CHAPTER 14

ECONOMIC AND FINANCIAL EVALUATION

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ECONOMIC AND FINANCIAL EVALUATION

14.1 General

The optimal reinforcement and extension plans for the power transmission and distribution networks to meet the demand growth in the Kathmandu Valley are evaluated in this chapter by calculating the economic and financial internal rate of return (EIRR and FIRR).

Revenue from the additional energy sales in the Valley which may becomes possible due to such reinforcement works is considered as benefits for calculation of EIRR and FIRR, since the reinforcement and extension plans aim to meet the demand growth in the Valley only.

(1) Investment Costs

In addition to the investment costs of the sub-projects selected for their feasibility study in this study, the investment costs of the PSEP and LRP (Phase III) explained in Chapter 9 are included in calculation of the internal rate of return. However, one third (1/3) of the project cost of LRP is considered, because the project includes the materials for the improvement works to reduce system losses on the distribution system outside the Valley as well as the remaining part of the system in the Valley. Main part of the existing distribution system has been improved by the materials procured under the Phase II project.

Disbursement schedule of the capital cost of each project to be considered in the evaluation study is summarized below, and its details with a breakdown of the foreign currency and local currency portions are given in Table 14.1.

(Unit: US$1,000)

	HV System		MV System	LV System		
	PSEP	JICA	JICA	LRP	JICA	Total
1991/92	4,600	-	-	1,104	-	5,704
1992/93	4,830	-	7,112	1,190	-	13,132
1993/94	4,830	-	4,170	1,190	-	10,190
1994/95	1,840	10,124	6,359	482	4,312	23,117
1995/96	-	4,864	3,736	-	1,082	10,670
Total	16,100	15,986	21,367	3,966	5,394	62,813

Note: JICA = Projects selected in this study

(2) Selling Price of Electricity and Long-Run Marginal Cost

The "Long-Run Marginal Cost (LRMC) and Tariff Study" was conducted by French consultant in 1990 under the financial assistance of IDA. In the draft report (December,1990), theoretical tariffs are recommended on the basis of the study of the NEA's financial conditions, analysis of prevailing tariffs and LRMC study. Following table shows the results of those studies.

Customer Group	Existing Tariffs	Theoretical Tariffs	LRMC
(Generation)	-	-	Rs. 1.28
HV Customer	Rs. 1.13	Rs. 1.04	Rs. 2.01
MV Customer	Rs. 1.47	Rs. 1.50	Rs. 3.34
LV Customer	Rs. 1.40	Rs. 3.21	Rs. 5.35
Average	Rs. 1.40	Rs. 2.75	-

In the above table, the existing tariffs are the average ones calculated by each voltage level based on the total revenue and total energy sold in 1988/89 at the existing tariff structure. The theoretical tariffs are represented as the target average price by analyzing the financial conditions of NEA from the viewpoint of short run period and also considering the LRMC for indicating a price level which will be able to solve its financial problems.

The LRMC is deduced based on the least cost generation expansion program including the Arun-3 hydroelectric project, extension and reinforcement plans for power transmission and distribution systems from the viewpoint of long term period worked out taking into account the total demand increase.

(3) Additional Energy Sales

For calculating additional energy sales for this study, only energy sales in the Valley should be considered. They are worked out as a difference between the total energy sales of the Bagmati Zone forecasted in Chapter 6 and the projected demand in the area outside the Valley such as Kavre, Trisuli and Sunkosi. Additional energy sales are considered to be generated for the period between 1992/93 and 1996/97 taking into account the implementation schedule of the

reinforcement and extension works and the effect of the extension and reinforcement plans after their completion.

Additional Energy Sales

(GWh)

	91/92	92/93	93/94	94/95	95/96	96/97
Bagmati	308.5	340.3	375.0	413.7	456.0	504.0
Kavre, Trisuli & Sunkosi	13.5	14.8	16.3	17.9	19.6	21.6
Kathmandu	295.0	325.5	359.0	395.8	436.4	482.4
Additional Sales	-	30.5	64.0	100.8	141.4	187.4

Increase of additional energy sales is considered upto 1996/97, because stable power supply in 1996/97 would be guaranteed by the completion of the planned extension and reinforcement of the networks till 1995/96. Thereafter, additional energy sales in 1996/97 is commonly applied throughout the study horizon.

(4) Unit Benefit

As explained above, about half of the investment costs for the reinforcement and extension works in the Valley is occupied by that for the HV networks. For simplicity, however, the difference of LV customers' tariff and HV customers' tariff will be used as the unit benefit. There are no HV customers in the Valley.

14.2 Economic Evaluation

The optimal extension and reinforcement plans for the networks in the Kathmandu Valley to be implemented under the financial assistance of IDA and to be selected in this study are evaluated here by applying the concepts of additional revenue due to increased energy sales in the Valley and using the EIRR as the evaluation index. The evaluation procedure for the reinforcement plans of the network is much the same as that for any individual project. The different points are:

(a) the plans aim to open up a new area to supply from the grid and to increase supply capabilities to an already connected area, and

(b) the measurement of benefits is the additional power supply to a particular area.

The evaluation procedure consists of the following steps:

1) Measurement of economic costs
2) Estimation of unit benefit
3) Calculation of benefits
4) Preparation of benefit and cost streams including operation and maintenance (O/M) cost throughout the study horizon and calculation of EIRR

Measurement of Economic Costs

For economic evaluation, all the costs involved in the development plans have to be measured as economic costs, i.e. the real resources costs or "opportunity costs" incurred from the viewpoint of the nation's economy. The measurement of economic cost of any commodity depends on how it is likely to be procured - whether by increasing import, decreasing export, expanding domestic production or diverting from other uses. Usually an appropriate conversion factor is defined for each group of commodities or each kind of work involving a set of inputs (resources) in order to convert respective financial costs into economic costs. In this study, the conversion factors are set at 1.0 for the foreign currency portion and 0.9 for the local currency portion of the financial costs.

Estimation of Unit Benefit

For calculation of benefits for economic analysis, the LRMC explained in Section 14.1 is used, i.e. Rs. 3.34/kWh (=5.35 - 2.01). The exchange rate of Rs. 28.6=US$, which was applied in the LRMC and Tariff Study Report (Draft), is used for converting Rs. into US$.

Calculation of Benefits

The unit benefit derived above is multiplied by the additional energy sales in each year to obtain the economic benefits by year.

EIRR

The evaluation period is set at 35 years for all power transmission and distribution facilities in this study, taking into account the economic life of these facilities. The O/M cost is also assumed at 2.0 percent of the total investment.

EIRR is computed at 35.1 percent, and details of calculation including the economic costs, O/M costs and benefit streams are given in Table 14.2.

14.3 Financial Evaluation

Financial costs of the optimal extension and reinforcement plans for the networks in the Valley are estimated at the price level of mid-1991. Operation and maintenance (O/M) costs are estimated on the basis of the similar projects for power transmission and distribution facilities, including labour and administration costs.

The theoretical tariffs explained in Section 14.1 are applied for measurement of benefits. The unit benefit which is the difference between LV customers' tariff and HV customers' tariff (Rs. 2.17/kWh) is multiplied by the additional energy sales to obtain the financial benefit for each year.

Capital costs including those of the projects to be implemented by financial assistance of IDA and other donors, O/M costs, benefits streams are given in Table 14.3.

FIRR has been calculated to be 21.3 % for the base case.

14.4 Sensitivity Analysis

The viability of the reinforcement and extension plans for the power transmission and distribution networks in the Valley are tested against major factors where uncertainties are involved.

Electricity Tariffs

As explained in the Draft Report on LRMC and Tariff Study, the NEA's prevailing tariffs seem to be far from structurally consistent. Thus the domestic consumers, all supplied with low voltage, pay a lower price than the industrial consumers supplied with low, medium and high voltage.

Despite the latest tariff increase in May 1988, which saw the average selling price of electricity rise from Rs. 1.17 to Rs. 1.41/kWh (21% increase), NEA's financial position remains highly unsatisfactory. Over the period from 1984/86 to 1989/90, the operating expenses increased 42% per annum on an average whereas the operating revenue progressed much more slowly, at an average annual rate of 20%. Hence NEA's operating ratio (Expense/Revenue) has been deteriorating, increasing from 63% in 1986 to 123% in 1990.

As a result of the study the following increases of the existing tariffs are proposed in the Draft Report.

a) a tariff structure having seasonal (wet and dry seasons) and time-of-day (peak, day and night) trariff categories and an average selling price of Rs. 2.75 per kWh, at different voltage levels.

b) If the above tariff structure is not accepted, the existing categories supplied with HV and LV remain unchanged, and the existing categories supplied with LV are uniformly increased by 129%, which is expressed by an increase of the present average selling price (all customers) of 96%

In this study therefore, several tariff levels are examined for their effects on the viability of the plans.

(1) EIRR

The change of EIRR accompanied by the theoretical tariffs used for the financial evaluation (about 65% of LRMC) and two intermediary points (-15% and -30% of LRMC) has been examined, and the results are given below:

	Unit Benefit	EIRR
a) Base case (LRMC)	Rs. 3.34/kWh	35.1%
b) -15% of LRMC	Rs. 2.84/kWh	29.2%
c) -30% of LRMC	Rs. 2.34/kWh	23.2%
d) Theoretical tariffs	Rs. 2.17/kWh	21.5%

(2) FIRR

The change of FIRR accompanied by the existing tariff level (about 51% of the theoretical tariff) and two intermediary points (-15% and -30% of the theoretical tariff) has been examined.

However, the basic assumption set in the previous Section, that the difference between LV customers' tariff and HV customers' tariff is used as the unit benefit for evaluation, cannot be applied since LV customers' tariff is lower than HV customers' tariff in the existing tariff structure. In this study, therefore, the tariff of each voltage level in the existing tariff structure is estimated as same ratio with that of the theoretical tariffs as given below together with the calculated FIRR.

	Base Case	-15%	-30%	Present Tariff
HV customer	1.04	0.88	0.74	0.53
MV customer	1.50	1.28	1.05	0.76
LV customer	3.21	2.73	2.25	1.63
Average	2.75	2.34	1.93	1.40
Unit Benefit	2.17	1.85	1.51	1.10
FIRR	21.3%	17.7%	13.8%	9.0%

Costs

The change of EIRR and FIRR caused by cost increase has been examined as summarized below:

		EIRR	FIRR
a) Base case		35.1%	21.3%
b) Const. cost:	+10%	31.5%	19.2%
	+20%	28.6%	17.4%
d) O/M cost:	+25%	34.6%	20.8%
	+50%	34.0%	20.3%

14.5 Conclusion

As presented in the preceding Sections, it can be said that the envisaged optimal reinforcement and extension plans for the power transmission and distribution networks in the Kathmandu Valley are quite feasible from the economic and financial points of view.

TABLES

Table 2.1 Annual GDP in Nepal

(million Rs.)

Sector	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
AT CURRENT PRICE									(*1)	(*2)	(*3)
Agriculture	13,683	15,679	17,903	19,282	22,771	24,171	26,819	30,587	36,032	41,658	46,176
Mining & quarrying	49	68	76	98	128	161	138	151	126	126	128
Manufacturing	1,082	1,225	1,437	1,683	2,091	2,295	3,018	4,059	4,265	4,674	5,017
Electricity, gas & water	69	78	95	146	182	225	394	470	620	615	785
Construction	1,814	2,306	2,707	2,740	2,966	4,115	4,592	5,749	6,986	6,437	6,785
Trade, restaurant & hotels	1,027	1,113	1,234	1,382	1,750	2,110	2,541	3,313	3,889	4,430	4,849
Transport, communication & storage	1,781	2,206	2,302	2,454	2,842	3,174	3,595	4,099	4,997	4,797	5,271
Others	3,846	4,632	5,234	5,976	6,661	8,167	9,331	11,168	12,598	14,678	15,897
GDP in total	23,351	27,307	30,988	33,761	39,390	44,417	50,428	59,596	69,513	77,414	84,907
GDP per capita (Rs.)	1,596	1,818	2,009	2,132	2,423	2,662	2,944	3,394	3,863	4,198	4,492
AT 1974/75 CONSTANT PRICE(*4)											
Agriculture	10,933	12,066	12,616	12,478	13,668	13,990	14,705	16,771	17,993	19,664	21,797
Mining & quarrying	35	44	44	51	63	73	55	52	39	35	33
Manufacturing	688	756	761	792	868	854	1,253	881	959	1,019	968
Electricity, gas & water	42	39	43	56	63	67	107	122	143	122	141
Construction	1,309	1,490	1,548	1,437	1,472	1,863	1,814	1,981	2,152	1,796	1,759
Trade, restaurant & hotels	823	637	635	703	864	976	965	1,090	1,133	1,202	1,268
Transport, communication & storage	1,390	1,434	1,453	1,456	1,604	1,647	1,704	1,709	1,809	1,564	1,523
Others	3,387	3,692	3,821	3,324	3,659	4,161	4,042	6,245	7,592	9,212	10,374
GDP in total	18,606	20,158	20,920	20,297	22,262	23,630	24,645	28,851	31,820	34,613	37,864
GDP per capita (Rs.)	1,271	1,342	1,356	1,282	1,370	1,416	1,439	1,643	1,768	1,877	2,003

Source: Statistic Year Book of Nepal 1989, by Central Bureau of Statistics revised by Economic Survey 1990, by Ministry of Finance.

Note(*1): Revised preliminary estimate.
(*2): Preliminary estimate.
(*3): Tentative estimate.
(*4): Estimation based on the method explained by Central Bureau of Statistics.

Table 2.2 Absolute Extreme Temperature

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Max
1976	18.8	24.0	27.8	29.5	29.8	29.2	29.3	28.5	28.0	26.5	25.8	21.2	29.8
1977	19.4	24.3	28.2	29.0	30.8	31.4	29.9	29.8	29.2	26.4	24.7	21.7	31.4
1978	19.4	23.7	24.6	28.2	31.0	29.0	29.5	31.0	29.0	27.0	24.4	23.7	31.0
1979	21.8	22.8	27.3	30.6	33.0	34.0	31.3	30.4	29.0	28.8	25.8	21.0	34.0
1980	19.1	22.8	28.2	32.3	30.6	29.6	30.1	29.4	29.1	26.8	25.3	21.8	32.3
1981	22.0	24.5	24.8	27.0	29.2	31.2	29.2	30.0	29.2	26.9	25.6	22.4	31.2
1982	22.0	22.7	26.4	28.6	32.9	31.0	30.2	30.8	31.2	28.4	25.5	21.5	32.9
1983	20.2	24.4	27.4	28.4	30.2	33.7	30.4	30.6	29.6	29.2	26.4	21.5	33.7
1984	20.8	24.8	28.8	31.8	31.6	32.0	29.8	31.5	29.0	29.8	25.5	22.3	32.0
1985	20.7	23.8	28.6	31.6	31.7	30.6	29.4	30.9	29.9	28.6	26.2	22.2	31.7
1986	21.2	23.4	30.6	29.6	29.4	32.0	30.2	30.8	30.4	27.4	25.2	24.0	32.0
Max.	22.0	24.8	30.6	32.3	33.0	34.0	31.3	31.5	31.2	29.8	26.4	24.0	34.0

Remarks : Kathmandu Airport

Table 2.3 Minimum Temperature

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Min.
1976	0.2	1.8	3.0	8.2	11.9	16.0	17.8	17.0	14.2	8.2	2.4	-2.0	-2.0
1977	-2.4	-1.2	3.5	7.9	8.9	14.0	18.6	17.6	14.9	6.5	3.0	-2.0	-2.4
1978	-3.5	2.4	0.5	3.7	14.3	16.5	18.5	18.2	16.7	8.6	3.6	0.6	-3.5
1979	-0.8	0.8	1.3	8.9	10.4	14.5	19.1	18.5	14.0	9.0	7.8	0.0	-0.8
1980	-1.0	0.6	3.0	7.8	12.8	17.6	19.0	19.4	16.8	7.2	5.2	-1.0	-1.0
1981	-1.4	0.6	4.0	7.8	12.8	14.2	19.2	18.8	16.0	9.0	2.6	0.0	-1.4
1982	-0.4	0.4	2.2	7.2	10.8	11.1	19.0	17.8	11.8	7.5	3.0	0.0	-0.4
1983	-2.0	-2.2	2.6	6.4	10.8	14.4	19.2	19.2	16.6	6.6	4.2	-0.4	-2.2
1984	-2.6	-0.2	3.6	6.4	11.5	18.2	19.0	13.0	12.6	9.2	3.2	-1.9	-2.6
1985	-1.2	1.0	6.0	8.0	11.5	15.8	18.5	18.6	15.8	8.2	4.5	2.0	-1.2
1986	0.1	0.0	3.0	6.9	9.6	12.8	19.1	18.0	15.8	8.2	5.6	-0.2	-0.2
Min.	-3.5	-2.2	0.5	3.7	8.9	11.1	17.8	13.0	11.8	6.5	2.4	-2.0	-3.5

Remarks : Kathmandu Airport

Table 2.4 Precipitation

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1976	30	14	0	69	153	387	335	307	170	24	0	0	1489
1977	12	12	17	104	90	266	323	338	79	29	14	14	1298
1978	5	11	69	42	143	299	324	392	160	109	0	2	1556
1979	6	39	1	42	37	258	447	320	99	36	6	65	1356
1980	1	18	46	10	124	349	296	238	184	69	0	0	1335
1981	14	0	60	101	216	141	304	267	225	0	42	0	1370
1982	14	22	36	49	40	200	238	384	155	9	18	3	1168
1983	18	4	30	79	110	81	500	194	288	130	0	15	1449
1984	14	17	14	60	96	275	250	302	260	18	0	7	1313
1985	10	3	4	25	133	161	418	434	376	167	0	55	1786
1986	0	23	16	93	97	316	381	219	221	80	0	49	1495
Average	11	15	27	61	113	248	347	309	202	61	7	19	1420

Remarks : Kathmandu Airport

Table 2.5 Relative Humidity

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	65	52	35	43	61	73	75	80	81	69	72	62
1977	66	50	46	57	58	71	80	80	76	72	75	73
1978	65	59	51	54	67	74	78	70	80	75	77	65
1979	66	61	41	56	46	65	80	82	75	76	72	74
1980	64	52	50	41	58	74	78	77	79	72	72	68
1981	65	55	57	56	66	68	81	78	75	67	78	73
1982	67	62	52	47	44	67	71	81	79	71	77	70
1983	68	65	61	60	73	64	83	81	80	76	72	70
1984	62	52	48	43	68	77	82	79	78	71	64	67
1985	66	58	41	38	58	68	82	79	79	77	72	72
1986	65	58	43	54	58	71	81	78	81	71	72	68

Remarks : Kathmandu Airport

Table 2.6 Population and Household Size by Development Zone, and Administrative Zone

Development regions, administrative zones & districts	Land area as of 1981 (sq.km)	Population In 1981	Population In 1990*	Number of households in 1981	Household size (persons/ household)
NEPAL	147,181	15,022,839	18,900,289 **	2,585,154	5.81
A. Eastern Dev. Region	28,456	3,708,923	4,707,281 ***	651,795	5.69
-Mechi zone	8,196	932,625	1,262,548	159,152	5.86
-Koshi zone	9,669	1,423,624	1,813,249	248,994	5.72
-Sagarmatha zone	10,591	1,352,674	1,631,484	243,649	5.55
B. Central Dev. Region	27,410	4,909,357	6,220,404 ***	854,545	5.74
-Janakpur zone	9,669	1,688,115	2,196,060	304,141	5.55
-Bagmati zone	9,428	1,782,439	2,170,131	302,517	5.89
Lalitpur	385	184,341	224,292	29,943	6.16
Bhaktapur	119	159,767	217,434	25,047	6.38
Kathmandu	395	422,237	514,547	67,933	6.22
-Narayani zone	8,313	1,438,803	1,854,213	247,887	5.80
C. Western Dev. Region	29,398	3,128,859	3,925,612 ***	544,283	5.75
-Gandaki zone	12,275	1,107,569	1,348,736	199,039	5.56
-Dhawalagiri zone	8,148	453,462	550,307	82,761	5.48
-Lumbini zone	8,975	1,567,828	2,026,569	262,483	5.97
D. Mid-Western Dev. Region	42,378	1,955,611	2,429,768 ***	322,334	6.07
-Rapti zone	10,482	876,723	1,055,966	143,850	6.09
-Bheri zone	10,545	836,402	1,094,182	135,188	6.19
-Karnali zone	21,351	242,486	279,620	43,296	5.60
E. Far-Western Dev. Region	19,539	1,320,089	1,617,223 ***	212,197	6.22
-Seti zone	12,550	794,911	951,376	131,058	6.07
-Mahakali zone	6,989	525,178	665,847	81,139	6.47

Source: Population Monograph of Nepal, by Central Bureau of Statistics, 1987.

Note(*): Based on population density in 1990 estimated by using annual increase of population density from 1971 to 1981 as shown in Table 3.2.

(**): Based on Statistic Year Book of Nepal 1989, by Central Bureau of Statistics.

(***): Based on Population Projection of Nepal (Total and Sectoral) 1981-2001, by Central Bureau of Statistics.

Table 2.7 Population and Population Density by Ecological Zone

Ecological Zones and Development Regions	Area in sq.km (1981)	Population						Population Density		
		1971	1981	Increasing ratio 1971-81	1990*	Increasing ratio 1971-90	Increasing ratio 1981-90	1971	1981	1990*
Mountain	51,817	1,138,610	1,302,896	1.36%	1,361,970	0.95%	0.49%	22.0	25.1	26.3
Eatern Dev. Region	10,438	304,352	338,439	1.07%	351,669	0.76%	0.43%	29.2	32.4	33.7
Central Dev. Region	6,277	353,923	413,143	1.56%	432,128	1.06%	0.50%	56.4	65.8	68.8
Western Dev. Region	5,819	34,380	19,951	-5.30%	20,866	-2.59%	0.50%	5.9	3.4	3.6
Mid-West. Dev. Region	21,351	207,122	242,486	1.59%	254,071	1.08%	0.52%	9.7	11.4	11.9
Far-West. Dev. Region	7,932	238,833	288,877	1.92%	303,236	1.26%	0.54%	30.1	36.4	38.2
Hill	61,345	6,071,407	7,163,115	1.67%	8,682,839	1.90%	2.16%	99.0	116.8	141.5
Eatern Dev. Region	10,749	1,105,590	1,257,042	1.29%	1,514,688	1.67%	2.09%	102.9	116.9	140.9
Central Dev. Region	11,805	1,741,594	2,108,433	1.93%	2,557,357	2.04%	2.17%	147.5	178.6	216.6
Western Dev. Region	18,319	1,816,940	2,150,939	1.70%	2,608,646	1.92%	2.17%	99.2	117.4	142.4
Mid-West. Dev. Region	13,710	885,562	1,042,365	1.64%	1,266,507	1.90%	2.19%	64.6	76.0	92.4
Far-West. Dev. Region	6,762	521,721	604,336	1.48%	735,640	1.82%	2.21%	77.2	89.4	108.8
Terai	34,019	4,345,966	6,556,828	4.20%	8,855,480	3.82%	3.40%	127.8	192.7	260.3
Eatern Dev. Region	7,269	1,387,558	2,113,422	4.30%	2,840,924	3.84%	3.34%	190.9	290.7	390.8
Central Dev. Region	9,328	1,770,236	2,387,781	3.04%	3,230,919	3.22%	3.42%	189.8	256.0	346.4
Western Dev. Region	5,260	595,110	957,969	4.88%	1,296,100	4.18%	3.42%	113.1	182.1	246.4
Mid-West. Dev. Region	7,317	395,322	670,760	5.43%	909,190	4.48%	3.44%	54.0	91.7	124.3
Far-West. Dev. Region	4,845	197,740	426,876	8.00%	578,347	5.81%	3.43%	40.8	88.1	119.4
Nepal	147,181	11,555,983	15,022,839	2.66%	18,900,289	2.62%	2.58%	78.5	102.1	128.4

Source: Population Monograph of Nepal, by Central Bureau of Statistics, 1987.

Note(*): Estimation based on the data of "Population Projection of Nepal (Total and Sectoral), 1981-2001", and "Statistical Year Book of Nepal 1989", by Central Bureau of Statistics.

Table 3.1 Major Industry Group of Economic Active Population by Development Region, Administrative Zones and Districts in 1981

(persons)

Development regions, administrative zones and districts	Agricult., forestry & fishery	Mining and quarrying	Manufac-turing	Electric-ity, gas & water	Construc-tion	Commerce	Transport, & communi-cation	Finance/ business services	Personal community services	Industry not stated	Total
Nepal	6,244,289	971	33,029	3,013	2,022	109,446	7,424	9,850	313,570	127,272	6,850,886
A. Eastern Development Region	1,447,056	185	11,934	780	684	32,316	2,152	2,343	117,214	35,473	1,650,137
- Mechi Zone	383,056	39	1,672	43	16	9,020	390	749	29,885	7,634	432,504
- Kosi Zone	529,380	65	8,412	478	459	15,228	1,447	1,159	43,264	16,903	616,795
- Sagarmatha Zone	534,620	81	1,850	259	209	8,068	315	435	44,065	10,936	600,838
B. Central Development Region	1,886,258	437	15,043	1,834	907	47,607	3,981	5,839	130,996	41,097	2,133,999
- Janakpur Zone	565,308	75	3,362	76	82	12,182	513	901	51,889	9,669	644,057
- Bagmati Zone	760,023	286	7,151	1,267	624	24,533	2,301	3,720	50,026	20,461	870,392
Lalitpur	61,163	42	1,511	230	114	3,253	328	707	8,198	1,877	77,423
Bhaktapur	56,354	11	1,412	76	40	3,609	257	274	5,374	1,618	69,225
Kathmandu	132,154	147	3,272	541	426	11,910	1,421	2,471	26,243	5,480	184,065
- Narayani Zone	560,927	76	4,530	491	201	10,892	1,167	1,218	29,081	10,967	619,550
C. Western Development Region	1,380,822	176	3,381	316	191	17,046	952	1,006	36,435	26,144	1,466,469
- Gandaki Zone	523,913	96	1,112	39	66	6,021	158	321	11,244	8,824	551,794
- Dhawalagiri Zone	213,639	19	356	12	2	1,322	18	73	4,233	3,422	223,096
- Lumbini Zone	643,270	61	1,913	265	123	9,703	776	612	20,958	13,878	691,559
D. Mid-Western Development Regic	918,826	92	1,602	57	230	8,792	253	338	18,398	14,558	963,146
- Rapti Zone	390,258	32	834	13	32	3,074	46	90	5,917	4,952	405,248
- Bheri Zone	381,631	41	718	23	198	4,984	206	223	10,812	6,845	405,681
- Karnali Zone	146,937	19	50	21	0	734	1	25	1,669	2,761	152,217
E. Far-Western Development Regic	611,327	81	1,069	26	10	3,685	86	324	10,527	10,000	637,135
- Seti Zone	367,998	47	391	5	6	1,584	43	259	5,769	6,037	382,139
- Mahakali Zone	243,329	34	678	21	4	2,101	43	65	4,758	3,963	254,996

Source: Statistic Year Book of Nepal 1989, by Central Bureau of Statistics.

