerated depreciation and Tax holidays etc. should continue for the present to encourage the private investment.
10.	4.20	The Committee note that modern Biomass conversion technologies provide us an opportunity to use Biomass feed stocks for production of all three kinds of fuel i.e. gaseous, liquid and solid. Established technologies for Biomass combustion, cogeneration and anaerobic digestion are available. Recent developments in pyrolysis and gasification have further added advantages for using Biomass more effectively not only for heat and electricity generation but also for transport and chemicals production. The Committee, however, feel that there are various barriers in technology development. The main barriers include inadequate reliable regional data and availability of agricultural residues, lack of coordinated approach in finalizing technology i.e. of combustion/ gasification/ cogeneration for a given kind of feed stock, capacity and use, lack of standard specifications and inadequate testing facilities for Biomass furnaces, biolers gasifiers and meagre budget support for R&D to pilot to demonstration to first of a kind of commercial scale plant. The Committee, therefore, desire that Ministry of Non-Conventional Energy should take time-bound initiatives for standardization of technology/systems for Biomass production, harvesting handling, storage and preprocessing, development and finalization of advance combustion/gasification/cogeneration technology for different kinds of feedstocks and development and demonstration of gas engines and micro-turbines for using Biogass and producer gas. The Committee also desire that Ministry should take concrete initiatives for development of standard specifications and testing protocol for selected technologies in collaboration with Bureau of Indian Standards. The Committee also recommend that testing and certification mechanism should be strengthened and the Government should establish institutions for testing and certification.
11.	4.21	The Committee note that a lot of work has been done in developing small capacity Biogas production units and Biomass gasifiers and industrial scale Biomass furnaces, boilers, dual fuel engines etc. With the increase in the use of natural gas, now industry has started manufacturing gas compressors and producer gas engines. The Committee desire that the R&D efforts should now be concentrated to develop and implement selected co-coordinated projects with target to develop demonstrable technology packages having potential for wider adaptation. The Committee also desire that Government should prepare a detailed programme for setting up of pilot and first of a kind commercial scale units to demonstrate indigenously developed technology packages and develop confidence of industries concerned. The Committee further desire that in preparation of such programme/ project the participation of users stakeholders should also be ensured.

12. 4.22 The Committee strongly feel that the budget support being given for R&D in Biomass sector is very small. The Committee note that during 2002-03 only an about of Rs. 3.74 crores was spent which came down to Rs. 2.60 and Rs. 2.46 crores during 2003-04 and 2004-05 respectively and for the year 2005-06 an amount of Rs. 4 crore has been allocated. This all shows a very poor attention of the Government towards the R&D projects in the field of Biomass Cogeneration, Combustion and Gasification Technologies. The Committee consider this poor funding for R&D projects responsible for very slow progress in development of Biogas and Biomass gasifier technology during last one decade. The Committee are surprised to note that as against American Budget of U$ 80 million for R&D in the year 2005, India is spending very small amount of Rs. 4 crore on R&D projects. The Committee therefore, desire that Ministry of Non-Conventional Energy Sources should undertake a detailed review of R&D projects and deployment of programmes by involving industry stakeholders also for getting better results in future. The Committee also desire that R&D budget should be enhanced sufficiently so that R&D projects in development of Bio-energy do not suffer due to non-availability of funds.

