STANDING COMMITTEE ON ENERGY

13

(2005-06)

FOURTEENTH LOK SABHA

MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES

DEMANDS FOR GRANTS (2006-07)

THIRTEENTH REPORT

LOK SABHA SECRETARIAT
NEW DELHI

May, 2006/Vaisakha, 1928 (Saka)

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Presented to Lok Sabha on 22.5.2006
Laid in Rajya Sabha on 22.5.2006

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COE NO.158

Price : **Rs. .....**

Published under Rule 382 of the Rules of Procedure and Conduct of Business in Lok Sabha (Eleventh Edition) and Printed by

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* Expired on 14th April, 2006

** Ceased to be Member of the Committee w.e.f 2nd April, 2006, consequent upon his retirement from Rajya Sabha

INTRODUCTION

I, the Chairman, Standing Committee on Energy having been authorised by the Committee to submit the Report on their behalf, present this Thirteenth Report on the Demands for Grants of the Ministry of Non-Conventional Energy Sources for the year 2006-07.

2. The Committee took evidence of the representatives of the Ministry of Non-Conventional Energy Sources on 22nd March, 2006.

3. The Committee wish to express their thanks to the representatives of the Ministry of Non-Conventional Energy Sources for appearing before the Committee and for furnishing the replies to the points raised by the Committee in connection with examination of the subject.

4. The Report was considered and adopted by the Committee at their sitting held on 17th May, 2006.

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

NEW DELHI;
17 May, 2006
27 Vaisakha, 1928 (Saka)

GURUDAS KAMAT
Chairman,
Standing Committee on Energy

Report

Introductory

Energy is the basic requirement for the economic development of any country. Every sector of economy – agriculture, industry, transport, commercial and domestic need energy. The requirement of energy in all countries including India has been increasing year after year. This has resulted in the increasing dependence on fossil fuels such as coal, oil, gas. Rising prices of oil and gas and potential shortages in the future lead to concerns about the energy security of the country. India is blessed with a variety of renewable energy sources i.e. solar energy, wind energy, Hydro power, biomass/Bagasse, municipal and Industrial wastes, etc.

2. The Ministry of Non-Conventional Energy Sources (MNES) is a Nodal Ministry of the Government of India for all the matters relating to new and renewable energy.

3. The mission of the Ministry of Non-Conventional Energy Sources is as follows:

(i) Energy Security: Lesser dependence on oil imports through development and deployment of alternate fuels (hydrogen, bio-fuels and synthetic fuels) to contribute towards bridging the gap between domestic oil supply and demand;

(ii) Energy Independence: Renewable (bio-energy, wind, hydro, solar, geothermal and tidal) electricity to contribute towards bridging the gap between fossil fuel based electricity supply and demand;

(iii) Energy Availability and Access: Augment energy needs of cooking, heating, motive power and captive generation in rural, urban, industrial and commercial sectors;

(iv) Energy Affordability: Cost-competitive new and renewable energy supply options; and

(v) Energy Equity: Per-capita energy consumption at par with the global average level by 2050, through a sustainable fuel-mix.

4. India is leading in the world in terms of use of renewable energy. As stated by the Ministry India's position vis-à-vis the world is given in the table below:

(i)	Wind installation (global) India's share (and position)	60,000 MW (cumulative) 4,400 MW (fourth in the world)
(ii)	SPV cell production (global) India's share (and position)	1,700 MW (in 2005) 37 MW (seventh in the world)
(iii)	Biogas plants (global) India's share (and position)	16 million units (cumulative) 3.8 million family size units (second in the world)
(iv)	Solar Thermal (global) India's share (and position)	110 million sq. m (cumulative) 1.3 million sq. m (ninth in the world)

5. The Ministry of Non-Conventional Energy Sources supports a broad-spectrum of programmes covering the entire range of new and renewable energy. The programmes seek to supplement conventional power through wind, small hydro and biomass power; reach renewable energy to remote rural areas for cooking, lighting and motive power; use renewable energy in urban, industrial and commercial applications; and develop alternate fuels, i.e., hydrogen, synthetic fuel and bio-fuel systems/devices. The detailed Demands for Grants of the Ministry of Non-Conventional Energy Sources were laid on the table of Lok Sabha on 10th March 2006. Demand No.64 of the Central Government expenditure pertains to the Ministry under which provision has been made for plan and non-plan expenditure. It consists of two parts viz Revenue Section and Capital Section for 2006-07 as per the figures given below:

(2006-07) **Rs. in Crores**

	Plan	**Non-Plan**	**Total**
Revenue section	531.75	6.64	538.39
Capital section	65.25	-	65.25
Total	597.00	6.64	603.64

6. The cumulative achievements (as on 31.12.2005) as stated by the Ministry of Non-Conventional Energy Sources include 7088 MW of grid Power installed capacity, Electrification of 2800 villages and hamlets, 1 million solar lighting systems, 1.3 million sq. m. solar area for water heating and 3.8 million family size

biogas plants. 6% of the total grid power is stated to be coming from Non-Conventional sources of energy.

7. Having scrutinized the detailed Demands for Grants (2006-07) given in Annexure-I, the Committee find that the Ministry is unable to utilize all the funds allocated to them under most of their programmes. The Committee endorse the Demands for Grants of the Ministry of Non-Conventional Energy Sources subject to the observations made in the succeeding paras.

Chapter – I

Analysis of Demands for Grants (2006-07) of the Ministry of Non-Conventional Energy Sources
Utilisation of Plan outlay

1.1 The following table indicate the position of targets/achievements under various programmes of the MNES during the last three years:

S.No.	Name of the	Units	2003-04		2004-05		2005-06		2006-07
	Scheme / Project / Programme		Target	Achievements	Target	Achievements	Target	Achievements	Target
	Power from Renewables							as on 31.12.05	
1	Wind power	MW	250.00	615.25	300.00	1111.55	450.00	840.00	1000.00
2	Small Hydro (upto 25 MW)	MW	80.00	84.04	100.00	102.31	130.00	60.10	160.00
3	Biomass Power / Cogeneration	MW	125.00	129.50	125.00	136.10	160.00	118.00	215.00
4	Biomass Gasifier	MW	5.00	4.85	10.00	8.25	10.00	1.34	2.00
5	SPV Power	MW	0.75	0.05	0.10	0.18	0.00	0.025	
6	Waste to Energy Programme	MW	10.00	15.65	10.00	8.00	10.00	1.75	30.00
	Total	MW	470.75	849.34	545.10	1366.39	760.00	1021.21	_
7	Village Electrification Programme		1000	613	3000	381	2000	253	1000
8	Biogas Plants	Nos. in lakhs	1.49	1.41	1.00	1.09	0.66	0.28	0.50
9	Solar Phtovoltaic Programme (SPV)								
	SPV Home Light	Nos	53000	11870	50000	34844	0.00	0.000	60000
	SPV Lanterns	Nos	0	0	0	21577	100000	885	30000
	SPV Street Lighting Systems	Nos	0	620	2000	2693	0	0	1250
	SPV Power Plants	kWp	450.00	0.00	200	79.7	0	0.000	400.00
10	SPV Pumps	Nos	1600	841	3500	366	500	222	300
11	Solar Thermal Energy Programme								
	Solar water Heating Sys.	m2 collector area	55000	1,50,000	100,000	150,000	400,000	150000	400000
	Solar Cooker	Nos	35000	17,562	35,000	20,000	35,000	17760	22000
12	Wind Pumps	Nos	150	80	100	47	100	67	100
13	Hybrid Systems	kWp	150.00	122.60	150.00	40.00	150.00	79	150.00
	MW = Megawatt, kWp = kilo Watt peak	Nos.=Numbers.							
	MW = Megawatt, kWp = kilo Watt peak	Nos.=Numbers.							

1.2 The Ministry of Non-Conventional Energy Sources (MNES) deals with the promotion, development and utilisation of various new and renewable sources of energy in the country. The MNES have presented the Demands for Grants to the tune of Rs.603.64 crore for 2006-07. From a statement furnished to the Committee it has been observed that there had been shortfalls in utilization of funds against the Budget Estimates and there is an unusual trend that Ministry of Finance/Planning Commission has been reducing the Gross Budgetary Support to the Ministry from 2002-03 onwards, (as indicated in Table – I below) when the Budget Estimate was to the tune of Rs.624.25 crore (Rs.599.80 cr in 2004-05, 566.50 cr in 2005-06 and Rs.603.64 cr in 2006-07).

Table – I

(Rupees in Crores)

2002-03			**2003-04**			**2004-05**		
BE	**RE**	**Actual**	**BE**	**RE**	**Actual**	**BE**	**RE**	**Actual**
624.25	468.29	423.12	624.80	390.00	375.82	599.80	400.00	235.12

Table II: The table below shows the financial performance 2004-05 and 2005-06 in relation to Plan Expenditure of the Ministry.

(Rupees in Crores)

Budget Estimates	**Revised Estimates**	**Expenditure**	**Budget Estimates**	**Revised Estimates (final)**	**Expenditure**
2004-05	2004-05	2004-05	2005-06	2005-06	Upto 30.01.2006
494.94	373.10	218.06	566.50	316.74	160.58

1.3 A shortfall in utilization of funds has been seen by the Committee under the Village Electrification Programme, Programme on Energy Recovery from Urban & Industrial Waste and the Solar Energy Centre for 2005-06 which is as follows:

Programme	BE	RE	Actual (as on 28.02.2006)
Village Electrification	155.00	55.40	21.45
Energy Recovery from Urban & Industrial Waste	14.50	5.00	3.41
Solar Energy Centre	2.75	7.50	0.24

1.4 Quarter-wise actual expenditure during the year2005-06 is as follows:

Items	Amount (Rs. in crore)
Budget Estimates (GBS)	600.00
Revised Estimate (GBS)	350.00
Expenditure	
First Quarter	9.55
Second Quarter	35.31
Third Quarter	91.21
Fourth Quarter	77.72 (as on 28.2.2006)
Total	213.79

1.5 As would be seen from the above tables there is a shortfall in utilization of funds in almost all the major programmes of the Ministry i.e. Village Electrification, Energy Recovery from Urban and Industrial Waste, Solar Energy, etc. Moreover, there is an unhealthy trend of utilizing a major portion of Budgetary outlay by the Ministry during the last two quarters of the Financial year.

1.6 The Committee desired to know the reasons for the general decrease in the Actual Expenditure of the Ministry. In reply, it has been stated as under:

> "The procedure for approval of schemes that was being followed for almost 22 years was suddenly questioned by the Integrated Finance Division (IFD) which raised doubts about the powers of the Commission for Additional Sources of Energy (CASE) for according approvals to Ministry's schemes irrespective of financial outlay. On account of this, proposals pertaining to the Village Electrification Programme during 2004-05 were not concurred in, resulting in significant reduction of expenditure under this programme to only about Rs.28 crore against the BE of Rs.200 crore. Subsequently, during 2005-06 IFD refused concurrence for every programme whose 10th Plan outlay exceeded Rs.100 crore. Although the matter was resolved by the Committee of Secretaries under the Chairman of the Cabinet, Ministry of Finance gave its approval for incurring expenditure only on 24 July 2005, wherever four months were lost during 2005-06.
>
> The release of funds under different schemes of the Ministry is contingent upon the submission of UCs and audited SOEs by the implementing State agencies in respect of funds released in the past. There have been delays in receipt of these documents. In the wake of the instructions of MoF for not making fresh releases till such time as the receipt of the aforesaid documents, led to further delays in case of several schemes / programmes.

The ceiling of 1/3rd expenditure during the last quarter imposed by the Ministry of Finance further compounded the problem of reduced expenditure."