Table 3.2 Land Use in 1981/82

(sq.km)

Development regions, administrative zones and districts	Total area	Non arable area	Arable area						
			Temporary crops	Temporary fallow & meadow	Permanent crops	Permanent meadow & pasture	Wood and forest	All others	Total
Nepal	147,181.00	122,543.83	22,501.97	372.99	291.54	425.43	149.75	895.49	24,637.17
A. Eastern Development Region	28,456.00	20,746.06	7,111.23	112.06	96.16	58.03	86.55	245.91	7,709.94
- Mechi Zone	8,196.00	5,842.20	2,150.57	33.21	30.82	31.84	59.28	48.08	2,353.80
- Kosi Zone	9,669.00	6,805.05	2,649.07	50.49	21.60	8.87	8.81	125.11	2,863.95
- Sagarmatha Zone	10,591.00	8,098.81	2,311.59	28.36	43.74	17.32	18.46	72.72	2,492.19
B. Central Development Region	27,410.00	19,177.01	7,526.53	103.87	140.45	98.39	35.15	328.60	8,232.99
- Janakpur Zone	9,669.00	6,835.77	2,528.12	41.64	82.45	47.06	11.13	122.83	2,833.23
- Bagmati Zone	9,428.00	7,139.88	2,148.05	20.63	7.82	37.15	19.25	55.22	2,288.12
Lalitpur	385.00	232.04	145.25	1.63	0.29	1.09	1.09	3.61	152.96
Bhaktapur	119.00	25.61	87.78	0.37	0.03	0.11	0.42	4.68	93.39
Kathmandu	395.00	143.48	236.40	4.71	0.13	0.83	0.78	8.67	251.52
- Narayani Zone	8,313.00	5,201.36	2,850.36	41.60	50.18	14.18	4.77	150.55	3,111.64
C. Western Development Region	29,398.00	24,761.59	4,137.20	45.01	39.47	230.87	18.86	165.00	4,636.41
- Gandaki Zone	12,275.00	10,936.63	1,223.04	19.76	4.60	42.27	8.58	40.12	1,338.37
- Dhawalagiri Zone	8,148.00	7,774.14	321.06	4.63	7.31	27.89	2.90	10.07	373.86
- Lumbini Zone	8,975.00	6,050.82	2,593.10	20.62	27.56	160.71	7.38	114.81	2,924.18
D. Mid-Western Development Region	42,378.00	39,796.30	2,427.96	15.53	5.20	28.31	2.48	102.22	2,581.70
- Rapti Zone	10,482.00	9,577.77	840.15	7.02	1.60	24.50	0.75	30.21	904.23
- Bheri Zone	10,545.00	9,077.94	1,390.72	6.52	1.71	2.54	1.51	64.06	1,467.06
- Karnali Zone	21,351.00	21,140.59	197.09	1.99	1.89	1.27	0.22	7.95	210.41
E. Far-Western Development Region	19,539.00	18,062.87	1,299.05	96.52	10.26	9.83	6.71	53.76	1,476.13
- Seti Zone	12,550.00	11,755.51	690.71	62.56	7.71	2.74	2.66	28.11	794.49
- Mahakali Zone	6,989.00	6,307.36	608.34	33.96	2.55	7.09	4.05	25.65	681.64

Source: Statistic Year Book of Nepal 1989, by Central Bureau of Statistics.

Table 3.3 Area, Production and Yield of Principal Food Crops

Area: Thousand ha.
Production: Thousand M.T.
Yield: M.T./ha.

Food crops		1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	Average annual increasing ratio
Paddy	Area	1,240	1,256	1,262	1,264	1,263	1,254	1,276	1,297	1,265	1,334	1,377	1,391	1,333	1,423	1,450	1,433	0.97%
	Production	2,452	2,605	2,386	2,282	2,339	2,060	2,464	2,560	1,833	2,757	2,709	2,804	2,372	2,982	3,283	3,390	2.18%
	Yield	1.98	2.07	1.89	1.81	1.85	1.64	1.93	1.97	1.45	2.07	1.97	2.02	1.78	2.09	2.26	2.37	1.21%
Maize	Area	458	453	445	445	454	432	457	475	511	504	579	615	627	674	722	751	3.35%
	Production	827	748	797	740	743	576	743	752	718	761	820	874	868	902	1,072	1,201	2.52%
	Yield	1.81	1.65	1.79	1.66	1.64	1.33	1.63	1.58	1.41	1.51	1.42	1.42	1.38	1.34	1.48	1.60	-0.82%
Wheat	Area	291	329	348	367	356	367	392	400	484	472	452	483	536	597	599	604	4.99%
	Production	331	387	362	411	415	440	477	526	657	634	534	598	701	745	830	850	6.49%
	Yield	1.14	1.18	1.04	1.12	1.17	1.20	1.22	1.32	1.36	1.34	1.18	1.24	1.31	1.25	1.39	1.41	1.43%
Barley	Area	28	26	25	26	26	26	27	27	24	25	28	29	29	29	29	30	0.46%
	Production	26	25	21	22	23	23	23	23	21	22	24	23	25	24	27	27	0.25%
	Yield	0.93	0.96	0.84	0.85	0.88	0.88	0.85	0.85	0.88	0.88	0.86	0.79	0.86	0.86	0.93	0.90	-0.22%
Millet	Area	125	126	122	121	123	123	122	122	129	124	134	151	151	165	183	193	2.94%
	Production	142	143	138	130	133	119	122	122	121	115	124	138	138	150	163	225	3.12%
	Yield	1.14	1.14	1.13	1.07	1.08	0.97	1.00	1.00	0.94	0.93	0.93	0.91	0.91	0.91	1.00	1.17	0.17%
		Index of food crops (1974/75=100)																
Whole food crops	Area	100.00%	102.19%	102.95%	103.98%	103.83%	102.90%	106.31%	108.51%	112.44%	114.85%	119.48%	123.11%	123.43%	132.36%	135.59%	136.24%	2.54%
	Production	100.00%	103.44%	98.04%	94.89%	96.69%	85.18%	101.35%	105.43%	88.67%	113.53%	111.46%	117.44%	108.63%	127.13%	142.27%	150.69%	2.91%
	Yield	100.00%	100.00%	95.57%	93.00%	94.57%	86.00%	94.71%	96.00%	86.29%	96.14%	90.86%	91.14%	89.14%	92.14%	100.86%	106.43%	0.35%

Source: Economic Survey 1990, by Ministry of Finance.

Table 3.4 Production of Principal Industries

Products	Unit	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	Annual increasing ratio (%)
Jute Goods	Metric ton	15,502	19,619	21,323	20,026	16,389	18,289	17,198	1.75%
Sugar	Metric ton	20,764	22,357	17,496	11,039	15,190	24,565	30,040	6.35%
Cigarettes	In lakh stick	28,345	32,090	37,407	42,520	47,410	56,000	60,460	12.46%
Leather	1,000 pieces	1,637	2,800	2,770	2,247	2,001	2,877	1,509	–1.35%
Bricks & Tiles	1,000 pieces	20,884	30,689	29,760	25,254	28,451	33,876	34,629	8.79%
Cotton Textiles	1,000 metres	6,862	7,966	10,240	10,533	14,118	17,822	9,914	6.32%
Cement	Metric ton	30,378	36,959	39,225	31,479	96,041	151,631	215,010	38.56%

Source: Statistical Year Book of Nepal 1989, by Central Bureau of Statistics.

Table 3.5 Gross Output, Gross Input and Value Added of Manufacturing Industries in Nepal and Kathmandu Valley

(Million NRs.)

Products	Gross Output		Gross Input		Value Added	
	1981/82	1986/87	1981/82	1986/87	1981/82	1986/87
Nepal	7,098.2	13,537.6	4,736.9	9,048.1	2,361.3	4,489.5
Kathmandu Valley	1,148.1	2,809.6	753.6	1,674.6	394.5	1,135.0
Kathmandu District	724.3	1,911.7	466.1	1,146.7	258.2	765.0
Lalitpur District	142.0	692.8	88.8	395.7	53.2	297.1
Bhaktapur District	281.8	205.1	198.7	132.2	83.1	72.9

Source: Statistical Year Book of Nepal 1989, by Central Bureau of Statistics

Table 3.6 Number of Establishments and Persons Engaged by Development Regions, Administrative Zones and Districts

Development regions, administrative zones and districts	Number of establishment					Number of persons engaged				
	1964/65	1972/73	1976/77	1981/82	1986/87	1964/65	1972/73	1976/77	1981/82	1986/87
Nepal	1,260	2,434	3,528	4,903	9,359	18,701	47,638	50,120	81,050	152,579
A. Eastern Development Region	278	507	745	977	1,761	8,543	15,538	15,561	27,631	33,498
- Mechi Zone	59	121	210	247	376	710	3,641	5,819	7,153	5,027
- Kosi Zone	120	207	263	407	892	7,013	9,846	6,685	15,552	22,253
- Sagarmatha Zone	99	179	272	323	493	820	2,051	3,057	4,926	6,218
B. Central Development Region	693	1,319	1,787	2,495	4,436	7,972	24,871	22,134	38,686	86,812
- Janakpur Zone	194	341	476	629	1,095	1,748	11,209	5,292	4,559	9,683
- Bagmati Zone	290	495	708	928	1,896	3,014	6,870	8,605	16,998	54,868
Lalitpur	62	95	141	148	423	585	2,039	2,508	3,476	15,673
Bhaktapur	32	39	99	129	262	184	226	1,064	2,257	6,444
Kathmandu	196	307	368	521	819	2,245	4,403	4,506	10,582	30,746
- Narayani Zone	209	483	603	938	1,445	3,210	6,792	8,237	17,129	22,261
C. Western Development Region	195	382	665	974	2,117	1,282	4,682	7,864	8,238	21,273
- Gandaki Zone	0	86	158	305	569	0	841	2,230	2,565	5,023
- Dhawalagiri Zone	0	0	27	43	172	0	0	147	200	613
- Lumbini Zone	195	296	480	626	1,376	1,282	3,841	5,487	5,473	15,637
D. Mid-Western Development Region	52	142	180	265	605	613	1,897	3,186	3,659	6,055
- Rapti Zone	0	46	60	79	180	0	176	403	904	849
- Bheri Zone	52	96	120	186	420	613	1,721	2,783	2,755	5,181
- Karnali Zone	0	0	0	0	5	0	0	0	0	25
E. Far-Western Development Region	42	84	151	192	440	291	650	1,375	2,836	4,941
- Seti Zone	32	56	91	116	277	206	391	653	1,772	3,301
- Mahakali Zone	10	28	60	76	163	85	259	722	1,064	1,640

Source: Statistic Year Book of Nepal 1989, by Central Bureau of Statistics.

Table 3.7 Statistics of Tourism Industry

Item	1981	1982	1982	1984	1985	1986	1987
TOURIST ARRIVALS							
Total number	161,669	175,448	179,405	176,634	180,989	223,331	248,080
Growth rate (%)	(0.8)	8.5	2.3	(1.5)	2.5	23.4	11.1
Number by purpose							
Pleasure	127,709	136,693	132,350	140,592	128,217	163,958	184,979
Trecking	21,668	23,507	24,198	15,010	28,707	33,609	36,164
Business	6,379	7,374	9,801	8,137	10,416	10,863	11,781
Official	5,674	7,166	8,479	9,399	9,230	8,825	8,882
Others	239	708	4,577	3,496	4,419	6,076	6,274
Gross foreign exchange							
Earnings (US$1,000)	44,935	33,441	35,667	41,273	39,185	50,841	60,229
Growth rate (%)	(13.0)	(25.6)	6.7	15.7	(5.1)	29.7	18.5
HOTEL INDUSTRY							
Number of rooms	24,675	26,038	25,033	22,361	21,862	23,784	23,194
Kathmandu Valley	20,152	22,038	20,695	19,092	18,356	19,778	19,097
Other areas	4,163	4,000	4,338	3,269	3,508	4,006	4,097
Number of beds	49,047	50,534	48,607	43,728	42,724	47,266	45,385
Kathmandu Valley	40,343	42,432	40,031	37,228	35,453	38,960	37,221
Other areas	8,704	8,102	8,576	6,440	7,271	8,306	8,164
Guest arrivals	202,268	193,788	179,638	175,044	175,652	231,152	224,835
Guest nights	527,206	528,773	475,314	516,719	452,166	571,769	623,282
Average guest nights/arriv	2.6	2.7	2.6	3.0	2.6	2.5	2.7
Percentage of bed occupancy							
Kathmandu Valley	35.8	35.5	32.9	40.2	35.9	41.8	46.2
Other areas	31.8	29.3	28.9	31.3	28.9	29.4	40.5

Source: Statistical Year Book of Nepal 1989, by Central Bureau of Statistics.

Table 3.8 Finance of Government

(million Rs.)

Head	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89
FINANCE										
Expenditure	3,470.7	4,092.3	5,361.3	6,979.2	7,437.3	8,394.8	9,797.1	11,513.2	14,105.1	18,004.9
Regular (detail:see Table 3.12)	1,162.1	1,361.2	1,634.4	1,997.1	2,273.5	2,906.1	3,584.0	4,135.2	4,677.1	5,676.2
Development	2,308.6	2,731.1	3,726.9	4,962.1	5,163.8	5,488.7	6,213.1	7,378.0	9,428.0	12,328.7
Receipts	2,685.6	3,288.1	3,672.8	3,931.7	4,285.9	4,840.0	5,817.4	7,260.2	9,427.2	9,457.4
Revenue	1,880.0	2,419.2	2,679.5	2,841.6	3,409.3	3,916.6	4,644.5	5,975.1	7,350.4	7,776.8
Foreign grants	805.6	868.9	993.3	1,090.1	876.6	923.4	1,172.9	1,285.1	2,076.8	1,680.6
Over Surplus (+) or Deficit (-)	(785.1)	(804.2)	(1,688.5)	(3,047.5)	(3,151.4)	(3,554.8)	(3,979.7)	(4,253.0)	(4,677.9)	(8,547.5)
SOURCES OF FINANCING DEFICITS										
Foreign Loan	534.9	693.3	729.9	985.8	1,670.9	1,754.9	2,501.1	2,705.8	3,815.8	5,666.4
Internal Loan	180.0	250.0	500.0	1,000.0	1,576.8	1,799.9	1,403.4	1,644.7	1,130.0	1,330.0
a. Banking system	0.0	0.0	0.0	0.0	1,076.8	1,299.9	903.4	1,116.3	790.6	1,320.0
b. Non-banking system	0.0	0.0	0.0	0.0	500.0	500.0	500.0	528.4	339.4	10.0
Cash Balance Surplus (-)	70.2	139.1	458.6	1,061.7	(96.3)	0.0	75.2	(97.5)	(268.0)	1,551.1

Source: Economic Survey 1990, by Ministry of Finance.

Table 3.9 Target of GDP of the Seventh 5-Year Plan (1985-1990) at 1984/85 Constant Price

Sector	GDP(million Rs.)		Annual growth rate (%) from	Composition of GDP(%)	
	1984/85	1989/90	1985 to 1990	1984/85	1989/90
Agricultural sector	22,080	26,220	3.5%	52.4%	49.9%
Non-Agricultural sector	20,060	26,290	5.6%	47.6%	50.1%
GDP in total	42,140	52,510	4.5%	100.0%	100.0%

Source: The Seventh Plan (1985-1990) (A Summary), by National Planning Commission.

Table 3.10 Actual GDP for the Period of Seventh 5-Year Plan (1985-1990) at 1984/85 Constant Price

Sector	GDP(million Rs.)		Annual growth rate (%) from	Composition of GDP(%)	
	1984/85	1989/90*	1985 to 1990	1984/85	1989/90
Agricultural sector	24,170	30,340	4.7%	54.4%	56.2%
Non-Agricultural sector	20,250	23,670	3.2%	45.6%	43.8%
GDP in total	44,420	54,010	4.0%	100.0%	100.0%

Source: Economic Survey 1990, by Ministry of Finance.

Note(*): The current prices have been converted into 1984/85 prices by using GDP price index (Deflator).

Table 3.11 Estimates of GDP, Investment and Saving for the Seventh 5-Year Plan Period(1985-1990) at 1984/85 Constant Price

Sector	GDP(million Rs.)		Annual growth rate (%) from	Composition of GDP(%)	
	1984/85	1989/90	1985 to 1990	1984/85	1989/90
Consumption	37,741	48,168	5.0%	89.6%	91.7%
Total Investment	7,936	9,350	3.3%	18.8%	17.8%
Fixed Capital Formation	7,448	8,746	3.3%	17.7%	16.7%
Govmt. Sector	3,575	3,467	-0.6%	8.5%	6.6%
Non-Govmt. Sector	3,873	5,279	6.4%	9.2%	10.1%
Change in Balance	488	604	4.4%	1.2%	1.2%
Foreign Balance	(3,539)	(5,006)	7.2%	-8.4%	-9.5%
Import Goods and Services	8,669	11,352	5.5%	20.6%	21.6%
Export Goods and Services	5,130	6,346	4.3%	12.2%	12.1%
GDP	42,138	52,512	4.5%	100.0%	100.0%
Domestic Savings	4,397	4,397	0.0%	10.4%	8.4%

Source: The Seventh Plan (1985-1990) (A Summary), by National Planning Commission.

Table 3.12 Actual GDP, Investment and Saving for the Seventh 5-Year Plan Period (1985 -1989) at 1984/85 Constant Price

Sector	GDP(million Rs.)		Annual growth rate (%) from	Composition of GDP(%)	
	1984/85	1988/89*	1985 to 1989	1984/85	1988/89
Consumption	38,178	49,287	6.6%	86.0%	92.8%
Total Investment	10,184	10,343	0.4%	22.9%	19.5%
Fixed Capital Formation	9,386	8,269	-3.1%	21.1%	15.6%
Govmt. Sector	3,629	4,617	6.2%	8.2%	8.7%
Non-Govmt. Sector	5,757	3,652	-10.8%	13.0%	6.9%
Change in Balance	798	2,075	27.0%	1.8%	3.9%
Foreign Balance	(3,945)	(6,504)	13.3%	-8.9%	-12.2%
Import Goods and Services	9,317	13,283	9.3%	21.0%	25.0%
Export Goods and Services	5,372	6,779	6.0%	12.1%	12.8%
GDP	44,417	53,126	4.6%	100.0%	100.0%
Domestic Savings	6,239	3,839	-11.4%	14.0%	7.2%

Source: Economic Survey 1990, by Ministry of Finance.

Note(*): The current prices, revised preliminary estimate in the source, have been converted into 1984/85 price by using GDP price index (Deflator).

Table 3.13 Direction of Foreign Trade

(million Rs.)

Exports/Imports	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	Average annual increasing ratio
Exports F.O.B.	890	1,186	1,165	1,046	1,297	1,151	1,608	1,491	1,132	1,704	2,741	3,078	2,992	4,115	4,195	11.71%
India	747	894	780	498	650	521	992	994	843	1,161	1,602	1,241	1,303	1,568	1,035	2.36%
Other countries	143	292	385	548	647	630	616	497	289	543	1,139	1,837	1,689	2,547	3,160	24.75%
Imports C.I.F	1,815	1,982	2,009	2,470	2,885	3,480	4,428	4,930	6,314	6,514	7,742	9,341	10,905	13,870	16,264	16.96%
India	1,476	1,227	1,344	1,534	1,582	1,786	2,179	2,281	2,500	3,058	3,896	3,971	4,262	4,596	4,239	7.83%
Other countries	339	755	665	936	1,303	1,694	2,249	2,649	3,814	3,456	3,846	5,370	6,643	9,274	12,025	29.03%
Trade Balance	(925)	(796)	(844)	(1,424)	(1,588)	(2,329)	(2,820)	(3,439)	(5,182)	(4,810)	(5,001)	(6,263)	(7,913)	(9,755)	(12,069)	20.14%
India	(729)	(333)	(564)	(1,036)	(932)	(1,265)	(1,187)	(1,287)	(1,657)	(1,897)	(2,294)	(2,730)	(2,959)	(3,028)	(3,204)	11.15%
Other countries	(196)	(463)	(280)	(388)	(656)	(1,064)	(1,633)	(2,152)	(3,525)	(2,913)	(2,707)	(3,533)	(4,954)	(6,727)	(8,865)	31.29%
Total Trade Volume	2,705	3,168	3,174	3,516	4,182	4,631	6,036	6,421	7,446	8,218	10,483	12,419	13,897	17,985	20,459	15.55%
India	2,223	2,121	2,124	2,032	2,232	2,307	3,171	3,275	3,343	4,219	5,498	5,212	5,565	6,164	5,274	6.37%
Other countries	482	1,047	1,050	1,484	1,950	2,324	2,865	3,146	4,103	3,999	4,985	7,207	8,332	11,821	15,185	27.95%
Share in Trade (%)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-
India	82.18%	66.95%	66.92%	57.79%	53.37%	49.82%	52.53%	51.00%	44.90%	51.34%	52.45%	41.97%	40.04%	34.27%	25.78%	-
Other countries	17.82%	33.05%	33.08%	42.21%	46.63%	50.18%	47.47%	49.00%	55.10%	48.66%	47.55%	58.03%	59.96%	65.73%	74.22%	-

Source: Economic Survey 1990, by Ministry of Finance.

Table 3.14 Monthly Fluctuation of Trade (1988-1990)

(million Rs.)

Year	Month	Exports	Imports	Balance	Total trade
1987/88	July/Aug.	245.6	697.1	(451.5)	942.7
	Aug./Sep.	259.6	747.7	(488.1)	1,007.3
	Sep./Oct.	277.7	1,799.9	(1,522.2)	2,077.6
	Oct./Nov.	289.3	833.4	(544.1)	1,122.7
	Nov./Dec.	327.9	993.4	(665.5)	1,321.3
	Dec./Jan.	365.5	910.1	(544.6)	1,275.6
	Jan./Feb.	394.8	1,074.2	(679.4)	1,469.0
	Feb./Mar.	405.2	1,137.7	(732.5)	1,542.9
	Mar./Apr.	393.2	1,179.3	(786.1)	1,572.5
	Apr./May	421.3	1,353.1	(931.8)	1,774.4
	May/June	391.9	1,516.0	(1,124.1)	1,907.9
	June/July	342.6	1,627.7	(1,285.1)	1,970.3
1988/89	July/Aug.	358.4	1,156.6	(798.2)	1,515.0
	Aug./Sep.	322.8	1,161.4	(838.6)	1,484.2
	Sep./Oct.	355.7	2,308.2	(1,952.5)	2,663.9
	Oct./Nov.	275.8	1,248.6	(972.8)	1,524.4
	Nov./Dec.	405.9	1,148.1	(742.2)	1,554.0
	Dec./Jan.	408.3	1,292.9	(884.6)	1,701.2
	Jan./Feb.	431.4	1,406.6	(975.2)	1,838.0
	Feb./Mar.	494.9	1,524.8	(1,029.9)	2,019.7
	Mar./Apr.	354.7	1,088.8	(734.1)	1,443.5
	Apr./May	261.1	1,171.4	(910.3)	1,432.5
	May/June	275.9	1,482.2	(1,206.3)	1,758.1
	June/july	250.6	1,274.0	(1,023.4)	1,524.6
1989/90	July/Aug.	291.0	1,309.4	(1,018.4)	1,600.4
	Aug./Sep.	272.2	1,464.7	(1,192.5)	1,736.9
	Sep./Oct.	304.2	1,124.3	(820.1)	1,428.5
	Oct./Nov.	394.0	1,240.9	(846.9)	1,634.9
	Nov./Dec.	471.5	1,412.1	(940.6)	1,883.6
	Dec./Jan.	418.2	1,719.0	(1,300.8)	2,137.2
	Jan./Feb.	453.0	1,746.4	(1,293.4)	2,199.4
	Feb./Mar.	499.3	1,605.2	(1,105.9)	2,104.5
	Mar./Apr.	537.6	1,552.7	(1,015.1)	2,090.3

Source: *Monthly Report of Main Economic Indicator* (March/April, 1990), by Nepal Rastra Bank (Nepal National Bank).

Table 3.15 Actual Energy Consumption in Nepal by Sector

(1,000 TOE)*

Sector		1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	Annual increasing ratio (%)
Domestic Sector	Consumption	3,224.56	3,307.03	3,312.69	3,863.53	3,970.42	5,523.19	5,499.40	5,624.30	8.27%
	Percentage(%)	95.62%	94.84%	94.51%	93.98%	94.16%	95.53%	95.21%	94.77%	
Industrial Sector	Consumption	53.46	77.81	80.19	115.61	109.09	129.47	116.00	117.80	11.95%
	Percentage(%)	1.59%	2.23%	2.29%	2.81%	2.59%	2.24%	2.01%	1.98%	
Commercial Sector	Consumption	17.99	27.03	28.63	35.34	36.67	31.42	45.50	51.80	16.31%
	Percentage(%)	0.53%	0.78%	0.82%	0.86%	0.87%	0.54%	0.79%	0.87%	
Transport Sector	Consumption	70.00	69.37	77.49	88.64	92.15	82.57	106.30	129.90	9.23%
	Percentage(%)	2.08%	1.99%	2.21%	2.16%	2.19%	1.43%	1.84%	2.19%	
Agricultural Sector	Consumption	5.48	5.09	5.68	6.58	7.04	14.54	7.60	8.70	6.83%
	Percentage(%)	0.16%	0.15%	0.16%	0.16%	0.17%	0.25%	0.13%	0.15%	
Other	Consumption	0.59	0.75	0.41	1.01	1.10	0.22	1.30	2.20	20.68%
	Percentage(%)	0.02%	0.02%	0.01%	0.02%	0.03%	0.00%	0.02%	0.04%	
Non Energy Use	Consumption	0.03	0.06	0.20	0.21	0.12	0.00	0.00	0.00	-59.38%
	Percentage(%)	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	
Power Generation	Consumption	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
	Percentage(%)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
Total	Consumption	3,372.11	3,487.14	3,505.29	4,110.92	4,216.59	5,781.41	5,776.10	5,934.70	8.41%
	Percentage(%)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Source: Energy Balance Sheet of Nepal (Revised and Updated)(1981 - 1988), Report No.4/4/19061989/1/1, Seq.No.321, by Water and Energy Commission, Ministry of Water Resources.