13. 4.23 The Committee note that bio-fuels have been considered as most preferred alternative to petrol and diesel particularly in the transport sector. The MNES have initiated a programme on bio-fuels for transportation since 2002-03. The focus of the programme is to develop the technology for converting vegetable oils, mainly non-edible oils, to bio-fuel and promote the use of these bio-fuels in automobile sector after taking care of different aspects of the conventional diesel/petrol engines. The Committee are happy to note that Ministry have taken up a scheme on Bio-fuel Demonstration Projects in rural areas for implementation initially in four villages to demonstrate the use of non-edible vegetable oils for meeting the entire energy needs of lighting, agricultural operations and other community based stationery applications and to study various techno-economic parameters. The Committee recommend that the ministry should first of all undertake detailed non-edible seed resource assessment study to know the potential of such seed production in each agro-climatic zone. After that, they must prepare a time-bound programme for extending similar bio-fuel demonstration projects covering more and more villages in all States of the Country. In Committee's view, a large number of activities are to be taken up under bio-fuel programme, therefore, the Ministry should also prepare a National Policy on bio-fuels with the participation of the concerned stakeholders and institutions working in the field of bio-fuels. Since this programme involves major R&D efforts at this stage, the Government should provide separate budget as per requirement of the projects to be undertaken during the coming years.

14. 4.24 The Committee note that there is a mission to launch a Mission on Bio-diesel with a special focus on Jatropha Curcas to be planted on a large

scale to produce bio-diesel from non-edible oils. The Committee desire that special incentives be given to the farmers to encourage them to take up the plantation of Jatropha Curcas and maximum area should be covered. Village Panchayats and Gram Sabhas should be involved in the programme and should be monitored closely to make it a success.

15. 5.16 The Committee are happy to note that Ministry of Non-Conventional Energy Sources have evolved a concept of providing energy security in villages mainly through biomass. The objective of the Village Energy Security Projects is to go beyond mere electrification per se by meeting the total energy requirements of villages including cooking, lighting and motive power with full participation of the local communities including women. It will also create avenues for employment generation, full participation of local communities and environmental improvements leading to overall sustainable development. The programme has the potential to generate 15 million jobs in rural areas. The Committee note that Test Projects are being taken up in remote villages and hamlets that are not likely to be electrified through coventional means with emphasis on forest fringe and tribal villages. The energy production systems would comprise biogas plants based on dung and leafy biomass, biomass gasifiers coupled to 100% producer gas engines and bio-fuel run pump sets. The Committee feel that projects based on poultry droppings, like the one working at Nammakal, Tamil Nadu, should also be encouraged in other states. The Committee note that 210 preliminary proposals for Test Projects on Village Energy Security have been received from 12 States. Out of this 92 proposals were short-listed for preparing detailed proposals. Ministry have received 55 detailed village energy plans from 8 States. Out of this 24 projects have been sanctioned in three States i.e. Madhya Pradesh, Rajasthan and Uttar Pradesh. The Committee feel that these Test Projects should have been spread in all parts of the country for getting better experience and results. The Committee, therefore, desire that Government should sanction the projects in different states. They should also persuade the other States to submit such proposals so that Test Projects may be distributed evenly in all agro-climatic regions and results may come out in the proposed period of one year.

16. 5.17 The Committee observe that Test Projects would be undertaken by a Village Energy Committee formed by the Gram Sabha and notified by the Panchayat and facilitated by implementing agencies such as District Rural Development Agencies (DRDAs), forestry departments and NGOs with technical inputs overall coordination and monitoring by the State Nodal Agencies. A high level Steering Group has been constituted to provide overall guidance for the implementation of Test Projects. It is proposed to take up about two lakh villages, consisting of 1.73 lakh forest fringe villages and about 25,000 remote unelectrified villages, total investment would be 40,000 crore. The Committee therefore, want that role of NGOs in such projects should be well defined & monitored closely to check the misuse of the huge funds released under this programme for the benefits of poor villagers. The Government should issue strict guidelines in this regard. The Committee also desire that Forest departments should certainly be

associated in selection of forest fringe villages and plantation of fast growing oil seed bearing trees for getting better results.

17. 5.18 The Committee also feel that if the projects of Biomass Co-generation are to be taken up on a large scale at the village/ district level, proper training of the people, who will handle the equipment of Biomass Co-generation, is required. The Committee, therefore, desire that Diploma level courses should be started in the polytechnics in the various states covered under the programme with the help of Ministry of HRD & State Governments.