1.7 On being asked about the outstanding balances with States upto March 2006, the Ministry submitted:

"The figures of outstanding balances remaining with States as on 31.3.2006 are under compilation. However, the status as on 31.12.2005 is given in the table below:

Programme	Unspent balance as on31-12-05 (Rs. in lakh)
Village Electrification	1910.70
Small Hydro Power	253.00
New Technology	206.43
Urban, Industrial & Commercial Applications	225.09
Solar Photovoltaic	1680.50
Solar Thermal	95.21
Small Wind Energy/ Hybrid Systems	197.00
o-Energy Development	853.64
Total	5781.65

1.8 The Committee desired to know about reasons for the shortfalls, in the various programmes, the Ministry submitted as under: -

"Village Electrification Programme: The responsibility of providing lists of remote villages is entrusted to REC which could do so only by November, 2005, when a part list of remote census villages was made available to this Ministry. Thereafter, State Governments were required to submit proposals for each remote village containing therein a feasible and cost-effective solution. As a result, progress in this Programme could not be made as envisaged.

The Programme on Energy Recovery from Urban Wastes was revived during 2005-06 after a gap of over two years. The Supreme Court in Writ Petition No.888/1996 ordered in May 2005 that till the position was clear, Government would not sanction any further subsidies for projects based on Municipal Solid Wastes. As a result, projects could not be sanctioned under the Programme. Further, as regard the programme on Energy Recovery from Industrial Wastes, subsidy has to be released only upon successful commissioning of the project. Accordingly, funds could not be released for projects sanctioned

during the year since they were not commissioned on time. Consequently, allocation for the Programme was reduced at RE stage.

Under Solar Energy Centre funds had to be released to the Haryana Urban Development Agency towards penal interest for land allotted to the Centre. On account of the matter having been referred to the Ministry of Law for admissibility of the amount, the envisaged payment could not be made. The matter is now being taken up for waiver of penal interest with the Haryana Government.

Against a B.E. of Rs. 600 crore and R.E. of Rs. 350 crore an expenditure of Rs. 213.79 have been incurred under different programmes/ heads by 28.02.2006."

1.9 The Committee then enquired about the corrective steps taken by the Ministry to ensure full utilization of budget allocations at a uniform rate during 2005-06, the Ministry submitted:

"(i) A Brainstorming session on "Mainstreaming of Renewable Energy in the Country and Attaining Global Leadership" was organized to which Renewable/ Power Secretaries of States/UTs were invited to discuss, among other things, measures required to be taken for the timely implementation of renewable energy programmes during the year.

(ii) To oversee implementation of Renewable Energy Programmes at the district level, District Advisory Committees have been set up in districts. These Committee are headed by the District Collector with Project Director, DRDA as Member-Secretary and comprise district level functionaries of the departments of industry, power, forest, renewable energy, agriculture and horticulture; representatives of NIC, NGOs; social workers, doctors lawyers, engineers, scientists, Lions, Rotarions; two representatives of the concerned MPs etc. Support to these Committees @ Rs. 1.5 lakh per district/annum is being provided.

(iii) Involvement of concerned departmental field level-functionaries from forests, power, etc.

(iv) Senior Scientists of the Ministry have been assigned various States/UTs for maintaining close liaison for the purpose of review, monitoring, implementation and coordination of programmes/ projects of the Ministry. The Liaison Officers also make periodic visits to assigned States for the purpose.

(v) States are being persuaded on a continuous basis to submit Utilisation Certificates etc. in order that further financial releases can take place.

(vi) Steps have been taken to rationalize various programmes/schemes with a view to simplifying procedures."

1.10 During the course of evidence the Committee desired to know from the Secretary, the Ministry of Non-Conventional Energy Sources the specific reasons that lead to low utilisation of resources as also the lower Revised Estimates during 2005-06. He explained:

> "In fact, if you see the trend during the first four years of the current five year plan, the outlay that was ultimately agreed to, which is popularly known as Revised Estimates. While we are naturally aggrieved by this cut in the outlays, I would not put the entire blame on either the Ministry of Finance or Planning Commission. They also make an assessment of the trend of expenditure, the kind of expenditure we had incurred during the first 7-8 months of the financial year and then determine the revised outlay. Though we have grievances on that but I would not blame them entirely. There are two important aspects that you have brought out as to why they have not resulted in as much of expenditure as it was expected. One was the village electrification scheme and the second was about the urban, industrial and commercial waste being converted into energy. On the village electrification scheme, we have been going ahead with electrifying villages to the extent possible through biomass and solar photovoltaics. But, when the Rajiv Gandhi Grameen Vidyutikaran Yojana was launched, a conscious decision was taken that the non-conventional energy sources would be used to electrify only those villages which are not likely to be electrified through the grid power in the near future. This is a conscious decision taken by the Ministry of Power."

1.11 Elaborating further on the inability of the Ministry to spend the amount allocated, he further stated:

> "…… all that we are trying to ensure is that let us start with the programmes, issue sanctions and release funds in the first quarter. Normally, the revised estimate is reviewed by the Finance Ministry in October-November, depending upon the expenditure level of first six months. There is also a new stipulation by which 66 per cent of the Budget should be exhausted by 31st December. If we can have a specific target of ensuring, then – why 66 per cent? – we should be able to achieve 70 or 75 per cent by December end.
>
> What we plan to do is to get all the sanctions issued to States and monitor the programmes State Government-wise. One more common reason for all the four years is that we wait for utilisation certificates from the State Government, which take long in coming. Regarding this

> one area, we have to pull our socks up and ensure that the State Governments also give utilisation certificates so that they become eligible for more funds. At the same time, it looks unfair to take one State's funds and give it to another State.
>
> I am only saying that this also has its own set of problems. But we have drawn up a plan of action, and we are confident that we will be able to do it. If necessary, the Standing Committee can call us sometime during September-October -- before we go for the Revised Estimates -- and ask us the same question."

1.12 On a suggestion that the States can be warned to spend the entire allocated amount by August otherwise, the allocation can be given to the States who are doing a better job, the representative of the MNES responded:

> "It is absolutely correct, but this is not a major problem. We have already started doing it, and we have begun having dialogue with the State Governments on this issue."

1.13 The Committee are concerned to note that during 2004-05, the utilisation of fund was Rs.218.06 crore against Rs.373.10 crore (RE) and in 2005-06 upto 28.02.2006, the utilisation of fund was Rs.213.79 crore against RE Rs.316.74 crore and Rs.603.64 crore has been allocated for 2006-07. The Committee observe that expenditure by the Ministry in the First quarter, Second, Third and Fourth quarter upto 28.02.2006 was Rs.9.55 crore, Rs.35.31 crore, Rs.91.21 crore and Rs.77.72 crore respectively during 2005-06. Due to uneven quarterly expenditure, the Ministry of Finance/Planning Commission has been reducing the Gross Budgetary support since 2002-03.

1.14 A shortfall in utilisation of funds is seen in almost all the major programmes of the Ministry i.e. Village Electrification, Energy Recovery from urban and Industrial Waste and Solar Energy, etc. The Committee also note that there is another unhealthy trend of utilizing a major portion of Budgetary outlay during the last two quarters of the financial year by the Ministry. The Ministry has given various reasons for non-utilisation of funds which do not justify the slow pace and under utilisation of funds by the Ministry. One of the factors responsible therefor, as stated by the Ministry, is that the States were not sending their utilisation certificates in time and due to this also there appeared to be uneven utilisation of funds. Further the Ministry added that it was difficult to monitor the projects executed in the States. To overcome these problems the Ministry has stated that for implementation of Renewable Energy Programmes at the district level, District Advisory Committees had been set up in districts. These Committees are headed by the District collector with Project Director, DRDA as Member Secretary and also comprised of the district level functionaries of Departments of industry, power, forest, renewable energy, agriculture and horticulture, NIC and NGOs, social workers, doctors, lawyers, engineers, scientists, Rotarians, two representatives of the concerned MPs, etc. Senior scientists of the Ministry of Non-Conventional Energy Sources have been assigned various States/UTs for maintaining close liaison for purpose of review, monitoring, implementation and coordination of programmes/projects of the Ministry. The Committee note that the reasons advanced by the Ministry for non-utilisation are administrative in nature for which corrective action should have been taken in advance.

1.15 The Committee note the steps being taken by the Ministry of Non-Conventional Energy Sources to ensure proper utilisation of funds, the Committee would still like to be apprised of the results of these measures during the first six months of the current financial year and periodically thereafter. The Committee recommend that the States which do not submit utilisation certificates should be subjected to certain penalties like stoppage of release of funds, etc. Under utilisation and uneven utilisation of funds allocated to a Ministry/Department is a serious matter and all efforts should be made in this regard to tackle this problem. The main reasons for curtailing funds at the RE stage by the Ministry of Finance is the inability of the Ministry to spend the amount allocated during the first two quarters of the year. The Committee trust that the Ministry would take all corrective steps in this regard to avoid such situation in the current financial year, i.e., 2006-07.

CHAPTER – II

Major Projects/Programmes of the Ministry of Non-Conventional Energy Sources – Targets and Achievements

A. New Technologies – Hydrogen Energy

2.1 Hydrogen has the potential to replace liquid fossil fuels in the future. In recent years significant progress has been reported by several countries including India in the development of hydrogen as an alternate fuel. Serious concerns relating to energy security are driving this global transformation effort towards a hydrogen economy. Hydrogen is environmentally benign. Hydrogen, at present, is mainly produced by reformation of hydrocarbons and as a by-product from some chemical industries. Hydrogen can also be produced through biological conversion of various organic effluents like distillery wastes, starch, sugar processing, etc. Several other methods including electrolysis of water, thermo-chemical, photo-electrochemical, photo-catalytic and microbial decomposition of water and also from various renewable sources like biomass, solar energy, etc. are in various stages of research and development.

2.2 Apart from its existing uses in industry, hydrogen can be used for a wide range of applications, including power generation and vehicular transport. Hydrogen can be used either directly in IC engines or through fuel cells. The Ministry has been making allocation for new technology in the past years. The trends of allocation and utilisation in regard thereto are shown below in the table:

New Technology Rs. in crore	**2003-04**			**2004-05**			**2005-06**			**2006-07**
	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate
	18.00	6.00	3.13	15.00	10.00	3.27	20.10	3.01	1.00	33.00

2.3 The Ministry has informed that the fuel cells are modular in nature and their efficiency is independent of size. Fuel cells are emerging as a clean and fuel-efficient technology for stationary, transport and portable applications. Fuel cells can be potentially used in domestic, industrial and transport sectors. Fuel cell power systems can be used as uninterruptible power supply (UPS) systems, replacing batteries and diesel generators. In view of the relevance of fuel cells for on-site or distributed power generation, several organisations are pursuing R & D activities with an objective of development of fuel cells and related materials, components and sub systems for various applications.

2.4 In view of the growing importance of hydrogen the Ministry had set up a National Hydrogen Energy Board during 2003-04 under the Chairmanship of the Minister of Non-Conventional Energy Sources to provide guidance for the preparation of a National Hydrogen Energy Road Map and its implementation. The National Hydrogen Energy Road Map, covering all aspects of hydrogen from production, storage, transport, delivery, applications, codes and standards, public awareness and capacity building has been prepared by a Steering Group of the National Hydrogen Energy Board under the Chairmanship of Shri Ratan Tata. In the Third Meeting of the National Hydrogen Energy Board held on 16 January 2006 under the Chairmanship of Hon'ble Minister (NES) the Road Map was endorsed.