Note(*): TEO - Tons of Oil Equivalent Unit.

Table 3.16 Actual Energy Consumption in Nepal by Kind of Energy

(1,000 TOE)*

Kind of Energy			1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	Annual increasing ratio (%)
Fuel wood		Consumption	3,141.32	3,256.76	3,260.15	3,432.68	3,523.99	4,414.40	4,374.30	4,477.60	5.19%
		Percentage	93.16%	93.39%	93.01%	83.50%	83.57%	76.36%	75.73%	75.45%	
Agricultural residue		Consumption	55.20	56.70	56.26	383.70	393.90	641.10	636.50	648.60	42.19%
		Percentage	1.64%	1.63%	1.61%	9.33%	9.34%	11.09%	11.02%	10.93%	
Animal dung		Consumption	21.06	21.58	21.30	66.82	68.60	488.28	480.00	490.00	56.76%
		Percentage	0.62%	0.62%	0.61%	1.63%	1.63%	8.45%	8.31%	8.26%	
Coal		Consumption	23.10	24.63	24.90	60.27	48.21	32.04	51.10	52.50	12.44%
		Percentage	0.69%	0.71%	0.71%	1.47%	1.14%	0.55%	0.88%	0.88%	
Petroleum products	LPG	Consumption	0.40	0.62	0.80	0.84	3.21	1.63	2.00	2.00	25.85%
		Percentage	0.01%	0.02%	0.02%	0.02%	0.08%	0.03%	0.03%	0.03%	
	Motor sprit	Consumption	9.04	10.62	12.04	13.40	14.04	16.03	15.60	17.70	10.07%
		Percentage	0.27%	0.30%	0.34%	0.33%	0.33%	0.28%	0.27%	0.30%	
	ATF	Consumption	13.51	15.61	15.50	19.31	18.35	18.92	19.50	22.90	7.83%
		Percentage	0.40%	0.45%	0.44%	0.47%	0.44%	0.33%	0.34%	0.39%	
	Kerosene	Consumption	32.72	29.08	29.94	40.39	42.27	52.97	59.90	69.20	11.29%
		Percentage	0.97%	0.83%	0.85%	0.98%	1.00%	0.92%	1.04%	1.17%	
	H.S.D. oil	Consumption	51.90	47.17	54.84	60.84	64.97	60.69	77.10	96.10	9.20%
		Percentage	1.54%	1.35%	1.56%	1.48%	1.54%	1.05%	1.33%	1.62%	
	L.D. oil	Consumption	6.76	5.10	4.22	4.62	5.02	10.71	4.80	6.40	-0.78%
		Percentage	0.20%	0.15%	0.12%	0.11%	0.12%	0.19%	0.08%	0.11%	
	Fuel oil	Consumption	3.02	3.40	5.86	6.64	9.16	15.52	13.80	9.00	16.88%
		Percentage	0.09%	0.10%	0.17%	0.16%	0.22%	0.27%	0.24%	0.15%	
	Non energy	Consumption	0.03	0.06	0.20	0.21	0.12	0.00	7.90	8.20	122.89%
		Percentage	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%	0.14%	0.14%	
Electricity		Consumption	14.05	15.81	19.28	21.20	24.75	29.12	33.60	34.50	13.69%
		Percentage	0.42%	0.45%	0.55%	0.52%	0.59%	0.50%	0.58%	0.58%	
Total		Consumption	3,372.11	3,487.14	3,505.29	4,110.92	4,216.59	5,781.41	5,776.10	5,934.70	8.41%
		Percentage(%)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Source: Energy Balance Sheet of Nepal (Revised and Updated)(1981 - 1988), Report No.4/4/19061989/1/1, Seq.No.321, by Water and Energy Commission, Ministry of Water Resources.

Note(*): TEO - Tons of Oil Equivalent Unit.

Table 3.17 Actual Electricity Consumption in Nepal by Sector

(GWh)

Sector		1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	Annual increasing ratio (%)
Domestic Sector	Consumption	78.57	90.67	119.01	101.41	125.35	167.80	187.88	185.35	13.04%
	Percentage	48.14%	49.31%	51.60%	41.14%	43.55%	49.56%	46.74%	44.84%	
Industrial Sector	Consumption	50.20	61.28	81.95	78.34	92.52	142.70	169.38	166.30	18.66%
	Percentage	30.76%	33.32%	35.53%	31.78%	32.14%	42.15%	42.13%	40.23%	
Commercial Sector	Consumption	23.20	17.83	21.34	48.14	49.80	21.00	22.08	25.04	1.10%
	Percentage	14.21%	9.70%	9.25%	19.53%	17.30%	6.20%	5.49%	6.06%	
Transport Sector	Consumption	1.05	1.05	1.05	1.05	1.05	1.50	1.60	1.60	6.20%
	Percentage	0.64%	0.57%	0.46%	0.43%	0.36%	0.44%	0.40%	0.39%	
Agricultural Sector	Consumption	3.36	4.31	2.40	5.80	6.31	3.00	6.09	8.65	14.46%
	Percentage	2.06%	2.34%	1.04%	2.35%	2.19%	0.89%	1.51%	2.09%	
Others	Consumption	6.83	8.75	4.87	11.77	12.81	2.56	14.97	26.46	21.35%
	Percentage	4.18%	4.76%	2.11%	4.77%	4.45%	0.76%	3.72%	6.40%	
Total	Consumption	163.21	183.89	230.62	246.51	287.84	338.56	402.00	413.40	14.20%
	Percentage(%)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	

Source: Energy Balance Sheet of Nepal (Revised and Updated)(1981 - 1988), Report No.4/4/19061989/1/1, Seq.No.321, by Water and Energy Commission, Ministry of Water Resources.

Table 4.1 Existing Generating Plants on the Interconnected System

Name	Date in Service	Number of Units and Size MW	Installed Capacity MW	Firm Capacity MW
Hydro Electric:				
Trisuli	1962/70	7 x 3.0	21.0	18.0
Sunkosi	1973	3 x 3.35	10.1	5.8
Gandak	1979	3 x 5.0	15.0	9.4
Kulekhani I	1982	2 x 30.0	60.0	60.0
Devighat	1984	3 x 4.7	14.1	14.1
Kulekhani II	1986	2 x 16.0	32.0	32.0
Marsyangdi	1990	3 x 23.0	69.0	63.0
Subtotal - Hydro			221.2	202.3
Misc. Small Hydro			6.0	6.0
Total Hydro - Interconnected System			227.2	208.3
Diesel:				
Hetauda		4 x 2.5	10.0	10.0
Misc. Diesel			15.0	7.0
Subtotal - Diesel			25.0	17.0
Total Plant Installed			252.2	225.3

(1) Kulekhani I and II share a common hydraulic system and can only be operated in tandem as (30 + 16) = 46 MW units. Similarly, unit outages at Trisuli results in reduction of power output at Devighat.

Table 4.2 Existing Power Facilities Outside Integrated System

Name	Type	Installed Capacity (MW)	Available Capacity (MW)	In-Service Date	Region
Dhankuta	Hydro	2 x 0.12 - 0.24	0.16	1973	Eastern
Surkhet	Hydro	3 x 0.12 - 0.36	0.12	1978	M & FW 1/
Banglung	Hydro	1 x 0.18 - 0.18	-	1981	Western
Phidim	Hydro	2 x 0.13 - 0.26	-	1981	Eastern
Jomsom	Hydro	2 x 0.13 - 0.26	-	1982	Western
Junla	Hydro	2 x 0.10 - 0.20	-	1982	M & FW
Doti	Hydro	2 x 0.10 - 0.20	-	1982	M & FW
Gorkha	Hydro	2 x 0.03 - 0.06	-	1982	Eastern
Dhading	Hydro	1 x 0.03 - 0.03	-	1982	Central
Syangja	Hydro	2 x 0.04 - 0.08	-	1984	Western
Helambu	Hydro	1 x 0.05 - 0.05	-	1985	Central
Sub-total I		1.92			
Janakpur	Diesel	3 units - 0.83	0.60	1961	Central
Bharatpur	Diesel	2 x 0.26 - 0.52	0.50	1961	Central
Bhairawa	Diesel	2 x 0.26 - 0.52	0.50	1961	Western
Illam	Diesel	2 x 0.10 - 0.20	0.16	91/73	Eastern
Bhadrapur	Diesel	1 x 0.34 - 0.34	0.24	1975	Eastern
Ghorahi	Diesel	2 x 0.05 - 0.10	0.10	56/82	M & FW
Tulsipur	Diesel	2 units - 0.07	0.05	1956	M & FW
Nepalgunj	Diesel	2 x 0.26 - 0.52	0.50	1960	M & FW
Sub-total II		3.10		4.27	
TOTAL I & II		5.02			

1 / M & FW: Mid- and Far-Western Regions.

Table 4.3 Existing Transmission Lines in Nepal-Integrated System

	From	To	Volt. (kV)	CCT	Length (km)	Conductors Kind	Conductors Size	Conductors Type	Commis Year	Remarks
I)	Existing 132 kV Line									
1.	Hetauda	Bhratpur	132	1	70.0	ACSR	200	Panther	1979	Tower (SC)
2.	Bhratpur	Burdghat (Dumkibas)	132	1	70.0	ACSR	200	Panther	1979	Tower (SC)
3.	Burdghat	Gandak	132	1	14.0	ACSR	200	Panther	1979	Tower (SC)
4.	Bhratpur	Pokhara	132	1	85.0	ACSR	150	Wolf		Tower (SC)
5.	Hetauda	Dhalkebar (Janakpur)	132	1	137.0	ACSR	250	Bear		Tower (SC)
6.	Dhalkebar	Dubi (Binatnagar)	132	1st (a)	146.0	ACSR	250	Bear	1985	Tower (DC)
7.	Burdghat	Butwal	132	1st	43.0	ACSR	250	Bear		Tower (DC)
8.	Kulikhani-II	Siuchatar	132	1st	34.0	ACSR	250	Bear	1986	Tower (DC)
9.	Kulikhani-II	Hetauda	132	1st	8.0	ACSR	250	Bear	1986	Tower (DC)
10.	Dubi	Anarmani	132	1	76.0	ACSR				Tower (DC)
11.	Marshyangdi	Balaju	132	1	84.0	ACSR	300	DIN (300/50)		Tower (SC)
12.	Marshyangdi	Bharatpur	132	1	25.0	ACSR	300	DIN (300/50)		Tower (SC)
13.	Butwal	Shivpur	132	1st	60.6	ACSR	250	Bear		Tower (DC)
14.	Shivpur	Lamahi	132	1st	51.1	ACSR	250	Bear		Tower (DC)
15.	Lamahi	Kohalpur	132	1st	95.7	ACSR	250	Bear		Tower (DC)
II)	Existing 66 kV Line									
1.	Trisuli	Balaju	66	1	29.0	ACSR	100		1962	Tower (DC)
2.	Balaju	Siuchatar	66	2	4.0	ACSR	150	Wolf		Tower (DC)
3.	Sunkosi	Baneswar	66	1	55.0	ACSR	120		1972	Tower (SC)
4.	Hetauda	Amlekhgunj	66	2	16.0	ACSR	150	Wolf		Tower (DC)
5.	Amlekhgunj	Simra	66	2	10.0	ACSR	150	Wolf		Tower (DC)
6.	Simra	Parmanipur	66	2	9.0	ACSR	150	Wolf		Tower (DC)
7.	Paramanipur	Birgunj	66	2	9.0	ACSR	150	Wolf		Tower (DC)
8.	Kulikhani-I	Siuchatar	66	2	29.0	ACSR	150	Wolf	1982	Tower (DC)
9.	Kulikhani-I	Hetauda	66	2	16.0	ACSR	150	Wolf	1982	Tower (DC)
10.	Patan	Siuchatar	66	1st	7.0	ACSR	150	Wolf	1982	Tower (DC)
11.	Devigat	New Chabel	66	1st	33.0	ACSR	150	Wolf	1983	Tower (DC)
12.	Baneswar	N. Patan	66	1	2.8	ACSR	120	Wolf	1986	Tower (DC)
13.	Balaju	Lainchar	66	1	2.3	ACSR	200		1989	Pole-H (SC)
14.	Balaju	New Chabel	66	1	23.0	ACSR	100/150(b)		1990	

Remarks: a) "1st" means a single circuit on double-circuit towers.
b) Trisuli-Balaju and Devighat-New Chabel lines have been connected with jumper conductors since 1990.

Table 4.4 Existing Grid Substations - 132 and 66 kV

Name	Voltage (kV)	Unit Capacity (MVA)		No. of Units		Total Capacity (MVA)	Region
Butwal	132/33	10.0		2		20.0	Western
Bardaghat (Dumkibas)	132/11	5.0		1		5.0	Western
Chanauta (Shivpur)	132/33	5.0		1		5.0	Western
		5.0					
Lamahi	132/33	5.0		1		5.0	Mid Western
Kohalpur	132/33	5.0		2		10.0	Mid Western
Gandaki	6.6/131	10.0	/b	2		10.0	Western
Bharatpur	132/11	10.0		1		10.0	Central
Pokhara	132/11	6.0		1		6.0	Western
Damauli	132/33	5.0		1		5.0	Western
Dhalkebar	132/33/11	10.0		1		10.0	Central
Dubi (Biratnagar)	132/33	15.0		2		30.0	Eastern
Hetauda	132/66	20.0		1		20.0	Central
	132/66	10.0		1		10.0	
	66/11	6.0		2		12.0	
Marsyangdi	11/132	30.0	/b	3	/a	90.0	Western
	33/11	6.0	/b	1		6.0	
Kulekhani II	6.6/132	37.8	/b	1	/a	37.8	Central
Kulekhani I	66/11	3.0	/b	1		3.0	Central
	11/66	35.0	/b	2		70.0	
Siuchatar	132/66	37.8		1	/a	37.8	Central
	66/11	18.0		2		36.0	
Baneswar	66/11	18.0		1	/a	18.0	Central
Birgunj	66/11	6.0		1		6.0	Central
	66/11	3.15		2		6.3	
Trisuli	6.6/66	11.25	/b	2	/a	22.5	Central
Balaju	66/11	10.0		2		20.0	Central
	132/66	45.0		1	/a	45.0	
Phachkhal	66/11	1.5		1	/c	1.5	Central
Sunkosi	6.6/66	5.6	/b	2		11.2	Central
Parwanipur	66/11	1.5		2		3.0	Central
N. Patan	66/11	18.0		2	/a	36.0	Central
Devighat	6.6/66	6.3	/b	3		18.9	Central
N. Chabel	66/11	6.3		3		18.9	Central
Amlekhgunj	66/11	1.5		1		1.5	Central
Simra	66/11	1.5		1		1.5	Central
Lainchaur	66/11	10.0		2		20.0	Central

Notes:
/a Bank of single phase transformers.
/b Transformers at power station
/c Out of order

Table 4.5 Daily Report on Power Generation

NEPAL ELECTRICITY AUTHORITY
System Control Department
Load Dispatching Centre

Daily Generation Data

KULEKHANI Water level_____(metre)

Name of the Powr Station	Kulekhani 1	Kulekhani 2	Trishuli	Devighat	Gandak	Marsyangdi	Sunkoshi	HET.DIS	Total
Generation (MWH)									
Maximum Load (MW)									
System Peak (MW)									
Load Factor									
Generation upto date (MWH)									

Peak time: _____ hrs

Max load to Dhalkebar _____ (MW)
Max load to Bharatpur _____ (MW)
Max load to Birguni _____ (MW)

Frequency: Max _____ HZ
Min _____ HZ

Temp: Max _____ c
Min _____ c

Morning Peak _____ (MW); at _____ hrs.

Copy to:

1) Managing Director, NEA
2) Chief Director, Operation and Maintenance Directorate
3) Chief Director, Planning Directorate
4) Chief Director, Construction Directorate
5) Director, System Control Department
6) Director, Generation Department
7) Director, Transmission Department
8) Chief Director, Distribution & Consumer Services

_____
Shift incharge

_____
Deputy Manager
(Buddha Harayan Manandhar)

204 / / (/ /19),

Table 4.6 Existing 11 kV Ring Main Distribution Lines (Kathmandu)

S. No.	From	To	Circuit	Voltage (kv)	Length (KM)	Conductor Type
1	Balaju	Maharajgunj	SC	11	4.5	0.2 sq. in
2	Balaju	Old Chabel	SC	11	9.0	0.2 sq. in
3	Teku	Thapathali	DC (UGC)	11	1.7	200 sq. mm
4	Balaju	Teku	DC	11	3.8	0.2 sq. in
5	Teku	Siuchatar	DC	11	2.5	0.2 sq. in
6	Teku	N. Patan	DC	11	4.5	0.2 sq. in
7	New Patan	K-2	DC	11	4.8	0.2 sq. in
8	K-2	R. Palace	SC (UGC)	11	1.0	240 sq. mm
9	K-2	Lainchaur	SC (UGC)	11	1.7	240 sq. mm
10	Lainchaur	R. Palace	SC (UGC)	11	0.7	240 sq. mm
11	Maharajgunj	Old Chabel	SC	11	2.7	0.2 sq. in
12	Old Chabel	N. Chabel	DC	11	1.0	0.2 sq. in
13	N. Chabel	Bhaktapur	DC	11	9.6	0.2 sq. in
14	Bhaktapur	Thimi	DC	11	3.2	0.2 sq. in
15	Thimi	New Patan	DC	11	7.9	0.2 sq. in
16	Old Patan	N. Patan	DC (Cable)	11	0.05	0.1 sq. in

Source : NEA

Note : UGC = under ground power cables

Table 4.7 Existing 11 kV Feeders

Substation/ Switching Station	No.s of Feeder	Feeder Name	Length (km)
SIUCHATAR SUBSTATION	6	ROPEWAY (KIRTIPUR)	17.5
		KALIMATI	4.7
		KALANKI	1.2
		SWAYAMBHU	14.5
		THANKOT	31.5
		TAHACHAL	2.3
		SUBTOTAL	71.7
BALAJU SUBSTATION	4	DHARMASTHALI	27.6
		SWAYAMBHU	8.9
		B.I.D.	1.3
		NAYABAZAR	9.2
		SUBTOTAL	46.9
NEW CHABEL SUBSTATION	4	MAHARAJGUNJ	8.1
		AIRPORT	2.9
		SUNDARIJAL	34.0
		BOUDHA JORPATI	13.0
		SUBTOTAL	57.9
NEW PATAN SUBSTATION	2	OLD PATAN-2	0.0
		OLD PATAN-1	0.0
		SUBTOTAL	0.1
OLD PATAN SWITCHING STATION	6	RING ROAD	7.0
		RADIO NEPAL	3.5
		PATAN	3.1
		JAWALAKHEL	3.7
		PHARPING	34.4
		MANGAL BAZAR	1.5
		SUBTOTAL	53.3
BANESWAR SUBSTATION	6	BANESWAR	4.3
		AIRPORT	12.6
		GODAWARI-2	40.4
		GODAWARI-1	35.4
		IMADOL	10.0
		SHANKHAMUL	4.1
		SUBTOTAL	106.8
LAINCHAUR SUBSTATION	4	SPARE (NAYA BAZAR)	9.2
		LAZIMPAT	3.3
		KING'S WAY	4.8
		GAIRI-DHARA	5.9
		SUBTOTAL	23.1
OLD CHABEL SWITCHING STATION	4	BANESWOR	3.5
		NAXAL	7.0
		SUNDARIJAL (not used)	6.9
		TANGAL	3.5
		SUBTOTAL	20.9
TEKU SWITCHING STATION	8	PULCHOWK	8.5
		KALIMATI	0.5
		KIRTIPUR	4.7
		MINT	2.3
		TAHACHAL	4.0
		THANKOT	3.5
		BHIMSENTHAN	4.9
		TRIPURESWOR	1.2
		SUBTOTAL	29.6
K2 SWITCHING STATION	7	KING'S WAY	4.2
		KAMALADI	3.0
		SINGHA DURBAR	0.3
		MAHABOUDHA	2.0
		CITY-1	2.5
		TANGAL	4.7
		BABAR MAHAL	1.4
		SUBTOTAL	18.2
BHAKTAPUR SWITCHING STATION	6	BYASI	11.6
		KATUNJE	7.0
		NAUN CHOWK	14.7
		KHOPASI	13.7
		BRICK FACTORY	3.6
		NAGARKOT	27.2
		SUBTOTAL	77.8
MAHARAJGUNJ SWITCHING STATION	3	KING'S WAY	1.0
		BUDHANILKANTHA	19.6
		BALUWATAR	1.0
		SUBTOTAL	21.5
THIMI SWITCHING STATION	2	THIMI	12.3
		TROLLEY BUS	0.9
		SUBTOTAL	13.2
THAPATHALI SWITCHING STATION	6	TEKU	1.8
		PATAN	3.8
		THAPATHALI	1.2
		SINGHDARBAR	9.3
		SANEPA	2.8
		SUBTOTAL	18.9
TOTAL	68		559.9
AVERAGE	4.9		8.2

Table 4.8 Existing Distribution Transformers

(UNIT: Nos.)

Unit Capacity (KVA)	Number of Units					Total
	Kathmandu West	Kathmandu East	Kathmandu Central	Bhaktapur	Lalitpur	
10	0	4	1	0	2	7
15	5	7	4	1	0	17
25	44	18	2	19	18	101
30	6	1	0	0	0	7
45	2	0	0	0	1	3
50	39	37	19	53	38	186
63	2	0	1	0	2	5
75	0	2	1	1	1	5
100	132	109	188	65	156	650
125	2	1	6	1	2	12
150	14	5	10	1	8	38
200	16	9	26	3	12	66
250	24	22	137	4	28	215
300	0	0	0	3	1	4
315	0	0	3	0	1	4
350	1	0	0	0	0	1
400	2	0	0	0	1	3
500	1	4	6	0	2	13
600	0	0	0	0	1	1
650	0	0	1	0	0	1
750	1	0	2	0	3	6
1000	0	1	1	0	1	3
1300	0	0	1	0	0	1
2250	1	0	0	0	0	1
* 7265	21	0	0	0	0	21
Total Nos.	313	220	409	151	278	1371
Total kVA	40186	24700	70103	12490	34931	182410

Note: 1) This table is prepared based on the route map of distribution lines
2) This table includes private transformers.
3) Transformer capacity of 7265kVA marked with (*) is total capacity of 21 nos. of transformers.

