

CHAPTER 9

ENERGY

Power or electricity is the most convenient and versatile form of energy. All form of economic activity whether it be agriculture, industry or services is relied upon the un-interrupted power supply as well as it is the most crucial source of supplying domestic energy requirement. Diesel Generating (DG) sets is the major source of energy in this Union Territory.

Prior to Independence, a small steam driven reciprocating engine direct current generator of 100 KW capacity was installed by the Britishers at Ross Island in 1932. After the departure of the Japanese occupation forces and British re-occupation in these island in 1945, the power house was shifted from Ross Island to Atlanta Point, Aberdeen, Port Blair and two 50 KW diesel engine driven DC generators were installed and commissioned. Only the bungalows and offices of the British were provided with electricity. After Independence two steam turbine generating sets of 550 KW each were established during 1951 in the Power House at Chatham Island. The boilers were operated on wood fuel an saw dust which were the waste products of Chatham Saw Mill, and later on Mangrove wood was also used as fuel. This was the start of the alternating current power supply at Port Blair.

Due to the geographical and topographical peculiarities of these islands, including separation by sea over great distances, there is no single power grid for all the electrified islands and instead separate power houses cater independently to the power requirements of separate Islands. At present there are 34 power houses with diesel generating sets of capacity ranging from 6KW to 250 KW and aggregate capacity of 68 MW. Round the clock power supply is available in South, Middle, North Andaman Islands, Neil Island, Havelock Island, Long Island, Little Andaman Island, Car Nicobar Islands, Katchal Islands, Kamorta Islands, Campbell Bay and 16 Hrs power supply is provided in Chowra, Campion and Teressa Islands. M/s Suryachakra is operating a 20 MW DG Power House at south Andaman on PPA basis.

The Electricity Department is operating power generation, transmission and distribution systems & networks in these islands for providing electric power supply to the general public and various categories of consumers in different part of these islands. The Electricity Department also functions as a Nodal Agency for implementing Renewable Energy Programmes and schemes and Integrated Rural Energy Programmes of the Ministry of Non-Conventional Energy Sources in these islands.

VHF communication Network is established in South, Middle & North Andaman for better monitoring and quick fault rectification for improved services to the consumers. Computerized Billing has been introduced at all site Offices in South Andaman Island. 1133 Km of High Tension Lines, 2682 Km Low Tension Lines & 566 No. Distribution Transformers provide power supply to about 80990 consumers. The Annual per capita energy consumption of these islands is around 385 KWh as against the national average of 593 KWh due to every less industrial power requirement.

Investment in the Energy Sector

The share of energy in total plan expenditure since 9th Five Year Plan is given below.

Statement 9.1
Outlay & Expenditure under Energy Sector

Plan	Period	Total Plan Expenditure of UT(Rs. in crores)	Expenditure on Energy Sector (Rs. in crores)	% to Total UT Plan Expenditure
Ninth Plan	1997-2002	1747.5618	140.86	8.06
Tenth Plan	2002-2007	2211.8063	127.58	5.77
Annual Plan	2002-2003	400.8966	23.25	5.80
Annual Plan	2003-2004	405.8782	25.08	6.18
Annual Plan	2004-2005	402.4160	29.63	7.36
Annual Plan	2005-2006	485.3400	25.20	5.19
Annual Plan	2006-2007	517.2755	24.42	4.72
Annual Plan	2007-2008	593.6853	28.53	4.81

(Source: Report received from Planning Department)

