CHAPTER 10

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 and 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 53 power houses with diesel generating sets of capacity ranging from 6KW to5000 KW and aggregate capacity of 104.65 MW.

The Electricity Department A&N Administration is providing round the clock power supply in all Major islands to 117046 consumers. The per capita power consumption in A&N Islands is 568 KWH as against the National Average of 917 KWh for the year 2012-13 as per Executive Summary July-2014 issued by CEA, Ministry of power, Govt of India. The consumers has been increased to 119743Nos during 2014-15.The department also functions as a Nodal Agency of the Ministry of New and Renewable Energy sources for implementing Renewable Energy Programmes. It is also designated as an agency of Bureau of Energy Efficiency, GOI for implementation of Energy Efficiency and conservation Programme.

Investment in the Energy Sector

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

Statement 10.1
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	28.58	4.81
Annual Plan	2008-2009	694.4591	42.23	6.08
Annual plan	2009-2010	887.1085	38.91	4.39
Annual Plan	2010-2011	954.36	44.81	4.69
Annual Plan	2011-2012	1287.00	77.60	6.03
Annual Plan	2012-13	1484.50	84.95	5.72
Annual plan	2013-14	1591.19	135.33	8.50

(Source: Report received from Planning Department)

Energy Demand

The present total installed capacity is104.65 MW in 53 different Power Houses with a peak demand of 55 MW.

Statement 10.2
Peak Demand Met (MW)

2002-2003	31
2003-2004	33
2004-2005	34
2005-2006	36
2006-2007	38
2007-2008	38
2008-2009	40
2009-2010	42
2010-2011	44
2011-2012	46
2012-2013	48
2013-2014	55

The present peak demand of all the islands is about 55 MW,out of which 88% is in the Andaman Group and 12% in the Nicobar Group of Islands.

Statement10.3
Energy Supplied (MU)

2002-2003	101.76
2003-2004	112.89
2004-2005	115.14
2005-2006	116.26
2006-2007	136.63
2007-2008	149.85
2008-2009	160.47
2009-2010	176.89
2010-2011	187.00
2011-2012	198.61
2012-2013	210.38

1,17,046 consumers have been provided electricity through about 4734 Kms. Of HT and LT lines and 876 Nos by Distribution Transformers.

Power supply is available to 96% of population. Remaining 4% are in encroached forest area where in some power is being provided through solar equipments.

Islands /areas comprising around 85% of population have been covered 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 8 to 19 hours per day through small DG power Houses, Community Power Houses, Solar Power Plants and Solar Home Lighting Systems.

Energy Generation

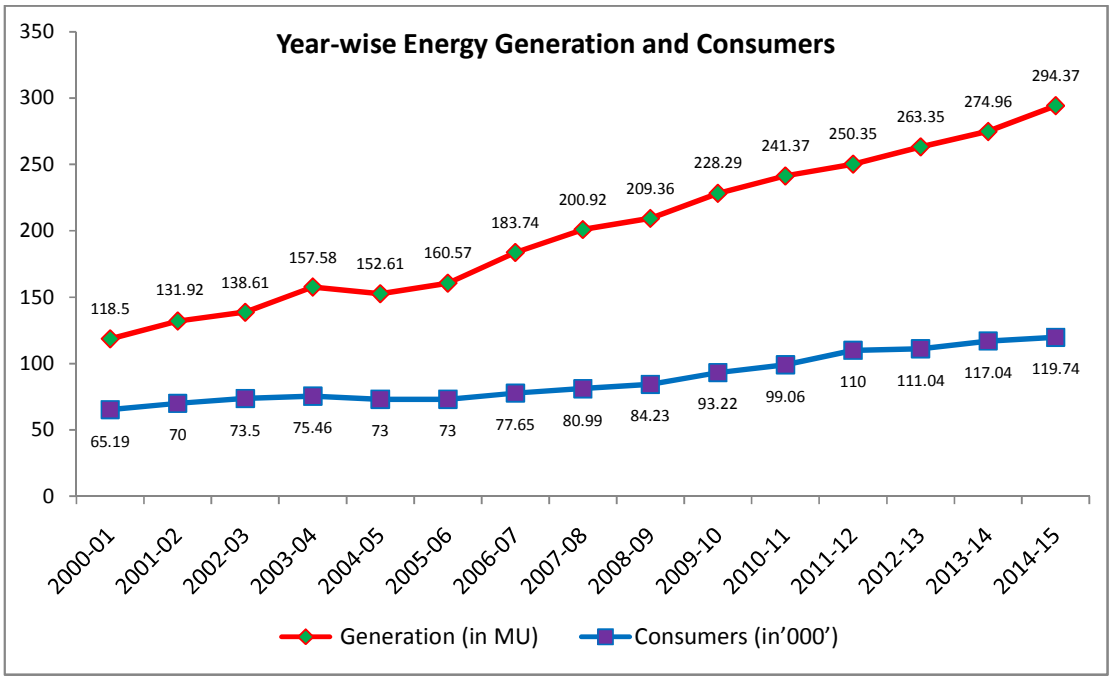
The total quantity of power generation in 1993-94 was 68.73 MU which increased to 294.37 MU in 2014-15. The number of consumers(in '000') also increased from 47.17 during 1993-94 to 119.74 in 2014-15.

