CHAPTER – V

ENERGY

5.1 POWER

5.1.1. The approved Ninth Plan outlay for Power Sector is Rs. 31200.00 lakhs. The expenditure during the first four years of the Ninth Plan and the approved outlay during the year 2001-02 are as indicated below :-

(Rs. Lakhs)

Sl. No.	Items	Ninth Plan 1997-2002 Approved Outlay	1997-98 Actual Expenditure	1998-99 Actual Expenditure	1999-00 Actual Expenditure	2000-01 Actual Expenditure	2001-02 Approved Outlay
1.	Generation Schemes (Leshka HEP)	7200.00	25.46	-	200.00	-	2661.00*
2.	R&M of Umiam Stage-I (EAP)	7740.00	-	264.00	-	843.00	1970.00
3	T & D Works						
4.	a) Construction of 132 KV Sub-Station at Nongstoin	450.00	13.95	250.00	75.00	184.44	85.00
	b) 132KV NEHU Sub-Station	-	103.73	-	-	-	-
	b) Eighth/ Ninth Plan T&T Schemes	560.00	-	210.00	70.00	61.51	140.00
	c) Improvement of Power system at Shillong	2000.00	237.36	500.00	180.00	140.92	120.00
	d) Improvement of Power system at Tura	-	-	150.00	105.00	61.76	10.00
	e) Distribution of Master Plan of Meghalaya	3000.00	197.63	550.00	320.00	409.51	395.00
	f) State Load Despatch Centre	1600.00	-	-	-	-	-
3.	Survey and Investigation	650.00	91.35	140.00	50.00	78.71	50.00
4.	Rural / Village Electrification (PMGY)	8000.00	40.07	-	250.00	1872.00	600.00
5.	Heavy Fuel Oil Based Power project	-	-	-	-	1000.00	-
	TOTAL	**31200.00**	**709.55**	**2064.00**	**1250.00**	**4651.85**	**6031.00**

* Includes LIC Loan of Rs. 495.00 Lakhs and Rs. 2166.00 Lakhs of Other Loans.

5.1.2. **The proposed outlay for the Tenth Plan and Annual Plan 2002-03 are as indicated below:-**

(Rs. Lakhs)

Sl. No.	Items	Tenth Plan 2002-2007 Proposed Outlay	Annual Plan 2002-2003 Proposed Outlay
	Continuing Schemes :		
	T & D Work :-		
1.	a) Shillong Improvement scheme	1200.00	200.00
	b) Distribution Master Plan	1800.00	400.00
	c) Tura Improvement Scheme	1000.00	200.00
2..	Survey & Investigation	375.00	75.00
3.	**Generation Scheme** - Leshka HEP	30600.00	6500.00
4.	**Renovation & Modernisation** of Umiam Stage –I.	1887.00	1887.00
5.	**Rural Electrification** (PMGY)	3705.00	638.00
	New Schemes :		
5.	**T & D Work :-**		
	a) Augmentation of existing 132 KV S/S b) Construction of 220 KV/132 KV S/S (Byrnihat / Khliehriat)	270.00 600.00	- 100.00
	c) 132 KV S/C Line (Leshka- Khliehriat)	800.00	-
6.	**Generation** – HFO Based Power Project (4x6 MW) at Byrnihat / Mendipathar	-	-
7.	**Renovation & Modernisation** of Umiam Stage II & III	7900.00	-
	TOTAL :	**50137.00**	**10000 .00**

5.1.3. **Myntdu – Leshka (2x42 MW) H. E. Project:** The Detailed Project Report of Myntdu-Leshka H.E.Project (2x42 MW) was prepared at an estimated cost of Rs. 285.36 Crores excluding IDC and financing cost. The cost of the project including IDC and FC is Rs. 363.08 Crores. The TEC was issued by Central Electricity Authority in September, 1999 subject to the condition that environmental and forest clearance are to be obtained from the Ministry of Environment and Forest, New Delhi. The Ministry of Environment and Forest, New Delhi issued the environment and forest clearance on 26-09-01 vide their letter No.J-12011/4/99-1A1 dated 26-09-01. **While issuing TEC by Central Electricity Authority the tentative financial package was considered as follows:**

Sl. No.	Source of Finance	Domestic component INR (Rs. Crores)	Percentage of Total outlay
1.	Equity (MeSEB)	108.90	30.0 %
2.	Debt :		
	i) State Govt. Loan	72.60	20.0 %
	ii) Loan from Financial Institutions (PFC / OPEC / JBIC/ etc.)	181.50	50.0 %