Table 4.9 Overload and Voltage Drop on 11kV Distribution Lines (1989/90) (1/3)

FEEDER NAME	MAX. LOAD CUR-RENT (A)	SECTION-1					SECTION-2					SECTION-3					SECTION-4					VOLTAGE AT 11KV D/L END (P.U.)	JUDGE-MENT
		R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)	R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)	R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)	R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)		
SIUCHATAR S/S																							
ROPEWAY (KIRTIPUR)	95	0.3504	0.3268	2.6	345	95	0.6957	0.3483	3.4	223	66.279	0.6957	0.3483	2.6	223	28.721						0.957	O
KALIMATI	67	0.3504	0.3268	2	345	67	0.6957	0.3483	2	223	33.5											0.987	O
KALANKI	15	0.6957	0.3483	1	223	15	0.3504	0.3268	1	345	7.5											0.999	O
SWAYAMBHU	30	0.159	0.0856	0.5	375	30	0.3504	0.3268	5.7	345	28.421	0.6957	0.3483	3	223	10.421	1.1638	0.3645	0.3	161	0.9474	0.988	O
THANKOT	105	0.3504	0.3268	6.5	345	105	0.6957	0.3483	1.8	223	38.798	1.1638	0.3645	2	161	20.388						0.945	O
TAHACHAL	60	0.6957	0.3483	2	223	60	0.3504	0.3268	0.5	223	12											0.992	O
BALAJU S/S																							
DHARMASTHALI	90	0.6957	0.3483	2	223	90	0.3504	0.3268	4.5	345	62.308											0.975	O
SWAYAMBHU	50	0.3504	0.3268	1.5	345	50																0.997	O
B.I.D.	100	0.6957	0.3483	1	223	100																0.994	O
NAYABAZAR	120	0.3504	0.3268	0.5	345	120	0.159	0.0856	2.9	375	102.35											0.993	O
NEW CHABEL S/S																							
MAHARAJGUNJ	65	0.3504	0.3268	3.2	345	65																0.993	O
AIRPORT	NA	0.6957	0.3483	2.6	223	NA																NA	NA
SUNDARIJAL	35	1.4013	0.3703	8	158	35																0.968	O
BOUDHA JORPATI	200	0.6620	0.3481	3.7	223	200																0.957	O
CHABEL S/S																							
BANESWOR	100	0.6957	0.3483	3.6	223	100																0.976	O
NAXAL	125	0.3504	0.3268	3.2	345	125																0.986	O
SUNDARIJAL	90	1.4013	0.3703	8.2	158	90																0.916	X
TANGAL	52	0.3504	0.3268	2.3	345	52																0.996	O
NEW PATAN S/S																							
OLD PATAN-2	180	0.3504	0.3268	0.05	345	180																1.000	O
OLD PATAN-1	225	0.3504	0.3268	0.05	345	225																1.000	O
OLD PATAN S/S																							
RING ROAD	50	0.5046	0.3277	2	287	50																0.991	O
RADIO NEPAL	60	1.1638	0.3645	2	161	60																0.984	O
PATAN	105	0.5046	0.3277	1.5	287	105																0.989	O
JAWALAKHEL	80	0.5046	0.3277	2	287	80																0.988	O
PHARPING	90	0.3504	0.3268	6	345	90	0.6957	0.3483	4.2	223	37.059											0.955	O
MANGAL BAZAR	48	0.5046	0.3277	0.5	287	48	0.1278	0.0833	1	420	32											0.994	O

Table 4.9 Overload and Voltage Drop on 11kV Distribution Lines (1989/90) (2/3)

FEEDER NAME	MAX. LOAD CUR-RENT (A)	SECTION-1					SECTION-2					SECTION-3					SECTION-4					VOLTAGE AT 11KV D/L END (P.U.)	JUDGE-MENT
		R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)	R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)	R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)	R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)		
NEW BANEWOR S/S																							
BANESWOR	130	0.3504	0.3268	1.5	345	130	0.0979	0.0795	0.3	480	21.667											0.993	O
AIRPORT	180	0.3504	0.3268	6.7	345	180	0.6957	0.3483	1.1	223	25.385											0.947	O
GODAWARI-2	165	0.3504	0.3268	4	345	165	0.3504	0.3268	1	345	121	0.3504	0.3268	10	345	110						0.915	X
GODAWARI-1	130	0.3504	0.3268	4	345	130	0.1748	0.302	3	546	92.857	0.3504	0.3268	7	345	65						0.943	O
* IMADOL	80	0.3504	0.3268	4	345	80																0.989	O
SHANKHAMUL	138	0.3504	0.3268	2	345	138																0.991	O
TEKU S/S																							
PULCHOWK	115	0.3504	0.3268	3.5	345	115																0.986	O
KALIMATI	23	0.3504	0.3268	1.6	345	23																0.999	O
KIRTIPUR	30	0.3504	0.3268	2.4	345	30																0.998	O
MINT	130	0.3504	0.3268	1.2	345	130	0.159	0.0856	0.4	375	32.5											0.994	O
TAHACHAL	47	0.3504	0.3268	2.6	345	47																0.996	O
THANKOT	21	0.3504	0.3268	0.75	345	21																0.999	O
BHIMSENTHAN	135	0.159	0.0856	1.5	375	135	0.3504	0.3268	0.3	345	22.5											0.996	O
TRIPURESWOR	35	0.159	0.0856	0.5	375	35	0.3504	0.3268	0.8	345	21.538											0.999	O
K2 S/S																							
KING'S WAY	150	0.3504	0.3268	1.2	345	150	0.1218	0.0833	0.8	368	60											0.993	O
KAMALADI	95	0.1218	0.0833	0.7	368	95	0.3504	0.3268	1.1	345	58.056											0.996	O
SINGHA DURBAR	50	0.118	0.0817	0.3	439	50	0.3504	0.3268	1.6	345	43.478	0.6957	0.3483	0.4	223	8.6957						0.996	O
MAHABOUDHA	80	0.1218	0.0833	0.5	368	80	0.118	0.0817	0.6	439	51.429	0.3504	0.3268	0.3	345	17.143						0.998	O
CITY-1	110	0.118	0.0817	1.2	439	110																0.999	O
TANGAL	160	0.159	0.0856	0.7	375	160	0.3504	0.3268	2.7	345	127.06											0.984	O
BABAR MAHAL	70	0.159	0.0856	0.5	375	70	0.3504	0.3268	1	345	46.667											0.997	O
LAINCHAUR S/S																							
SPARE (NAYA BAZAR)	52	0.3504	0.3268	4	345	52																0.993	O
LAZIMPAT	100	0.159	0.0856	0.1	375	100	0.3504	0.3268	2.3	345	95.833											0.992	O
KING'S WAY	132	0.159	0.0856	0.3	375	132	0.3504	0.3268	1.5	345	110											0.993	O
GAIRI-DHARA	100	0.159	0.0856	0.15	375	100	0.3504	0.3268	2.5	345	94.34											0.991	O

Table 4.9 Overload and Voltage Drop on 11kV Distribution Lines (1989/90) (3/3)

FEEDER NAME	MAX. LOAD CUR-RENT (A)	SECTION-1					SECTION-2					SECTION-3					SECTION-4					VOLTAGE AT 11KV D/L END (P.U.)	JUDGE-MENT
		R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)	R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)	R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)	R (OHM/KM)	X (OHM/KM)	TRUNK LINE LENGTH (KM)	MAX. ALLOW CUR-RENT (A)	PASSING CUR-RENT (A)		
BHAKTAPUR S/S																							
BYASI	108	0.3504	0.3268	2	345	108																0.993	O
KATUNJE	42	0.159	0.0856	0.8	375	42	0.3504	0.3268	0.9	345	36.985	0.6957	0.3268	5	223	31.343						0.986	O
NALIN CHOWK	20	0.159	0.0856	0.7	375	20	0.3504	0.3268	2.6	345	18.028	0.6957	0.3483	3.8	223	10.704						0.993	O
BANEPA (KHOPASI)	58	0.1748	0.302	13	546	58																0.985	O
BRICK FACTORY	115	0.3504	0.3268	1.8	345	115																0.993	O
NAGARKOT	44	1.1638	0.3645	2.6	161	44	0.6957	0.3483	11	223	35.588											0.960	O
MAHARAJGUNJ S/S																							
KING'S WAY	NA	0.159	0.0856	1	375	NA																NA	NA
BUDHANILKANTHA	70	0.6957	0.3483	3.8	223	70																0.984	O
BALUWATAR	45	0.3504	0.3268	1.2	345	45																0.998	O
THIMI S/S																							
THIMI	95	0.3504	0.3268	2.3	345	95	0.6957	0.3483	3	223	53.774											0.975	O
TROLLEY BUS	30	0.3504	0.3268	0.9	345	30																0.999	O
THAPATHALI S/S																							
TEKU	54	0.3504	0.3268	1.1	345	54																0.998	O
PATAN	124	0.3504	0.3268	1.5	345	124																0.994	O
THAPATHALI	33	0.3504	0.3268	1.1	345	33																0.999	O
SINGHDARBAR	46	0.3504	0.3268	2.5	345	46																0.996	O
SANEPA	48	1.4013	0.3703	0.7	158	48	0.6957	0.3483	0.3	223	22.154	0.1278	0.0833	0.2	420	11.077	0.6957	0.3483	0.1	223	3.6923	0.995	O

Note:
1) "NA" means "Not Available" or "Not Applicable".
2) Max. load current is data measured on January 5,1990 except the feeder marked with * of which data was measured on October 10, 1990.
3) Voltage at D/L end for OLD PATAN S/S is calculated taking into account volatage drop between NEW PATAN S/S and OLD PATAN S/S.

Table 4.10 Number of Trips of Circuit Breakers on 11 KV Feeders (1/4)

SUBSTATIONS	FEEDER	FREQUENCY OF TRIPPING PER MONTH (NOS. / MONTH) 2046(1989)-2047(1990)																																							FREQUENCY OF TRIP/YEAR			LENGTH (KM)	FREQ./ YEAR/ KM	JUDGE
		APR-MAY BAISAKHA			MAY-JUN JESTHA			JUN-JUL ASADHA			JUL-AUG SHARAWAN			AUG-SEP BHADRA			SEP-OCT ASHWIN			OCT-NOV KARTIK			NOV-DEC MARGA			DEC-JAN POUCH			JAN-FEB MARGA			FEB-MAR FALGUN			MAR-APR CHAITRA								
		OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT			
SIUCHATAR	TEKU-2	1	0	1	1	5	6	2	3	5	7	1	8	2	3	5	0	3	3	0	2	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	13	18	31	2.50	12.40	O
	TR. NO.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.00	NA	
	BUS-COUPLER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	NA	
	TR. NO.1	0	1	1	3	0	3	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	5	0.00	NA	
	TEKU-1	0	1	1	1	6	7	2	2	4	1	5	6	3	5	8	1	2	3	0	1	2	0	2	2	0	1	1	0	0	0	0	0	0	0	0	0	8	26	34	2.50	13.60	O
	THANKOT	5	13	18	1	6	7	3	16	19	5	5	10	5	15	20	1	13	14	4	1	5	0	2	2	0	5	5	0	10	10	2	1	3	5	1	6	31	88	119	31.50	3.78	X
	TAHACHAL	1	1	2	0	0	0	12	2	14	0	1	1	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	14	5	19	2.30	8.26	O
	SWOYAMBHU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	6	6	0	1	1	2	0	2	2	2	4	3	1	4	3	1	4	11	12	23	14.50	1.59	O
	KALANKI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	2	4	6	1.20	5.00	O
	KALIMATI	0	0	0	0	0	0	0	0	0	0	3	3	0	1	1	2	2	4	4	0	4	0	1	1	0	0	0	0	4	4	0	0	0	1	0	1	7	11	18	4.70	3.83	O
	KIRTIPUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	3	3	6	0	0	0	5	0	5	4	0	4	13	4	17	17.50	0.97	O
BALAJU	DHARMASTHALI	1	6	7	2	7	9	4	19	23	2	9	11	0	4	4	1	3	4	0	4	4	0	0	0	0	0	0	0	1	1	0	0	0	0	8	8	10	61	71	27.60	2.57	O
	SWOYAMBHU	1	10	11	0	7	7	7	8	15	1	8	9	5	6	11	1	0	1	1	1	2	1	3	4	0	0	0	0	8	8	0	0	0	0	1	1	17	52	69	8.90	7.75	O
	MAHARAJGUNJ	4	0	4	0	0	0	1	0	1	5	1	6	4	3	7	2	1	3	2	1	3	3	3	6	3	3	6	0	2	2	0	0	0	0	2	2	24	16	40	4.43	9.03	O
	LAINCHOUR-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.20	0.00	O
	KALIMATI-1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	NA	NA	
	TEKU-1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4.00	0.50	O
	TR. NO.1	0	0	0	2	0	2	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6	0.00	NA	
	BUS-COUPLER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	NA	
	TR. NO.2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.00	NA	
	LAINCHOUR-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.20	0.00	O
	KALIMATI-2	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	NA	NA	
	B. I. D	5	0	5	3	3	6	0	9	9	1	3	4	0	0	0	2	0	2	1	0	3	0	1	1	0	0	0	0	1	1	1	2	3	0	0	0	13	19	34	1.30	26.15	O
	TEKU-2	0	0	0	0	0	0	0	0	0	1	1	2	2	3	5	0	0	0	0	2	1	0	2	2	0	1	1	0	0	0	0	1	1	0	0	0	3	10	12	4.00	3.00	O
	CHABEL	5	0	5	6	0	6	3	0	3	4	0	4	7	4	11	2	2	4	1	1	1	2	2	4	2	3	5	0	0	0	2	0	2	0	1	1	34	13	46	9.00	5.11	O
	NAYABAZAR	2	4	6	0	6	6	0	11	11	1	2	3	0	2	2	2	2	4	0	0	5	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	5	28	38	9.20	4.13	O
NEW-CHABEL	SUNDARIJAL	11	7	8	5	3	8	4	10	14	2	1	3	1	5	6	0	0	0	2	5	2	0	0	0	1	0	1	0	0	0	6	1	7	9	3	12	31	35	61	34.00	1.79	O
	INCOMER-3	0	0	0	0	4	4	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	6	6	0.00	NA	
	BHAKTAPUR-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	6	6	0	2	2	0	2	2	0	10	13	9.50	1.35	O
	CHABEL-2	0	0	0	0	6	6	1	3	4	1	6	7	0	0	0	0	1	1	0	3	3	0	0	0	2	0	2	6	0	6	1	1	2	4	4	8	15	24	39	1.00	39.00	O
	CHABEL-1	0	0	0	0	0	0	1	3	4	1	6	7	0	2	2	0	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	15	14	1.00	14.00	O
	BHAKTAPUR-1	1	0	1	1	5	6	0	0	0	0	2	2	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	5	5	0	2	2	0	2	2	2	18	20	9.60	2.08	O
	INCOMER-2	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	1	3	0	0	0	0	0	0	2	7	9	0.00	NA	
	INCOMER-1	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	4	6	0.00	NA	
	MAHARAJGUNJ	0	0	0	1	1	2	1	3	4	1	1	2	6	1	9	1	2	3	0	2	1	0	0	0	1	2	3	2	1	3	0	4	4	6	3	9	21	20	40	8.10	4.94	O
NEW-PATAN	THIMI-2	0	0	0	0	3	3	0	0	0	0	2	2	1	0	1	1	1	2	0	1	1	0	0	0	0	8	8	1	0	1	0	1	1	5	6	11	8	22	30	7.90	3.80	O
	PATAN-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	3	0.05	60.00	O
	KATHMANDU-2	0	0	0	0	1	1	0	1	1	0	2	2	0	0	0	1	1	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	2	7	11	4.20	2.62	O
	THAPATHALI-2	0	0	0	0	0	0	0	0	0	0	3	3	1	0	1	0	0	0	0	2	1	0	0	0	1	2	3	0	1	1	0	0	0	0	0	0	2	8	9	4.20	2.14	O
	TR. NO.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.00	NA	
	BUS-COUPLER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	NA	
	TR. NO.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.00	NA	
	THAPTHALI-1	0	0	0	0	0	0	0	0	0	0	4	4	5	1	6	1	2	3	0	2	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	6	10	14	4.20	3.33	O
	KATHMANDU-1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	3	4.20	0.71	O
	PATAN-1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0.05	40.00	O
	THIMI-1	0	0	0	0	0	0	0	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	1	1	3	3	6	7.90	0.76	O

Remarks: OC: Overcurrent relay
EF: Earth fault relay
TT: Total

Table 4.10 Number of Trips of Circuit Breakers on 11 KV Feeders (2/4)

SUBSTATIONS	FEEDER	FREQUENCY OF TRIPPING PER MONTH (NOS. / MONTH) 2046(1989)-2047(1990)																																					FREQUENCY OF TRIP/YEAR			LENGTH (KM)	FREQ./ YEAR/ KM	JUD GE.
		APR-MAY BAISAKHA			MAY-JUN JESTHA			JUN-JUL ASADHA			JUL-AUG SHARAWAN			AUG-SEP BHADRA			SEP-OCT ASHWIN			OCT-NOV KARTIK			NOV-DEC MARGA			DEC-JAN POUSH			JAN-FEB MAGHA			FEB-MAR FALGUN			MAR-APR CHITRA								
		OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT			
NEW-BANESWAR	MAIN TR.	4	0	4	0	2	2	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	1	0	1	7	4	11	0.00	NA	
	BANESWAR	3	9	12	1	8	9	3	3	6	1	4	5	0	1	1	1	3	4	1	5	6	1	0	1	6	3	9	2	0	2	4	0	4	1	2	3	24	38	62	4.30	14.42	O
	AIR PORT	2	8	10	5	9	14	1	3	4	0	3	3	0	11	11	0	10	10	0	3	3	1	8	9	2	1	3	1	1	2	1	8	9	4	15	19	17	80	97	12.60	7.70	O
	SANKHA-MUL	1	2	3	6	7	13	0	7	7	0	11	11	0	17	17	4	8	12	0	4	4	0	5	5	1	4	5	1	1	2	2	2	4	1	1	2	16	69	85	4.10	20.73	O
	GODAWARI-1	0	0	0	0	0	0	0	0	0	0	5	5	1	26	27	5	28	33	1	17	18	1	5	6	0	4	4	0	11	11	0	14	14	0	8	8	8	118	126	35.40	3.56	X
	GODAWARI-2	0	0	0	0	0	0	0	0	0	0	16	16	2	26	28	0	15	15	4	24	28	1	8	9	3	16	19	0	6	6	0	2	2	10	38	48	20	151	171	40.40	4.23	X
	IMBDOL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.00	0.00	O
PATAN	RING ROAD	4	0	4	2	0	2	0	1	1	9	10	19	1	3	4	0	0	0	0	2	2	2	2	4	0	0	0	0	0	0	6	8	14	0	4	4	26	28	54	7.00	7.71	O
	RADIP-NEPAL	0	2	2	0	0	0	1	1	2	0	1	1	3	3	6	2	5	7	0	3	3	6	6	12	0	0	0	0	0	0	1	2	3	1	7	8	14	30	44	3.50	12.57	O
	NEW-PATAN-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.00	O
	NEW-PATAN-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.02	0.00	O
	JAWALAKHEL	1	0	1	1	0	1	4	3	7	8	8	16	6	5	11	5	2	7	0	1	1	0	0	0	0	0	0	3	3	6	2	0	2	1	1	2	31	23	54	3.70	14.59	O
	PATAN	3	2	5	1	0	1	1	1	2	5	5	10	4	4	8	7	5	12	2	3	5	0	0	0	7	5	12	1	0	1	1	1	2	5	0	5	37	26	63	3.10	20.32	O
	PHARPING	8	11	17	5	7	12	3	18	21	13	8	21	12	5	17	2	4	6	0	0	0	3	2	5	1	3	4	2	3	5	0	0	0	4	8	12	51	69	120	34.40	3.49	X
	MANGAL BAZAR	0	0	0	0	0	0	1	2	3	3	3	6	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	6	6	13	19	1.50	12.67	O
TEKU	PULCHOK	6	12	18	2	3	5	0	0	0	3	5	8	8	7	15	4	1	5	6	5	11	1	3	4	0	0	0	0	0	0	1	1	2	2	4	6	35	41	74	8.50	8.71	O
	KALIMATI	0	0	0	0	0	0	0	0	0	1	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	0.50	8.00	O
	KIRTIPUR	8	6	14	9	15	24	3	13	16	4	5	9	6	7	13	6	4	10	6	6	12	5	2	7	7	4	11	0	1	1	2	2	4	1	0	1	57	65	122	4.70	25.96	X
	BHIMSENSTHAN	5	5	10	3	2	5	5	3	8	9	2	11	7	4	11	2	1	3	1	1	2	4	4	8	2	1	3	0	0	0	0	0	0	1	0	1	39	23	62	4.90	12.65	O
	TEKU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	NA	
	THANKOT	2	3	5	2	0	2	1	3	4	5	5	10	0	0	0	1	1	2	0	0	0	0	1	1	0	1	1	1	1	2	0	1	1	4	2	6	16	18	34	3.50	9.71	O
	PATAN-1	0	0	0	1	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	4.51	0.67	O
	PATAN-2	0	0	0	1	0	1	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	4.51	0.67	O
	SIUCHATAR-1	0	0	0	1	4	5	1	4	5	0	6	6	1	3	4	1	3	4	0	4	4	0	3	3	0	1	1	0	0	0	0	0	0	0	0	0	4	28	32	3.00	10.67	O
	SIUCHATAR-2	0	0	0	2	1	3	1	1	2	1	1	2	3	1	4	1	1	2	0	2	2	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	8	9	17	3.00	5.67	O
	BALAJU-1	0	0	0	1	3	4	1	0	1	2	7	9	2	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	13	19	4.00	4.75	O
	BALAJU-2	0	0	0	1	1	2	0	0	0	0	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	5	6	4.00	1.50	O
	TRIPURESHOR	0	0	0	1	1	2	0	2	2	3	3	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	10	1.20	8.33	O
	MINT	4	6	10	6	10	16	3	3	6	5	8	13	1	15	16	5	8	13	2	2	4	1	1	2	1	4	5	1	1	2	2	2	4	1	1	2	32	61	93	2.30	40.43	O
	TAHACHAT	2	3	5	3	3	6	9	11	20	3	3	6	16	8	18	3	4	7	6	5	11	2	4	6	2	3	5	2	2	4	2	2	4	12	12	24	56	60	116	4.00	29.00	X
K-2	PATAN-1	0	1	1	0	2	2	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	7	7	4.83	1.45	O
	PATAN-2	0	2	2	0	3	3	0	0	0	0	1	1	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	8	4.83	1.66	O
	LAINCHOUR	0	2	2	0	0	0	0	1	1	0	0	0	0	0	0	0	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	2.00	3.00	O
	RAJDURBAR	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	5	5	1.00	5.00	O
	TANGAL	1	0	1	0	2	2	0	2	2	0	2	2	0	3	3	0	4	4	1	0	1	0	1	1	0	0	0	0	3	3	0	0	0	0	0	0	2	17	19	4.70	4.04	O
	KAMALADI	1	1	2	0	0	0	1	2	3	0	1	1	0	0	0	0	2	2	0	0	0	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	3	7	10	3.00	3.33	O
	CITY-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2.20	0.45	O
	CITY-1	0	0	0	0	0	0	0	2	2	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	2.50	1.60	O
	MAHABOUDHA	7	0	7	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	0	1	1	0	0	0	2	0	2	1	1	2	0	0	0	1	0	1	12	4	16	2.00	8.00	O
	BABARMAHAL	1	4	5	0	2	2	0	1	1	1	0	1	0	0	0	0	0	0	2	1	3	3	1	4	0	0	0	0	0	0	2	2	4	0	0	0	9	11	20	1.40	14.29	O
	SINGH-DURBAR	0	1	1	1	3	4	0	1	1	1	0	1	0	0	0	1	0	1	1	0	1	0	1	1	0	0	0	0	2	2	0	1	1	0	2	2	4	11	15	0.30	50.00	O
	KING'S WAY	0	2	2	1	2	3	2	1	3	0	1	1	1	4	5	0	0	0	0	1	1	0	1	1	0	0	0	2	2	4	0	2	2	0	0	0	6	16	22	4.20	5.24	O

Remarks:
OC: Overcurrent relay
EF: Earth fault relay
TT: Total

Table 4.10 Number of Trips of Circuit Breakers on 11 KV Feeders (3/4)

SUBSTATIONS	FEEDER	FREQUENCY OF TRIPPING PER MONTH (NOS. / MONTH) 2046(1989)-2047(1990)																																					FREQUENCY OF TRIP/YEAR			LENGTH (KM)	FREQ/ YEAR/ KM	JUDGE
		APR-MAY BAISAKHA			MAY-JUN JESTHA			JUN-JUL ASADHA			JUL-AUG SHARAWAN			AUG-SEP BHADRA			SEP-OCT ASHWIN			OCT-NOV KARTIK			NOV-DEC MARGA			DEC-JAN POUSH			JAN-FEB MAGHA			FEB-MAR FALGUN			MAR-APR CHITRA								
		OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT			
LAINCHOUR	BALAJU-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	1.2	2.5	O
	BALAJU-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	1.2	1.667	O
	KATHMANDU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	*	NA	
	RAJDURBAR	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0.7	2.857	O
	NAYA BAZAR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	3	5	2	2	4	0	0	0	0	0	0	2	2	4	5	3	8	12	11	23	9.2	2.5	O
	LAZIMPAT	8	5	13	0	0	0	1	1	2	0	5	5	4	3	7	0	0	0	4	4	8	6	6	12	1	1	2	0	3	3	4	2	6	34	0	34	62	30	92	3.3	27.88	O
	GAIRIDHARA	7	3	10	3	4	7	4	2	6	0	5	5	0	3	3	3	2	5	1	1	2	9	10	19	2	2	4	0	1	1	3	1	4	3	3	6	35	37	72	5.9	12.2	O
	KING'S WAY	7	4	11	1	1	2	1	1	2	0	1	1	0	0	0	4	3	7	1	1	2	2	1	3	1	1	2	0	3	3	1	1	2	4	0	4	22	17	39	4.8	8.125	O
	LAINCHOUR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	NA	
CHABEL	MAHARAJGUNJ	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3.8	0.263	O
	BALAJU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	O
	BANESWAR	1	1	2	1	1	2	5	3	8	0	1	1	0	2	2	0	0	0	0	0	0	0	2	2	0	3	3	2	2	4	3	2	5	4	2	6	16	19	35	3.5	10	O
	NAXAL	1	0	1	0	0	0	2	4	6	1	4	5	0	9	9	6	6	12	0	0	0	0	2	2	0	0	0	0	3	3	0	0	0	1	2	3	11	30	41	7	5.857	O
	BOUDHA-JORPAT	4	0	4	0	11	11	7	11	18	0	19	19	4	10	14	8	8	16	1	5	6	1	8	9	1	5	6	3	7	10	11	9	20	9	11	20	49	104	153	5	30.6	X
	NEW-CHABEL-1	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0.5	6	O
	NEW-CHABEL-2	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	2	O
	AIR PORT	2	2	4	0	3	3	4	2	6	1	1	2	2	2	4	3	2	5	1	1	2	1	3	4	0	1	1	0	4	4	0	2	2	4	0	4	18	23	41	4.5	9.111	O
	TANGAL	0	0	0	0	2	2	7	7	14	2	1	3	11	7	18	3	3	6	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0	0	1	1	24	22	46	3.5	13.14	O
BHAKTAPUR	CHABEL-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.6	0	O
	NAGARKOT	1	3	4	1	7	8	5	8	13	1	9	10	2	8	10	1	3	4	2	2	4	0	1	1	2	4	6	4	2	6	2	4	6	3	2	5	24	53	77	27.2	2.831	O
	THIMI-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2	0	O
	BRICK	0	14	14	1	8	9	0	0	0	0	3	3	1	6	7	0	3	3	2	1	3	1	2	3	0	1	1	0	0	0	0	1	1	0	1	1	5	40	45	3.6	12.5	O
	KATUNJE	0	0	0	0	0	0	4	28	32	0	5	5	2	0	2	4	2	6	2	3	5	1	0	1	0	1	1	0	4	4	0	2	2	1	2	3	14	47	61	7	8.714	O
	BUS-COUPLER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	NA	
	KHOPASI	0	0	0	1	8	9	7	7	14	5	20	25	5	12	17	1	7	8	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	21	54	75	13.7	5.474	O
	THIMI-1	6	10	16	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	8	11	19	3.2	5.938	O
	BYASI	0	1	1	1	3	4	1	1	2	0	1	1	2	0	2	3	1	4	0	2	2	0	0	0	1	0	1	0	2	2	0	5	5	0	3	3	3	19	27	11.6	2.328	O
	CHABEL-1	0	1	1	0	6	6	2	8	10	1	6	7	5	3	8	2	4	6	1	3	4	6	1	7	1	0	1	1	0	1	0	0	0	0	0	0	19	32	51	9.6	5.313	O
	NAUNCHOUK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	3	1	4	9	0	9	13	1	14	14.7	0.952	O
MAHARAJGUNJ	BALAJU	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	4	1	5	4.5	1.111	O
	CHABEL	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2.66	0.376	O
	KING'S WAY	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	O
	BALUWATAR	6	0	6	0	1	1	0	0	0	1	1	2	3	1	4	0	0	0	0	2	2	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	10	7	17	1	17	O
	BUDHANILKANTH	3	6	9	2	3	5	0	3	3	1	1	2	2	7	9	0	0	0	0	3	3	2	4	6	1	0	1	0	1	1	0	2	2	3	6	9	14	36	50	19.6	2.551	O
THIMI	PATAN-1	1	1	2	2	4	6	0	0	0	3	6	9	9	3	12	1	5	6	1	0	1	2	5	7	3	1	4	0	2	2	1	1	2	0	6	6	23	34	57	7.9	7.215	O
	PATAN-2	1	1	2	2	7	9	0	0	0	3	6	9	2	8	10	1	6	7	1	0	1	1	5	6	4	1	5	0	2	2	1	1	2	0	6	6	16	43	59	7.9	7.468	O
	THIMI	4	4	8	1	17	18	0	0	0	6	15	21	2	8	10	2	3	5	0	2	2	1	6	7	1	1	2	2	9	11	3	3	6	1	6	7	23	74	97	12.3	7.886	O
	TROLLEY-BUS	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0.9	2.222	O
	BHAKTAPUR-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.2	0	O
	BHAKTAPUR-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	3.2	0.313	O