Statement 10.4

Year wise Energy Generated and no of Electricity consumers

Year	Generation(in MU)	Consumers (in'000')
1993-94	68.73	47.17
1994-95	74.43	50.26
1995-96	83.87	53.27
1996-97	89.76	55.75
1997-98	95.18	57.72
1998-99	103.56	59.83
1999-00	112.72	62.90
2000-01	118.50	65.19
2001-02	131.92	70.00
2002-03	138.61	73.50
2003-04	157.58	75.46

2004-05	152.61	73.00
2005-06	160.57	73.00
2006-07	183.74	77.65
2007-08	200.92	80.99
2008-09	209.36	84.23
2009-10	228.29	93.22
2010-11	241.37	99.06
2011-12	250.35	110.00
2012-13	263.35	111.04
2013-14	274.96	117.04
2014-15	294.37	119.74



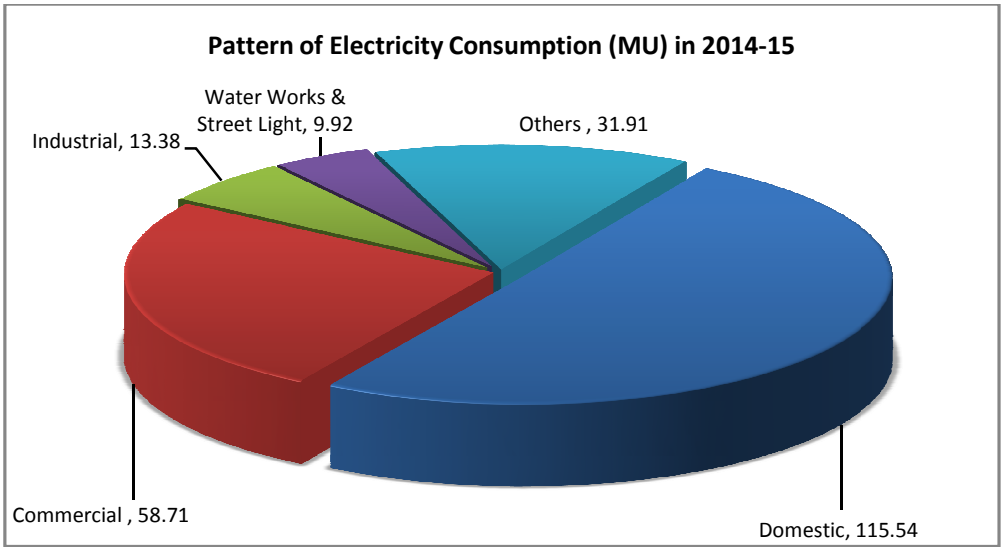
The pattern of consumption is given in following statement.