The Estimated Cost of the Project are as follows :

(Rs. In Crores)

Sl. No.	Item of work	Present Day Cost (January '99 Price Level)
1.	Civil cost	181.69
2.	E & M Works	103.67
3.	**Total Cost without IDC & FC (1+2)**	**285.36**
4.	IDC	75.90
5.	Financing Cost (FC)	1.82
6.	**Total Cost including IDC & FC (3+4+5)**	**363.08**

For the purpose of resource mobilization and timely implementation of the project both the State Government's and the Central Government's help is necessary. Accordingly, the works for the year 2002-03 was identified at an estimated amount of Rs. 65.00 Crores. Funding from the Non-Lapsable Central Pool of Resources is also being sought for. Further The State Government had also requested the North Eastern Council to include this project in the Tenth Plan.

5.1.4. **Renovation and Modernisation of Umiam Stage -I Power Station :** MeSEB formulated the scheme of R & M of Umiam Stage -I and Stage-II Power Station by engaging JCI Consultants, Tokyo. The Schemes were submitted to the Ministry of Power, GOI for OECF (presently known as JBIC) assistance in 1995. The JBIC, after obtaining report through their fact-finding mission, approved funding of the scheme for R & M of Stage-I Power Station during 1996-97 with the completion target during the Ninth Plan period. The estimated cost of the scheme is 2047 Million Yen (Rs. 85.30 Crores considering current exchange rates Re.1= 2.4 Japanese Yen). The loan component is 1700 Million Yen (Rs.70.80 Crores). The local component is 347 Million Yen (Rs. 14.50 Crores). The Contract Agreement for the R & M works were signed between MeSEB and Mitsui & Co. Ltd./ M/S TPK (India) Pvt. Ltd. on 26-04-2000. The work during 2000-01 and 2001-02 includes design, manufacturing, shop testing and shipment of the foreign supply equipments including transportation to the site along with the local supply of equipments. The approved outlay for the year 2001-02 is Rs. 1970.00 Lakhs and the proposed outlay for the year 2002-03 is Rs. 1887.00 Lakhs.

5.1.5. **Transmission & Distribution Scheme :**

(i) **Shillong Improvement Scheme :** In order to strengthen and improve the Sub-Transmission and Distribution System in Shillong and Greater Shillong area the scheme was statrted during the Seventh Plan period and continued till date. It is likely to be completed by the middle of the Tenth Plan period. The scheme envisages the construction of 33/11 KV Sub-Station, 33KV ring main system, 11KV ring main system, augmentation of distribution Sub-Station and LT lines. Due to price escalation the scheme was revised in June,1999 at an estimated cost of Rs. 3725.00 Lakhs from its original cost of Rs. 2654.00 Lakhs. An additional Central Assistance through the Non-Lapsable Central Pool of Resources amounting to Rs. 400.00 Lakhs was released during 2000-01 for completion of the scheme within the time schedule. The upto date expenditure till March, 2001 is Rs. 2992.66 Lakhs from State Govt. Loan and Rs. 148.11 Lakhs from the Non-Lapsable Central Pool of Resources. The proposed outlay for the scheme during the Tenth Plan and Annual Plan 2002-03 are Rs. 1200.00 Lakhs and Rs. 200.00 Lakhs respectively.

(ii) **Tura Improvement Scheme :** In order to strengthen and improve the excisting Sub-transmission and distribution system of Tura town and parts of West Garo Hills, MeSEB had formulated a scheme in the beginning of the Ninth Plan at an estimated cost of Rs. 1512.00 Lakhs. The scheme envisages construction of two Sub-Stations of 2x5 MVA at Tura and New Tura and construction of 33KV, 11KV, and LT lines with distribution Sub-Stations. The scheme started during the Ninth Plan period and is likely to continue till the end of the Tenth Plan period. An additional Central Assistance from the Non-Lapsable Central Pool of Resources amounting to Rs. 600.00 Lakhs was released during 2000-01 for completion of the scheme within the time schedule. The upto date expenditure till March, 2001 is Rs. 120.21 Lakhs from the State Government Loan. The proposed outlay for the scheme during the Tenth Plan and Annual Plan, 2002-03 are Rs. 1000.00 Lakhs and Rs. 200.00 Lakhs respectively.