2.5 In this connection, the Ministry has further informed that they have been supporting a broad based research, development and demonstration programme on different aspects of hydrogen and fuel cell technologies including production, storage and utilisation of hydrogen as a fuel. Several research, scientific and educational institutions, laboratories, universities, industries, etc. are involved in implementing the projects. During 2005-06 emphasis of the research has been on further improvements in renewable energy-based hydrogen production techniques, its storage methods and materials used for storage and utilisation of hydrogen energy as a fuel. The focus of the research on fuel cell technology has been on further improvements in the fuel cell related materials, components, sub-systems and fuel cell systems.

2.6 Explaining R&D efforts being made across the country in this sector, the Ministry has informed that Shri A.M.M. Murugappa Chettiar Research Centre (MCRC), Chennai, has

developed a biological process for generation of hydrogen from a variety of sugar containing industrial wastes under a project sponsored by the Ministry. Another project for production of hydrogen through bacterial route employing bagasse has concluded at the Banaras Hindu University (BHU), Varanasi. Hydrogen can be produced by fermentation of sugarcane juice extracted from bagasse either by hot water treatment or by acid hydrolysis using hydrochloric acid. Indian Institute of Technology, Kharagpur is engaged in scale up studies on production of hydrogen from Enterobacter cloacae – IIT-BT08 through fermentation route. A portable indigenous hydrogen generator of 400 watt capacity based on PEM water electrolyser suitable for supplying pure hydrogen for small-scale applications has been developed by Central Electrochemical Research Institute (CECRI), Karaikudi. Further research, development and demonstration projects are in progress at BHU, IIT Madras and Jadavpur University. BHU has already developed hydrogen fuelled two wheelers under the projects sponsored by the Ministry.

2.7 Elaborating further on the new technology of hydrogen energy and R&D in connection with the same, the Ministry of Non-Conventional Energy Sources stated in a note:

> "The proposed outlay of Rs.20 crore has been kept to provide for the spurt in R&D activities in this sector consequent to the preparation of the National Hydrogen Energy Road Map document, which lays down the pathway for development of hydrogen energy infrastructure in the country including introduction of upto 1 million hydrogen fueled vehicles by 2020. This document was endorsed by the National Hydrogen Energy Board in January 2006."

2.8 During evidence the Committee pointed out that the developed countries are spending thousands of dollars on hydrogen energy, which is emerging as a vital sector. They desired to know from the Secretary, MNES about the position in India. In reply he submitted:

> "Sir, as I have said, we have an allocation of Rs.41 crore for research and development. As much as Rs.20 crore is set apart for new technologies. When we talk about new technologies, the major component of that is hydrogen. If I have quoted the example of what has been done in motorcycle, a few things here or there, they are insignificant as compared to what we need to achieve. But this is a sustained research and development effort which is not being done only in our country but also in various other countries. We are already in discussions with companies like GE, shell and who are also willing to

participate in our research and development activities. This is an issue on which we are also collaborating with the Ministry of Science and Technology – whether they can open some of their institutes for research in the same field. I had detailed discussions with the Secretary of Science and Technology. He is absolutely open to the idea. We can put our heads and shoulders together and work on it. And as I said, the amount of Rs.20 crore may not be significant in a particular year.

…… but, at the same time, we want to increase the funds for R&D and that we will negotiate with the Ministry of Finance to see that we get more funds for R&D. There, I am sure I am going to get the support of both the Ministry Science and Technology and the Planning commission. We will strive towards it.

This has worked out the investment requirement over the next 15 years and for the period 2005-07, an outlay of Rs.200 crore has been proposed which would include Rs.50 crore for R&D and about Rs.100 crore for demonstration projects on a large scale so that there is a widespread awareness of the kinds of demonstration projects that have been there. You have mentioned in the last meeting that you have seen in Japan and in other countries. We had the third meeting of the National Hydro-Energy Advisory Board which is chaired by the Hon'ble Minister. We have leading industrialists as members of this Board. They had recommended that a corpus fund should be created. The Member (Planning Commission) was also present in the meeting and he has agreed to that idea. We are in the process of preparing a Cabinet note on this. We hope that the outlay of Rs.20 crore has been earmarked based on the limited resources we got for next year. But we hope that during the course of the next few months we will be able to have a larger programme and hopefully it will be supported by different Ministries, as you just pointed out and supported by the Cabinet. We hope to mount a very major programme and we would be happy to send you all the details."

2.9 The Committee note that hydrogen as a form of energy has the potential to provide a clean, convenient and affordable fuel for meeting future needs. It is envisaged by the Ministry that hydrogen will be available in the future for stationary, transport, portable and commercial applications. However, the transition to a hydrogen economy requires solutions to many challenges – scientific, technological and economic. The Committee note that Rs.20 crore has been earmarked for new R&D activities in this field, out of a total of Rs.41 crore kept aside for research and development in different sectors for the Ministry as a whole. The Committee are of the view that hydrogen is a future fuel of the world and more funds for R&D in the field are required to be earmarked. The Committee note that the Ministry of Non-Conventional Energy Sources desire to increase the allocation to R&D and propose to go to the Ministry of Finance again for the same. The Committee, therefore, recommend that the matter of more funds for R&D should be taken up with the Ministry of Finance and Planning by the Ministry at the earliest so that it could get the enhanced funds at RE stage. The Committee further desire that all out efforts should be made to carry out research in this field as this fuel have a wide range of applications for power generation and vehicular transport as also in other fields. The Committee hope that with the endorsement of National Hydrogen Energy Road Map document by the Hydrogen Energy Board, advancements in this field shall take place more rapidly. The Committee would like to be apprised of the developments in this field from time-to-time.

B. SOLAR ENERGY

2.10 The Committee has been informed during 2006-07, allocation for R&D in solar energy has been made under different budget heads and a total amount of Rs. 11.0 crore has been proposed for the purpose and related activities at the Solar Energy Centre.

2.11 On being asked, the Ministry has informed that on account of the current high costs of solar power generation, the utilities in the states have not shown much interest in grid interactive solar power projects. The State Electricity Boards were also reluctant to enter into Power Purchase Agreements for these projects. The Ministry, however, continues to provide support deployment of several other solar systems/devices. In this connection, solar hot water systems are being encouraged with a deployment aim of 1.0 million sq.m. collector area during 2005-06 to 2006-07. In addition, the Ministry is also supporting deployment of solar lanterns in un-electrified villages of Special Category States.

2.12 The Committee specifically desired to know the fate of grid-interactive SPV power programme and also the efforts being made by the Ministry in this regard. In reply the Ministry stated:

> "……..the estimated cost of generation of grid-interactive SPV power is placed around Rs.20/kWh, the programme has been discontinued. Subsidy has, however, been released to projects sanctioned earlier. Since the proposed Integrated Solar Combined Cycle (ISCC) Power Plant at Mathania has undergone changes in project scope, design, etc., it has been suggested that the Rajasthan Government should go in for a fresh DPR which could be appraised by the Project Appraisal Division of the Planning Commission and thereafter the State Government could take an appropriate decision in the matter."

The following figures indicate the extent of allocation for SPV demonstration and utilisation programme of the Ministry which includes SPV home lighting systems, SPV lanterns and SPV generators:

SPV demonstration and utilisation Rs. in crore	**2003-04**			**2004-05**			**2005-06**			**2006-07**
	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate
	37.00	27.00	28.65	23.00	46.00	12.12	25.00	20.00	16.04	34

2.13 The Committee further desired to know about the discontinuance of subsidy from grid-interactive SPV power programme, the Ministry submitted:

> "The removal of subsidy on grid interactive solar photovoltaic power is not likely to have any adverse impact on the over all progress of the solar energy programme in the country. The grid interactive solar photovoltaic projects were taken up with the main objective of technology awareness. So far about 33 projects have been installed in the country with financial support from the Ministry."

2.14 During evidence, the Committee specifically pointed out that there was a target to give 1,00,000 solar lanterns, but the numbers distributed was only 8,850 solar lanterns. Further the target has been reduced to 30,000 solar lanterns this year. Clarifying the position the representative of the Ministry stated:

> "Sir, actually when the matter was placed before the Commission for Additional Sources of Energy (CASE), it felt that we should not give solar lanterns to village that have already received electricity. Therefore, they confined the scheme only to special category States. Through our plan was to distribute 1,00,000 solar lanterns across the country and even to the electrified villages, yet we had to curtail the scheme because of the decision given by CASE. Subsequently, in 2006-07, as this scheme was confined only to 11 States, therefore, the target had to be reduced to 30,000 solar lanterns. We had

to confine ourselves only to the villages, which had not received electricity. This is the reason for reducing the target.

CASE is the body, which approves our schemes. CASE has said that the solar photovoltaic systems are very costly, and we should not give these systems to the electrified villages.

It is true, but our programme was more or less confined only to these States. These are very small special category States, and most of them are in the Himalayan belt."

2.15 The total allocation of Rs.4.5 crore has been made for the SPV Demonstration Programme for NE states as stated by the Ministry. The details of state-wise release of funds to NE States during the last three years and the targets/ achievements are given in Table 1 and 2 below:

Table 1: State-wise Release of Funds to NE Region under SPV Demonstration Programme during 2002-03, 2003-04 and 2004-05

(Rs. in Lakh)

Sl. No.	States	Release of funds during year 2002-03, 03-04 & 04-05
1.	Arunachal Pradesh	75.09
2.	Assam	356.92
3.	Manipur	191.76
4.	Meghalaya	49.90
5.	Mizoram	247.51
6.	Nagaland	-
7.	Sikkim	60.49
8.	Tripura	571.06

Table 2: State-wise Target & Achievements for the NE Region under SPV Demonstration Programme during 2002-03, 2003-04 and 2004-05

Sl. No.	States / Union Territory	Solar Street Lights		Solar Home Lights	
		T	A	T	A
1.	Arunachal Pradesh	170	133	980	980
2.	Assam	120	0	3500	800
3.	Manipur	150	0	2400	1000
4.	Meghalaya	100	0	1800	1000
5.	Mizoram	50	0	1120	600
6.	Nagaland	80	0	1000	0
7.	Sikkim	35	25	790	905
8.	Tripura	360	350	4700	2800

2.16 In response to a further query by the Committee in regard to providing SPV street lights, solar traffics signals, solar home lighting and solar water heating systems, the Ministry gave the following information to the Committee:

> "The Ministry has announced a scheme on 20.02.2006 for providing subsidy on solar lanterns @ Rs.2400 per lantern in all households in all un-electrified villages of Special Category States (seven N.E. States including, Sikkim, Jammu & Kashmir, Himachal Pradesh and Uttaranchal). The target of 100,000 solar lanterns has been allocated to these States for 2005-06 for which the subsidy requirement is estimated for Rs.24 crore.
>
> During the last three years, 46,787 solar street lighting systems and 75,701 solar home lighting systems were installed in the country and an amount of Rs. 115.29 crores was released to the implementing agencies.
>
> The progress in respect of solar traffic signals was 'nil' as the support for this component was introduced only during 2005-06 under a new scheme for urban areas.
>
> Solar water heating systems collector area of about 4.50 lakh sq.m. was installed and an amount of Rs.20.80 crore was spent towards interest subsidy for such systems during the last three years (2002-03 to 2005-06)."

2.17 The Ministry in a post evidence reply has intimated that Government is supporting research in development and up-gradation of solar energy systems, components and materials used in manufacture of such systems. The focus on research in solar photovoltaic (PV) technology is to (i) support research groups and industry in reducing the cost of solar cells, modules and systems by improving the conversion efficiency, developing new materials and processes to make low cost and efficient solar cells, modules and other components for PV systems (ii) support industry to indigenously produce critical materials like silicon etc., and (iii) improve the reliability and life of PV products and encourage exports etc. Continued R&D efforts in above areas are expected to bring down the cost of generation of solar electricity and make it competitive in the next 15 – 20 years.