Energy Demand

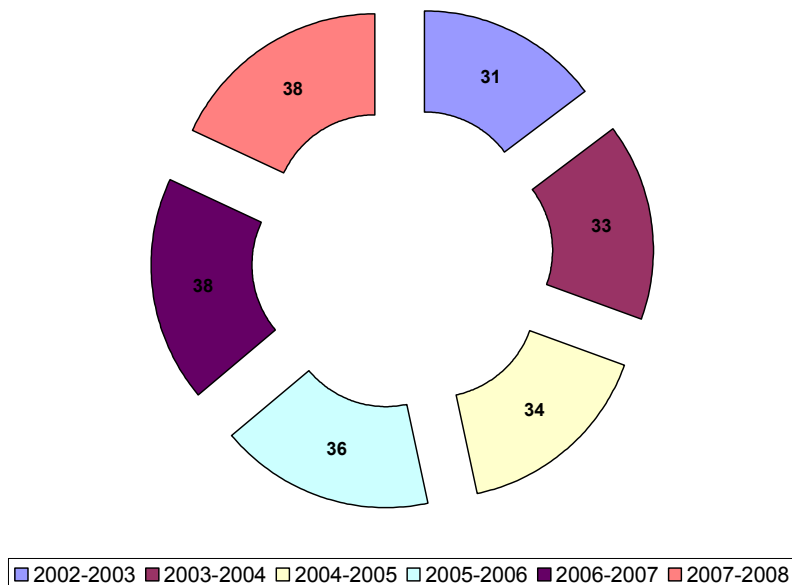
The present total installed capacity is 68.46 MW in 41 different Power Houses with a peak demand of 38 MW.

Statement 9.2

Peak Demand Met (MW)	
2002-2003	31
2003-2004	33
2004-2005	34
2005-2006	36
2006-2007	38
2007-2008	38

Chart -9.1

Peak Demand Met (MW)

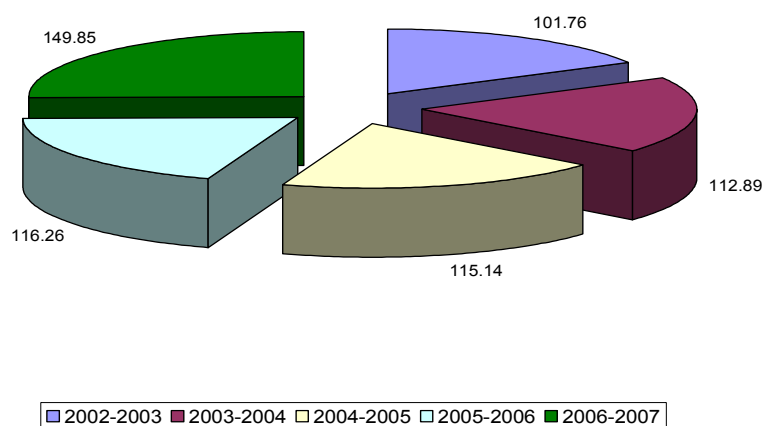


Statement 9.3
Energy Supplied (MU)

2002-2003	101.76
2003-2004	112.89
2004-2005	115.14
2005-2006	116.26
2006-2007	149.85

Chart 9.2

Energy Supplied (MU)