Remarks: OC: Overcurrent relay
EF: Earth fault relay
TT: Total

Table 4.10 Number of Trips of Circuit Breakers on 11 KV Feeders (4/4)

SUBSTATIONS	FEEDER	FREQUENCY OF TRIPPING PER MONTH (NOS. / MONTH) 2046(1989)-2047(1990)																																					FREQUENCY OF TRIP/YEAR			LENGTH (KM)	FREQ./ YEAR/ KM	JUDGE
		APR-MAY			MAY-JUN			JUN-JUL			JUL-AUG			AUG-SEP			SEP-OCT			OCT-NOV			NOV-DEC			DEC-JAN			JAN-FEB			FEB-MAR			MAR-APR								
		BAISAKHA			JESTHA			ASADHA			SHARAWAN			BHADRA			ASHWIN			KARTIK			MARGA			POUSH			MAGHA			FALGUN			CHITRA								
		OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT	OC	EF	TT			
THAPATHALI	INCOMER-1	1	0	1	3	0	3	11	0	11	3	0	3	4	0	4	0	0	0	0	6	0	0	0	0	1	1	2	0	0	0	0	2	2	0	0	0	23	3	26	1.7	15.29	O
	TEKU	1	0	1	2	1	3	3	0	3	1	1	2	1	0	1	0	0	0	1	1	2	0	0	0	1	1	2	2	0	2	2	1	3	0	0	0	14	5	19	1.8	10.56	O
	PATAN	4	2	6	4	2	6	5	3	8	3	0	3	6	0	6	0	0	0	1	0	1	1	1	2	4	0	4	3	1	4	2	2	4	4	2	6	37	13	50	3.8	13.16	O
	THAPATHALI	0	0	0	1	2	3	3	0	3	3	0	3	1	0	1	0	0	0	2	1	3	0	0	0	0	0	0	0	1	1	0	1	1	0	2	2	10	7	17	1.2	14.17	O
	SINGH-DURBAR	1	0	1	1	4	5	8	1	9	9	0	9	4	0	4	0	0	0	0	1	1	0	0	0	1	1	2	2	0	2	1	1	2	0	1	1	27	9	36	9.3	3.871	O
	SANEPA	1	1	2	3	4	7	1	0	1	1	0	1	2	0	2	0	0	0	6	1	7	2	1	3	0	0	0	0	1	1	0	0	0	2	1	3	18	9	27	2.8	9.643	O
	INCOMER-2	2	0	2	3	0	3	11	0	11	3	0	3	4	0	4	0	0	0	0	0	0	1	1	2	1	1	2	0	0	0	0	2	2	0	0	0	25	4	29	1.7	17.06	O
TOTAL		150	184	334	115	261	376	180	277	457	162	314	476	192	309	501	119	222	341	78	175	253	84	145	229	81	107	188	50	134	184	88	115	203	180	211	391	1479	2454	3933	742.6	5.296	

Remarks: OC: Overcurrent relay
EF: Earth fault relay
TT: Total

Table 4.11 Utilization Factor of Distribution Transformers in Lalitpur Division (1989/90) (1/3)

Name of Transformer			Peak Load Current				Utilization
Tr.No.	KVA	Location	R	Y	B	Date	Factor
11	100	Sat Dobato	100	98	75	Nov.15, 1989	0.693
12	100	" Ringroad	128	130	138	"	0.956
15	100	" Godawaryway	87	61	98	Nov.13, 1989	0.679
16	100	Batuki Bhairab	54	24	30	Mar.19, 1990	0.374
701	100	Talchikhel	106	111	93	Nov.16, 1989	0.769
702	100	Jwarkunj Ringroad	152	187	158	Dec.05, 1989	1.296
703	100	Kusunti	153	121	131	"	1.060
704	100	Tikhederal	140	130	125	Nov.16, 1989	0.970
706	100	Bagdol-Nakhu	112	66	93	Dec.16, 1989	0.776
707	25	Bagdol	162	-	-	Dec.11, 1989	4.489
708	100	Pattiba	146	137	185	Mar.19, 1990	1.282
704A	50	Nakhipot(Tikhedeva)	30	14	60	Nov.15, 1989	0.831
801	100	Lagankhel	135	158	128	Dec.09, 1989	1.095
-	100	Thasikhel	250	105	230	Dec.05, 1989	1.732
601A	100	Eebahal	80	75	85	Dec.19, 1989	0.589
602	250	Ekhalakhu	276	248	253	Nov.26, 1989	0.765
603	100	Balakha	126	106	129	Dec.01, 1989	0.894
604	100	Purnachandi	108	119	118	Nov.28, 1989	0.824
605	200	Gabahal	174	187	183	Dec.15, 1989	0.648
617	250	Mangal Bazar	150	135	115	Jan.06, 1990	0.416
617A	100	Mahapal	50	45	30	Sept.18,1989	0.346
618	200	Tangal	173	161	146	Dec.24, 1989	0.599
201	100	Naradera	130	85	77	Oct.04, 1989	0.901
202	100	Man Bhawan	150	195	140	Nov.24, 1988	1.351
205	100	Taphaloo	170	177	140	Nov.17, 1989	1.226
204	100	Kumaripati	110	124	115	Nov.27, 1989	0.859
205	100	Agnisala	102	152	109	Nov.23, 1989	1.053
206	200	Tadhoka	160	168	180	Nov.18, 1989	0.624
211	100	Jwarkunja	60	55	90	Aug.30, 1989	0.624
204B	100	Kumaripati	135	100	116	Nov.11, 1989	0.935
-	100	Patan Hospital	105	92	100	Nov.20, 1989	0.727
-	100	Bigi Iron	120	100	168	Nov.23, 1989	1.164
-	100	Dakhinkali	154	104	176	Mar.01, 1990	1.219
501	200	Lagankhel Bus Stop	242	205	284	Feb.18, 1990	0.984
502	100	Lagankhel Wood Depo	70	45	90	Jan.04, 1989	0.624
503	100	Lagankhel Podetole	137	117	92	Nov.14, 1989	0.949
-	100	Kani Bahal	75	54	103	Nov.06, 1989	0.714
507	100	Sincha-biry	80	75	50	Nov.17, 1988	0.554
506	150	Okubahal	100	195	155	Dec.14, 1989	0.901
508	100	Lukhusi	160	150	200	26-May-89	1.386
509	250	Dhalachhe	136	137	151	Nov.29, 1989	0.418
510	250	Tyagal	312	259	239	Dec.01, 1989	0.865
510A	100	Pillachhe	136	137	151	Nov.29, 1989	1.046
511	250	Pinchhe	334	357	306	Dec.01, 1989	0.989
512	250	Guitole	242	205	276	Dec.03, 1989	0.765

Table 4.11 Utilization Factor of Distribution Transformers in Lalitpur Division (1989/90) (2/3)

Name of Transformer			Peak Load Current				Utilization
Tr.No.	KVA	Location	R	Y	B	Date	Factor
513	100	Bhul-dhoka	137	119	147	Dec.03, 1989	1.018
514	100	Chapat Ganesh	90	95	60	Oct.26, 1988	0.658
-	100	Gwarko	113	106	146	Dec.20, 1989	1.012
616	100	Bailachhe	102	95	115	Dec.20, 1989	0.797
616A	100	Bailachhe	110	101	110	Dec.20, 1989	0.762
615	250	Kobahal Tole	187	214	250	Nov.29, 1989	0.693
614	100	Kumbheswore	140	114	168	Nov.29, 1989	1.164
613	250	Kwalakhu	275	425	250	Dec.02, 1988	1.178
612	100	Dhapagal	110	100	115	Aug.25, 1989	0.797
609	200	Ekhachhe Tole	100	96	107	Dec.15, 1989	0.371
608	100	Tapahity	143	140	154	Dec.15, 1989	1.067
610	100	Nagabahal	106	93	121	Dec.07, 1989	0.838
606	250	Nakabahil	251	186	240	Dec.15, 1989	0.696
611	250	Dhallayacha	177	229	210	Dec.07, 1989	0.635
607	100	Ashok Hall	185	162	152	Dec.07, 1989	1.282
504	150	Thaina	210	138	182	Dec.24, 1989	0.970
517	250	Walkhu	60	135	150	Oct.03, 1987	0.416
505	100	Saugal Tole	125	150	120	Dec.23, 1988	1.039
-	100	Khhapinchhe	104	105	138	Nov.28, 1989	0.956
516A	100	Chyasal Tole	127	40	51	Nov.28, 1989	0.880
515	250	Neuta	228	258	210	Nov.28, 1989	0.715
516	250	Chyasal Tole	298	286	288	Nov.28, 1989	0.826
101	250	Kupandole	335	240	300	Dec.13, 1988	0.928
101A	100	Hotel Himalaya	114	78	133	Oct.20, 1989	0.921
104	100	Jwagal	119	157	163	Dec.12, 1989	1.129
105	250	Chakupat Bread	230	247	201	Nov.30. 1989	0.685
108	125	Sajha Bus	158	80	117	Feb.14, 1990	0.876
-	100	Jwagal	100	167	140	Dec.12, 1989	1.157
215	100	Chhyabahal	100	100	146	Dec.01, 1989	1.012
218	150	Pulchowk Police	167	150	155	Dec.04, 1989	0.771
219	100	Natole	110	195	135	Dec.01, 1989	1.351
102	100	Kandevtasthan	159	158	177	Dec.12, 1989	1.226
316	100	Tanginchauk	76	85	50	Nov.20, 1989	0.589
103	250	Kupandole(Aurbed)	365	360	330	Dec.12, 1989	1.012
309	100	Sanepa Amarabati	152	120	150	Nov.17, 1989	1.053
310	100	Gusingal	83	21	75	Nov.18, 1989	0.575
313	100	Nanicha Shop	79	87	98	Dec.12, 1989	0.679
314	100	Bakhundole Greenwich	95	116	129	Nov.20, 1989	0.894
315	100	"	100	109	75	Nov.24, 1989	0.755
-	100	"	141	151	140	Nov.21, 1989	1.046
212	150	Panchayat Training	161	143	156	Dec.13, 1989	0.744
213	100	Jawalakhel Busn Stop	103	78	141	Jan.23, 1990	0.977
214	100	Machagal	200	142	220	Oct.16, 1989	1.524
216	100	Damkal West	150	125	125	Sept.21,1987	1.039
217	100	Damkal East	210	195	236	Dec.19, 1989	1.635

Table 4.11 Utilization Factor of Distribution Transformers in Lalitpur Division (1989/90) (3/3)

Name of Transformer			Peak Load Current				Utilization
Tr.No.	KVA	Location	R	Y	B	Date	Factor
307	100	Sanepa	108	91	84	Nov.28, 1989	0.748
308	100	"	135	113	158	Nov.24, 1989	1.095
709	100	Bhanimandal	238	167	232	Sept.03,1989	1.649
710	100	Gainda Goath	129	143	145	Dec.10, 1989	1.005
311	100	Sanchal	158	75	190	Nov.26, 1989	1.316
312	100	Sanepa Kalolpul	99	65	86	Nov.27, 1989	0.686
711A	150	Dhobighat	243	175	225	Dec.10, 1989	1.122
712	100	Dhobighat Chaur	155	139	175	Dec.07, 1989	1.212
713	100	Hari Shop	112	120	170	Dec.11, 1989	1.178
317	100	Ex.Military Organisation	115	125	135	Apr.06, 1990	0.935
716	100	Jawalakhel Wood	40	55	70	Dec.31, 1988	0.485
-	100	Kharibot	140	118	121	Nov.18, 1989	0.970
-	100	Sanepa Sanchal	79	77	118	Nov.26, 1989	0.818
717	150	Tibetan Gumpa	128	170	60	Dec.13, 1989	0.785
708C	100	Pashupati Textile	107	93	82	Nov.26, 1989	0.741
909	100	Lubhu Police	120	135	150	Dec.10, 1989	1.039
910	250	Lubhu Bazar	350	350	400	Jan.13, 1989	1.109
911	250	Sanugaun Bazar	500	450	425	Jan.06, 1989	1.386
913	200	Sanugaun Purba	325	350	350	Jan.13, 1989	1.212
907A	50	Lamatar No.1	35	25	15	Jan.10, 1989	0.485
907B	50	Lamatar No.2	65	40	30	Jan.10, 1989	0.901
401D	200	Tuttepani	158	134	146	Feb.23, 1989	0.547
209	250	Chhayabahal	363	337	388	Nov.27, 1988	1.075
-	100	Nirbhawan	102	150	129	Dec.08, 1988	1.039
-	250	Sundhara	200	135	150	Oct.26, 1988	0.554
444	100	Thecho	120	85	90	Nov.16, 1987	0.831
444A	200	Thecho Bazar	105	150	170	Nov.16, 1987	0.589
419	200	Badegaun	120	150	135	Oct.14, 1987	0.520
417A	100	Thaiba Road	25	55	80	Nov.30, 1988	0.554
417	100	Thaiba City	150	95	135	Oct.16, 1987	1.039
414	250	Harisiddhi Chaur	385	430	475	Oct.16, 1987	1.316
414A	100	Harisiddhi Main Road	60	60	120	Nov.04, 1987	0.831
415	150	Harisiddhi City	200	200	200	Nov.04, 1987	0.924
Average	134.1		150.9	143.1	154.3		0.935

Table 4.12 Circuit Breakers Data - 132 kV and 66 kV

Substation	Rated Voltage	Rated Current	Breaking Current	B/L	Type
1. 132 kV Circuit Breakers					
Balaju	145 kV	1,250 A	20 kA	650 kV	GIS
Siuchatar	145 kV	800 A	25 kA	650 kV	SF6
2. 66 kV Circuit Breakers					
Balaju: Bus Tie	72.5 kV	1,250 A	20 kA	325 kV	GIS
Others	72.5 kV	630 A	20 kA	325 kV	GIS
Siuchatar	66 kV (Nominal)	800 A	13.1kA	350 kV	MINI OIL
New Patan	66 kV (Nominal)	800 A	13.1 kA	350 kV	MINI OIL
Sunkosi-Patan	*1	1,000 A	20 kA	*1	*1
New Baneswar	72 kV	600 A	12.5 kA	350 kV	SF6
New Chabel	66 kV (Nominal)	1,600 A	21.9 kA	325 kV	MINI OIL
Lainchaur *2	72.5 kV	630 A	20 kA	325 kV	GIS

*1: Information is not available
*2: Data for original CB before fire accident

Table 4.13 11 kV Circuit Breakers Data

Substation or Switching Station	Breaking Capacity	Type	Q'ty	Remarks
Balaju	20.0 kA	MINI OIL	16 nos.	AEG
Siuchatar	26.3 kA	MINI OIL	12 nos.	India. Mf.
New Patan	26.3kA	MINI OIL	11 nos.	India. Mf.
New Baneswar	25.0 kA	VC	10 nos.	Japanese Mf.
New Chabel	18.4 kA	BULK OIL	14 nos.	India. Mf.
Lainchaur (*1)	20.0 kA	V C	8 nos.	Chines. Mf.
Teku - A	7.88 kA	BULK OIL	11 nos.	English Elec.
- B	20.0 kA	BULK OIL	6 nos.	Yorkshire
K-2	25.0 kA	VC	18 nos.	Japanese Mf.
Royal Palace	7.88 kA	BULK OIL	5 nos.	English Elec.
Bhaktapur	20.0 kA	BULK OIL	11 nos.	Yorkshire
Old Chabel	7.88 kA	BULK OIL	10 nos.	English Elec.
Old Patan				
- Gen. Circuit	13.1 kA	BULK OIL	1 no.	English Elec.
- Mangal Line	20.0 kA	BULK OIL	1 no.	Yorkshire
- Others	7.88 kA	BULK OIL	11 nos.	English Elec.
Thimi	7.88 kA	BULK OIL	6 nos.	English Elec.
Maharajgunj	7.88 kA	BULK OIL	5 nos.	English Elec.
Thapathali	40.0 kA	MINI OIL	8 nos.	Japanese Mf.

(*1) Tempolary use.

Table 5.1 Monthly Energy Production by Hydropower Plants (1/2)

Unit: MWh

Description	Shrawan 7/8	Bhadra 8/9	Ashwin 9/10	Kartik 10/11	Marga 11/12	Poush 12/1	Magha 1/2	Falgun 2/3	Chitra 3/4	Baishak 4/5	Jestha 5/6	Asadha 6/7	Total
2040/41(83/84)	21572.8	23993.4	22649.4	22553.1	25182.2	28694.4	27761.2	25437.7	22694.1	21983.0	23876.7	23686.5	290084.5
Trishuli	7582.3	8744.7	8402.0	7999.2	8425.9	8496.8	8314.8	8349.0	7929.9	8092.8	8396.1	9403.3	100136.6
Devighat	2159.4	3825.0	2818.3	3677.4	2075.7	3073.8	3376.2	3280.7	2887.3	2859.6	4085.5	3423.5	37542.1
Sunkoshi	5304.0	5396.2	5236.3	5680.8	4897.0	3782.9	2880.0	2556.0	1152.5	3169.0	4533.1	4704.0	49291.7
Gandak	1582.2	3059.6	2674.9	2747.7	2422.7	1881.0	2146.2	2150.1	726.2	974.7	1714.0	1508.7	23588.0
Kulekhani I	4945.0	2968.0	3518.0	2448.0	7361.0	11460.0	11044.0	9102.0	9998.3	6887.0	5148.0	4647.0	79526.3
2041/42(84/85)	24680.5	23551.8	22896.8	24807.6	27225.0	32150.8	30173.6	28170.1	26202.0	25987.4	27607.2	28547.6	322000.4
Trishuli	9216.8	8305.9	6699.2	6024.0	7226.8	7958.2	7616.4	7999.1	8279.2	7154.8	6683.9	5950.0	89114.2
Devighat	107.8	3946.5	4213.6	3925.7	4389.6	5082.9	4884.3	4950.2	4566.8	4299.0	4145.9	3607.5	48119.8
Sunkoshi	3964.3	3734.2	5901.1	4005.1	2582.4	2561.8	2800.8	2684.2	2415.4	2656.3	4262.8	5155.2	42723.6
Gandak	2344.6	319.3	1367.9	4698.9	5270.2	2969.9	4271.1	4261.6	1684.7	1269.2	4198.6	3722.9	36378.8
Kulekhani I	9047.0	7246.0	4715.0	6154.0	7756.0	13578.0	10601.0	8275.0	9256.0	10608.0	8316.0	10112.0	105664.0
2042/43(85/86)	29217.6	29926.6	29940.1	28521.2	32923.9	37489.2	39494.9	35850.9	35704.2	36339.0	38832.1	39954.0	414193.5
Trishuli	5033.7	5883.8	7551.8	6398.2	7829.7	8011.1	8501.5	6351.2	6508.2	8735.3	8319.5	8704.7	87828.5
Devighat	3144.5	3495.7	3294.6	2982.1	4841.3	5546.3	4653.8	3358.2	4245.3	5549.6	5085.0	5308.1	51504.4
Sunkoshi	5566.9	5209.0	6385.4	6718.6	5788.8	4486.8	3343.2	3063.8	3093.1	4057.1	4991.1	4594.7	57298.5
Gandak	2532.4	2116.1	3688.3	3985.3	4444.2	4383.0	4484.4	4078.7	1404.6	2149.0	4570.6	5314.5	43151.1
Kulekhani I	12940.0	13222.0	9020.0	8437.0	10020.0	15062.0	18512.0	18999.0	20453.0	15848.0	15866.0	16032.0	174411.0
2043/44(86/87)	41763.5	38410.1	37645.5	37648.2	43316.3	49747.1	45620.6	45321.9	43143.5	44686.5	43303.2	44781.1	515387.4
Trishuli	8974.1	9247.2	9411.3	8720.2	8074.2	8155.3	8230.9	6262.3	6761.5	9114.8	9107.9	9373.6	101433.1
Devighat	5385.2	5271.9	5816.1	5619.7	5715.2	5661.4	3565.5	3500.2	2795.8	6077.8	6054.6	6138.7	61601.9
Sunkoshi	4802.4	4178.4	5940.5	4899.1	4607.5	4153.0	3003.4	2534.4	3288.0	3272.2	2863.7	1592.8	45135.2
Gandak	5029.9	4368.6	4501.6	5090.2	5631.5	5760.9	4774.8	4207.4	1911.0	2081.7	5790.3	3124.9	52272.7
Kulekhani I	17572.0	15344.0	11976.0	13319.0	14078.0	17260.0	17440.0	19250.0	18980.0	15952.0	12914.0	15511.0	189596.0
Kulekhani II					5209.9	8756.5	8606.1	9567.6	9407.3	8188.2	6572.8	9040.1	65348.5
2044/45(87/88)	43176.4	46214.6	43286.1	43239.0	46937.6	49758.6	48027.7	44239.0	41711.5	42923.1	44910.1	44855.5	539279.1
Trishuli	8898.6	8867.8	9580.5	9336.5	8991.6	8955.2	8250.3	8660.7	8805.3	8126.3	9219.8	9145.2	106837.8
Devighat	5214.5	5131.5	6442.4	6728.6	6505.8	6591.9	6038.7	6247.8	6414.6	5805.6	6435.8	5887.1	73444.1
Sunkoshi						845.3	2242.6	1168.3	696.3	1750.6	2185.4	1751.0	10639.5
Gandak	2297.1	3116.0	4415.8	5192.1	4991.2	5638.8	3280.4	3061.0	1480.6	2967.3	6254.9	3856.6	46551.8
Kulekhani I	15831.0	17780.0	14987.0	14478.0	17825.0	18740.0	19192.0	17068.0	16487.0	16402.0	14037.0	15340.0	198167.0
Kulekhani II	10935.2	11319.3	7860.4	7503.9	8624.0	8987.4	9023.8	8033.2	7827.6	7871.4	6777.2	8875.5	103638.9

Table 5.1 Monthly Energy Production by Hydropower Plants (2/2)

Unit: MWh

Description	Shrawan 7/8	Bhadra 8/9	Ashwin 9/10	Kartik 10/11	Marga 11/12	Poush 12/1	Magha 1/2	Falgun 2/3	Chitra 3/4	Baishak 4/5	Jestha 5/6	Asadha 6/7	Total
2045/46(88/89)	48501.0	46299.5	46705.7	42392.7	43974.6	50762.3	47490.6	46996.8	37978.1	35398.4	37205.0	41221.2	524925.9
Trishuli	9682.1	9220.5	9305.3	9276.3	8893.2	8545.9	8501.7	9101.5	9260.0	9202.4	9184.5	8879.3	109052.5
Devighat	6217.5	5993.5	6496.5	6711.3	6569.8	6509.4	6532.7	6914.7	7122.6	6969.0	6855.8	6156.2	79048.8
Sunkoshi	2858.9	3875.5	3535.2	4270.1	4057.4	4196.2	4058.9	3545.3	4022.9	4653.1	4733.8	4770.7	48577.9
Gandak	2823.3	1122.8	1354.9	4878.7	5336.5	5555.4	5953.4	5137.8					32162.8
Kulekhani I	16808.0	15482.0	17011.0	12135.0	13273.0	17985.0	15563.0	15431.0	12139.0	10018.0	11209.0	13818.0	170872.0
Kulekhani II	10111.2	10605.3	9002.9	5121.3	5844.7	7970.4	6880.9	6866.6	5433.6	4555.9	5222.0	7597.0	85211.8
2046/47(89/90)	50442.5	51107.5	49042.8	53864.3	63746.3	66448.5	60992.6	56351.9	54349.4	59735.4	60525.3	60028.5	686634.8
Trishuli	8455.4	8584.1	8450.9	9006.4	8203.5	6938.5	7462.8	7660.6	7977.8	6348.6	8421.5	8670.4	96180.4
Devighat	6074.7	6157.6	6253.8	6880.6	6114.6	5264.1	5819.4	5933.5	6111.8	4727.5	6250.4	6233.2	71821.2
Sunkoshi	4269.1	4410.2	4446.2	5513.9	4380.0	3034.6	2960.2	3038.4	3255.4	3776.3	774.2	2503.7	42362.2
Gandak	4059.4	3248.6	4968.8	4983.4	5319.2	4215.3	3822.3	3654.4	2938.4	1388.9	5221.1	4970.3	48790.1
Kulekhani I	17250.0	18641.0	16134.0	10800.0	12007.0	13251.0	10828.0	8331.0	5902.0	6573.0	7262.0	5611.0	132590.0
Kulekhani II	10334.0	10066.0	8789.0	4783.0	5211.0	5628.0	4592.0	3603.0	2497.0	2694.0	3013.0	1690.0	62900.0
Marsyangdi				11897.0	22511.0	28117.0	25508.0	24131.0	25667.0	34227.0	29583.0	30350.0	231991.0

Table 5.2 Annual Energy Sales by Region and by Tariff (1989/90)

Unit: MWh

	Bagmati	Central Jnakpur	Narayani	East-ern	Western Gandaki	Western Lumbini	Mid&Far Western	Total	(Share in %)
Domestic	150,883	5,767	23,154	16,455	10,863	15,565	7,796	230,483	42.2
Non-commercial	27,586	1,539	3,479	4,267	5,252	1,831	3,001	46,955	8.6
Commercial	27,148	749	1,992	1,289	1,038	497	1,090	33,803	6.2
Industrial	43,082	10,952	60,286	38,884	4,491	14,617	5,908	178,220	32.6
Water Supply	7,464	318	505	1,345		1,910	387	11,929	2.2
Irrigation	207	1,701	8,147	100		1,661	149	11,965	2.2
Street Right	2,962	277	668	837	85	1,146	1,272	7,247	1.3
Temporary Supply	116		112	43	39	20	65	395	0.1
Transportation	1,882		160				18	2,060	0.4
Temples	115	17		96		25	12	265	0.0
Bulk Supply(Expo)			3,978	1,631		17,677		23,286	4.3
Total	261,445	21,320	102,481	64,947	21,768	54,949	19,698	546,608	100.0
(Share in %)	47.8	3.9	18.7	11.9	4.0	10.1	3.6	100.0	