2.18 Further the Ministry has informed that at present about 90% of the world's commercial production of solar cells is based on crystalline silicon technology. This technology is very expensive but is likely to remain the dominant technology for next 10 – 15 years. The efficiency of commercial solar cells based on this technology is in the range of 14-16%. There are some inherent technical limitations in improving the efficiency and reducing

the cost of solar cells and efforts are underway globally to develop high efficiency and low cost solar cells using various other materials and methods (such as thin films of other semiconductor materials, Gallium Arsenide, CNT -Carbon Nano Tubes based solar cells, etc.) which are still at Lab/pilot production stage and certain technical issues need to be fully understood and resolved.

2.19 Regarding the use of silicon vis-à-vis other materials when enquired by the Committee, the Ministry stated:

> "…….. we have, to some extent, missed the solar thing, especially on the silicon, like cadmium arsenide or nitrate. These are issues which we want to take up under R&D programmes. On that, if you can give me liberty, I will come back with the material and take your advice. It is not that we are ruling it out. It may be, probably to some extent, far too late to set up a silicon facility when other new technology may overtake it. We have to take a call on that. Whether we could have new technologies to develop further or to go ahead with silicon is something on which we have to take a conscious decision. It is not going to be any individual's decision, but it has to be a collective and a conscious decision."

2.20 The Committee note that as the estimated cost of generation of grid interactive SPV power is around Rs.20 kwh and hence the programme has been discontinued. Due to high cost the utilities in the States have not shown much interest in the grid interactive solar power projects. The Ministry has further informed that the removal of subsidy on grid interactive solar photovoltaic power will not have any adverse effect on the over all progress of the solar photovoltaic programme of the country as the main objective of such programmes was technology awareness. The Ministry, however, continues to provide support for development of other solar systems/devices. The Committee is however very unhappy to note poor performance in the North-Eastern States. The targets for distribution of solar lanterns and solar street lights could not be achieved in the financial year 2005-06. The Committee recommend that the Solar Energy Programme of the Ministry is an ambitious programme and it should be continued in right earnest.

2.21 The Committee note that basic user friendly projects of the Ministry viz solar traffic lights, street lighting, solar water lighting programmes should be pursued vigorously as they help in saving grid connected electricity. The Committee also desire that equipment like solar lanterns should be distributed in large numbers in villages/hamlets not having any grid connectivity and such important programmes of larger public interest should in no case be allowed to be stalled for lack of co-ordination in the decision making organs of the Government.

2.22 The Committee find that a budgetary provision of only Rs.11 crore for 2006-07 for the R&D and related activities at solar energy centre. To a specific query whether allocated fund is adequate to meet the requirement of the projects, no reply has been furnish in this regard. The Committee feel expenditure on R&D activities for such an important projects should be more. The Committee, therefore, desire the Ministry should take steps to enhance the fund at RE stage, if need be. The Committee further note that the Government is supporting R&D in the solar photovoltaic (PV) technology, the aim of which is to reduce the cost of solar cells, modules and systems, support industry to indigenously produce critical materials like silicon etc. As stated by the

Ministry continued R&D efforts in the above areas are expected to bring down the cost of generation of solar energy and make it competitive in the next 15-20 years.

2.23 The Committee note with great concern that the solar programme has already been delayed and the Ministry's has been unable to bring down the cost of solar photovoltaic materials which was candidly admitted by the Secretary. The Committee, therefore, recommend the Ministry should make vigorous R&D efforts to bring down the cost of silicon and develop other materials for use in the solar programme. The Committee would like the Ministry to lay special emphasis on photovoltaic research programmes and the Committee be apprised of the same.

C. Biomass Power/Cogeneration Programme

2.24 The Ministry has informed that the 10th Plan outlay and physical target for biomass power/cogeneration programme are Rs. 125 crore and 700 MW respectively. An expenditure of Rs.35.97 crore and installation of 486.23 MW capacity have been achieved as on 31.12.2005. As projects aggregating 858 MW are under implementation, a problem in achieving 10th Plan target is not likely to arise.

The following figures show the allocation and expenditure on Biomass Cogeneration programme for the last three years:

Biomass power/ Cogeneration Rs. in crore	**2003-04**			**2004-05**			**2005-06**			**2006-07**
	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate
	18.00	16.50	11.95	14.54	12.54	6.22	16.00	5.50	1.05	43.00

2.25 Further for biomass based power generation, around 2.6% of the theoretically feasible potential of 16,000 MW has been harnessed through 359 MW of biomass grid interactive power projects and 66 MW installed capacity through biomass gasification technology. For bagasse based cogeneration, around 14.5% of the total estimated potential of 3500 MW has been harnessed through 508 MW of bagasse cogeneration projects in sugar mills. The 11th Plan target for grid-interactive renewable power is 10,000 MW out of which the targeted share of bio-power is around 30%, which works out to 3,000 MW. No specific targets have been fixed for the 12th Plan as yet. The Ministry has further added that some estimates place a potential of 16,000 MW from agro-residues, which is still being mapped by the Indian Institute of Science, Bangalore. The Ministry, however, also submitted that it may not be feasible to harness the entire technical potential on account of problems associated with collection and transportation of agro-residues to a centralized power plant location.

2.26 The Ministry has further informed that under the Biomass power/cogeneration programme capital subsidy was being provided to bagasse cogeneration and biomass power projects, thereafter interest subsidy was introduced till 2004-05 depending upon boiler configuration since several difficulties were experienced in implementing the interest subsidy scheme, a one time subsidy scheme was proposed in 2005-06. However, the capital subsidy scheme could not be implemented during the year. The average cost of biomass based power generation projects is estimated at Rs.3-4 crore per MW. As informed by the Ministry, the cost of bagasse cogeneration projects is estimated at Rs.2.5 – 3.5 cr per MW. The expected economic life of biomass power and bagasse cogeneration project is about 25 years.

2.27 The Ministry added that the role of IREDA is limited to provision of term loans to Biomass Power and Cogeneration Projects. In addition, interest subsidy made available to such projects by MNES is passed through IREDA only for those projects for which term loans have been provided by IREDA or projects co-financed by IREDA.

2.28 On being specifically asked by the Committee to state the barriers to accelerating the growth of bio-power, the Ministry informed:

(i) Inability of cooperative sugar mills to generate bankable projects. FIs for a variety of reasons including poor balance sheet position of several cooperative sugar mills are not able to extend term loans facilities.

(ii) Many old sugar mills have small crushing capacities that are lower than the minimum economic capacity specified by the Government. Consequently, these mills neither have the requisite financial resources nor sufficiently long crushing periods that would make cogeneration a viable proposition.

(iii) Availability of adequate quantity of biomass. Adequate and sustained availability of biomass in an area of 50 Kms radius of the project for grid interactive power generation has been a problem in some areas.

2.29 Asked to State the corrective steps taken by the Ministry in this regard, it was submitted:

"(i) Financial incentives would be given in the form of one time capital subsidy to be released after the successful commissioning of the project as per DPR norms.

(ii) A Committee has been set up comprising, among others, representatives of Ministry of Consumer Affairs and NCDC to suggest innovative ways and means for accelerated growth of bagasse cogeneration especially in the cooperative sector. The Committee is expected to submit its report by end-April, 2006.

(iii) A Biomass Resource Atlas for India" is being prepared for providing information on types of biomass materials available in different parts of the country, the pattern of their usages and estimates about the surplus biomass materials available for energy applications. The National Informatics Centre, Govt. of India, will carry out web hosting of the Atlas."

2.30 When asked by the Committee to state the subsidy provisions under the programme in particular for the private sector, the Ministry stated:

"The provisions of Biomass power/cogeneration programme are applicable for promoters in all sectors including private sector. The same level of CFA is admissible to government as well as joint/cooperative sector projects which is kept at a higher level as compared to private sector projects. Thus, no special dispensations is being provided to the private sector in these projects."

2.31 Regarding incentives to Bagasse co-generation it has been added by the Ministry:

"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 depending upon boiler configuration. It may be mentioned that these initiatives have helped in introducing high pressure/high temperature steam generation technology in sugar mills and biomass combustion based power projects. The projects in sugar mills now operate at 87 ata system and some projects at 105 ata are under implementation. As a result 867 MW capacity, comprising 359 MW biomass power and 508 MW bagasse based cogeneration has been set up in the country as on 31.12.2005 and projects aggregating 858 MW are under implementation."

2.32 On being asked by the Committee to state the major constraints faced by private developers in this area. They were informed as under:

"(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."

2.33 The Ministry have stated that they continue this effort to improve acceptability of this technology through technology development, cost reduction, demonstration training and awareness creation and package of incentives in form of subsidies to further motivate commercial users.

2.34 During evidence where the issue of subsidies/clearance of the Bagasse based co-generation units was taken up by the Committee, the Secretary clarified:

> "…….. as far as the sugar mills in the private sector are concerned, there is no dearth of finances for setting up these plants. In case of cooperatives, there are problems and we are trying to sort them out. Now, the energy sector has become much more complicated than what it was till a few years ago.
>
> Bagasse-based co-generation does not necessarily mean, the entire power is for captive consumption in which case additional power that is generated by these co-generation units had to be supplied to the Grid. If they have to be supplied to the Grid, they have to be purchased by the distribution companies which are operating in the State. In quite a few States, there are State Electricity Boards. In a few States, they have set up independent power distribution companies. While doing so, there is a question of commitment to purchase power on a regular basis at a fixed price or an agreeable price formula. The State Electricity Boards are finding it difficult to enter into specific agreements with generators of power to enter into long-term contracts.
>
> So, it is a complex web there. The Regulatory Commissions are, to some extent, statutory. There is no way neither I nor the State Departments of Power can go and interfere in their working. At best, what we can do and we propose to do is to go and lobby with the State Electricity Regulatory Commissions to adapt suitable policies to encourage co-generation of power, then purchase by the distribution companies, and the co-generation power producers getting a remunerative price for a suitable period of time. This is something we are working on."

2.35 The Committee note that of the total theoretically feasible potential of 16,000 MW, 26% i.e. 359 MW of Bio-mass grid interactive power and 66 MW Bio-mass gasification has already been achieved. Around 14.5% of the total estimated potential of 3500 MW of Bagasse co-generation has been harnessed through 508 MW of Bagasse co-generation in sugar mills. Projects aggregating 858 MW are already under implementation. As stated by the Ministry, it may not be feasible to harness, the entire theoretical potential on account of problems associated with collection and transportation of agro-residues to the centralized power plant locations. The Committee were informed by the Ministry the Bagasse based co-generation are facing certain problems like inability of the co-generative sugar mills to generate bankable projects and many old sugar mills have small crushing capacities that are lower than the minimum economic capacity specified by the Government.

2.36 The Committee find that the Bagasse based co-generation units are also facing some difficulties in getting subsidy/clearances for setting up co-generation units in the sugar mills and many of the sugar producing factories have put up applications for getting clearances. The Committee have been informed that many agencies are involved in giving clearances to the sugar producing factories for setting up Bagasse based co-generation. The State Regulatory Commissions are involved in fixing tariff and the State Electricity Boards in buying of electricity from sugar mills. The Committee recommend that the clearance procedures for the co-generation projects should be simplified and the State Electricity Boards should be persuaded to enter into long term power purchase agreements with the sugar mills to ensure the success of Biomass Cogeneration projects.

2.37 The Committee note that the financial and physical targets under 10th Plan for Biomass Power/Cogeneration programme is Rs.125 crore and 700 MW respectively. Achievement of targets as on 31.12.2005 are Rs.35.97 crore and 486.23 MW. The Committee are surprised that the Ministry has utilized about 30% of the allocated fund even after the elapse of 4 years of 10th Plan, how it will be able to fully utilize the fund within 10th Plan when only one year is left. Although the Secretary was confident that the Ministry will achieve the targets, yet the Committee in the absence of any concrete

proposal in this regard find it difficult to subscribe to his optimism. Needless to mention that the matter is required to be taken up more seriously than done hitherto.