Energy Generation

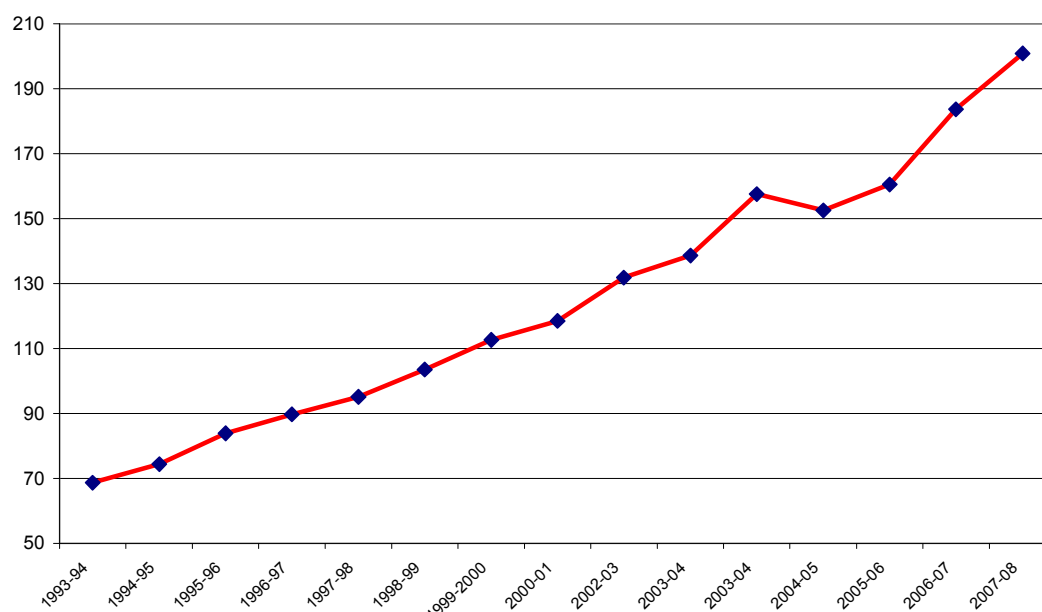
The total quantity of power generation in 1993-94 was 68.73 MU which increased 157.58 MU in 2003-04. It further increased to 200.92 MU in 2007-08. The number of consumers also increased from 47170 during 1993-94 to 88990 in 2007-08.

Statement 9.4
Energy Generated
(in MU)

Year	Generation
1993-94	68.73
1994-95	74.43
1995-96	83.87
1996-97	89.76
1997-98	95.18
1998-99	103.56
1999-2000	112.72
2000-01	118.50
2001-02	131.92
2002-03	138.61
2003-04	157.58
2004-05	1523.61
2005-06	160.57
2006-07	183.74
2007-08	200.92

Chart 9.3

Generation of Energy



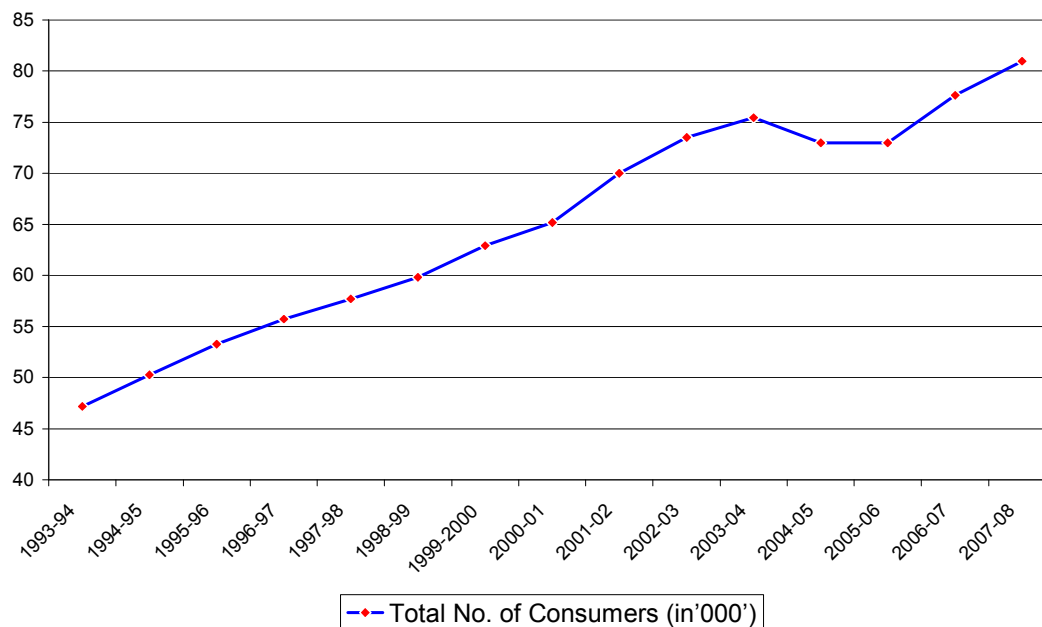
Statement 9.5

Year wise no of Electricity consumers

Year	Consumers (in'000')
1993-94	47.17
1994-95	50.26
1995-96	53.27
1996-97	55.75
1997-98	57.72
1998-99	59.83
1999-'00	62.90
2000-01	65.19
2001-02	70.00
2002-03	73.50
2003-04	75.46
2004-05	73.00
2005-06	73.00
2006-07	77.65
2007-08	80.99