18. 5.19 The Committee note that Village Energy Security through Biomass Programme relates to villagers. There is a lack of awareness about such an important scheme. The Committee, therefore, desire that Government should take up extensive awareness generation and training programmes in prospect villages for local communities who will run the Biomass Power generating equipment. They also desire that similar programmes should be arranged for Government functionaries, local NGOs, entrepreneurs etc. to prepare a good team of facilitators.

19. 5.28 The Committee note that at present there is a potential for generation of over 1700 MW of power from urban wastes in the country. Out of this, only three projects with an aggregate capacity of 17.6 MW have been set up at Hyderabad, Vijaywada and Lucknow. The Committee note that the project at Lucknow has come to a standstill due to its the inability to get waste material and management related problems. The Committee desire that such issues should be resolved at the earliest to start the functioning of Lucknow Project. The Ministry should also try to resolve the objections of Hon'ble Supreme Court regarding other Waste to Energy projects so that the ambitious programme to establish many more such projects does not suffer.

20. 5.29 The Committee are happy to note that as per the need of the hour and as desired by them in their 5th Report on Demands for Grants 2005-06, the Ministry have prepared an Accelerated Programme for promotion of projects for energy recovery from urban wastes and promotion is proposed to be done in fast track mode. The Committee are also satisfied with the proposed incentives in the form of capital subsidy upto Rs. 2 crore through FIs / banks for making MSW, financially viable and remunerative. The Committee find that the most important step is firming up of potential for urban, industrial and commercial wastes for specific urban centers and industrial units. For this purpose, the Ministry should prepare a time-bound programme in consultation with State Governments, major municipal bodies, government institutions and private developers to know the quantity and quality of urban wastes in all the major cities. The Committee also desire that States should be persuaded to implement MSW (Management and

Handling) Rules 2000 at the earliest as this will facilitate setting up of projects based on MSW. The Committee also note that only the States of Andhra Pradesh, Karnataka, Kerala, Haryana, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh have announced policies for promotion of waste-to-energy projects in their states. The Committee, therefore, desire that other States should be asked to formulate and announce similar policies for supply of waste of desired quality and quantity at project site and facilities for evacuation and purchase of power generated from such projects in their States.

21. 5.30 The Committee observe that all the Waste-to-Energy projects are to be developed through public private partnership. The Committee find that lack of awareness may be one of the main hurdles in attracting private sector participation in the projects. The Committee, therefore, desire that Government should undertake extensive awareness creation and wide publicity programme to attract private investment for this sector and to harness the potential in a time-bond manner. The Government should also take initiatives to convince FIs/Banks for getting projects developed and making easy financing available for Waste-to-Energy projects.

22. 5.35 The Committee note that there is a huge potential of Bio Energy in the Islands where coconut tree residues are available abundantly. The DPRs submitted by IISC Bangalore for Biomass power systems at South Andaman, Little Andaman and Great Andaman are to be approved. The Committee further note that at the initiative of the Ministry a project report has been prepared by the Anna University for utilizing Biomass from coconut residues for power generation in different Islands of Lakshawadeep. The Andaman & Nicobar administration has been advised to conduct a fresh study in the light of the post Tsunami changed situation. The Committee hope that such studies would be completed in a short span of time so that the projects of Biomass could be taken up expeditiously in these Islands. The Committee desire that there should be an integrated approach to power generation in the Islands exploring Biomass, tidal, solar and other forms of renewable energy. The Committee desire that a time-bound programme to implement these projects should be drawn up and sufficient funds should be earmarked in advance by union/state governments to avoid time & costs over-runs.

MINUTES OF THE FIRST SITTING OF THE SUB-COMMITTEE-III ON NON-CONVENTIONAL ENERGY SOURCES OF THE STANDING COMMITTEE ON ENERGY (2004-05) HELD ON 30TH DECEMBER, 2004 IN COMMITTEE ROOM 'D',PARLIAMENT HOUSE ANNEXE,NEW DELHI

The Committee met from 1100 hours to 1300 hours.