2.38 The Committee in their 11th Report on Action Taken by the Government on the recommendations contained in the sixth Report on Demands for Grants (2005-06) had desired that targets for Biomass/co-generation should be enhanced in the 10th and 11th plan periods. The Committee reiterate their earlier recommendation to this effect as well. The Committee desire that 'Biomass Resource Atlas for India' should be finalised at the earliest and private sector should be encouraged to make investment in this field. They may also be granted some fiscal and other benefits. The Committee may also be informed of the recommendations made by the Committee set up to accelerate growth of bagasse Cogeneration in the cooperative sector and Government's reaction thereto.

D. Biofuels

2.39 The Ministry has taken up a scheme on Biofuel Pilot Demonstration Project initially in one village each in Karnataka, Uttar Pradesh, Madhya Pradesh and Jharkhand with the objective of providing energy for lighting, agricultural operations and other community requirements such as drinking water etc. through utilizing different types of non-edible vegetable oilseeds for rural people. Two of these demonstration projects, one in Karnataka and another in Uttar Pradesh, have been commissioned and are supplying electricity to the selected villages for 3 to 4 hours every day. The other two projects in M.P. and Jharkhand are in the process of being commissioned. Field data, particularly, on the performance of diesel engines are being generated through these Pilot Projects. A comprehensive programme on Biofuels with focus on surface transport was initiated in 2002-03 to develop the technology for the production of both, bio-ethanol as well as biodiesel from different feed stocks, various non-edible oils were utilized to produce biodiesel and test their applications in the automotive sector.

2.40 The Ministry has further informed that a number of developmental activities are being taken up in the country for development and production of biofuels, which include 5% compulsory blend of ethanol in petrol in 9 States and trials for 10% and above ethanol blends. In the case of biodiesel, while in European Union (EU) countries and the USA, edible vegetable oils are being used to produce biodiesel, India is endowed with a number of non-edible vegetable oil producing trees and shrubs, which can be used for the production of biodiesel for use in diesel engines.

2.41 The Ministry has also sponsored R&D projects on various aspects of biodiesel. The R&D Project entitled “Production of Biodiesel from non-edible oils and field trials of diesel car with bio-diesel operation” sponsored at I.I.T. Delhi, aims at formulation and development of process conditions for producing bio-diesel from non-edible oils especially Pongamia pinnata (Karanja) through transesterification process using methanol and ethanol; selection of appropriate bio-diesel for long term operation; studies on shelf-life of bio-diesel on storage; determination of physico-chemical properties of neat diesel oil; biodiesel and the blended fuel as per ASTM (American Society for Testing and Materials) specifications; utilisation of the

biodiesel developed in the lab to evaluate the performance and emission studies on typical diesel-powered car engines to generate baseline data. Karanja oil has been extracted from the kernels by mechanical as well as solvent extraction process at laboratory scale. Biodiesel has been produced in the laboratory through transesterification process using methanol (1 litre and 6 liters batch capacities).

2.42 The Committee learn that the R&D Project entitled "Biodiesel from Jatropha curcas oil and its study on vehicles including field trials", sponsored at Indian Institute of Petroleum (IIP), Dehradun, is studying various aspects on conversion of Jatropha curcas oil into biodiesel by transesterification process using methanol and ethanol and to carry out the performance of diesel car engine using biodiesel particularly in terms of full load operation of power, torque, fuel efficiency and smoke with regular diesel and blended bio-diesel. IIP, Dehradun has reported that a catalyst has been developed to convert free fatty acids. Field trails at 5% blend of biodiesel produced from Jatropha curcas in diesel car are being carried out.

2.43 The Ministry informed that an R&D Project sanctioned to Delhi College of Engineering is aimed to design and develop a bio-diesel reactor of 200 litre capacity for production from multiple feedstock. The performance of medium capacity diesel engine, emissions, combustion and tribology will be studied under this project to access the feasibility of using biodiesel in diesel engines. The Ministry added that based on the satisfactory progress of village demonstration projects it was decided by the Government to extend the programme to other selected States, namely Andhra Pradesh, Chhattisgarh, Haryana, Punjab, Orissa and Tamil Nadu. It is proposed to progressively cover all the States utilizing different types of non-edible seeds for production of bio-oils which can be used for decentralised power generation in meeting village level energy needs of lighting, irrigation, motive power etc.

2.44 During the course of evidence the Committee took up the issue of the use of Biofuels as also the R&D taking place in this sector. In reply, the Secretary, MNES stated:

"On the question of biofuel, various Departments, the Forest Department also is involved here, are involved and we are in touch with them. As far as R&D in utilisation of the biofuel that is generated, it is being done by the R&D institutions that are being supported by the Ministry of Petroleum, mainly the Petroleum Conservation Research Association and the National Oil and Vegetable Oil Board under the Ministry of Agriculture who are also taking up lab tests, field tests and its usefulness for blending with various types and fuel both for stationary applications and automotive applications. In R&D we need to transfer the results much faster to others.

…… too many Ministries are involved; we are asked to evolve policy, R&D applications in which the Ministry of Petroleum will also come in. they have to agree to the blending issues, etc. Even in Jetropha, there is a difference of opinion. There are other seed bearing trees like pongamia which is said to be more efficient than Jetropha; they have taken on a route of going through Jetropha which the Ministry of Rural Development is pushing; the Ministry of Panchayati Raj is pushing and the Ministry of Petroleum has agreed to some extent to consider blending and give remunerative price to farmers."

2.45 The Secretary further elaborated:

"As I said earlier, we are concentrating only on evolving policies and doing some R&D work. The Ministry that has been designated as the nodal Ministry for National Mission of biodiesel is the Ministry of Rural Development. They have taken up plantation of Jetropha in 4 lakh acres of land for production of bio-diesel from oilseed plantation and the blending issue has to be taken up with the Ministry of Petroleum. They are doing demonstration projects. I have been told that Chattisgarh has demonstration projects and I have also been told that even the State Government of Chattisgarh themselves are operating a few vehicles, Government vehicles exclusively on Jetropha oils. They have also taken up two lakh hectares of non-forest land and two lakh acres of degraded forest land. The total cost of the demonstration project that has been taken up by the Ministry of Rural Development is Rs.1286 crore and the cost of each plantation is estimated to be Rs.22,800 per hectare. The oil companies have agreed to purchase biodiesel at Rs.25 per litre.

As far as our Ministry is concerned, we are not directly involved in the cultivation of Jetropha or holding land. The Ministry of Rural Development either through the Forest or through various State Governments are doing it. We are not directly involved in the cultivation.

In Chhatisgarh, they said they have 5,000-10,000 hectares of land for Jetropha. It takes three years to yield the seeds, after which the facilities for oil extraction come in; this is something which is to be deliberated upon consciously as to whether it is going to be a small scale industry or a large scale one, so that the oil companies can lift them directly. These are the issues

in which we are putting out heads together and the Cabinet Secretary took a meeting two months ago and earmarked roles for each Ministry. He entrusted the job of making a policy to us. This is the aspect on which I do not think I will be able to provide a complete answer. Even if I admit that that would be satisfactory, there are limitations which I must say."

2.46 The Committee note that the Ministry of Non-Conventional Energy Sources is involved in the Project on Bio-fuels in co-ordination with various other Ministries. The role of the Ministry is mainly envisaged in developing technologies for conversion of vegetable oils to bio-fuels and develop specifically designed bio-diesel engines. The Committee also note that the Ministry had taken up a scheme on Bio-fuel Pilot Demonstration Project initially in one village each in Karnataka, Uttar Pradesh, Madhya Pradesh and Jharkhand with the objective of providing energy for lighting, agricultural operation and other community, requirements such as drinking water. The Nodal Ministry for the Bio-diesel project is the Ministry of Rural Development. The Committee feel that all the Ministries should act in proper coordination with unity of purpose to fulfil the objective of development of Biofuels. The Committee are happy to note that some State Governments are operating their vehicles on Bio-diesels and oil companies have agreed to purchase bio-diesel at Rs.25 per liter. It has been stated to be the most preferred alternative to petrol and diesel particularly in the transport sector.

2.47 The Committee further note that the project on Bio-diesel requires coordinated efforts of the various Ministries i.e. Rural Development, Petroleum and Chemicals, Panchayati Raj, Environment & Forests etc. It requires a launching of a Mission with a special focus on Jatropha caucas/other oil yielding plants to be planted on large scale to produce Bio-diesel from non-edible oils. The Committee recommend that the State Governments should be actively involved in assessing the potential of growing non-edible oil seeds for producing Bio-diesel. The Committee desire the Ministry of Non-Conventional Energy Sources should continue its R&D activities to develop technologies which can run Bio-diesel in transport vehicles, for lighting, in pump sets, gensets to increase their efficiency. Accordingly they recommend that all the funds required for the same may be made available to the Ministry.

E. Energy Recovery from Urban and Industrial Wastes

2.48 Projects for Energy Recovery from Urban and Industrial Wastes have been promoted since 1995. The following table shows the allocation and utilisation for the above programme for the last three years:

Energy from UI wastes Rs. in crore	**2003-04**			**2004-05**			**2005-06**			**2006-07**
	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate
	14.00	6.00	4.35	15.00	10.00	4.44	15.00	5.00	3.91	25.00

Three projects based on Municipal Solid Wastes with an aggregate capacity of about 18 MW have been set up at Hyderabad, Vijayawada and Lucknow. Projects based on other urban wastes include: a 1 MW project based on cattle manure at Haebowal, Ludhiana; a 0.5 MW project for generation of power from biogas at a sewage treatment plant at Surat; and a 150 kW plant for vegetable market and slaughterhouse wastes at Vijayawada. Another project of 250 kW based on vegetable market waste is under commissioning at Chennai.

2.49 The status of the various waste to Energy projects as specified by the Ministry are given below:

(i) 6.6 MW Power from MSW at Hyderabad, A.P.

A Waste-to-Energy project based on the Refuse Derived Fuel (RDF) technology has been set up at Hyderabad. While a plant for production of RDF pellets, which can be used as a substitute for coal, was taken up in 1999 in Phase I, utilization of RDF for generation of power was commissioned in Phase-II in November 2003. The project cost is Rs 43.50 crore. Over 65 lakh units of electricity have so far been generated by this project.

(ii) 6 MW Power from MSW at Vijayawada, Andhra Pradesh

This project at Vijayawada utilizes combustion of RDF (in fluff form) produced from MSW. A total of 500 tonnes of municipal solid waste available from Vijayawada and

Guntur cities is collected and processed for preparation of fluff in respective cities and used at the plant site. The cost of the project is about Rs.45 crore. This project has already generated over 60 lakh units of electricity.

(iii) 5 MW Power from MSW at Lucknow, Uttar Pradesh

This project at Lucknow aims to process about 300–500 tonnes per day of Municipal Solid Waste of Lucknow city to obtain about 115 tonnes per day of dry volatile solids for production of about 50,000 cubic meter biogas per day and about 75 tonnes per day of organic fertilizer. The biogas so produced is to be used for running 5 biogas engine gen-sets aggregating 5 MW. Commissioning of this project has been terminated by the project developers due to operational reasons. Efforts are underway for reviving this project.

(iv) 1 MW Power from Biogas Plant at a Dairy Complex in Ludhiana, Punjab

Haebowal dairy complex, spread over an area of 50 acres, has 1500 dairies with a cattle population of 1,50,000 which generate about 2500 tonnes of cattle dung. A 1 MW demonstration project which gives 45 tonnes / day of stabilized organic manure as by product from 235 tonnes of cattle dung has been set up at a cost of Rs. 13.66 crore. The project is functioning satisfactorily since November 2004.