Chart 9.4

Consumers of Energy



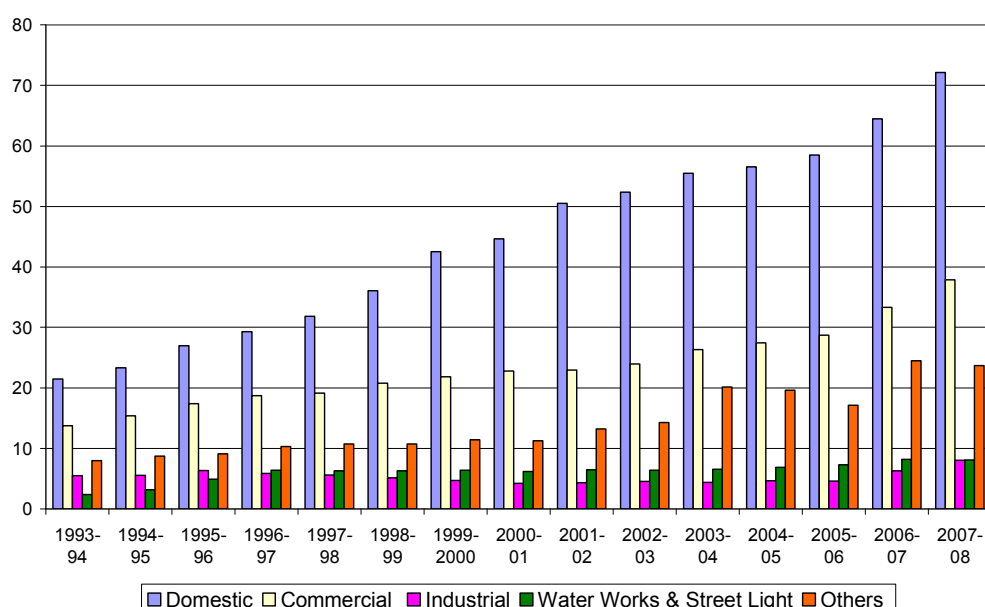
The pattern of consumption is given in following statement.

Statement 9.6
Pattern of Electricity Consumption (MU)

Year	Domestic	Commercial	Industrial	Water Works & Street Light	Others	Total
1993-94	21.46	13.75	5.48	2.37	7.98	51.04
1994-95	23.34	15.38	5.52	3.15	8.7	51.04
1995-96	26.96	17.39	6.34	4.91	9.09	102.08
1996-97	29.29	18.70	5.83	6.39	10.29	204.16
1997-98	31.82	19.13	5.58	6.27	10.73	408.32
1998-99	36.07	20.78	5.09	6.28	10.73	816.64
1999-2000	42.53	21.85	4.71	6.38	11.43	1633.28
2000-01	44.67	22.76	4.24	6.18	11.24	3266.56
2001-02	50.54	22.92	4.29	6.45	13.19	6533.12
2002-03	52.34	23.93	4.53	6.37	14.28	13066.24
2003-04	55.48	26.33	4.36	6.55	20.15	26132.48
2004-05	56.54	27.44	4.66	6.84	19.63	52264.96
2005-06	58.51	28.74	4.58	7.29	17.13	104529.92
2006-07	64.46	33.33	6.30	8.19	24.50	209059.84
2007-08	72.15	37.85	8.03	8.07	23.70	418119.68

The domestic consumption of energy increased from 21.46 MU during 1993-94 to 72.15 MU during 2007-08 where as industrial consumption decreased from 6.34 MU during 1995-96 to 4.58 MU during 2005-06. There was a rapid increase in the commercial use of energy as well as water works and street lights. It can be observed that there was small fall in the other consumption of energy during 2004-05 & 2005-06 due to tsunami.