Source: NEA Commercial Department, Revenue Division
Statement of units sold, revenue analisys no. of consumers and collection

Table 5.3 Number of Customers in Recent 5 Years

	1985/86	1986/87	1987/88	1988/89	1989/90
Domestic	175,860	208,870	230,178	251,753	274,921
Industrial	4,575	5,464	6,181	6,769	7,482
Commercial	527	315	641	1,678	1,758
Non-commercial	1,881	1,768	2,403	3,477	4,506
Transportation	8	8	8	9	9
Irrigation			311	343	382
Water Supply	277	351	77	105	112
Temples			59	152	205
Street Light	318	675	1,474	385	517
Temporary Supply	113	275	145	104	123
Total	183,559	217,726	241,477	264,775	290,015

Source : Commercial Department, Policy Division

Table 5.4 Electrification Ratio

Year	Whole Nepal			Bagmati Zone		
	Populat. (1000)	Customer	E.Ratio (%)	Populat. (1000)	Customer	E.Ratio (%)
1981/82	15,020	119,435	4.77	1,780	86,051	29.01
1982/83	15,421	131,651	5.12	1,828	83,392	27.37
1983/84	15,833	139,418	5.28	1,876	86,218	27.58
1984/85	16,256	162,040	5.98	1,926	100,171	31.21
1985/86	16,690	182,938	6.58	1,978	111,343	33.77
1986/87	17,123	208,870	7.32	2,029	119,460	35.33
1987/88	17,581	230,178	7.86	2,083	131,096	37.76
1988/89	18,050	215,753	7.17	2,139	142,886	40.08
1989/90	18,532	274,921	8.90	2,196	155,599	42.51

Source : NEA Commercial Department, Policy Division

(Remarks) (1) Base of population : 1981 Census
(2) Growth rate of population : 2.67%
(3) Averaged household size : 6 persons

Table 5.5 Hourly Output of Power Stations on Jan. 5,1990

UNIT:MW

Time	MRS	KL-1	KL-2	TRL	DEV	SNK	GDK	PAN	SUN	BUT	STI	FEW	TOTAL
24.00	44.00			11.00	8.50	4.20	7.60	0.50	0.60	0.29	1.32	0.75	78.76
1.00	42.90			9.20	8.50	4.20	7.60		0.30	0.23	1.22	0.76	74.91
2.00	43.20			9.20	7.50	3.90	7.40		0.30	0.23	1.22	0.76	73.71
3.00	42.20			9.20	7.00	3.90	7.50		0.30	0.23	1.22	0.76	72.31
4.00	41.40			9.20	7.00	4.00	7.50		0.60	0.23	1.22	0.76	71.91
5.00	49.00			9.20	7.00	4.00	4.20	0.60	0.60	0.26	1.20	0.77	76.83
6.00	53.30	11.20	2.60	11.00	7.00	4.60	7.10	0.60	0.60	0.31	1.20	0.76	100.27
7.00	50.30	28.00	13.50	11.00	9.00	6.00	7.30	0.60	0.60	0.37	1.20	0.76	128.63
8.00	54.00	31.20	16.30	11.00	9.00	5.80	6.40	0.60	0.60	0.30	1.20	0.72	137.12
9.00	42.80	31.40	15.10	11.00	9.00	5.00	7.30	0.60	0.60	0.29	1.20	0.72	125.01
10.00	40.80	27.80	9.60	11.00	9.00	4.30	7.70	0.60	0.60	0.26	1.20	0.72	113.58
11.00	38.70	23.80	14.70	11.00	8.50	3.90	4.10	0.60	0.34	0.23	1.20	0.75	107.82
12.00	35.90	17.50	9.30	11.00	8.50	3.90	6.40	0.60	0.34	0.20	1.20	0.75	95.59
13.00	34.00	14.10	7.80	11.00	8.50	3.90	8.10		0.34	0.14	1.20	0.61	89.69
14.00	41.00	12.10	4.80	11.00	8.50	2.80	8.10		0.34	0.11	1.20	0.42	90.37
15.00	40.20	16.20	7.30	11.00	8.00	2.70	7.90		0.34	0.26	1.20	0.40	95.50
16.00	41.50	17.20	7.70	11.00	8.00	2.80	7.80		0.34	0.26	1.22	0.59	98.41
17.00	56.50	16.40	7.60	11.00	8.00	3.20	7.60	0.50	0.60	0.26	1.22	0.76	113.64
18.00	54.60	53.10	24.60	11.00	8.50	4.50	7.60	1.00	0.60	0.40	1.22	0.78	167.90
19.00	52.10	56.10	26.40	11.00	8.50	6.00	7.50	1.00	0.60	0.46	1.22	0.77	171.65
20.00	42.30	54.20	25.70	11.00	8.50	6.00	7.40	1.00	0.60	0.46	1.11	0.76	159.03
21.00	47.50	36.70	14.60	11.00	8.50	5.80	7.10	1.00	0.60	0.41	1.11	0.75	135.07
22.00	41.20	25.30	5.30	11.00	8.50	4.30	5.90	0.50	0.60	0.37	1.11	0.75	104.83
23.00	46.00	4.70	4.60	11.00	8.50	4.00	5.00	0.50	0.60	0.34	1.11	0.75	87.10
24.00	39.70			11.00	8.50	3.80	5.50	0.50	0.60	0.31	1.11	0.75	71.77
Total	1115.10	477.00	217.50	266.00	206.00	107.50	173.60	11.30	12.54	7.21	29.83	17.83	2641.41

1) Daily load factor of the day: 62.2%
2) Maximum peak demand of 176.2 MW of the year was recorded at 18:30 p.m. of the day.

Note:

MRS: Marsyangdi
KL-1: Kulekhani-1
KL-2: Kulekhani-2
TRL: Trishuli
DEV: Devigat
SNK: Sunkoshi
GDK: Gandak
PAN: Panauti
SUN: Sundarijal
BUT: Butwal
STI: Seti
FEW: Fewa

Table 5.6 Monthly Energy Sales by Division and by Tariff in Kathmandu Valley (1989/90) (1/3)

KATHMANDU CENTRAL

Unit: MWh

Months	DOM	NCOM	COM	IND	WSPL	IRR	SLGT	TSPL	TRNS	TMPL	BLK	TOTAL
Sharwan	4,965.2	1,002.0	1,231.4	487.6	167.8	0.0	82.6	0.0	0.3	0.0	0.0	7,936.9
Bhadra	5,113.9	981.1	1,345.9	497.9	230.9	0.0	83.8	0.0	0.7	0.0	0.0	8,254.2
Ashwin	4,988.8	805.3	1,213.7	617.5	129.6	0.0	140.8	0.0	0.7	0.0	0.0	7,896.4
Kartik	5,706.9	953.3	1,593.2	491.9	348.3	0.0	134.3	0.0	0.6	0.0	0.0	9,228.5
Marga	6,760.8	1,039.6	1,535.6	594.1	170.6	0.0	142.0	0.0	0.5	0.0	0.0	10,243.2
Poush	7,231.4	1,438.1	1,749.1	741.1	190.4	0.0	164.7	0.0	0.9	0.0	0.0	11,515.7
Magha	7,031.8	1,274.1	1,524.1	704.9	168.6	0.0	155.5	0.0	0.9	0.0	0.0	10,859.9
Falgun	6,520.0	1,409.6	1,537.8	774.5	243.5	0.0	158.1	0.0	1.2	0.0	0.0	10,644.7
Chaitra	6,103.2	1,143.6	1,434.5	687.2	202.0	0.0	293.5	0.0	0.7	0.0	0.0	9,864.7
Baishak	5,635.9	839.6	1,319.7	580.4	172.4	0.0	269.6	0.0	0.3	0.0	0.0	8,817.9
Jestha	5,484.1	927.0	1,130.7	606.0	219.3	0.0	279.8	0.0	0.5	0.0	0.0	8,647.4
Asadha	5,486.2	983.6	1,457.5	606.2	174.0	0.0	277.3	0.0	0.4	0.0	0.0	8,985.2
Total	71,028.2	12,796.9	17,073.2	7,389.3	2,417.4	0.0	2,182.0	0.0	7.7	0.0	0.0	112,894.7

KATHMANDU EAST

Unit: MWh

Months	DOM	NCOM	COM	IND	WSPL	IRR	SLGT	TSPL	TRNS	TMPL	BLK	TOTAL
Sharwan	1,457.6	303.8	182.2	253.7	127.1	0.7	0.3	0.1	87.3	3.4	0.0	2,416.2
Bhadra	1,616.3	279.0	221.2	239.6	265.3	0.7	0.3	0.1	95.9	4.2	0.0	2,722.6
Ashwin	1,672.0	448.9	319.5	245.3	142.5	0.1	0.6	0.2	92.0	4.0	0.0	2,925.1
Kartik	1,729.7	157.6	76.6	245.7	203.0	0.3	0.7	0.1	84.3	5.1	0.0	2,503.1
Marga	1,953.3	393.2	182.3	294.0	176.1	1.0	0.6	0.1	84.9	4.8	0.0	3,090.3
Poush	2,147.7	308.1	193.6	330.7	123.6	0.7	0.9	0.2	66.0	13.6	0.0	3,185.1
Magha	2,039.9	341.0	169.9	334.5	161.8	1.0	0.0	0.2	101.2	13.5	0.0	3,163.0
Falgun	1,970.8	357.2	169.2	367.8	166.1	0.4	0.0	0.3	90.2	13.9	0.0	3,135.9
Chaitra	1,888.0	325.1	158.8	368.2	185.9	0.3	3.6	0.2	92.4	14.6	0.0	3,037.1
Baishak	1,754.5	282.5	197.8	315.5	167.6	0.3	0.0	0.2	81.4	13.9	0.0	2,813.7
Jestha	1,725.7	238.7	158.8	343.5	174.0	0.1	2.7	0.1	88.0	10.8	0.0	2,742.4
Asadha	1,730.9	282.7	236.3	294.9	167.3	0.4	2.5	0.1	88.0	10.7	0.0	2,813.8
Total	21,686.4	3,717.8	2,266.2	3,633.4	2,060.3	6.0	12.2	1.9	1,051.6	112.5	0.0	34,548.3

NOTES :

DOM	:	Domestic	WSPL	:	Water supply	TRNS	: Transportation
NCOM	:	Non-commercial	IRR	:	Irrigation	TMPL	: Temple
COM	:	Commercial	SLGT	:	Street light	BLK	: Bulk supply
IND	:	Industrial	TSPL	:	Temporary		

Table 5.6 Monthly Energy Sales by Division and by Tariff in Kathmandu Valley (1989/90) (2/3)

KATHMANDU WEST

Unit: MWh

Months	DOM	NCOM	COM	IND	WSPL	IRR	SLGT	TSPL	TRNS	TMPL	BLK	TOTAL
Sharwan	1,254.7	220.2	456.2	1,290.5	176.7	0.0	13.2	0.1	0.0	0.0	0.0	3,411.6
Bhadra	1,347.4	240.3	564.1	1,085.6	167.4	0.0	13.2	0.1	0.0	0.0	0.0	3,418.1
Ashwin	1,349.5	246.9	523.6	1,115.7	216.5	0.0	13.2	0.1	0.0	0.0	0.0	3,465.5
Kartik	1,435.8	197.1	470.7	874.8	169.5	0.0	13.2	0.0	0.0	0.0	0.0	3,161.1
Marga	1,678.9	486.3	409.5	1,191.1	165.8	0.0	13.2	1.3	0.0	0.0	0.0	3,946.1
Poush	1,827.6	331.1	441.9	1,279.7	165.6	0.0	13.2	0.1	0.0	0.0	0.0	4,059.2
Magha	1,700.6	350.2	389.1	1,233.2	174.4	0.0	13.2	0.7	0.0	0.0	0.0	3,861.4
Falgun	1,567.6	299.7	387.7	1,165.4	183.3	0.0	13.2	0.1	0.0	0.0	0.0	3,617.0
Chaitra	1,620.2	260.8	418.5	1,181.8	197.5	0.0	13.2	0.1	0.0	0.0	0.0	3,692.1
Baishak	1,458.7	216.9	423.8	895.6	134.9	0.0	13.2	0.8	0.0	0.0	0.0	3,143.9
Jestha	1,383.0	237.6	407.4	1,231.4	113.9	0.0	13.2	0.7	0.0	0.0	0.0	3,387.2
Asadha	1,404.9	241.7	564.7	1,613.2	233.4	0.0	13.2	0.6	0.0	0.0	0.0	4,071.7
Total	18,028.9	3,328.8	5,457.2	14,158.0	2,098.9	0.0	158.4	4.7	0.0	0.0	0.0	43,234.9

LALITPUR

Unit: MWh

Months	DOM	NCOM	COM	IND	WSPL	IRR	SLGT	TSPL	TRNS	TMPL	BLK	TOTAL
Sharwan	1,860.5	299.4	187.7	871.8	20.3	0.0	21.5	2.8	3.0	0.0	0.0	3,267.0
Bhadra	1,992.0	373.3	160.5	893.4	26.7	0.0	21.5	2.4	14.8	0.0	0.0	3,484.6
Ashwin	1,935.2	928.1	228.7	343.7	29.7	0.0	21.5	5.0	2.8	0.0	0.0	3,494.7
Kartik	1,982.2	221.1	114.3	685.1	24.8	0.0	21.5	2.2	5.7	0.0	0.0	3,056.9
Marga	2,285.7	603.9	258.9	1,116.8	20.4	0.0	21.5	8.8	22.3	0.0	0.0	4,338.3
Poush	2,565.2	363.2	245.2	882.1	21.5	0.0	21.5	4.3	0.0	0.0	0.0	4,103.0
Magha	2,428.6	430.9	196.3	1,014.6	32.5	0.0	21.5	4.3	0.0	0.0	0.0	4,128.7
Falgun	2,308.1	454.5	218.1	1,074.2	20.2	0.0	21.5	6.6	0.0	0.0	0.0	4,103.2
Chaitra	2,240.0	434.6	211.8	1,072.3	20.6	0.0	21.5	11.4	0.0	0.0	0.0	4,012.2
Baishak	1,943.7	306.1	181.9	932.8	21.1	0.0	21.5	6.7	0.0	0.0	0.0	3,413.8
Jestha	1,990.9	290.4	123.7	890.6	18.8	0.0	21.5	4.7	0.0	0.0	0.0	3,340.6
Asadha	2,035.0	285.3	154.8	958.8	23.5	0.0	21.5	5.8	0.0	0.0	0.0	3,484.7
Total	25,567.1	4,990.8	2,281.9	10,736.2	280.1	0.0	258.0	65.0	48.6	0.0	0.0	44,227.7

NOTES :

DOM :	Domestic	WSPL :	Water supply	TRNS :	Transportation
NCOM :	Non-commercial	IRR :	Irrigation	TMPL :	Temple
COM :	Commercial	SLGT :	Street light	BLK :	Bulk supply
IND :	Industrial	TSPL :	Temporary		

Table 5.6 Monthly Energy Sales by Division and by Tariff in Kathmandu Valley (1989/90) (3/3)

BHAKTAPUR

Unit: MWh

Months	DOM	NCOM	COM	IND	WSPL	IRR	SLGT	TSPL	TRNS	TMPL	BLK	TOTAL
Sharwan	534.9	124.3	3.0	236.4	44.8	0.2	24.0	0.9	60.1	0.0	0.0	1,028.6
Bhadra	547.4	143.3	4.1	267.5	46.4	0.5	24.0	1.3	70.6	0.0	0.0	1,105.1
Ashwin	545.7	120.9	3.9	260.1	48.1	0.0	0.0	1.6	56.5	0.0	0.0	1,036.8
Kartik	582.2	141.9	3.6	309.5	48.9	0.0	24.0	1.8	58.0	0.0	0.0	1,169.9
Marga	583.9	179.8	3.6	303.5	48.9	0.0	24.0	1.1	79.0	0.0	0.0	1,223.8
Poush	624.8	231.2	5.0	343.7	47.3	0.0	24.0	1.5	74.5	0.0	0.0	1,352.0
Magha	672.4	208.2	5.0	391.5	44.1	0.0	24.0	1.7	76.3	0.0	0.0	1,423.2
Falgun	585.7	171.3	4.0	345.1	43.8	0.0	24.0	1.4	54.8	0.0	0.0	1,230.1
Chaitra	634.8	150.4	3.8	366.3	47.1	0.0	24.0	1.1	62.2	0.0	0.0	1,289.7
Baishak	694.5	126.4	2.3	303.8	54.4	0.0	24.0	1.1	57.7	0.0	0.0	1,264.2
Jestha	654.1	117.0	2.1	320.1	63.0	0.0	24.0	1.4	58.0	0.0	0.0	1,239.7
Asadha	623.8	111.6	2.7	297.0	59.2	0.0	24.0	1.1	66.1	0.0	0.0	1,185.5
Total	7,284.2	1,826.3	43.1	3,744.5	596.0	0.7	264.0	16.0	773.8	0.0	0.0	14,548.6

NOTES :

DOM :	Domestic	WSPL :	Water supply	TRNS :	Transportation
NCOM :	Non-commercial	IRR :	Irrigation	TMPL :	Temple
COM :	Commercial	SLGT :	Street light	BLK :	Bulk supply
IND :	Industrial	TSPL :	Temporary		

Table 5.7 Maximum Demand at 17:00 of Jan. 5, 1990

Name	Max. Demand (MW)
Siuchatar Substation	6.34
Balaju Substation	5.37
New Chabel Substation	1.74
Baneswar Substation	13.50
Lainchaur Substation	6.89
Patan Substation	- (*1)
K-2 Switching Station	12.40
Teku Switching Station	9.03
Old Patan Switching Station	7.22
Thapathali Switching Station	5.30
Old Chabel Switching Station	8.08
Maharajgunj Switching Station	1.97
Thimi Switching Station	1.78
Bhaktapur Switching Station	5.61
Total	85.23 MW

(Note) *1: No feeder line is fed.

Table 5.8 Present Electricity Tariff

(Since May 14, 1989)

Category	Minimum/demand charges		Consumption charges		Charge for metering	
Domestic	Upto 2.5 Ampere for minimum allowance of 25 KWh:	NRs. 9.0/month	1 KWh upto 75 KWh:	NRs.1.20/KWh	Upto 2.5 Ampere meter capacity:	NRs. 2/month
	2.5 A upto 15 A for minimum allowance of 25 KWh:	NRs. 30.0/month	Thereafter:		Above 2.5 A upto 30 A meter capacity:	NRs. 5/month
	15 A upto 30 A for minimum allowance of 50 KWh:	NRs. 60.0/month	76 KWh upto 200 kWh:	NRs.1.30/KWh	All above 30 A meter capacity:	NRs. 10/month
	31 A upto 60 A for minimum allowance of 75 KWh:	NRs. 90.0/month	over 201 KWh:	NRs.1.60/KWh		
	61 A upto 100 A for minimum allowance of 100 KWh	NRs. 122.5/month				
	101 A over for minimum allowance of 300 KWh:	NRs. 412.5/month				
Commercial	Supply at 400/200 V:	NRs. 108.0/Kw/month		NRs.1.60/KWh		
	Supply at 11 KV and above;	NRs. 100.0/Kw/month		NRs.1.50/KWh	--	
	Others upto 25 Kh:	NRs. 80.0/Kw/month		NRs.1.65/KWh		
Non-commercial		NRs. 100.0/month		NRs.1.80/KWh		
Temple		NRs.10.0/month and KWh allowance		NRs.1.10/KWh		
Industrial	(A) Rural/cottage upto 12 Kw/15Hp capacty	NRs. 20.0/month		NRs.1.20/KWh		
	(B) By voltage: - 400/220 V above 12 upt 50 KW	NRs. 75.0/Kw/month		NRs.1.25/KWh	--	
	- 11 Kv	NRs. 70.0/Kw/month		NRs.1.20/KWh		
	- 33 Kv	NRs. 65.0/Kw/month		NRs.1.10/KWh		
	- 66 Kv	NRs. 60.0/Kw/month		NRs.0.95/KWh		
	- 132 Kv	NRs. 50.0/Kw/month		NRs.0.85/KWh		
Irrigation	(A) Small scale (10 KVA and 400/220 V supply)	NRs. 20.0/Kw/month		NRs.0.80/KWh		
	(B) By voltage: - 400 V above 10 upto 25 KVA	NRs. 45.0/Kw/month		NRs.0.80/KWh	--	
	- 11 Kv	NRs. 40.0/Kw/month		NRs.0.70/KWh		
	- 33 Kv	NRs. 35.0/Kw/month		NRs.0.65/KWh		
Water supply at 400 V supply		NRs. 57.0/Kw/month		NRs.0.70/KWh	--	
	Supply at 11 Kv and above	NRs. 50.0/Kw/month		NRs.0.65/KWh		
Transportation		NRs. 66.0/Kw/month		NRs.0.70/KWh	--	
Street light	(A) Supply through meter	-		NRs.1.25/KWh	--	
	(B) Supply without meter	-		NRs.0.50/KWh		
Temporary supply	(A) Supply through meter	-		NRs.3.70/KWh	--	
	(B) Supply without meter	-		NRs.1.75/KWh		

Source: Nepal Electricity Authority

Table 6.1 Results of NEA's 1986 Load Forecast (Whole Country)

Year			Generation (GWh)		Peak Load (MW)
			National	Inter-connected	Inter-connected
2040/41	:	1983/84	381.15	324.96	76.0
2041/42	:	1984/85	421.05	351.91	79.7
2042/43	:	1985/86	498.55	473.27 (1)	107.1
2043/44	:	1986/87	589.32	557.46	124.0
2044/45	:	1987/88	675.76	635.49	141.1
2045/46	:	1988/89	757.57	709.67	157.7
2046/47	:	1989/90	817.49	786.97 (2)	177.4
2047/48	:	1990/91	881.50	869.84 (3)	196.3
2048/49	:	1991/92	958.76	946.01	213.3
2049/50	:	1992/93	1038.10	1038.10 (4)	233.8
2050/51	:	1993/94	1121.54	1121.54	251.8
2051/52	:	1994/95	1204.24	1204.24	269.5
2052/53	:	1995/96	1281.28	1281.28	286.5
2053/54	:	1996/97	1357.80	1357.80	303.6
2054/55	:	1997/98	1439.65	1439.65	321.7
2055/56	:	1998/99	1524.85	1524.85	340.7
2056/57	:	1999/00	1613.31	1613.31	360.5
2057/58	:	2000/01	1705.41	1705.41	381.2
2058/59	:	2001/02	1801.27	1801.27	402.9
2059/60	:	2002/03	1901.37	1901.37	425.8
2060/61	:	2003/04	2005.32	2005.32	449.8
2061/62	:	2004/05	2113.59	2113.59	475.0
2062/63	:	2005/06	2225.75	2225.75	501.3

Remarks:

(i) 1983/84 and 1984/85 values are actual.
(ii) 1985/86 values are estimated.

(1) Interconnection of Koshi and Janakapur.
(2) Interconnection of Mechi and Rapti-Bheri
(3) Interconnection of Sagarmatha
(4) Interconnection of Seti-Mahakali

Source : Electricity Load Forecast -1986, Main Report Vol.1 Table 10.4, NEA

Table 6.2 Results of EDF's Load Forcast (Interconnected System)

	Medium			High			Low		
	Consum (GWh)	Produ. (GWh)	Peak (MW)	Consum (GWh)	Produ. (GWh)	Peak (MW)	Consum (GWh)	Produ. (GWh)	Peak (MW)
1987/88	442.0	611.0	141.0	442.0	611.0	141.0	442.0	611.0	141.0
1988/89	482.0	656.0	150.0	482.0	656.0	150.0	482.0	656.0	150.0
1989/90	510.0	691.0	160.0	523.0	709.0	164.0	502.0	681.0	157.0
1990/91	556.0	739.0	169.0	585.0	778.0	178.0	537.0	714.0	165.0
1991/92	616.5	810.9	185.5	663.6	872.8	199.8	583.2	767.0	176.9
1992/93	683.6	889.8	203.5	752.8	979.9	224.2	633.3	824.3	189.8
1993/94	758.0	976.6	223.4	854.0	1100.3	251.7	687.7	886.0	203.5
1994/95	840.5	1072.0	245.1	968.8	1235.6	282.4	746.8	952.5	218.2
1995/96	932.0	1176.8	269.0	1099.0	1388.0	317.0	811.0	1024.0	234.0
1996/97	1029.4	1296.5	296.3	1224.0	1541.6	352.1	882.5	1111.4	253.9
1997/98	1137.0	1428.4	326.3	1363.1	1712.6	391.1	960.2	1206.3	275.5
1998/99	1255.8	1573.8	359.4	1518.1	1902.6	434.4	1044.8	1309.4	299.0
1999/00	1387.0	1734.0	395.9	1690.8	2113.7	482.6	1136.8	1421.2	324.4
2000/01	1532.0	1910.0	436.0	1883.0	2348.0	536.0	1237.0	1543.0	352.0
2001/02	1658.5	2965.6	469.6	2045.5	2547.6	579.3	1341.8	1671.2	379.9
2002/03	1795.3	2233.3	505.8	2222.0	2764.0	626.0	1455.5	1810.6	410.0
2003/04	1943.5	2414.7	544.8	2413.7	2998.8	676.6	1578.9	1961.6	442.6
2004/05	2103.9	2610.8	586.8	2621.9	3253.6	731.2	1712.6	2125.2	477.6
2005/06	2277.6	2822.8	632.0	2848.2	3530.0	790.2	1857.8	2302.5	515.5
2006/07	2465.6	3052.0	680.7	3093.9	3829.8	854.0	2015.2	2494.5	556.4
2007/08	2669.1	3299.9	733.1	3360.8	4155.2	923.0	2185.9	2702.6	600.5
2008/09	2889.4	3567.9	789.6	3650.8	4508.2	997.5	2371.1	2928.0	648.1
2009/10	3127.8	3857.7	850.5	3965.8	4891.2	1078.0	2572.1	3172.3	699.5
2010/11	3386.0	4171.0	916.0	4308.0	5307.0	1165.0	2790.0	3437.0	755.0

Sourse : Ten Year Transmission and Distribution Plan, Load Forecast Study, EDF Dec. 1989

Table 6.3 Economic Growth Rates (1974/75 Price)

	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90	81-89	85-89
National	20920	20297	22262	23630	24645	25617	27624	28263	28831		
Increse(%)		-2.98	9.68	6.15	4.30	3.94	7.83	2.31	2.01	4.091	4.000
Agriculture	12616	12478	13668	13990	14705	14789	15993	17013	17563		
Share (%)	60.31	61.48	61.40	59.20	59.67	57.73	57.90	60.20	60.92		
Increse(%)		-1.09	9.54	2.36	5.11	0.57	8.14	6.38	3.23	4.222	4.540
Non-agriculture	8304	7819	8594	9640	9940	10828	11631	11250	11268		
Share (%)	39.69	38.52	38.60	40.80	40.33	42.27	42.10	39.80	39.08		
Increse(%)		-5.84	9.91	12.17	3.11	8.93	7.42	-3.28	0.16	3.889	3.185

Remarks :

1) 1987/88:Revised preliminary estimates.
2) 1988/89:Preliminary estimates.
3) 1989/90:Tentative estimates.