(v) 0.5 MW Power from biogas at Sewage Treatment Plant, Surat, Gujarat

Surat Municipal Corporation has six sewage treatment plants (STPs) out of which four plants have sludge digesters wherein biogas is generated. Average biogas generation is about 100-120 m3 / hr from three such digesters at one of the STPs at Anjana. A project for generation of power from this biogas has been set up at a cost of about Rs. 2.45 crore which is capable of operating on a wide variety of gases, including natural gas, sewage gas, landfill gas, etc., with minimal adjustments. The generated power is utilized for operations of the STP. The project is functioning satisfactorily since March 2004.

(vi) 150 kW Power from Mixed Urban Wastes at Vijayawada, Andhra Pradesh

A 150 kW demonstration project for generation of electricity through biomethanation of 20 tonnes of mixed wastes / day and rich bio-manure as by product has been installed by Vijayawada Municipal Corporation at Vijayawada. The daily feed to the plant consists of 16 tonnes of vegetable market waste and 4 tonnes of slaughterhouse waste. The sewage sludge from the adjoining Sewage Treatment Plant is being used for making slurry that is fed into digesters. A part of the generated electricity is used for captive consumption and the rest is exported to the grid. The project cost is Rs. 2.83 crore. The project is functioning satisfactorily since it's commissioning in June 2004.

(vii) 250 kW Power from vegetable market waste at Chennai, Tamil Nadu

A 250 kW The demonstration project generation of electricity through for biomethanation of 30 tonnes of vegetable market waste / day and rich bio-manure as by product has been set up at the Koyembedu Market Complex, Chennai. The project cost is about Rs. 5.00 crore. The project is presently under commissioning.

2.50 It has been stated in reply to a query by the Committee to this effect that the concerted efforts are being made for the formulation of projects for energy recovery from MSW in major cities of the country. As a result, projects in 16 cities in five states, namely Andhra Pradesh, Maharashtra, Delhi, Rajasthan and Karnataka are under formulation. However, these projects can only be supported once stay on subsidy for projects for power generation from MSW is vacated by the Supreme Court.

2.51 While taking a note of the Supreme Court's interim order given on 6th May 2005 which stayed sanction of subsidy to MSW to Energy projects until disposal of the case in regard to MSW plant at Lucknow, the Committee desired to know the latest position as obtaining in the matter. In reply, the Ministry stated that the Report of the Expert Committee for inspection and evaluation of the project for energy recovery from MSW at Lucknow constituted by MNES on the directive of the Supreme Court of India has already been submitted to the Supreme Court. The Committee has opined that the operational problems of the plant should not form the basis to judge the efficacy of a particular technology option or for rejecting a technology as a whole. Hence, the prayer for not providing any support to waste-to-energy projects per se did not appear to be justified. The Report of the Committee is expected to be considered in the next hearing in the matter.

2.52 Elaborating further on the waste to Energy projects of the Ministry, to a query by the Committee on under utilisation of funds during 2005-06 and enhanced allocation sought for the same by the Ministry during 2006-07 the Ministry has stated:

"Under the Programme on Energy Recovery from Urban Wastes, only a small amount could be utilized during 2005-06 as the Supreme Court stayed Govt. subsidy for projects based on MSW. As regards the enhanced allocation for 2006-07, the proposal is based on the promise that the aforesaid stay would be vacated and CFA would be required to projects aggregating 100 MW.

Under the Programme on Energy Recovery from Industrial and Commercial Wastes and Effluents, ten projects with an aggregate capacity of about 20 MW have been developed during the year. However, expenditure could not be

incurred as subsidy in case of new projects is payable only after successful commissioning of projects on reimbursement basis. As regards the enhanced allocation for 2006-07, this is required for projects already under implementation."

2.53 The Committee once again reiterate their earlier recommendation made in 8th Report (Fourteenth Lok Sabha) on the subject 'Biomass Power/Cogeneration-An Evaluation' that 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 note that concerted efforts are being made by the Ministry to formulate projects in 16 cities for energy recovery from MSW and these projects can only be supported once stay on subsidy for projects is vacated by Apex Court. Report of Expert Committee constituted in this regard on the directive of Supreme Court has already been submitted to the Court. The Committee recommend that the Ministry should pursue the case earnestly in order to get the stay vacated. The Committee further recommend that the feasibility to set up Waste to Energy plants in all the major metropolitan cities like Delhi, Mumbai, Chennai, Kolkata, etc. be worked out to make available grid interactive power available from the renewable sources like waste products, etc. as recommended in their 11th Report on Action Taken on the sixth report on Demands for Grants (2005-06).

F. Wind Energy

2.54 As stated by the Ministry the overall objective of Wind Power Programme is to catalyze commercialization of both grid-interactive and off-grid wind power. The programme includes wind power generation, wind resources assessment, R&D, demonstration and field-testing of various wind power generating devices. The overall physical and financial targets and achievement upto 31.12.2005 are stated to be as follows: -

	Target	Achievement
Physical (MW)	1500	2800
Financial (Rs. in crores)	125.00	34.14

The following table shows the allocation and utilisation for wind power during the last three years:

Wind Power Rs. in crore	**2003-04**			**2004-05**			**2005-06**			**2006-07**
	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate	Revised Estimate	Actual Expenditure	Budget Estimate
	14.00	10.30	6.92	12.35	8.00	7.69	5.00	2.00	1.08	4.00

2.55 As informed by the Ministry the physical target for the 10th Plan has already been exceeded by 86% and it is likely that achievement for the Plan period might be around triple the target. During 2006-07 over 1000 MW installed capacity is expected.

2.56 The Ministry further informed that the potential for Wind Power generation for both grid and off-grid applications has been estimated at about 47,000 MW taking sites having wind power density greater than 250 W/sq.m. at 50 m hub-height with 3% land availability in potential areas for setting up wind farms @ 12 MW/ha. Feasible potential for grid-interactive wind power could only be 15,000 MW, if the sites having wind power density greater than 300 W/sq.m at 50 m hub height were considered as suitable line with international practice. However, off-grid applications are feasible in lower wind regimes.

2.57 State-wise break up of the wind power potential were given as follows: -

TABLE: STATE-WISE WIND POWER POTENTIAL

Sl. No.	State	Potential (MW)	
		WPD>250 W/m2*	WPD>300 W/m2**
1.	Andhra Pradesh	4986	519
2.	Gujarat	10287	1761
3.	Karnataka	13746	3423
4.	Kerala	3015	1911
5.	Madhya Pradesh	15	--
6.	Maharashtra	735	--
7.	Orissa	15	--
8.	Rajasthan	2112	--
9.	Tamil Nadu	12831	7671
	Total	47,742	15,285

* For both grid and off-grid applications taking sites having Wind Power Densities (WPD) greater than 250 W/m2 at 50 m hub-height with 3% land availability for wind farms @12 ha/MW.

** The feasible potential for grid-interactive wind power would be lower (around 15000 MW) if sites with wind power densities greater than 300 W/m2 at 50 m hub-height were to be considered as suitable in line with international practice.

2.58 Matter regarding wind power potential is sought to be reviewed as stated by the Ministry. Also in relevance to a query as to how the wind assessment studies are carried out by the Ministry, the Secretary stated:

> "On the study of wind energy, we have a specialised organisation, known as C-WET. If we can get the location, we can undertake the study and have the demonstration."

2.59 The deployment aim for the 10th Plan and 11th Plan periods for grid-interactive wind power is 5,000 MW of which 1,500 MW is expected during the 10th Plan period. However, actual achievement during the 10th Plan period upto 31.12.2005 is 2,800 MW and the achievement by the entire Plan period is expected to be of the order of 4,500 MW. In the light of this achievement, the 11th Plan aim could be stretched from 3,500 MW to around to 6,500 MW making a total of 11,000 MW against the current aim of 5,000 MW for the two Plan periods (2002-2012).

2.60 To a specific query regarding the technology involved in the wind programme, the Ministry has stated that two types of wind turbines namely stall regulated and pitch regulated are being deployed in the country and abroad for grid-interactive power. The stall regulated wind turbines have fixed rotor blades whereas pitch regulated wind turbines have adjustable rotor blades that change the angle of attack depending upon wind speed. Both technologies have their own advantages and disadvantages. BHEL had developed wind turbines upto 55 kW capacity. Currently, wind energy industry in India is dependent on foreign technology through technology transfer or joint venture route. However, one domestic company is reported to be having its design offices overseas. Specified raw materials, sub-systems and components, especially for wind turbines above 500 kW capacity are imported. To reduce import dependency, the broad aim of indigenising design and manufacture of complete wind turbines by 2012 has been set. The present R&D efforts are, however, focused on problems common to the wind industry such as improvement in performance of existing wind turbine installation, etc.

2.61 Asked about the utilisation of fund on R&D, in reply, it has been stated that about Rs.0.72 crore had been spent on R&D and related projects covering wind systems and small aero-generators from 2000-01 onwards. In addition, R&D activities had been conducted through C-WET, which has spent about Rs.1.50 crore on various R&D projects. An amount of Rs.1.00 crore had been proposed for 2006-07.

2.62 In regard to activities of the C-WET when questioned by the Committee, they were informed:

> "The major activities of C-WET have been mainly confined to Wind Resource Assessment, Testing and Certification, Training and Commercial Services. It might be mentioned that as per global practice for the purpose of avoiding conflict of interest, certification agencies generally are not expected to conduct their own R&D since they are privy to designs of machines submitted to them for testing and certification purposes. Because of this limitation, C-WET has not initiated indigenous design activities for entire WEGs. However, C-WET has been carrying out specified R&D activity that is not likely to lead to conflict of interest. Hence, for C-WET to become a hub for design activities, it might have to surrender its certification business.

C-WET will be providing accredited testing and measurement services for wind turbines. Accredition of these services is being provided by NABL. A number of national and international training programmes on various aspects related to wind turbine technology have also been conducted. The wind turbine test stations set up at Kayathar is planned to be expanded."

2.63 As regards the inability of the Ministry to spend the BE 2005-06, when enquired by the Committee the Ministry of Non-Conventional Energy Sources stated:

"The B.E. provision of Rs. 3.00 crore during 2005-06 was for supporting R&D in Wind Energy Sector by taking up projects for achieving the broad aim of indigenizing design and manufacture wind turbine by 2012. However, during 2005-06, sufficient R&D proposals could not be generated. The provision for setting up wind demonstration projects could not be utilized as a decision was taken that wind demonstration projects be limited to those potential states where commercial activity had not yet been initiated. B.E. for C-WET was reduced at the R.E. stage.

The focus of the Wind Energy Programme has been to accelerate deployment of grid-interactive wind power. The result has been encouraging with the annual installed capacity having gradually increased to a level of about 1716 MW during 2005-06. The target of 1500 MW set for the 10th Plan has already been exceeded as 3684 MW has been set up upto 31.3.2006. Since adequate investment is being made by the private sector, the necessity of government stepping in does not arise."

2.64 Questioned in regard to the inability of the Ministry to achieve the financial targets, the Ministry submitted:

"The Financial targets could not be achieved during 2005-06 as a decision was taken that the scheme of wind demonstration projects with Central Financial Assistance be limited to those potential states where commercial activity had not yet been initiated. Therefore, new proposals under demonstration wind power projects received from states such as Madhya Pradesh and Andhra Pradesh could not be supported during 2005-06. However, expenditure has been incurred up to the R.E. level under the Wind Energy Programme.

The broad aim is that around 10% installed power generation capacity would be contributed by renewables with 5% contribution to the electricity mix by 2012 and around 15% and 10% respectively by 2032, contribution of wind electricity during this period will come down from 1.5% in 2012 to 1% in 2032 corresponding to around 13,000 MW in 2012 and 30,000 MW in 2032 respectively."