Present

Dr. K. Kasturirangan - Convenor

Members

2. Shri M. Shivanna
3. Shri Vijayendra Pal Singh
4. Shri Kamal Akhtar
5. Shri Sudarshan Akarapu

Secretariat

1.	Shri. John Joseph	-	Additional Secretary
2.	Shri P. K. Bhandari	-	Director

Representatives of the Ministry of Non-Conventional Energy Sources

1.	Dr. S.K.Chopra,	Sr. Adviser
2.	Shri A.K.Rath,	Addl. Secy. & FA
3.	Shri Sunil Khatri,	Joint Secretary
4.	Shri Sudhir Mohan	Sci. G.
5.	Shri K. P. Sukumaran,	Sci. G.
6.	Dr. B. Bandhopadhaya,	Sci. G.
7.	Shri B. M. L. Garg,	Sci. F.
8.	Shri S.K. Mishra,	Director
9.	Shri D. Majumdar	M. D. (IREDA)

2. At the outset, the Convenor of the Sub-Committee-III on Non-Conventional Energy Sources of the Standing Committee on Energy (2004-05) welcomed the representatives of the Ministry of Non-Conventional Energy Sources to the sitting of the Sub-Committee and apprised them of the provisions of 'Direction 58 of the Directions by the Speaker'.

3. After the introductory remarks of Convenor and formal introduction of the officials of the Ministry of Non-Conventional Energy Sources, a detailed presentation was made on the subject, "Biomass Power/Co-generation Programme – An Evaluation" by the Ministry. The main points, which came under detailed discussion during the course of presentation included: -

(i) Potential and achievements for biomass power/co-generation,

(ii) The role of the Ministry of Non-Conventional Energy Sources and Financial Institutions like IREDA, PFC, REC and Nationalised Banks,

(iii) Evaluation of the social benefits like employment generation, afforestation, etc., accrued out of the biomass power/co-generation programme,

(iv) The need to upgrade the technology of producing grid quality power beyond the demonstration phase,

(v) Need for using cow-dung in a major way to set up larger plants on the line of 1 MW plant in Punjab and also to incorporate dairies and other agro-based industries for the same,

(vi) Capital and interest subsidized available and required for the development of the Biomass Power and Co-generation Programme,

(vii) The need to motivate the cooperative sugar mills in the field of bagasse co-generation and to remove the hurdles in their way of getting loan from the banks,

(viii) The information about the project on "Biomass Resources Atlas for India" to assess the surplus biomass resources available for generation of power; and

(ix) Introduction of 'Village Energy Security Programme' to meet the total energy requirement of un-electrified villages with full community participation.

4. A copy of the verbatim proceedings of the sitting of the Sub-Committee has been kept on record.

The Sub-Committee then adjourned.

MINUTES OF THE SECOND SITTING OF THE SUB COMMITTEE-III OF THE STANDING COMMITTEE ON ENERGY (2004-05) HELD ON 18TH JULY, 2005 IN THE COMMITTEE ROOM G-074, BLOCK-K, PARLIAMENT LIBRARY BUILDING, NEW DELHI

The Committee met from 1500 hrs. to 16.30 hrs.

PRESENT

Dr. K. Kasturirangan - Convenor

MEMBERS

2. Sh. Subodh Mohite
3. Sh. Vijayendra Pal Singh
4. Sh. Dara Singh Chauhan
5. Sh. Sudarshan Akarapu
6. Sh. V. P. Goel

SECRETARIAT

1.	Shri P.K. Bhandari	-	Director
2.	Shri Dr. Ram Raj Rai	-	Under Secretary

LIST OF WITNESSES

Ministry of Non-Conventional Energy Sources

Sl. No.	Name	Designation
1.	Shri A.M. Gokhale	Secretry
2.	Dr. S.K. Chopra	Sr. Adviser
3.	Shri Debashish Majumdar	MD (IREDA)
4.	Shri Sunil Khatri	Jt. Secretary
5.	Dr. K.C. Khandelwal	Scientist “G”
6.	Shri Ajit K. Gupta	Scientist “G”
7.	Dr. T.C. Tripathi	Scientist “G”
8.	Shri N.P. Singh	Scientist “G”
9.	Shri Sudhir Mohan	Scientist “G”
10.	Shri K.P. Sukumaran	Scientist “G”
11.	Dr. B. Bandopadhyay	Scientist “G”