Statement 10.5

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	56.09
1995-96	26.96	17.39	6.34	4.91	9.09	64.69
1996-97	29.29	18.70	5.83	6.39	10.29	70.50
1997-98	31.82	19.13	5.58	6.27	10.73	73.53
1998-99	36.72	20.78	5.09	6.28	10.73	79.60
1999-00	42.53	21.85	4.71	6.38	11.43	86.90
2000-01	44.67	20.76	4.24	6.18	11.24	89.10
2001-02	50.54	22.92	4.29	6.45	13.19	97.40
2002-03	52.34	23.93	4.53	6.37	14.28	101.76

2003-04	55.48	26.33	4.36	6.55	20.15	112.87
2004-05	56.54	27.44	4.66	6.84	19.63	115.14
2005-06	58.51	28.74	4.58	7.29	17.13	116.25
2006-07	64.46	33.33	6.15	8.19	24.50	136.63
2007-08	72.15	37.85	8.03	8.07	23.70	149.80
2008-09	75.48	41.24	7.68	9.31	26.76	160.47
2009-10	83.96	47.44	8.72	9.10	27.68	176.90
2010-11	90.20	50.56	8.63	9.97	27.64	187.00
2011-12	93.98	52.24	10.89	10.16	31.35	198.62
2012-13	100.20	53.14	19.33	9.47	28.24	210.38
2014-15	115.54	58.71	13.38	9.92	31.91	229.46



The domestic consumption of energy increased from 21.46 MU during 1993-94 to 115.54 MU during 2014-15 where as industrial consumption decreased from 5.48 MU to 4.24 MU during 2000-01 and further increased to 19.38 MU during 2014-15. 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.

VILLAGE ELECTRIFICATION

There are 53 Power plants in the Islands having generating sets of different capacities ranging from 5KW to 5MW. The DG sets alone contribute 94.30 MW and remaining 10.35 MW is catered by 5.25 MW Kalpong hydro Power station in North Andaman,5 MW Solar Power Plant in South Andaman and two SPV Power Plants of 50KW each at Havelock and Neil Islands.
Electric power is available in 19 inhabited Islands of Andaman & Nicobar through 53 Power Houses.

100% electrification of the revenue villages has been achieved.
Every in habited Island has one or more plants with an Independent distribution network for catering to the power demand of the Island /village. Out of 53 Power Plants 28 Power Plants are in Andaman Group and 25 in Nicobar Group.

`Reduction in line losses

The T&D loss in the last Ten years has been reduced substantially. It shows the improvement in term of T&D losses from 26.14% during 03-04 to 17.93% during 2012-13.

The Year wise line losses are tabulated as below:

Statement 10.6

Year	Line Loss(%)
2003-04	26.14
2004-05	25.20
2005-06	25.23
2006-07	23.28
2007-08	22.91
2008-09	20.59
2009-10	19.89
2010-11	19.74
2011-12	18.03
2012-13	17.93

Reduction of losses and improvement of efficiency is one of the main aims of the department . In this regard various activities are initiated by the department .

- The present T&D loss is A&N is around 17.93 as against the National average of 28.65% (2006-07).
- The AT&C losses in A&N is around 21.77% (includes 17.93% T&D loss) as against the National average of 32.07% (2006-07).
- All consumers are metered in A&N Islands and electro mechanical energy meters are being replaced with static energy meters for loss reduction . Around 25,000 old defective meters were replaced by electronic meters during last six years.

Various system improvement method such as metering of DYs, Ht feeders , replacement of conventional meters with static meters, reducing HT/LT Ratio, replacement of stop meters , realization of out standing dues etc . has been adopted to bring down the AT&C Losses to 18% by the end of 12th Five Year Plan. Collection of consumer bills through common services(CSCs) have been started for the convenience of consumers and to increase of the collection efficiency.