2.65 The Committee are surprised to note that Rs.3 crore (BE) earmarked for R&D in Wind Energy Sector in 2005-06 with the broad aim of indigenising design and manufacture of Wind turbine by 2012, has to be scaled down at RE stage for C-Wet as sufficient R&D proposals could not be generated and due to non-setting up of Wind demonstration projects. The Committee is unable to accept these as valid reasons to scale down the allocations. It shows slackness on the part of the Ministry to handle the Wind Power projects. The Ministry should make all out efforts so that funds allotted under BE are optimally utilized. The Committee further find to their utter surprise that C-WET does not have any role in designing indigenous equipment for harnessing wind energy and its role is limited to wind resource assessment, testing and certification, training and commercial services.

2.66 The Committee are of the strong view that a specific agency needs to be appointed/set up to look into R&D aspects of indigenizition of wind turbines and all related equipment required for harnessing wind energy, for which, the funds have already been allocated, as equipment being used presently for the purpose are imported. In line with this, the Committee further desire that indigenization should be taken up by the Ministry in a fast track mode.

NEW DELHI;
17 May, 2006
27 Vaisakha, 1928 (Saka)

GURUDAS KAMAT,
Chairman,
Standing Committee on Energy

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.	1.13	The Committee are concerned to note that during 2004-05, the utilisation of fund was Rs.218.06 crore against Rs.373.10 crore (RE) and in 2005-06 upto 28.02.2006, the utilisation of fund was Rs.213.79 crore against RE Rs.316.74 crore and Rs.603.64 crore has been allocated for 2006-07. The Committee observe that expenditure by the Ministry in the First quarter, Second, Third and Fourth quarter upto 28.02.2006 was Rs.9.55 crore, Rs.35.31 crore, Rs.91.21 crore and Rs.77.72 crore respectively during 2005-06. Due to uneven quarterly expenditure, the Ministry of Finance/Planning Commission has been reducing the Gross Budgetary support since 2002-03.
2.	1.14	A shortfall in utilisation of funds is seen in almost all the major programmes of the Ministry i.e. Village Electrification, Energy Recovery from urban and Industrial Waste and Solar Energy, etc. The Committee also note that there is another unhealthy trend of utilizing a major portion of Budgetary outlay during the last two quarters of the financial year by the Ministry. The Ministry has given various reasons for non-utilisation of funds which do not justify the slow pace and under utilisation of funds by the Ministry. One of the factors responsible therefor, as stated by the Ministry, is that the States were not sending their utilisation certificates in time and due to this also there appeared to be uneven utilisation of funds. Further the Ministry added that it was difficult to monitor the projects executed in the States. To overcome these problems the Ministry has stated that for implementation of Renewable Energy Programmes at the district level, District Advisory Committees had been set up in districts. These Committees are headed by the District collector with Project Director, DRDA as Member Secretary and also comprised of the district level functionaries of Departments of industry, power, forest, renewable energy, agriculture and horticulture, NIC and NGOs, social workers, doctors, lawyers, engineers, scientists, Rotarians, two representatives of the concerned MPs, etc. Senior scientists of the Ministry

		of Non-Conventional Energy Sources have been assigned various States/UTs for maintaining close liaison for purpose of review, monitoring, implementation and coordination of programmes/projects of the Ministry. The Committee note that the reasons advanced by the Ministry for non-utilisation are administrative in nature for which corrective action should have been taken in advance.
3.	1.15	The Committee note the steps being taken by the Ministry of Non-Conventional Energy Sources to ensure proper utilisation of funds, the Committee would still like to be apprised of the results of these measures during the first six months of the current financial year and periodically thereafter. The Committee recommend that the States which do not submit utilisation certificates should be subjected to certain penalties like stoppage of release of funds, etc. Under utilisation and uneven utilisation of funds allocated to a Ministry/Department is a serious matter and all efforts should be made in this regard to tackle this problem. The main reasons for curtailing funds at the RE stage by the Ministry of Finance is the inability of the Ministry to spend the amount allocated during the first two quarters of the year. The Committee trust that the Ministry would take all corrective steps in this regard to avoid such situation in the current financial year, i.e., 2006-07.
4.	2.9	The Committee note that hydrogen as a form of energy has the potential to provide a clean, convenient and affordable fuel for meeting future needs. It is envisaged by the Ministry that hydrogen will be available in the future for stationary, transport, portable and commercial applications. However, the transition to a hydrogen economy requires solutions to many challenges – scientific, technological and economic. The Committee note that Rs.20 crore has been earmarked for new R&D activities in this field, out of a total of Rs.41 crore kept aside for research and development in different sectors for the Ministry as a whole. The Committee are of the view that hydrogen is a future fuel of the world and more funds for R&D in the field are required to be earmarked. The Committee note that the Ministry of Non-Conventional Energy Sources desire to increase the allocation to R&D and propose to go to the Ministry of Finance again for the same. The Committee, therefore, recommend that the matter of more funds for R&D should be taken up with the Ministry of Finance and Planning by the Ministry at the earliest so that it could get the enhanced funds at RE stage. The Committee further desire that all out

efforts should be made to carry out research in this field as this fuel have a wide range of applications for power generation and vehicular transport as also in other fields. The Committee hope that with the endorsement of National Hydrogen Energy Road Map document by the Hydrogen Energy Board, advancements in this field shall take place more rapidly. The Committee would like to be apprised of the developments in this field from time-to-time.

5. 2.20 The Committee note that as the estimated cost of generation of grid interactive SPV power is around Rs.20 kwh and hence the programme has been discontinued. Due to high cost the utilities in the States have not shown much interest in the grid interactive solar power projects. The Ministry has further informed that the removal of subsidy on grid interactive solar photovoltaic power will not have any adverse effect on the over all progress of the solar photovoltaic programme of the country as the main objective of such programmes was technology awareness. The Ministry, however, continues to provide support for development of other solar systems/devices. The Committee is however very unhappy to note poor performance in the North-Eastern States. The targets for distribution of solar lanterns and solar street lights could not be achieved in the financial year 2005-06. The Committee recommend that the Solar Energy Programme of the Ministry is an ambitious programme and it should be continued in right earnest.

6. 2.21 The Committee note that basic user friendly projects of the Ministry viz solar traffic lights, street lighting, solar water lighting programmes should be pursued vigorously as they help in saving grid connected electricity. The Committee also desire that equipment like solar lanterns should be distributed in large numbers in villages/hamlets not having any grid connectivity and such important programmes of larger public interest should in no case be allowed to be stalled for lack of co-ordination in the decision making organs of the Government.

7. 2.22 The Committee find that a budgetary provision of only Rs.11 crore for 2006-07 for the R&D and related activities at solar energy centre. To a specific query whether allocated fund is adequate to meet the requirement of the projects, no reply has been furnish in this regard. The Committee feel expenditure on R&D activities for such an important projects should be more. The Committee, therefore, desire the Ministry should take steps to enhance the fund at RE

		stage, if need be. The Committee further note that the Government is supporting R&D in the solar photovoltaic (PV) technology, the aim of which is to reduce the cost of solar cells, modules and systems, support industry to indigenously produce critical materials like silicon etc. As stated by the Ministry continued R&D efforts in the above areas are expected to bring down the cost of generation of solar energy and make it competitive in the next 15-20 years.
8.	2.23	The Committee note with great concern that the solar programme has already been delayed and the Ministry's has been unable to bring down the cost of solar photovoltaic materials which was candidly admitted by the Secretary. The Committee, therefore, recommend the Ministry should make vigorous R&D efforts to bring down the cost of silicon and develop other materials for use in the solar programme. The Committee would like the Ministry to lay special emphasis on photovoltaic research programmes and the Committee be apprised of the same.
9.	2.35	The Committee note that of the total theoretically feasible potential of 16,000 MW, 26% i.e. 359 MW of Bio-mass grid interactive power and 66 MW Bio-mass gasification has already been achieved. Around 14.5% of the total estimated potential of 3500 MW of Bagasse co-generation has been harnessed through 508 MW of Bagasse co-generation in sugar mills. Projects aggregating 858 MW are already under implementation. As stated by the Ministry, it may not be feasible to harness, the entire theoretical potential on account of problems associated with collection and transportation of agro-residues to the centralized power plant locations. The Committee were informed by the Ministry the Bagasse based co-generation are facing certain problems like inability of the co-generative sugar mills to generate bankable projects and many old sugar mills have small crushing capacities that are lower than the minimum economic capacity specified by the Government.
10.	2.36	The Committee find that the Bagasse based co-generation units are also facing some difficulties in getting subsidy/clearances for setting up co-generation units in the sugar mills and many of the sugar producing factories have put up applications for getting clearances. The Committee have been informed that many agencies are involved in giving clearances to the sugar producing factories for setting up Bagasse based co-generation. The State Regulatory Commissions are involved in fixing tariff and the State

		Electricity Boards in buying of electricity from sugar mills. The Committee recommend that the clearance procedures for the co-generation projects should be simplified and the State Electricity Boards should be persuaded to enter into long term power purchase agreements with the sugar mills to ensure the success of Biomass Cogeneration projects.
11.	2.37	The Committee note that the financial and physical targets under 10th Plan for Biomass Power/Cogeneration programme is Rs.125 crore and 700 MW respectively. Achievement of targets as on 31.12.2005 are Rs.35.97 crore and 486.23 MW. The Committee are surprised that the Ministry has utilized about 30% of the allocated fund even after the elapse of 4 years of 10th Plan, how it will be able to fully utilize the fund within 10th Plan when only one year is left. Although the Secretary was confident that the Ministry will achieve the targets, yet the Committee in the absence of any concrete proposal in this regard find it difficult to subscribe to his optimism. Needless to mention that the matter is required to be taken up more seriously than done hitherto.
12.	2.38	The Committee in their 11th Report on Action Taken by the Government on the recommendations contained in the sixth Report on Demands for Grants (2005-06) had desired that targets for Biomass/co-generation should be enhanced in the 10th and 11th plan periods. The Committee reiterate their earlier recommendation to this effect as well. The Committee desire that 'Biomass Resource Atlas for India' should be finalised at the earliest and private sector should be encouraged to make investment in this field. They may also be granted some fiscal and other benefits. The Committee may also be informed of the recommendations made by the Committee set up to accelerate growth of bagasse Cogeneration in the cooperative sector and Government's reaction thereto.
13.	2.46	The Committee note that the Ministry of Non-Conventional Energy Sources is involved in the Project on Bio-fuels in co-ordination with various other Ministries. The role of the Ministry is mainly envisaged in developing technologies for conversion of vegetable oils to bio-fuels and develop specifically designed bio-diesel engines. The Committee also note that the Ministry had taken up a scheme on Bio-fuel Pilot Demonstration Project initially in one village each in Karnataka, Uttar Pradesh, Madhya Pradesh and Jharkhand with the objective of providing energy for

lighting, agricultural operation and other community, requirements such as drinking water. The Nodal Ministry for the Bio-diesel project is the Ministry of Rural Development. The Committee feel that all the Ministries should act in proper coordination with unity of purpose to fulfil the objective of development of Biofuels. The Committee are happy to note that some State Governments are operating their vehicles on Bio-diesels and oil companies have agreed to purchase bio-diesel at Rs.25 per liter. It has been stated to be the most preferred alternative to petrol and diesel particularly in the transport sector.