Chart 9.5
Pattern of Electricity Consumption



VILLAGE ELECTRIFICATION

331 villages out of 547 census villages as per 2001 census are electrified both by conventional and non-conventional sources, which hold around 95% of total population. Locations holding around 85% of population have been covered in all major islands with round the clock power supply through DG sets. At other isolated islands/locations holding 10% of total population, electric power supply is available for 5 to 16 hours per day through small DG Power House, Solar Power Plants & Home Lighting System.

127 Encroached forest areas and un-inhabited villages holding 4% of total population are not to be electrified as per present guidelines. 72 Un-electrified villages in Nicobar District (prior to Tsunami), which were situated on the periphery of the islands, were washed away. All the population from these 72 villages was shifted to the intermediate shelters in Nicobar District, which are electrified. 17 Isolated villages in Andaman District holding 1% of total population are being surveyed for electrification by extension of conventional electricity as far as possible, establishment of Community Power House and for providing Solar Home Lighting Systems.

Programme for electrification of 17 villages

4 villages i.e. Gandhi Nagar, Shanti Nagar, Ganesh Nagar & Borang in North Andaman will be electrified by establishing Community Power House. 13 villages will be electrified by providing Solar Home Lighting Systems. Three outskirts namely Budha Nallah, Paresh Nagar and Kamalapur at Middle Andaman have been electrified by extending T & D Systems. A community power house with 16 KW DG capacity has been established at Shoal Bay No.19 for providing better power supply to the consumers. One un-electrified revenue village viz. Bangoan/Baroneal at Middle Andaman was electrified by established a Community Power House with an installed capacity of 16 KW DG Set along with 3 Km LT Line.

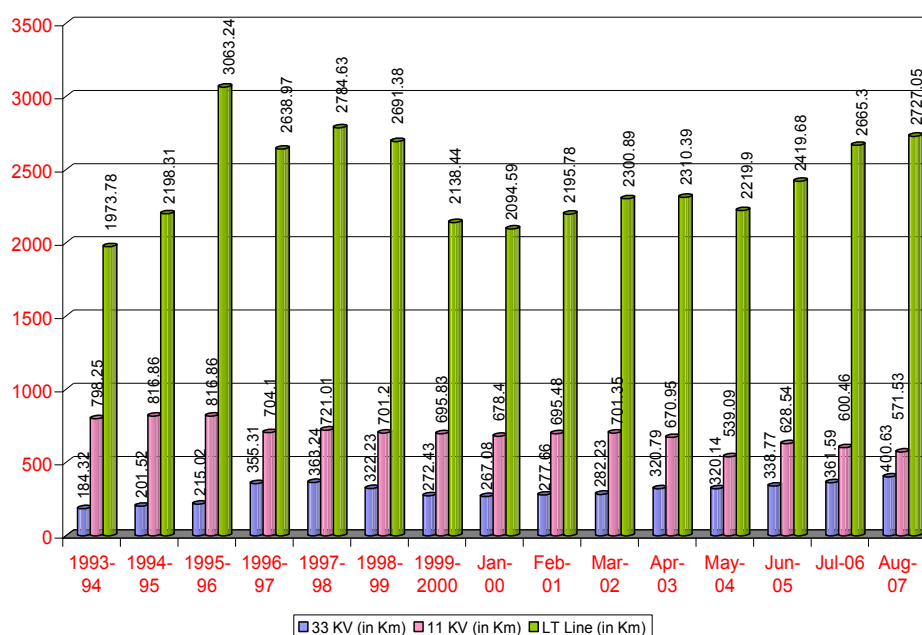
The present T & D system losses in these Islands is about 25% which is mainly due to the reason that the T&D system is old and power is fed to low density areas by long T&D lines. Steps have been initiated to reduce these losses to 15% by 2012. All the 33 and 11 KV Feeders & Distribution Transformers will be provided energy meters to identify high loss areas for taking corrective action. The existing T&D system will be renovated and strengthened by replacing old conductors, conversion of long 11 KV Feeders to 33 KV System and installation of additional distribution transformers. A 12.5 MVA 33/11 KV sub station is being established at Port Blair.