(iii) **Distribution Master Plan :** In order to strengthen and improve the existing Sub-Transmission and Distribution System of West Khasi Hills, East Khasi Hills, Jaintia Hills, East Garo Hills, South Garo Hills and Ri-Bhoi District, MeSEB formulated a scheme in 1985 at an estimated cost of Rs. 2404.00 Lakhs. The scheme was approved by the Planning Commission in September, 1989. Implementation of the scheme has suffered very much due to fund constraint. Due to the price escalation of the materials and equipments the cost estimate of the scheme was revised in the year 1999 at an estimated cost of Rs. 4926.00 Lakhs. The upto date expenditure till March, 2001 is Rs. 2475.71 Lakhs. The proposed outlay for the scheme during the Tenth Plan and Annual Plan 2002-03 are Rs. 1800.00 Lakhs and Rs. 400.00 lakhs respectively.

(iv) **9th Plan Transmission & Transformation scheme :** A transmission and Transformation scheme for augmentation of transformation capacity of all grid sub-station to cope up with the future demand of the State was formulated during the Ninth Plan period at an estimated cost of Rs. 577.00 Lakhs. Due to fund constraint much progress could not be achieved in this scheme. During the Ninth Plan period, commissioning of 5MVA transformer at Rongkhon Sub-Station was completed. The upto date expenditure till March, 2001 is Rs. 103.01 Lakhs.

(v) **Construction of 132/33 KV (2x5) MVA Sub-Station at Nongstoin :** To improve the reliability of power supply in West Khasi Hills and to minimize the restoration time in case of failure of 132KV Shillong-Nangalbibra line, a scheme was prepared at an estimated cost of Rs. 559.30 Lakhs for construction of a 132KV Sub-Station at Nongstoin with the loop in and loop out of the existing 132 KV line between Mawlai and Nangalbibra Sub-Stations. The scheme is in the final stage of completion. The upto date expenditure till March, 2001 is Rs. 478.74 Lakhs.

(vi) **Survey & Investigation :** It is a continuing scheme on investigation works of different hydro potential sources for tapping maximum power from the available sources. During 2000-01, survey and investigation work of Umiam-Umtru Stage-V HEP(40MW), Umngot HEP Stage-I (36MW), Leshka Stage-II and Umngi alongwith some small hydro project works were taken up and continuing. The works are likely to be continued till the end of Ninth Plan and may spill over to the Tenth Plan period before the data are ready for preparation of DPR.

(vii) **Construction of 132KV S/C Line from Leshka HEP to Khliehriat Sub-Station:** A new scheme for construction of 132 KV Single Circuit Line from (84MW) Leshka HEP to Khliehriat Sub-Station for evacuation of power is proposed during the Tenth Plan and

scheduled to be commissioned within the Tenth Plan period for facilitating evacuation of power from (2x42MW) Leshka HEP. The estimated cost of the scheme is Rs. 800.00 Lakhs.

5.1.6. **Rural Electrification Schemes :** MeSEB had electrified a total number of 2510 villages till date out of 5484 numbers of inhabited villages in the State as per 1991 Census. During the Ninth Plan, MeSEB could electrify only 34 villages as the Board decided not to carry out further Village Electrification by taking Loan from financial institutions Howecer, the Government provided an amount of Rs.1872.00 Lakhs during 2000-01 under MNP for electrification of 200 villages. In addition, an amount of Rs.149.00 Lakhs was also provided under the Prime Minister's Special Package for electrification of 10 Tribal villages in the State. The proposed outlay for the scheme during the Tenth Plan and Annual Plan, 2002-03 are Rs.3705.00 Lakhs and Rs. 638.00 Lakhs respectively. With this outlay, it is proposed to electrify 375 villages during the Tenth Plan and 75 villages during 2002-2003.

5.1.7. **Heavy Fuel Oil Power Station:** Due to the growing demand for industrial areas of Byrnihat and Garo Hills, MeSEB proposes to set up two new Heavy Fuel Power Stations at Byrnihat and Mendipathar. The capacity of each Power Station is 4x6 MW and the cost of each project is Rs. 90.00 Crores

5.2. NON CONVENTIONAL SOURCES OF ENERGY

5.2.1 Energy crisis caused by dwindling resources of fossil fuels has compelled us to find a safe and environmentally benign alternative sources of energy. The alternative /new sources of energy especially Solar, Hydro, Wind and Bio-Energy sources have already demonstrated that it can fit the bill though it may be a small fraction of our total energy requirement. The potential of these schemes will grow as the technologies in this field are improved year by year. Schemes under renewable energy, though on a limited scale, have been pursued with notable success in the State since the Seventh Plan period.