14. 2.47 The Committee further note that the project on Bio-diesel requires coordinated efforts of the various Ministries i.e. Rural Development, Petroleum and Chemicals, Panchayati Raj, Environment & Forests etc. It requires a launching of a Mission with a special focus on Jatropha caucas/other oil yielding plants to be planted on large scale to produce Bio-diesel from non-edible oils. The Committee recommend that the State Governments should be actively involved in assessing the potential of growing non-edible oil seeds for producing Bio-diesel. The Committee desire the Ministry of Non-Conventional Energy Sources should continue its R&D activities to develop technologies which can run Bio-diesel in transport vehicles, for lighting, in pump sets, gensets to increase their efficiency. Accordingly they recommend that all the funds required for the same may be made available to the Ministry.

15. 2.53 The Committee once again reiterate their earlier recommendation made in 8th Report (Fourteenth Lok Sabha) on the subject 'Biomass Power/Cogeneration-An Evaluation' that 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 note that concerted efforts are being made by the Ministry to formulate projects in 16 cities for energy recovery from MSW and these projects can only be supported once stay on subsidy for projects is vacated by Apex Court. Report of Expert Committee constituted in this regard on the directive of Supreme Court has already been submitted to the Court. The Committee recommend that the Ministry should pursue the case earnestly in order to get the stay vacated. The Committee further recommend that the feasibility to set up Waste to Energy plants in all the major metropolitan cities

like Delhi, Mumbai, Chennai, Kolkata, etc. be worked out to make available grid interactive power available from the renewable sources like waste products, etc. as recommended in their 11th Report on Action Taken on the sixth report on Demands for Grants (2005-06).

16. 2.65 The Committee are surprised to note that Rs.3 crore (BE) earmarked for R&D in Wind Energy Sector in 2005-06 with the broad aim of indigenising design and manufacture of Wind turbine by 2012, has to be scaled down at RE stage for C-Wet as sufficient R&D proposals could not be generated and due to non-setting up of Wind demonstration projects. The Committee is unable to accept these as valid reasons to scale down the allocations. It shows slackness on the part of the Ministry to handle the Wind Power projects. The Ministry should make all out efforts so that funds allotted under BE are optimally utilized. The Committee further find to their utter surprise that C-WET does not have any role in designing indigenous equipment for harnessing wind energy and its role is limited to wind resource assessment, testing and certification, training and commercial services.

17. 2.66 The Committee are of the strong view that a specific agency needs to be appointed/set up to look into R&D aspects of indigenizition of wind turbines and all related equipment required for harnessing wind energy, for which, the funds have already been allocated, as equipment being used presently for the purpose are imported. In line with this, the Committee further desire that indigenization should be taken up by the Ministry in a fast track mode.

Annexure – I

1.1 The detailed Demands for Grants (2006-07) of the Ministry of Non-Conventional Energy Sources are as follows:

(Rs. in crore)

			Revenue		Capital		Total				
			538.39		65.25		603.64				
Sl.	Major	Programme	Revenue Section								Remarks
No.	Heads	Scheme	2004-05		2005-06				2006-07		
			Actual		BE		RE		BE		
			Plan	Non-Plan	Plan	Non-plan	Plan	Non-Plan	Plan	Non-Plan	
1	2	3	4	5	6	7	8	9	10	11	12
1.	3451	Secretariat Economic Services	6.39	5.21	8.25	5.63	8.25	6.43	10.50	6.64	This Head comprises wages, O.T.A., Domestic & Foreign Travel Expenses, Office Expenses, Rent, Rates Taxes, Publications, other Administrative Expenses, Advertising & Publicity, Professional Service, Commission for Additional Sources of Energy, Regional Office.
2.	2501	Special Programme for Rural Development	0.96	--	--	--	0.5	--	1.5	--	This Programme includes IREP Programme, Grants-in-aids for National & Regional Training Centre.

1	2	3	4	5	6	7	8	9	10	11	12
3.	2552	Lumpsum provision for North-Eastern Region and Sikkim	--	--	60.00	--	35.00	--	60.00	--	Lumpsum provision forn North-Eastern Region and Sikkim.
4.	2810	Non-Conventional Sources of Energy	152.89	--	450.69	--	221.22	--	436.00	--	This Head comprises R&D Non-Conventional Energy Sources, Bio-Energy assistance to Biomass Programme, National Programme for Biogas, Energy from Urban Municipal Waste, Energy from Industrial Waste, Small Hydro Power Development, SHP Promotion Programme, UNDP/GEF Hilly Hydro Projects, Chemical Sources of Energy, Alternative Fuel for Surface Transportation, Hydrogen Energy, Ocean Energy, National Institute of Renewable Energy, Special Area Demonstration Project, North—Eastern States/State Nodal Agencies, Dutch/ SDC Grants to IREDA, Lumpsum Provision for North-Eastern States including Sikkim, UNDP Rural Energy Support Programme, Rural Energy Entrepreneurship, Institutional Development, Technology Commercialisation Fund,

1	2	3	4	5	6	7	8	9	10	11	12
											Village Electrification Programme, Women and Renewable Energy Development, National Project on Clean Energy Services for Rural Areas, TIFAC, DEB Management System, Information and Public Programme, International Cooperation.
5.	3601	Grants-in-aid to State Government	14.71	--	9.23	--	8.31	--	23.06	--	This Head includes Grants-in-aids to State Governments for Small Hydro Power Programme, Wind Energy Grants for Central Sponsored Plan Schemes for Bio-Energy, Development, Advertising & Publicity, Community and Institutions, Biogas Development, Biomass Briquetting, Energy Plantation, Biomass Gasifier for Stand Alone Application, National Bio-Energy Board, Biomass Cogeneration and Combustion, Grid Connection Gasifier, Animal Energy Programme, Solar Passive Architecture, Regional Technical Back-up Units Training Programme, Solar Energy Centre, Inter-active Research with other Institutions/ Organisations, Professional Service, SPV

1	2	3	4	5	6	7	8	9	10	11	12
											Pump Programme, Solar Thermal Power Generation Grid connected ASPV Power Projects, GEF Grants for IS Project, Assistance to Wind Power Generation Programme, Assistance to Wind Power Programme, Wind Energy Centre, Wind Resources Assessment, National Programme on Improved Choolah, Women and Renewable Energy Development, Energy from Urban and Agricultural Wastes, National Programme for Biogas Development, Community and Institutional Biogas Development, Solar Thermal Energy Programme, National Programme on Improved Chulhas, Energy from Urban & Agriculture Wastes, Integrated Rural Energy Planning Programme, Monitoring, Lumpsum provision for North-Eastern States including Sikkim.
6.	3602	Grants-in-aid to Union Territory Government	10.45	--	1.53	--	0.36	--	0.69	--	This Head includes Grants for Central Plan Schemes for Wind Demonstrations, Grant for Centrally Sponsored Plan Scheme for NPB Community and Institutional Biogas Development, Solar Thermal

1	2	3	4	5	6	7	8	9	10	11	12
											Energy Programme, National Programme on Improved Chulhas, Integrated Rural Energy Programme Monitoring, National Project on Clean Energy Services for Rural Areas.
7.	--	Total Revenue	175.07	5.21	529.7	5.63	273.65	6.43	531.75	6.64	----
8.	4810	Capital Outlay on Non-conventional Sources of	50.04	--	50.05	--	56.35	--	50.25	--	This Head includes capital investment for minor works in the Solar Energy Centre and investment in Indian Renewable Energy Development Agencies (IREDA).
9.	6810	Loans for Non-Conventional Sources Of Energy	10.00	--	20.00	--	20.00	--	15.00	--	This Head includes counterpart loan to IREDA for International Development Association (IDA) and Danish Export Finance Corporation (DEFC) components of grants under India Renewable Resources Development Project of the Ministry implemented through IREDA.
10.	--	Total Capital	60.04	--	70.05	--	76.35	--	65.25	--	----
11.	--	Total (Gross)	235.11	5.21	599.75	5.63	350.00	6.43	597.00	6.64	--

ANNEXURE - II

MINUTES OF THE SEVENTEENTH SITTING OF THE STANDING COMMITTEE ON ENERGY (2005-06) HELD ON 22ND MARCH, 2006 IN COMMITTEE ROOM 'B', PARLIAMENT HOUSE ANNEXE, NEW DELHI

The Committee met from 1500 hours to 1630 hours.

PRESENT

Shri Gurudas Kamat - Chairman

MEMBERS

Lok Sabha

2. Shri Chander Kumar
3. Shri Rabindra Kumar Rana
4. Shri J.M. Aaron Rashid
5. Shri M. Shivanna
6. Shri Vijayendra Pal Singh

Rajya Sabha

7. Dr. K. Kasturirangan
8. Shri Matilal Sarkar
9. Shri Motilal Vora
10. Shri Vedprakash P. Goyal

SECRETARIAT

1. Shri P.K. Bhandari, Joint Secretary

2. Shri Surender Singh, Deputy Secretary

3. Shri Shiv Kumar, Under Secretary

WITNESSES

Ministry of Non-Conventional Energy Sources

1.	Shri V. Subramanian,	Secretary (NCES)
2.	Shri A. K. Rath	AS & FA
3.	Dr. S.K. Chopra	Sr. Adviser
4.	Shri Sunil Khatri,	Joint 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"
12.	Shri Debashish Majumdar	MD(IREDA)

2. At the outset, the Chairman, welcomed the Members of the Committee and also the representatives of the Ministry of Non-Conventional Energy Sources to the sitting of the Committee and apprised them of the provisions of Direction 58 of the Directions by the Speaker.

3. Thereafter, the Secretary, Ministry of Non-Conventional Energy Sources made a presentation before the Committee on the programmes of Ministry of Non-Conventional Energy Sources as also on the Demands for Grants for the year 2006-07. The following important points were discussed with the representatives of the Ministry:

(i) Slow utilisation of the budgetary amount available with the Ministry.

(ii) Research and development in the Hydrogen energy sector.

(iii) Activities of the Ministry in regard to use of solar energy and R & D in the solar photovoltaic area.

(iv) Use of urban and industrial wastes for energy generation.

(v) Bagasse Co-generation

(vi) Role of the Ministry in development of bio-fuels.

(vii) Use of other forms of renewable energy i.e. wind, small hydropower and biogas.

(viii) Providing fiscal concessions to private players to encourage them into the field of renewable sources of energy.

4. Thereafter, the members raised some queries which were responded to by the representatives of the Ministry of Non-Conventional Energy Sources.

The Witnesses, then, withdrew

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

The Committee then adjourned.

MINUTES OF THE NINTEENTH SITTING OF THE STANDING COMMITTEE ON ENERGY(2005-06) HELD ON 17TH MAY, 2006 IN COMMITTEE ROOM G-074, PARLIAMENT LIBRARY BUILDING, NEW DELHI

The Committee met from 1500 hrs. to 1600 hrs.

PRESENT

Shri Gurudas Kamat -*Chairman*

MEMBERS

Lok Sabha

2. Shri Ajoy Chakraborty
3. Shri B. Vinod Kumar
4. Shri Chander Kumar
5. Shri Prashanta Pradhan
6. Shri Rabindra Kumar Rana
7. Shri J.M. Aaron Rashid
8. Shri M. Shivanna
9. Shri Vijayendra Pal Singh
10. Shri M.K. Subba

Rajya Sabha

11. Shri Vedprakash P. Goyal
12. Dr. K. Kasturirangan
13. Shri Jesu Das Seelam

SECRETARIAT

1.	Shri P.K. Bhandari	-	Joint Secretary
3.	Shri B.D. Swan	-	Deputy Secretary
4.	Shri Shiv Kumar	-	Under Secretary

2. At the outset, the Chairman, Standing Committee on Energy 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 Demands for Grants(2006-07) of the Ministry of Power.

(ii) Draft Report on the Demands for Grants (2006-07) of the Ministry of Non-Conventional Energy Sources.

(iii) Draft Report on the Electricity (Amendment) Bill, 2005 of the Ministry of Power.

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

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

The Committee then adjourned.