Table 6.4 Estimated Economic Growth Rates : 1989/90 - 2010/11

Year	GDP	Non-agriculture	Agriculture
1989/90	0.40	1.00	0.00
1990/91	2.30	0.96	3.20
1991/92	4.30	4.45	4.20
1992/93	4.30	4.45	4.20
1993/94	4.30	4.45	4.20
1994/95	4.30	4.45	4.20
1995/96	4.30	4.45	4.20
1996/97	5.20	6.70	4.20
1997/98	5.20	6.66	4.20
1998/99	5.20	6.63	4.20
1999/00	5.20	6.60	4.20
2000/01	5.20	6.57	4.20
2001/02	5.20	6.54	4.20
2002/03	5.20	6.51	4.20
2003/04	5.20	6.48	4.20
2004/05	5.20	6.45	4.20
2005/06	5.20	6.42	4.20
2006/07	5.20	6.40	4.20
2007/08	5.20	6.37	4.20
2008/09	5.20	6.35	4.20
2009/10	5.20	6.33	4.20
2010/11	5.20	6.30	4.20

Note: Growth rate of non-agriculture GDP is worked out from that of total GDP and agriculture GDP which are previously assumed, taking into account of change in composition of non-agriculture and agriculture GDP.

Table 6.5 Committed Industrial Projects (more than 200 kW)

S. No.	Name	Power Request > 200 kW
Region : Central Development		
Zone : Bagmati	Branch : Kathmandu	
1.	Everest Milk Food Industries	250 kW
2.	Swastik Textile Products	72,000 units
3.	Maskay Pole Industries, Naikab	200 kW
4.	Nepal Metal Company, Ganesh Himal	2,000 kW
Zone : Bagmati	Branch : Bhaktapur	
1.	Heem Elctronics	450 kW
2.	Nepal Orind Magnesite Pvt. Ltd., Lamosangu	2,000 kW
Zone : Narayani		
1.	Birgunj Brick Tile Factory, Parsa	300 kVA
2.	Nepal Bitmen and Barrel Industries, Bara	500 kVA
3.	Tam Lakhan Khandsari, Rasua	275 KVA
Zone : Gandaki		
1.	Gorkhali Rubber Udyog Ltd., Tanahu	2,500 kW
Region : Eastern Development		
Zone : Koshi / Janakapur / Sagarmatha		
1.	Pashupati Brick Factory, Duhabi, Sunsari	450 kW
2.	A.M. Jute Mills, Katahari, Morang	800 kW
3.	Pashupati Gas Udyog, Tanki, Morang	250 kW
4.	Golden Battery Industry, Tanki Morang	290 kW
5.	Arun Banaspati Limited, Duhabi, Sunsari	500 kW
6.	Udayapur Cement Factory, Udayapur, Sagarmatha	10,000 kW
Region : Mid-western Development		
Zone : Bheri	Distrct : Nepalganji / Banke	
1.	Nepal Paper Udyog Ltd.	2,000 kW
2.	Binayak Bicuit Pvt. Ltd.	480 kW
3.	Gaja Nand Textile Industries	200 kVA

Source : Ten Year Transmission and Distribution Plan
Load Forecast Study, Annex 1,

Table 6.6 Existing and Committed Large Scale Industries

Name of Industries	Location	Capacity	1987/88		1990/91		1995/96		2000/01		2010/11	
		kW	MWh	kW	MWh	kW	MWh	kW	MWh	kW	MWh	kW
Committed Industries												
Nepal Orind Magnesite	Bagmati	3,000			2,160	900	4,320	1,800	5,520	2,300	8,640	3,600
Nepal Metal Company	Kathmandu	2,000					2,880	1,200	3,680	1,530	5,760	2,400
Nepal Paper Udyog	Nepalgunj	3,000					10,400	1,800	13,270	2,300	20,800	3,600
Gorkhli Rubber	Gandaki	2,500			2,200	750	8,700	1,500	11,100	1,900	17,400	3,000
Udayapur Cement	Sagarmatha	10,000					29,700	6,000	48,130	8,320	78,400	13,500
Ashok Steel	Narayani	5,000			3,800	2,000	6,900	2,000	29,500	5,100	59,000	10,200
Total		25,500			8,160	3,650	62,900	14,300	111,200	21,450	190,000	36,300
Existing Industries												
Himal Cement		4,000	7,660	1,800	13,900	2,400	13,900	2,400	13,900	2,400	13,900	2,400
Hetauda Cement		8,500	23,200	5,100	29,500	5,100	29,500	5,100	29,500	5,100	59,000	10,200
Total		12,500	30,860	6,900	43,400	7,500	43,400	7,500	43,400	7,500	72,900	12,600

Source : Ten Year Transmission and Distribution Plan
Load Forecast Study, Table 5.3

Table 6.7 Energy Demand for Irrigation

(Unit : GWh)

District	Type	Ultimate 1986 Forecast Demand	FY 2000 7th Power Project Demand	M.W.R. FY 2000 Potential Estimate
Jhapa	STW		2.4	6.0
Morang	STW+DTW			14.0
Sunsari	STW+DTW		2.3	23.0
Saptari	STW+DTW+LIFT	9.1		35.0
Siraha	STW	9.8	2.3	4.0
Dhanusha	STW+DTW	10.5		13.0
Mahottari	STW+DTW			14.0
Sarlahi	STW+DTW		1.9	22.0
Rautahat	STW+DTW		1.3	26.0
Bara	STW+DTW	2.6		36.0
Parsa	STW+DTW			23.0
Chitwan	STW+LIFT	13.8	0.3	44.0
Nawal Parasi	STW		0.3	1.0
Kapilvasatu	STW+DTW	7.0		34.0
Rupandehi	STW+DTW+LIFT	1.7		7.0
Nuwakot	LIFT			3.0
Banke	STW+DTW		1.4	4.0
Bardiya	STW+DTW			22.0
Kailaki	STW+DTW	6.0		4.0
Kanchanpur	STW+DTW			4.0
Total		60.5	12.2	339.0

Note : STW : Shallow tubewells
DTW : Deep tubewells
LIFT : Lift irrigation

Source : Ten Year Transmission and Distribution Plan, Load Forecast, Table A4-2

Table 6.8 Past Trend of Energy Losses

	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90
Generation	234.7	275.2	347.0	382.4	420.8	488.5	571.0	627.0	672.3	769.7
Export	3.8	5.2	6.0	10.3	10.6	21.5	20.5	16.1	17.6	23.3
Gen-Expot	230.9	270	341	372.1	410.2	467.1	550.6	610.9	654.7	746.4
Sales	160.6	181.2	227.8	242.0	282.4	320.0	382.1	449.1	478.5	524.8
Energy loss	70.3	88.8	113.2	130.1	127.8	147.1	168.4	161.8	176.1	221.6
% Loss	30.46	32.89	33.19	34.97	31.16	31.50	30.59	26.49	26.91	29.69

Souses : NEA Commercial Department, Policy Division
Generation : including import from India.
E. Loss : including self consumption.

Table 6.9 Past Trend of Annual Load Factor

	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90
Generation	234.7	275.2	347.0	382.4	420.8	488.5	571.0	627.0	672.3	769.7
Export	3.8	5.2	6.0	10.3	10.6	21.5	20.5	16.1	17.6	23.29
Gen.-Export	231.0	270.0	341.0	372.1	410.2	467.1	550.6	610.9	654.7	746.4
Peak demand	59.5	75.1	83.7	96.8	104.5	113.7	123.0	135.2	149.5	176.2
Load factor	44.31	41.05	46.5	43.88	44.81	46.89	51.1	51.58	49.99	48.36

Souses : NEA Commercial Department, Policy Division
Generation : including import from India.

Table 6.10 Details of National Demand Forecast 1989/90 - 2010/11

	46/47	47/48	48/49	49/50	50/51	51/52	52/53	53/54	54/55	55/56	56/57	57/58	58/59	59/60	60/61	61/62	62/63	63/64	64/65	65/66	66/67	67/68
	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11
BAGMATI																						
Domestic	150.88	161.09	178.22	196.93	217.39	239.73	264.14	292.10	322.78	356.43	393.34	433.80	472.51	514.42	559.77	608.84	661.95	710.80	762.98	818.72	878.26	941.85
H.holds	366.00	372.56	379.20	385.92	392.74	399.63	406.61	413.68	420.83	428.06	435.38	442.78	450.26	457.83	498.82	473.21	481.03	488.92	496.89	504.95	513.08	521.29
Customer	155.60	169.08	182.80	196.72	210.77	224.93	239.13	253.37	267.59	281.77	295.90	309.95	323.90	337.74	351.46	365.06	378.52	391.85	405.03	418.08	430.99	443.76
E.Ratio	42.51	45.38	48.21	50.97	53.67	56.28	58.81	61.25	63.59	65.83	67.96	70.00	71.94	73.77	70.46	77.14	78.69	80.15	81.51	82.80	84.00	85.13
Unit	970	953	975	1001	1031	1066	1105	1153	1206	1265	1329	1400	1459	1523	1593	1668	1749	1814	1884	1958	2038	2122
Industrial	43.08	46.53	53.05	59.39	66.57	74.69	83.91	94.55	106.52	119.99	135.15	152.18	166.62	182.39	199.60	218.37	238.86	261.21	285.59	312.17	341.15	372.74
Commercial	27.15	28.78	31.87	35.30	39.09	43.29	47.95	52.93	58.44	64.52	71.23	78.63	84.77	91.38	98.51	106.19	114.47	123.40	133.03	143.40	154.59	166.65
Irrigation	0.21	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.30	0.31	0.32	0.34	0.35	0.36	0.38	0.40	0.41	0.43	0.45	0.47	0.49
Others	40.13	42.03	45.15	48.47	52.00	55.74	59.71	64.13	68.85	73.87	79.23	84.93	90.24	95.84	101.76	108.00	114.59	120.51	126.71	133.19	139.97	147.06
Total Sale	261.45	278.64	308.51	340.33	375.28	413.70	455.96	503.99	556.88	615.11	679.25	749.87	814.48	884.36	959.99	1041.79	1130.27	1216.34	1308.73	1407.92	1514.42	1628.78
Losses	29.7	29	28	27	26	25	24	23	22	21	20	19	18	18	18	18	18	18	18	18	18	18
Generation	371.90	392.45	428.49	466.20	507.14	551.61	599.95	654.53	713.95	778.63	849.06	925.77	993.27	1078.51	1170.72	1270.47	1378.38	1483.34	1596.02	1716.98	1846.86	1986.31
L.Factor	44.2	44.4	44.6	44.8	45	45.2	45.4	45.6	45.8	46	46.2	46.4	46.6	46.8	47	47.2	47.4	47.6	47.8	48	48.2	48.4
Peak Load	96.05	100.90	109.67	118.79	128.65	139.31	150.85	163.86	177.95	193.23	209.79	227.76	243.32	263.07	284.35	307.27	331.96	355.74	381.16	408.34	437.40	468.49
OTHER AREA																						
Domestic	80.52	87.55	98.60	110.93	124.65	139.91	156.86	176.45	198.26	222.53	249.50	279.46	309.09	341.53	377.03	415.67	458.34	498.78	542.37	589.35	639.95	694.44
H.holds	2722.67	2797.90	2874.82	2953.43	3033.75	3115.77	3199.51	3284.96	3372.12	3460.99	3551.56	3643.84	3737.79	3833.43	3930.72	4029.65	4130.20	4232.34	4336.04	4441.28	4548.02	4656.21
Customer	119.32	139.05	161.42	186.61	214.77	246.07	280.66	318.68	360.25	405.49	454.50	507.39	564.22	625.07	689.98	759.02	832.20	909.54	991.06	1076.75	1166.60	1260.57
E.Ratio	4.38	4.97	5.61	6.32	7.08	7.90	8.77	9.70	10.68	11.72	12.80	13.92	15.09	16.31	17.55	18.84	20.15	21.49	22.86	24.24	25.65	27.07
Unit	675	630	611	594	580	569	559	554	550	549	549	551	548	546	546	548	551	548	547	547	549	551
Industrial	135.24	145.30	167.27	190.10	217.84	252.37	296.50	335.93	380.41	430.57	487.12	550.84	600.54	654.66	713.57	777.71	847.52	923.50	1006.17	1096.13	1194.00	1300.46
Commercial	6.56	6.96	7.71	8.53	9.45	10.47	11.59	12.80	14.13	15.60	17.22	19.01	20.50	22.09	23.82	25.68	27.68	29.84	32.16	34.67	37.38	40.29
Irrigation	11.76	17.13	19.43	22.38	26.22	31.25	37.90	42.29	47.31	53.07	59.69	67.31	70.13	73.08	76.15	79.35	82.68	86.15	89.77	93.54	97.47	101.56
Others	29.26	30.65	32.93	35.35	37.92	40.65	43.55	46.77	50.21	53.88	57.78	61.94	65.81	69.90	74.21	78.77	83.58	87.89	92.41	97.14	102.08	107.25
Total Sale	263.34	287.59	325.93	367.29	416.08	474.65	546.41	614.24	690.32	775.64	871.31	978.57	1066.07	1161.26	1264.79	1377.37	1499.79	1626.16	1762.89	1910.83	2070.88	2244.01
Losses	29.7	29	28	27	26	25	24	23	22	21	20	19	18	18	18	18	18	18	18	18	18	18
Generation	374.60	405.05	452.69	503.14	562.28	632.87	718.96	797.71	885.03	981.83	1089.14	1208.11	1300.09	1416.17	1542.42	1679.72	1829.01	1983.12	2149.86	2330.28	2525.46	2736.60
L.Factor	56.6	56.8	57	57.2	57.4	57.6	57.8	58	58.2	58.4	58.6	58.8	59	59.2	59.4	59.6	59.8	60	60	60	60	60
Peak Load	75.55	81.41	90.66	100.41	111.82	125.43	141.99	157.00	173.59	191.92	212.17	234.54	251.55	273.08	296.42	321.73	349.15	377.31	409.03	443.36	480.49	520.66
WHOLE NEPAL																						
Domestic	231.40	248.64	276.82	307.86	342.04	379.65	421.00	468.55	521.04	578.96	642.84	713.26	781.60	855.95	936.80	1024.72	1120.28	1209.58	1305.36	1408.07	1518.21	1636.29
H.holds	3088.67	3170.46	3254.02	3339.36	3426.48	3515.40	3606.12	3698.63	3792.94	3889.05	3986.94	4086.61	4188.06	4291.26	4429.53	4502.86	4611.22	4721.26	4832.94	4946.23	5061.10	5177.50
Customer	274.92	308.12	344.22	383.32	425.54	471.00	519.80	572.04	627.83	687.26	750.40	817.33	888.12	962.81	1041.45	1124.08	1210.72	1301.39	1396.10	1494.83	1597.58	1704.33
E.Ratio	8.90	9.72	10.58	11.48	12.42	13.40	14.41	15.47	16.55	17.67	18.82	20.00	21.21	22.44	23.51	24.96	26.26	27.56	28.89	30.22	31.57	32.92
Unit	842	807	804	803	804	806	810	819	830	842	857	873	860	889	900	912	925	929	935	942	950	960
Industrial	178.32	191.83	220.32	249.50	284.41	327.06	380.41	430.48	486.93	550.56	622.27	703.03	767.17	837.05	913.17	996.08	1086.38	1184.71	1291.76	1408.29	1535.15	1673.20
Commercial	33.71	35.73	39.58	43.83	48.54	53.76	59.54	65.73	72.57	80.12	88.45	97.65	105.26	113.47	122.32	131.86	142.15	153.24	165.19	178.08	191.97	206.94
Irrigation	11.97	17.35	19.65	22.61	26.46	31.51	38.17	42.56	47.59	53.37	60.00	67.63	70.47	73.43	76.51	79.73	83.08	86.56	90.20	93.99	97.94	102.05
Others	69.39	72.68	78.08	83.82	89.92	96.39	103.26	110.91	119.06	127.75	137.01	146.88	156.05	165.74	175.97	186.77	198.17	208.41	219.12	230.32	242.05	254.31
Total Sale	524.79	566.23	634.45	707.62	791.37	868.36	1002.37	1118.23	1247.20	1390.76	1550.56	1728.44	1880.55	2045.64	2224.78	2419.15	2630.06	2842.50	3071.62	3318.75	3585.30	3872.79
Losses	29.70	29.00	28.00	27.00	26.00	25.00	24.00	23.00	22.00	21.00	20.00	19.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Generation	746.50	797.51	881.17	969.35	1069.42	1184.47	1318.91	1452.25	1598.97	1760.45	1938.20	2133.88	2293.36	2494.66	2713.14	2950.19	3207.39	3466.46	3745.88	4047.26	4372.32	4722.91
L.Factor	49.7	49.9	50.2	50.5	50.8	51.1	51.4	51.7	51.9	52.2	52.4	52.7	52.9	53.1	53.3	53.5	53.8	54.0	54.1	54.2	54.4	54.5
Peak Load	171.60	182.31	200.33	219.21	240.47	264.74	292.85	320.86	351.54	385.15	421.96	462.31	494.87	536.15	580.77	629.00	681.11	733.04	790.19	851.69	917.90	989.15

Table 6.11 Details of Areawise Demand Forecast

(A) Share od Demand by Study Area (%)

Area Name	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
KTM Central	45.19	43.88	42.62	41.40	40.23	39.10	38.02	36.98	35.97	35.01	34.08	33.19
KTM Eastern	12.77	13.29	13.80	14.30	14.78	15.24	15.69	16.13	16.55	16.96	17.36	17.75
KTM Western	16.00	16.59	17.17	17.72	18.25	18.77	19.26	19.74	20.21	20.66	21.09	21.50
Lalitpur	16.05	16.07	16.08	16.08	16.08	16.07	16.05	16.03	16.01	15.98	15.95	15.92
Bhaktapur	5.61	5.79	5.98	6.15	6.33	6.50	6.66	6.82	6.98	7.14	7.29	7.43
Kavre	1.73	1.73	1.72	1.72	1.72	1.71	1.70	1.70	1.69	1.68	1.68	1.67
Trisuri	1.36	1.36	1.35	1.35	1.35	1.34	1.34	1.33	1.33	1.32	1.32	1.31
Sunkosi	1.28	1.28	1.28	1.28	1.27	1.27	1.26	1.26	1.25	1.25	1.24	1.24
Total	100	100	100	100	100	100	100	100	100	100	100	100

(B) Energy Sales (GWh)

Area Name	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
KTM Central	118.16	122.27	131.47	140.89	150.97	161.76	173.35	186.36	200.33	215.35	231.50	248.87
KTM Eastern	33.38	37.04	42.58	48.66	55.46	63.06	71.56	81.30	92.19	104.35	117.93	133.07
KTM Western	41.84	46.24	52.96	60.30	68.50	77.64	87.84	99.51	112.54	127.05	143.23	161.24
Lalitpur	41.97	44.78	49.61	54.74	60.34	66.48	73.20	80.81	89.15	98.30	108.34	119.35
Bhaktapur	14.66	16.14	18.44	20.94	23.75	26.88	30.38	34.39	38.88	43.89	49.49	55.73
Kavre	4.53	4.82	5.32	5.86	6.44	7.07	7.77	8.55	9.41	10.35	11.38	12.50
Trisuri	3.56	3.78	4.18	4.60	5.06	5.56	6.10	6.72	7.39	8.13	8.94	9.82
Sunkosi	3.36	3.57	3.95	4.34	4.78	5.25	5.76	6.35	6.98	7.68	8.44	9.28
Total	261.45	278.64	308.51	340.33	375.28	413.70	455.96	503.99	556.88	615.11	679.25	749.87

Table 6.12 Demand Forecast at Each Station

Unit:MW

	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Kathmandu-2	12.40	13.05	13.74	14.46	15.22	16.02	16.86	17.74	18.67	19.65	20.68	21.77
Teku	9.03	9.61	10.23	10.89	11.59	12.34	13.13	13.98	14.88	15.84	16.86	17.94
Lainchour	6.89	7.25	7.63	8.03	8.45	8.90	9.37	9.86	10.38	10.92	11.49	12.10
Thapathali	5.30	5.58	5.87	6.18	6.50	6.85	7.20	7.58	7.98	8.40	8.84	9.31
Maharajganj	1.97	2.07	2.18	2.30	2.42	2.54	2.68	2.82	2.97	3.12	3.29	3.46
Chabel	8.08	8.71	9.38	10.11	10.90	11.74	12.66	13.64	14.70	15.84	17.07	18.40
New Chabel	1.74	1.94	2.16	2.41	2.69	3.00	3.35	3.74	4.17	4.65	5.19	5.78
Baneswar	13.50	14.81	16.24	17.81	19.54	21.43	23.51	25.78	28.28	31.02	34.03	37.32
Siuchatar	6.34	7.05	7.84	8.72	9.69	10.78	11.99	13.33	14.82	16.48	18.33	20.38
Balaju	5.37	5.97	6.64	7.38	8.21	9.13	10.15	11.29	12.55	13.96	15.52	17.26
Old Patan	7.22	7.81	8.45	9.14	9.88	10.69	11.57	12.51	13.53	14.64	15.83	17.13
Bhaktapur	5.61	6.18	6.80	7.49	8.25	9.08	10.00	11.01	12.12	13.34	14.69	16.18
Thimi	1.78	1.98	2.20	2.44	2.71	3.01	3.34	3.71	4.12	4.58	5.08	5.64
Trisuli	1.20	1.29	1.40	1.51	1.63	1.75	1.89	2.04	2.20	2.37	2.56	2.76
Sunkosi	1.56	1.68	1.82	1.96	2.11	2.28	2.46	2.65	2.86	3.09	3.33	3.59
Total	87.99	94.98	102.58	110.83	119.80	129.54	140.14	151.68	164.23	177.90	192.80	209.02

Remarks:

Kathmandu-2 : 100% Central
Teku : 80% Central + 20% Western
Lainchour : 100% Central
Thapathali : 100% Central
Maharajganj : 100% Central
Chabel : 60% Central + 40% Eastern
New Chabel : 100% Eastern

Baneswar : 50% Eastern + 50% Lalitpur
Siuchatar : 100% Western
Balaju : 100% Western
Old Patan : 100% Lalitpur
Bhaktapur : 70% Bhaktapur + 30% Kavre
Thimi : 100% Bhaktapur
Trisuri : 100% Trisuli
Sunkosi : 100% Sunkosi

Table 7.1 Constant of Generators in Current System

Station Name	Capacity (MW)	Power Factor
MARSYANGDI	69.0	0.90
KULEKHANI-1	60.0	0.85
KULEKHANI-2	32.0	0.85
TRISULI	18.0	0.80
DEVIGHAT	14.1	0.80
SUNKOSI	10.0	0.85
HETAUDA	10.0	0.85

Table 7.2 Constant of Transformers in Current System

Station Name	Nominal Voltage (higher side) [kV]	Reactance [pu ; 100MVA Base]
MARSYANGDI	132	0.1156
KULEKHANI-2	132	0.2910
HETAUDA	132	0.2450
SIUCHATAR	132	0.2471
BALAJU	132	0.2489
DEVIGHAT	66	0.3688
TRISULI	66	0.3693
KULEKHANI-1	66	0.1036
HETAUDA	66	0.6250
SUNKOSI	66	0.7116
PATAN	66	0.1813
SIUCHATAR	66	0.1853
BALAJU	66	0.3990
N.CHABEL	66	0.3503
LAINCHAUR	66	0.4390
BANESWAR	66	0.3685

Table 7.3 Constants of Transmission Lines and Ring Main Distribution Lines in Current System

Unit :100MVA Base pu

Station Name	Station Name	Nominal Voltage [kv]	impedance R	impedance j X	admittance j b
MARSYANGDI	BALAJU	132	0.063310	0.190998	0.042185
MARSYANGDI	BHARATPUR	132	0.018842	0.056845	0.012555
KULEKHANI-2	SIUCHATAR	132	0.025626	0.077309	0.017075
KULEKHANI-2	HETAUDA	132	0.006030	0.018190	0.004018
HETAUDA	BHARATPUR	132	0.065792	0.161950	0.034525
KULEKHANI-1	SIUCHATAR	66	0.073111	0.129801	0.007403
KULEKHANI-1	HETAUDA	66	0.040160	0.071570	0.004087
DEVIGHAT	N.CHABEL	66	0.166390	0.295410	0.004212
TRISULI	BALAJU	66	0.218612	0.269970	0.003554
SUNKOSI	BANESWAR	66	0.353472	0.501770	0.006883
PATAN	SIUCHATAR	66	0.020168	0.035807	0.000511
PATAN	BANESWAR	66	0.017995	0.025545	0.000350
SIUCHATAR	BALAJU	66	0.017647	0.031331	0.001787
BALAJU	JUMPER-1	66	0.052768	0.065165	0.000858
BALAJU	LAINCHAUR	66	0.008647	0.020102	0.000301
N.CHABEL	JUMPER-1	66	0.080674	0.143229	0.002042
PATAN	THIMI	11	0.534603	1.128020	0.000064
PATAN	K-2	11	0.324822	0.685380	0.000039
SIUCHATAR	TEKU	11	0.169178	0.356969	0.000020
BALAJU	TEKU	11	0.257151	0.542592	0.000031
BALAJU	MAHARAJGUNJ	11	0.609041	1.285087	0.000018
BALAJU	CHABEL	11	1.218083	2.570173	0.000036
N.CHABEL	BHAKTAPUR	11	0.649644	1.370759	0.000077
N.CHABEL	CHABEL	11	0.067671	0.142787	0.000008
CHABEL	MAHARAJGUNJ	11	0.365425	0.771052	0.000011
LAINCHAUR	R.PALACE	11	0.060744	0.045645	0.000114
R.PALACE	K-2	11	0.086777	0.065207	0.000163
K-2	LAINCHAUR	11	0.147934	0.110744	0.000278
TEKU	THAPATHALI	11	0.095041	0.057438	0.000453