Statement 10.7

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
1999-00	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	2310.39
2004-05	320.14	539.09	2219.90
2005-06	338.77	628.54	2419.68
2006-07	361.59	600.46	2665.30
2007-08	400.63	571.53	2727.05
2008-09	401.53	586.11	2791.34
2009-10	408.13	581.27	2797.02
2010-11	408.16	604.01	3077.33
2011-12	422.82	747.71	3330.98
2012-13	423.22	291.66	3010.20
	33 KV (in Km) 11 KV (in Km)		
2014-15	1314.16		3516.64

Tsunami Rehabilitation Programme

The power supply position improved all over the islands after completion of the following work under Tsunami Rehabilitation Programme (TRP) :-

1) Construction of new Power House buildings – 6 locations
2) Augmentation of Generation capacity – 12.75MW
3) Construction of 33KV HT Lines -134Km,
4) Construction of 11KV HT lines -403Km.
5) Connstruction of LT Lines -256Km.
6) Commissioning of Distribution Transformer -134Nos
7) Commissioning of Ring main Units - 80 Nos
8) Purchase of new Vehicles. - 44 Nos.

NRSE SCHEMES -(New & Renewable sources of Energy)

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. Tapping of the

Renewable Energy Sources will reduce dependence on Diesel for production of electricity which in turn will reduce of ill effects of environmental degradation due to excessive exploitation of fossil fuel and the consequent issues of climate change and globle warning. This will preserve the fragile eco system of A&N Islands .

Solar Photovoltaic Energy systems:-

5MW Solar Power Plant installed and commissioned at Garacharama under PPA with NTPC on 31.3.2013. This project is aimed to save diesel used for power generation and to meet the day demand to some extent . The project has started distribution of power in the grid with effect from 31.3.2013. Since then it has generated 1.05 MU saved 294 KL of HSD oil costing Rs. 1.48 crores upto June 2013.

It has been also been proposed to establish 1 MW Grid connected solar PV power plant under the guidelines of MNRE scheme through NTPC at Middle Andaman. The present Status is given below.

- MoU has been signed between A&N Administration and NTPC.
- Land has been allotted in favour of Electricity Department at Nimbutala.
- In-Principle approval received from MNRE for DPR for establishment of 1MW at middle Andaman.
- Contour Survey and fencing work is completed .
- Environmental and Forest Clearence for felling of 59 Nos. natural growing trees is awaited.

Wind Energy:

50 mtrs. Wind monitoring masts were installed at 5 locations viz wandoor, Collinpur, Chouldari in South Andaman, Hog Point in Car Nicobar and Vikas Nagar in Kamorta by C-WET, Chennai for study of wind potential for wind potential . Wind data study at all five locations were completed. But only one location namely Hog Point at Car Nicobar is having potential for wind generation.

The Centre for Wind Energy Technology C-WET, has requested for preparing the DPR and Tender documents for installation of 250 KW wing Generator Station at Car Nicobar.

HYDRO ENERGY:

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.since then it has generated 109.34 MU saved 30615.95 KL of HSD oil costing Rs 94.37 crores upto June 2013.

In principle sanction/ Technical approval has been received from MNRE during 1/2011 for DPR/FSR updated by AHEC , IIT ROORKIE for small hydro projects at kalpong Down Stream, North Andaman Korang Nallah, Middle Andaman.

SFC approval of Administration was accorded during 4/2011. Proposal for awarding work to NHPC was made but NHPC is reluctant to take up the projects due to very high capital cost.

Biomass based system:

A consultant , M/S Darashaw and Co.Pvt. Ltd Mumbai has been appointed by A&N Administration for implementation of Biomass projects at the following locations in A&N Islands. An agreement has been signed between M/s Darashaw and Co. pvt. Limited and Andaman and Nicobar Administration.

1.South Andaman-2.0MW
2.Little Andaman-1.5 MW
3.Car Nicobar – 2.0 MW

The power [purchase Agreement (PPA) between A&N Administration and M/S Suryachakra Green Fuel pvt. Ltd. Hyderabad is under process.

After a successful installation and commissioning of 2MW Biomass power plant at South Andaman , Ministry of new and Renewable Energy(MNRE) will approve the project for installation of 1.5MW Biomass based power plant at Hutbay and 2MW Biomass plant at Car Nicobar.

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 bio mass at different islands.