5.2.2. The approved Ninth Plan outlay for this sector was Rs. 600.00 Lakhs. As against this, Rs. 350.45 Lakhs is anticipated to be spent during the Plan period. The year-wise allocation made available to this sector and the expenditure made are as follows :-

(Rs. Lakhs)

Year	Approved Outlay	Actual Expenditure
1997-98	100.00	90.00
1998-99	100.00	77.70
1999-2000	100.00	56.70
2000-01	100.00	46.05
2001-02	100.00	80.00 (anticipated)
Total	**500.00**	**350.45**

5.2.3. The main thrust for the Tenth Plan is to intensify the programme and to restructure the scheme on basis of end use application of Technologies and the Electrification of villages as specified by the Govt. of India, Ministry of Non-Conventional Energy Sources to electrify all the remote villages through renewable sources of Energy by the end of the 11th Plan period, i.e. by 2012.

A. <u>Power Generation :</u>

(i) **Micro Hydel Projects:** The rising cost of grid electricity have created a growing interest in Micro Hydel Technology as an efficient low cost alternative in the State especially in the remote isolated areas. This system is also simple where anyone will be able to operate, manage and control. Moreover, this technology has an added advantage of short gestation period, no submergence or deforestation problems, reduced transmission losses and the schemes are environmentally more benign. It is proposed to take up the works of survey, investigation and implementation of 10 (ten) Micro Hydel Projects during the Tenth Plan.

(ii) **Solar Photovoltaic :** Solar Photovoltaic Cell has been found to be efficient especially due to the moderate temperature conditions prevailing in the State. Photovoltaic are an economical electricity source for the dispersed villages in the State and may become more economical when compared to the grid power. During the Tenth Plan, 3000 Solar PV Lantern is proposed to be distributed in rural areas at a subsidized rate, and 1000 Solar Home Lighting System is proposed to be installed in un-electrified villages in Meghalaya. This Scheme involves a Central Share of 40 %, a State Share of 40 %, and a contribution of 20 % from the beneficiaries.

B. <u>Bio Energy</u>

(i) The total availability of cattle and buffalo dung in the State have been estimated to be approximately 10 lakhs tonnes / year. Experiments have been carried out with KVIC / DEENBANDHU / FLEXI Type of Biogas Plants (which is made out of strong Rubberised Fabric) and Fixed Dome Type (which is made out of cement concrete) was found suitable to this hill State with an advantage of easy and faster installation. It is also maintenance free and cost effective. 600 (six hundred) 3 Cu.M family sized Biogas Plant is proposed to be installed with 80% subsidy (40 % Central share and 40 % State share) and 20 % contribution from the beneficiaries.

(ii) Installation of 7 (seven) Cu.M Community Night Soil Biogas Plant is proposed to be installed in the State on experimental basis during the Tenth Plan. This is a Centrally Sponsored Scheme with 90:10 sharing pattern between Centre and State.

5.2.4. **The outlay proposed for the Tenth Five Year plan is Rs. 440.00 Lakhs** as per break-up given below:

i)	Direction & Administration including Advt.& Publicity	-	Rs. 214.00 Lakhs
ii)	Micro Hydel Project	-	Rs. 100.00 Lakhs
iii)	Solar Photovoltaic	-	Rs. 96.00 Lakhs
iv)	Bio-Energy	-	Rs. 30.00 Lakhs
	TOTAL	-	**Rs. 440.00 Lakhs**

The Proposed outlay for the Annual Plan (2002-03) in respect of Non-Conventional Sources of Energy is Rs. 90.00 Lakhs.