At the outset, the Convenor, Sub-Committee III of Standing Committee on Energy welcomed the representatives of the Ministry of Non-Conventional Energy Sources to the sitting of the Sub Committee and apprised them of the provisions of Direction 58 of the Directions by the Speaker.

2. The discussion started with a detailed presentation by the Ministry on the various aspects pertaining to the subject 'Biomass Co-generation Programme – An evaluation.' The Members of the Sub Committee discussed the following important points during the sitting:

(i) The estimated Biomass potential of the country and exploitation thereof.
(ii) The additional power generation through Bagasse Cogeneration.
(iii) The details of the Ministry's programme on Bio Energy and the major constraints in the execution of the Biomass Cogeneration Programme.
(iv) The major issues regarding Research and Development and the milestones achieved.
(v) The role of the Ministry in the Bio-diesel project.
(vi) The difficulties faced by the sugar mills in the cooperative sector for engaging in Bagasse Cogeneration Projects.
(vii) The subsidy schemes for the Biomass Cogeneration Projects.
(viii) The Village Electrification Schemes and the role of the people in the villages in execution of the Biomass Programmes.

3. The Ministry were requested to send written replies to the list of points for oral evidence on the subject to the Secretariat at the earliest.

4. A copy of the verbatim proceedings of the sitting of the Committee has been kept on record.

The Committee then adjourned.

MINUTES OF THE SECOND SITTING OF THE STANDING COMMITTEE ON ENERGY (2005-06) HELD ON 23rd AUGUST, 2005 IN COMMITTEE ROOM 'E', PARLIAMENT HOUSE ANNEXE, NEW DELHI

The Committee met from 1600 hours to 1710 hours.

PRESENT

Shri Gurudas Kamat - Chairman

Members

2. Shri Nandkumar Singh Chauhan
3. Shri B. Vinod Kumar
4. Shri Chander Kumar
5. Shri Prashanta Pradhan
6. Shri Rabindra Kumar Rana
7. Shri Nandkumar Sai
8. Shri Vijayendra Pal Singh
9. Shri M. K. Subba
10. Shri Tarit Baran Topdar
11. Shri Chandrapal Singh Yadav
12. Shri Dara Singh Chauhan
13. Dr. K. Kasturirangan
14. Shri Matilal Sarkar
15. Shri Motilal Vora
16. Shri Jesu Das Seelam

Secretariat

1. Shri Anand B. Kulkarni, Joint Secretary
2. Shri P.K.Bhandrai, Director
3. Shri Surender Singh, Deputy Secretary
4. Dr.Ram Raj Rai, Under Secretary

2. At the outset, the Chairman, Standing Committee on Energy (2005-06) welcomed the Members to the sitting of the Committee.

3. The Committee then took up for consideration the following draft Reports:

(i) Draft Report on the subject 'Biomass Power/Co-generation Programme- An Evaluation of the Ministry of Non-Conventional Energy Sources.

(ii) Draft Report on the Implementation of APDRP of the Ministry of. Power

4. The Committee adopted draft Reports with minor additions/deletions/amendments suggested by the Members of the Committee.

5. The Committee also authorised the Chairman to finalise the above-mentioned Reports after incorporating the amendments suggested by the Members of the Committee and making consequential changes arising out of factual verification by the concerned Ministries and to present the same to both the Houses of Parliament.

The Committee then adjourned.