Statement 9.7
Details of Line Data

Year	33 KV (in Km)	11 KV (in Km)	LT Line (in Km)
1993-94	184.32	798.25	1973.78
1994-95	201.52	816.86	2198.31
1995-96	215.02	816.86	3063.24
1996-97	355.31	704.10	2638.97
1997-98	363.24	721.01	2784.63
1998-99	322.23	701.20	2691.38
1999-2000	272.43	695.83	2138.44
2000-01	267.08	678.40	2094.59
2001-02	277.66	695.48	2195.78
2002-03	282.23	701.35	2300.89
2003-04	320.79	670.95	2219.90
2004-05	320.14	628.54	2419.68
2005-06	338.77	600.46	2665.30
2006-07	400.63	571.53	2727.05

Chart 9.8

Details of Line Data



PROGRAMMING FOR PERMANENT RESTORATION OF POWER SUPPLY INFRASTRUCTURE WHICH WAS DESTROYED DUE TO EARTHQUAKE & TSUNAMI DURING DECEMER, 2004.

For full restoration of power supply infrastructure in all Tsunami affected islands a Detailed Project Report (DPR) costing Rs.198.82 crores

(PL/6/2006) was accorded investment approval by the Cabinet committee on Economic Affairs (CCEA) on 7.12.2006. The revised cost estimate of the DPR as per present cost is Rs.267.00 crores.

This DPR provides for following major works:

1.New DG Capacity Addition:	13500 KW
2. Construction of New Power House:	12 No.
3. T&D System:	902 Km
4. Distribution Transformer:	138 Nos.
5. Street Lights:	2580 No.
6. Service connection	8250 No.

1. PGCIL, Hyderabad had already started T&D works at South Andaman, Hut Bay & Car Nicobar. HT Line – 32.06 Km constructed, 553 poles erected and 15 Nos. Distribution Transformer erected upto 6/2008, as per the status report received from PGCIL, Hyderabad.
2. Power supply infrastructure for electrification of 820 permanent houses constructed for Tsunami affected families has been made available viz. 200 Nos at Kimios of Car Nicobar, 218 Nos. at Onge Tikrey, Hut Bay and 100 Nos. at Bambooflat, South Andaman.
3. Power supply to remaining permanent houses will be provided as and when these are completed and handed over to the beneficiaries.

HYDRO ELECTRIC POWER

The Hydro electric Project at Kalpong river at Diglipur in North Andaman was taken up for irrigation purpose in 1977 and later on for power generation.

The project utilizes water of both the left and right forks of the Kalpong river by constructing a 35.5 M high concrete dam on the left fork and 25 M high rock fill dam on the right fork. A link channel connects both the left fork and the right fork reservoirs.

The project with a capacity of 5.25 MW has started distribution of power in the North Andaman areas with effect from June 2002.

NRSE AND IREP SCHEMES

The Electricity Department is implementing the New & Renewable sources of Energy (NRSE) and Integrated Rural Energy Programme (IREP) Schemes in Andaman & Nicobar Islands as a Nodal Agency for the Ministry of Non-Conventional Energy Sources (MNES), New Delhi. In order to exploit/utilize more and more new and renewable sources of energy, during the year 1982, the erstwhile department of non-conventional Energy Sources under the Ministry of Energy had decided to implement NRSE & IREP schemes in Andaman & Nicobar islands as these islands have considerable potential of solar wind, ocean, hydro and bio-mass based energy sources.