5.3. INTEGRATED RURAL ENERGY PROGRAMME (IREP)

5.3.1. The scope of Integrated Rural Energy Programme is proposed to be intensified during the Tenth plan so as to improve the availability of commercial sources and application of Non-Conventional Sources in the rural areas of the State. The principle of adopting area

based rural energy plan with C.D. Block as unit, which has already been accepted by the State Government is proposed to be continued in 15 (fifteen) C.D. Blocks. The Ninth Plan outlay for this sector is Rs. 600.00 Lakhs. As against this, the year wise allocation of funds and the expenditure is as follows :-

(Rs. Lakhs)

Year	Approved Outlay	Expendirure
1997-98	100.00	42.10
1998-99	100.00	75.00
1999-2000	100.00	84.00
2000-01	100.00	74.63
2001-02	116.00	100.00
TOTAL	**516.00**	**375.73**

5.3.2. The main thrust during the Tenth Plan will be on project implementation in the Blocks as per Energy Plan; operation of the Regional Institute; and setting up of computerized monitoring system to monitor the physical and financial progress of the programme.

5.3.3. **Project Implementation in Block as per Energy Plan:** It is envisaged to meet the cooking, agriculture and community lighting needs through the Non-Conventional / improved conventional gadget, mainly through the following:-

i) **Solar Thermal** : Installation of 4 (Four) Solar Driers; 100 (hundred) Solar Water Heating System (89,000 LPD); and 33 (thirty three)SPV Water Pump (29,700 WP). An amount of Rs. 100.00 Lakhs is proposed for the purpose during the Tenth Plan.

ii) **Biomass Gasification**: It is proposed to implement 27 (twenty seven) assessment studies; 2500 Nos. of Briquetting ; and 10 Nos. of gasification (90 KW). The proposed outlay for the purpose during the Tenth plan is Rs. 75.00 Lakhs.

iii) **Field Project**: It is proposed to install 20,000 Nos. of Fixed Improved Chulhas and 1200 KW – SPV Power Pack Plant mainly for village electrification during the Tenth Plan. During the Tenth Plan, an amount of Rs. 200.00 Lakhs is proposed for the fie ld projects.

5.3.4. **Regional Institute of Rural Energy Planning and Development:** The first phase of the work of the Institute is completed and will be made operational by the end of the Ninth Plan. The second phase envisages construction of quarters for faculty members and introduction of computer services, research communication, project services, etc.. It is proposed to cover all these facilities during the Tenth Plan. An amount of Rs. 30.00 Lakhs is required for the purpose during the Tenth Plan.

5.3.5. During the Tenth Plan, an amount of Rs. 145.00 Lakhs is proposed for Direction and Administration of IREP and for setting up of Computerised Monitoring System in the State Headquarter to monitor and coordinate between Block Level Cells and MNES.

5.3.6. **The total proposed outlay for this sector for the Tenth Plan is Rs. 550.00 Lakhs and the proposed outlay for the Annual Plan ,2002-03 is Rs. 110.00 Lakhs**. The break-up is indicated below :-

(Rs. Lakhs)

Sl. No.	Items	Amount proposed for Tenth Plan	Amount proposed for 2002-03
1.	Direction and Administration	145.00	29.00
2.	Regional Institute of Rural Energy Planning & Development	30.00	6.00
3.	Solar Thermal	100.00	20.00
4.	Biomass Gasification	75.00	20.00
5.	Field Projects	200.00	35.00
	TOTAL	**550.00**	**110.00**

5.3.6. The Government of India, Ministry of Non-Conventional Energy Sources is expected to continue their assistance towards the Regional Institute for Integrated Rural Energy Planning and Development and towards IREP cells on the Blocks under C.S.S. The amounts required during the Tenth Plan are Rs. 117.80 Lakhs and Rs.102.65 Lakhs respectively.

5.4. VILLAGE ELECTRIFICATION (MNES SPECIAL SCHEME)

5.4.1. As projected by Rural Electrification Corporation (REC) there are about 18,000 villages in the country which are located in the remote and difficult areas which are required to be electrified by using Non-Conventional sources of Energy through Mini / Micro Power Plant, Solar Plant, Biomass Gasifier, Tidal Power Plant, Wind Power Plant, etc. It is proposed by MNES, Govt. of India that cent percent electrification of these 18,000 villages should be targeted for electrification by 2012. In Meghalaya, the total number of such remote villages in far flung areas which cannot be covered by conventional grid extension is projected at 2190 villages. However, these villages in Meghalaya also cover those villages which can be electrified by MeSEB. Meghalaya Non-Conventional and Rural Energy proposes that 1290 villages will be electrified by use of non-conventional methods and **an amount of Rs. 500.00 lakhs is proposed as State's share during the Tenth Plan. The amount proposed for Annual Plan, 2002-03 as State share is Rs. 50.00 Lakhs**