The NRSE Division of the Electricity Department is implementing these schemes in different remote and isolated location of these islands. These schemes deal with Non-Conventional energy systems and conserve energy, which is otherwise generated by costly imported HSD oil in these islands. Added advantages of these schemes are pollution free environment and are of much relevance to these islands for conserving its delicate fragile eco-system & environment.

Solar Photovoltaic Energy systems:- In order to meet energy demand in remote and isolated islands where it was not feasible to establish DG power house solar photovoltaic energy system were establish at various location of these islands. A total of 35 Nos SP plants with aggregate capacity of 166.54 Kwp have been established at 24 different locations for providing 6 to 12 hrs. of power supply for lighting homes and streets.

The MNES has sanctioned establishment of 2 Nos 50 Kwp grid connected solar power plants one each at Neil & Long Island at a cost of Rs.3.00 crores during the year 1999. The 50 Kwp grid connected SPV power plant at Neil Island is already established and the Long Island project is shifted to Havelock Island.

Wind Energy:

10 nos wind masts for studying the potential of wind were installed at different location during 1993-99 for installation of suitable capacities of wind battery chargers, wind pumps and wind generators. It is observed that only one location namely Keating Point at Mus, car Nicobar is having the required average win speed for installation of a wind electric generator. Few wind battery chargers and wind pumps have been installed at different locations. List annexed at Exhibit – 2

Hydro Energy:

The Hydro potential of Andaman & Nicobar Islands are being analyzed for establishment of mini-micro hydro electric power generating units. The Alternate Hydro energy Center of University of roorkee conducted detailed survey and investigation of different streams and nalhas in these islands during 1997 and submitted pre-feasibility reports for establishing Micro hydro plants at the following locations.

Sl.No	Area	Capacity(KW)
1	Vasundhara Nalha, South Andaman	2x15
2	Dhanikhari, South Andaman	2x50
3	Shoal Bay	1x5
4	Bada Khari, Rutland Island	2x5
5	Panchwati, Middle Andaman	2x25
6	Korang NaLAH, middle Andaman	2x10

The National Hydro Electric Power Corporation, Ltd. has been entrusted the work of preparation of detailed project reports for establishment of micro hydro electric stations at the above locations.

Ocean Energy;

The MNES had conducted a preliminary study of various locations in these islands during 1992 and had indicated that tidal power generation would be feasible at some locations with reference to cost of generation by diesel.

The MNES, New Delhi way back in 1997 was considering establishing a 1 MW Wave Plant at Mus break water. Car Nicobar for exploiting the wave energy potential at that location.

At present the Ocean thermal energy conserves ion system are not recommended for these islands by expert teams from MNES and IISC, Bangalore . The complete power requirement of these islands is met by diesel generation. In long run OTEC could be one of the renewable non-ending sources of electric power without any environmental impact for these islands.

Biomass based system:

The Andaman & Nicobar Islands have tropical rain forests and through gasification system of biomass, power requirement of remote & isolate areas can be met during the year 1998 the Karnataka State Council of Science & Technology indicated that around 1200 KW of power potential would be harvested by exploiting available by mass at different islands.

INTEGRATED RURAL ENERGY PLANNING PROGRAMME:

The IREP programme was initiated with a view to develop design and implement rural energy project so as to meet the cooking and lighting energy needs of people living in rural area villages. This is a component of minimum need programme under the 20 point programme of the Govt. of India. Household energy survey is conduct to ascertain energy needs and resources availability. IREP cells have been established at 5 block in these islands and project report submitted to the MNES for other islands. Fuel and energy saving devices and renewable energy system are being provided at subsidized cost by availing MNES subsidy.