Table 7.4 Selected Reinforcement and Extension Plans

Year	Sub-project of Scenario A	Sub-project of Scenario B	Sub-project of Scenario C
1990/91	(1) 2nd circuit of 66kV Siuchatar - Patan line includ. 66kV T/L bay at Patan and Siuchatar		
1991/92	(2) Creation of 66/11kV New Bhaktapur S/S,1x10MVA includ. connection of Sunkosi line and 11kV line (3) 66kV 1cct New Bhaktapur - New Chabel line includ. 66kV switchgear at New Chabel	(1) Creation of 132/66kV New Bhaktapur S/S, 132/66kV 45MVA and 132/11kV 1x18MVA includ. connection of Sunkosi line and 11kV line (2) 132kV Siuchatar-New Bhaktapur line, 1st cct includ. 132kV switchgear at Siuchatar	(1) Creation of 132kV switching station near Thankot (2) Creation of New Bhaktapur S/S, 132/66kV 1x45MVA and 132/11kV 1x18MVA, includ. includ. connection of Sunkosi line and 11kV line (3) 132kV Siuchatar-New Bhaktapur line (1st cct) includ. 132kV switchgear at Siuchatar
1992/93	(4) Modification of 66kV switchgear at Trisuli P/S and jumper connection between Trisuli and Devighat (5) Connection of Marsyangdi line to Siuchatar S/S includ. 132kV switchgear(2 T/L bays) (6) Addition of 66/11kV transformer at Baneswar includ. 66kV switchgear,2x18MVA in total	(3) Modification of 66kV switchgear at Trisuli P/S and jumper connection between Trisuli and Devighat (4) Connection of Marsyangdi line to Siuchatar includ. 132kV switchgear (5) Augmentation of 66/11kV transformer at Baneswar includ. 66kV switchgear	(4) Modification of 66kV switchgear at Trisuli P/S and jumper connection between Trisuli and Devighat (5) Augmentation of 66/11kV transformer at Baneswar includ. 66kV switchgear
1993/94	(7) Creation of 66kV K3 S/S, 2x18MVA includ. 11kV switchgear for transformer circuit (8) 66kV Siuchatar-K3 2cct line includ. switchgear at Siuchatar	(6) Creation of 66kV K3 S/S, 2x18MVA includ. 11kV switchgear for transformer circuit (7) 66kV Siuchatar-K3 2cct line includ. switchgear at Siuchatar	(6) Creation of 66kV K3 S/S, 2x18MVA includ. 11kV switchgear for transformer circuits (7) 66kV Siuchatar-K3 2cct line includ. switchgear at Siuchatar
1994/95	(9) Addition of 132/66kV transformer at Siuchatar includ. 132kV and 66kV switchgear		
1995/96	(10) Upgrading of Teku SW/S to 66kV 1x18MVA S/S includ. incoming lines from Siuchatar-K3 line (11) Addition of 66/11kV transformer at New Bhaktapur, 2x10MVA in total	(8) Augmentation of 132/66kV transformer at Siuchatar includ. 132kV and 66kV switchgear (9) Upgrading of Teku SW/S to 66kV 1x18MVA S/S includ. incoming lines from Siuchatar-K3 line	(8) Augmentation of 132/66kV transformer at Siuchatar includ. 132kV and 66kV switchgear (9) Upgrading of Teku SW/S to 66kV 1x18MVA S/S includ. incoming lines from Siuchatar-K3 line
1996/97	(12) Replacement of 66/11kV transformers at New Chabel S/S from 3x6.3MVA to 2x18MVA	(10) Replacement of 66/11kV transformers at New Chabel S/S from 3x6.3MVA to 2x18MVA	(10) Replacement of 66/11kV transformers at New Chabel S/S from 3x6.3MVA to 2x18MVA
1997/98	(13) Replacement of 66/11kV transformers at Lainchaur from 2x10MVA to 2x18MVA (14) Creation of 66/11kV Banepa S/S includ. connection of Sunkosi line and 11kV cubicles	(11) Replacement of 66/11kV transformers at Lainchaur from 2x10MVA to 2x18MVA (12) Creation of 66/11kV Banepa S/S, 1x10MVA includ. connection of Sunkosi line and 11kV cubicles	(11) Replacement of 66/11kV transformers at Lainchaur S/S from 2x10MVA to 2x18MVA (12) Creation of 66/11kV Banepa S/S includ. connection of Sunkosi line and 11kV cubicles
1998/99	(15) 132kV Siuchatar-New Bhaktapur 2cct line (16) Upgrading of New Bhaktapur S/S to 132kV includ. 132kV switchgear at Siuchatar (17) Creation of 132/11kV Chapagaon S/S, 1x18MVA (18) Addition of 66/11kV transformer at Teku S/S, 2x18MVA in total (19) Replacement of 66/11kV transformers at Balaju S/S from 2x10MVA to 2x18MVA	(13) 2nd circuit of 132kV Siuchatar - New Bhaktapur line includ. 132kV switchgears (14) Addition of 66/11kV transformer at Teku S/S, 2x18MVA in total (15) Creation of 132/11kV Chapagaon S/S, 1x18MVA (16) Replacement of 66/11kV transformers at Balaju from 2x10MVA to 2x18MVA (17) Augmentation of 132/11kV transformer at New Bhaktapur, 2x18MVA in total	(13) 2nd circuit of 132kV SW/S - New Bhaktapur line includ. 132kV switchgears (14) Addition of 66/11kV transformer at Teku S/S, 2x18MVA in total (15) Creation of 132/11kV Chapagaon S/S, 1x18MVA (16) Replacement of 66/11kV transformers at Balaju from 2x10MVA to 2x18MVA
1999/00	(20) Installation of static condenser at New Bhaktapur 66kV bus, 2x10MVA	(18) Installation of static condenser at New Bhaktapur 66kV bus, 2x10MVA	(17) Installation of static condenser at New Bhaktapur 66kV bus, 2x10MVA
2000/01	(21) Augmentation of 132/11kV transformers at New Bhaktapur, 1x18MVA		(18) Augmentation of 132/11kV transformer at New Bhaktapur, 2x18MVA in total

TABLE 7.5 SHORT CIRCUIT CURRENT AND RATED BREAKING CURRENT OF EXISTING 11KV CIRCUIT BREAKER

UNIT : kA

STATION NAME	RATED BREAKING CURRENT (Existing CB)	3 PHASE SHORT CIRCUIT CURRENT						
			SCENARIO - A		SCENARIO - B		SCENARIO - C	
		1989/90	1995/96	2000/01	1995/96	2000/01	1995/96	2000/01
PATAN	26.30	12.55	13.50	16.10	12.69	15.19	12.44	15.19
	20.00							
	13.10 / 1							
	7.88 / 2							
SIUCHATAR	26.30	12.95	14.91	18.98	15.00	18.76	14.73	18.75
BALAJU	20.00	10.59	14.85	18.94	15.04	18.60	14.81	18.60
LAINCHAUR	20.00 / 3	9.54	14.34	17.77	14.49	17.58	14.27	17.57
NEW CHABEL	18.40	8.70	13.33	17.09	12.45	14.62	12.31	14.62
BANESWAR	25.00	7.65	12.31	14.41	11.71	13.73	8.07	13.73
BHAKTAPUR	20.00	4.45	8.60	12.16	8.80	11.94	8.62	11.94
TEKU	20.00	9.09	13.86	20.14	13.93	19.88	13.70	19.88
	7.88							
THAPATHALI	40.00	7.86	11.24	14.95	11.29	14.87	11.13	14.87
R.PALACE	7.88	9.09	13.29	16.17	13.42	16.04	13.22	16.03
MAHARAJGUNJ	7.88	5.16	6.13	6.67	6.05	6.48	6.01	6.48
CHABEL	7.88 / 2	7.76	10.79	13.03	10.91	11.75	10.21	11.75
THIMI	7.88 / 2	4.69	6.92	8.41	6.91	8.29	6.81	8.29
K-2	25.00	9.26	13.46	16.39	13.57	16.25	13.37	16.25
K-3	-	-	12.88	15.45	12.95	15.35	12.76	15.34
N.BHAKTAPUR	-	-	10.10	16.29	10.27	15.50	9.99	15.51
CHAPAGAON	-	-	-	8.65	-	8.74		8.75

/ 1 : For diesel generator

/ 2 : No rating plate, but assumed to be 7.88 kA.

/ 3 : No information about breaking current, but assumed to be 20.0 kA.

Table 7.6 Replacement and New Installation of 11kV Cubicles

	Substation		Replace	Addition	Shift	New S/S	Total
Urgent Works							
1)	Old Patan	*1	14				14
2)	Royal Palace		5				5
Upto 1995/96							
3)	Teku	*2	17	2			19
4)	New Bhaktapur	*3				12	12
5)	Lainchaur	*4	8	2			10
6)	K3					10	10
7)	Chabel	*5			6		6
Upto 2000/01							
8)	Thimi		6				6
9)	Banepa					5	5
10)	Chapagaon					5	5
	Total		50	4	6	32	92

Remarks :

*1 : Existing building is considered to be used.

*2 : Replace is recommended to be done when the station is upgraded.

*3 : Including cubicles for connection of 11kV Thimi-Bhaktapur line.

*4 : Existing ones are temporally use.

*5 : Dismantled cubicles at Old Patan and Teku will be used.

Table 7.7 Construction Cost for Transmission System
(Scenario - A)

Year		Sub-project	Const. Cost (US$1000)
1990/91	(1)	2nd circuit of 66kV Siuchatar - Patan line includ. 66kV T/L bay at Patan and Siuchatar	860.7
1991/92	(2)	Creation of 66/11kV New Bhaktapur S/S,1x10MVA includ. connection of Sunkosi line and 11kV line	1,760.7
	(3)	66kV 1cct New Bhaktapur - New Chabel line includ. 66kV switchgear at New Chabel	1,036.4
1992/93	(4)	Modification of 66kV switchgear at Trisuli P/S and jumper connection between Trisuli and Devighat	642.9
	(5)	Connection of Marsyangdi line to Siuchatar S/S includ. 132kV switchgear(2 T/L bays)	907.1
	(6)	Addition of 66/11kV transformer at Baneswar includ. 66kV switchgear,2x18MVA in total	1,232.9
1993/94	(7)	Creation of 66kV K3 S/S, 2x18MVA includ. 11kV switchgear for transformer circuit	6,596.7
	(8)	66kV Siuchatar-K3 2cct line includ. switchgear at Siuchatar	3,206.4
1994/95	(9)	Addition of 132/66kV transformer at Siuchatar includ. 132kV and 66kV switchgear	2,815.3
1995/96	(10)	Upgrading of Teku SW/S to 66kV 1x18MVA S/S includ. incoming lines from Siuchatar-K3 line	3,176.5
	(11)	Addition of 66/11kV transformer at New Bhaktapur, 2x10MVA in total	1,164.3
1996/97	(12)	Replacement of 66/11kV transformers at New Chabel S/S from 3x6.3MVA to 2x18MVA	1,784.6
1997/98	(13)	Replacement of 66/11kV transformers at Lainchaur from 2x10MVA to 2x18MVA	1,708.9
	(14)	Creation of 66/11kV Banepa S/S includ. connection of Sunkosi line and 11kV cubicles	1,414.3
1998/99	(15)	132kV Siuchatar-New Bhaktapur 2cct line	3,664.3
	(16)	Upgrading of New Bhaktapur S/S to 132kV includ. 132kV switchgear at Siuchatar	3,837.1
	(17)	Creation of 132/11kV Chapagaon S/S, 1x18MVA	1,692.3
	(18)	Addition of 66/11kV transformer at Teku S/S, 2x18MVA in total	1,433.5
	(19)	Replacement of 66/11kV transformers at Balaju S/S from 2x10MVA to 2x18MVA	1,708.9
1999/00	(20)	Installation of static condenser at New Bhaktapur 66kV bus, 2x10MVA	642.9
2000/01	(21)	Augmentation of 132/11kV transformers at New Bhaktapur, 1x18MVA	1,247.8
Total			42,534.5

Table 7.8 Construction Cost for Transmission System
(Scenario - B)

Year			Const. Cost (US$1000)
1991/92	(1)	Creation of 132/66kV New Bhaktapur S/S, 132/66kV 45MVA and 132/11kV 1x18MVA includ. connection of Sunkosi line and 11kV line	5,328.1
	(2)	132kV Siuchatar-New Bhaktapur line, 1st cct includ. 132kV switchgear at Siuchatar	3,008.6
1992/93	(3)	Modification of 66kV switchgear at Trisuli P/S and jumper connection between Trisuli and Devighat	642.9
	(4)	Connection of Marsyangdi line to Siuchatar includ. 132kV switchgear	907.1
	(5)	Augmentation of 66/11kV transformer at Baneswar includ. 66kV switchgear	1,232.9
1993/94	(6)	Creation of 66kV K3 S/S, 2x18MVA includ. 11kV switchgear for transformer circuit	6,596.7
	(7)	66kV Siuchatar-K3 2cct line includ. switchgear at Siuchatar	3,206.4
1995/96	(8)	Augmentation of 132/66kV transformer at Siuchatar includ. 132kV and 66kV switchgear	2,815.3
	(9)	Upgrading of Teku SW/S to 66kV 1x18MVA S/S includ. incoming lines from Siuchatar-K3 line	3,176.5
1996/97	(10)	Replacement of 66/11kV transformers at New Chabel S/S from 3x6.3MVA to 2x18MVA	1,784.6
1997/98	(11)	Replacement of 66/11kV transformers at Lainchaur from 2x10MVA to 2x18MVA	1,708.9
	(12)	Creation of 66/11kV Banepa S/S, 1x10MVA includ. connection of Sunkosi line and 11kV cubicles	1,414.3
1998/99	(13)	2nd circuit of 132kV Siuchatar - New Bhaktapur line includ. 132kV switchgears	2,005.7
	(14)	Addition of 66/11kV transformer at Teku S/S, 2x18MVA in total	1,433.5
	(15)	Creation of 132/11kV Chapagaon S/S, 1x18MVA	1,692.3
	(16)	Replacement of 66/11kV transformers at Balaju from 2x10MVA to 2x18MVA	1,708.9
	(17)	Augmentation of 132/11kV transformer at New Bhaktapur, 2x18MVA in total	1,247.8
1999/00	(18)	Installation of static condenser at New Bhaktapur 66kV bus, 2x10MVA	642.9
Total			40,553.4

Table 7.9 Construction Cost for Transmission System
(Scenario - C)

Year		Sub-project	Const. Cost (US$1000)
1991/92	(1)	Creation of 132kV switching station near Thankot	3,480.0
	(2)	Creation of New Bhaktapur S/S, 132/66kV 1x45MVA and 132/11kV 1x18MVA, includ. includ. connection of Sunkosi line and 11kV line	5,328.1
	(3)	132kV Siuchatar-New Bhaktapur line (1st cct) includ. 132kV switchgear at Siuchatar	3,008.6
1992/93	(4)	Modification of 66kV switchgear at Trisuli P/S and jumper connection between Trisuli and Devighat	642.9
	(5)	Augmentation of 66/11kV transformer at Baneswar includ. 66kV switchgear	1,232.9
1993/94	(6)	Creation of 66kV K3 S/S, 2x18MVA includ. 11kV switchgear for transformer circuits	6,596.7
	(7)	66kV Siuchatar-K3 2cct line includ. switchgear at Siuchatar	3,206.4
1995/96	(8)	Augmentation of 132/66kV transformer at Siuchatar includ. 132kV and 66kV switchgear	2,815.3
	(9)	Upgrading of Teku SW/S to 66kV 1x18MVA S/S includ. incoming lines from Siuchatar-K3 line	3,176.5
1996/97	(10)	Replacement of 66/11kV transformers at New Chabel S/S from 3x6.3MVA to 2x18MVA	1,784.6
1997/98	(11)	Replacement of 66/11kV transformers at Lainchaur S/S from 2x10MVA to 2x18MVA	1,708.9
	(12)	Creation of 66/11kV Banepa S/S includ. connection of Sunkosi line and 11kV cubicles	1,414.3
1998/99	(13)	2nd circuit of 132kV SW/S - New Bhaktapur line includ. 132kV switchgears	2,005.7
	(14)	Addition of 66/11kV transformer at Teku S/S, 2x18MVA in total	1,433.5
	(15)	Creation of 132/11kV Chapagaon S/S, 1x18MVA	1,692.3
	(16)	Replacement of 66/11kV transformers at Balaju from 2x10MVA to 2x18MVA	1,708.9
1999/00	(17)	Installation of static condenser at New Bhaktapur 66kV bus, 2x10MVA	642.9
	(18)	Augmentation of 132/11kV transformer at New Bhaktapur, 2x18MVA in total	1,247.8
Total			43,126.3

Table 7.10 KW and KWh Values

Power and energy losses in the system is assessed by the following KW and KWh values.

KW Value

A basis of the value is obtained from the estimated construction cost of the undermentioned medium-speed diesel power plant (26MW) under construction in the Eastern region.

The construction cost is as below:

Foreign Currency (US$ 1,000)		18,145
(a)	Equipment and material costs	12,186
(b)	Site installation cost	5,256
(c)	Others (for Engineering, etc.)	703
Local currency (Nrs. 1,000)		11,000

Note: US$ 1.00 = NRs.28

The above estimate results in the unit rate of US$713/KW.
While, an equivalent fixed cost for the station including operation and maintenance costs is estimated at US$130/kW/year under the following conditions.

- Construction period	2 years
- Disbursement of construction cost	40% and 60%
- Discount rate	10%
- Life time of the plant	20 years
- Operation and maintenance costs	3% of total construction cost

KWh Value

Fuel cost is applied with that in 1990 price level.

- Fuel cost	US$ 0.3/l
- Calorific value of fuel	10,800 Kcal/kg
- Plant efficiency	37%
- Operation and maintenance cost	UScent 0.6/kWh

The kWh value is computed as UScent 7.5/kWh from the above assumptions.

Table 8.1 : Voltage Regulation and Overload of 11kV Feeder (1/3)

NAME OF FEEDER	1989/90			1990/91			1991/92			1992/93			1993/94			1994/95			1995/96			1996/97			1997/98			1998/99			1999/00			2000/01		
	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.
SIUCHATAR S/S																																				
Ropeway/Kirtipur	95.76	O	O	95.21	O	O	94.59	O	O	93.88	O	O	93.12	O	O	92.24	X	O	91.21	X	O	90.11	X	O	88.91	X	O	87.49	X	O	85.98	X	O	84.25	X	X
Kalimati	98.74	O	O	98.65	O	O	98.56	O	O	98.46	O	O	98.35	O	O	98.24	O	O	98.11	O	O	97.98	O	O	97.81	O	O	97.66	O	O	97.47	O	O	97.28	O	O
Kalanki	99.86	O	O	99.85	O	O	99.83	O	O	99.81	O	O	99.79	O	O	99.78	O	O	99.76	O	O	99.74	O	O	99.71	O	O	99.68	O	O	99.65	O	O	99.62	O	O
Swayambhu	98.77	O	O	98.49	O	O	98.20	O	O	97.84	O	O	97.47	O	O	97.02	O	O	96.49	O	O	95.92	O	O	95.26	O	O	94.53	O	O	93.71	O	O	92.77	O	O
Thankot	94.66	O	O	93.98	O	O	93.26	O	O	92.49	X	O	91.62	X	O	90.69	X	O	89.61	X	O	88.43	X	O	87.09	X	O	85.60	X	O	83.95	X	O	82.15	X	X
Tahachal	99.19	O	O	99.41	O	O	99.07	O	O	99.00	O	O	98.93	O	O	98.85	O	O	98.77	O	O	98.60	O	O	98.58	O	O	98.49	O	O	98.37	O	O	98.24	O	O
BALAJU S/S																																				
Dharmasthali	97.53	O	O	97.12	O	O	96.65	O	O	96.13	O	O	95.53	O	O	94.84	O	O	94.10	O	O	93.25	O	X	92.29	X	X	91.24	X	X	90.04	X	X	88.69	X	X
Swayambhu	99.74	O	O	99.70	O	O	99.65	O	O	99.60	O	O	99.53	O	O	99.70	O	O	99.39	O	O	99.31	O	O	99.22	O	O	99.11	O	O	99.00	O	O	98.87	O	O
B.I.D	99.41	O	O	99.22	O	O	99.00	O	O	98.75	O	X	98.47	O	X	98.15	O	X	97.78	O	X	97.37	O	X	96.91	O	X	96.39	O	X	95.80	O	X	95.14	O	X
Naya Bazar	99.37	O	O	99.31	O	O	99.26	O	O	99.19	O	O	99.12	O	O	99.05	O	O	98.98	O	O	98.87	O	O	98.77	O	O	98.65	O	O	98.52	O	O	98.39	O	O
NEW CHABEL S/S																																				
Maharajgunj	99.28	O	O	99.21	O	O	99.13	O	O	99.06	O	O	98.97	O	O	98.90	O	O	98.81	O	O	98.70	O	O	98.58	O	O	98.46	O	O	98.33	O	O	98.18	O	O
Airport	n.a	n.a	n.a	98.18	O	O	97.84	O	O	97.48	O	O	97.05	O	O	96.56	O	X	96.01	O	X	95.39	O	X	94.69	O	X	93.89	O	O	92.99	O	X	91.96	X	X
Sundarijal	96.84	O	O	96.57	O	O	96.20	O	O	95.84	O	O	95.39	O	O	94.94	O	O	94.40	O	O	93.76	O	O	93.13	O	O	92.32	X	O	91.50	X	O	90.60	X	O
Boudha-Jorpati	95.75	O	O	95.08	O	X	94.32	O	X	93.45	O	X	92.44	X	X	91.33	X	X	90.05	X	X	87.98	X	X	87.02	X	X	85.19	X	X	83.15	X	X	80.82	X	X
CHABEL Sw/S																																				
Baneswar	97.88	O	O	97.47	O	O	97.02	O	O	96.50	O	O	95.90	O	O	95.24	O	X	94.49	O	X	93.63	O	X	92.66	O	X	91.57	X	X	90.33	X	X	88.91	X	X
Naxal	98.61	O	O	98.51	O	O	98.39	O	O	98.26	O	O	98.16	O	O	98.03	O	O	97.89	O	O	97.73	O	O	97.55	O	O	97.37	O	O	97.16	O	O	96.95	O	O
Sundarijal	91.86	X	O	91.08	X	O	90.83	X	O	89.90	X	O	88.88	X	O	87.77	X	O	86.48	X	O	85.18	X	X	83.70	X	X	82.12	X	X	80.38	X	X	78.42	X	X
Tangal	99.58	O	O	99.55	O	O	99.52	O	O	99.49	O	O	99.45	O	O	99.41	O	O	99.38	O	O	99.31	O	O	99.25	O	O	99.20	O	O	99.13	O	O	99.07	O	O
NEW PATAN S/S																																				
Old Patan-1	99.96	O	O	99.96	O	O	99.95	O	O	99.95	O	O	99.94	O	X	99.94	O	X	99.93	O	X	99.93	O	X	99.92	O	X	99.91	O	X	99.90	O	X	99.89	O	X
Old Patan-2	99.75	O	O	99.97	O	O	99.96	O	O	99.96	O	O	99.96	O	O	99.95	O	O	99.95	O	O	99.94	O	X	99.94	O	X	99.93	O	X	99.92	O	X	99.91	O	X
OLD PATAN P/S																																				
Ring Road	99.57	O	O	99.54	O	O	99.49	O	O	99.45	O	O	99.40	O	O	99.35	O	O	99.30	O	O	99.23	O	O	99.16	O	O	99.08	O	O	98.90	O	O	98.50	O	O
Radio Nepal	98.91	O	O	98.80	O	O	98.69	O	O	98.56	O	O	98.44	O	O	98.29	O	O	98.13	O	O	97.94	O	O	97.74	O	O	97.53	O	O	97.29	O	O	97.02	O	X

Table 3.1 : Voltage Regulation and Overload of 11kV Feeder (2/3)

NAME OF FEEDER	1989/90			1990/91			1991/92			1992/93			1993/94			1994/95			1995/96			1996/97			1997/98			1998/99			1999/00			2000/01		
	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.
OLD PATAN P/S																																				
Patan	99.32	○	○	99.27	○	○	99.22	○	○	99.16	○	○	99.10	○	○	99.04	○	○	98.97	○	○	98.88	○	○	98.79	○	○	98.70	○	○	98.59	○	○	98.49	○	○
Jawalakhel	99.31	○	○	99.25	○	○	99.19	○	○	99.11	○	○	99.05	○	○	98.96	○	○	98.87	○	○	98.77	○	○	98.66	○	○	98.53	○	○	98.40	○	○	98.26	○	○
Pharping	95.89	○	○	95.39	○	○	94.84	○	○	94.21	○	○	93.48	○	○	92.66	○	○	91.79	X	○	90.74	X	○	89.60	X	○	88.32	X	○	86.86	X	○	85.26	X	X
Mangal Bazar	99.84	○	○	99.83	○	○	99.82	○	○	99.80	○	○	99.74	○	○	99.77	○	○	99.75	○	○	99.73	○	○	99.71	○	○	99.69	○	○	99.67	○	○	99.64	○	X
NEW BANESWAR S/S																																				
Baneswar	99.29	○	○	99.22	○	○	99.14	○	○	99.06	○	○	98.97	○	○	98.88	○	○	98.77	○	○	98.66	○	○	98.53	○	○	98.39	○	○	98.24	○	○	98.07	○	X
Airport	94.63	○	○	94.04	○	○	93.41	○	○	92.67	○	○	91.89	X	○	91.00	X	○	90.01	X	X	88.91	X	X	87.72	X	X	86.38	X	X	84.88	X	X	83.21	X	X
Godawari-1	94.15	○	○	93.71	○	○	93.21	○	○	92.67	○	○	92.13	X	○	91.50	X	○	90.83	X	○	90.06	X	○	89.21	X	○	88.26	X	○	87.26	X	○	86.20	X	○
Godawari-2	91.38	X	○	90.75	X	○	90.02	X	○	89.29	X	○	88.45	X	○	87.56	X	○	86.57	X	○	85.47	X	○	84.27	X	○	82.91	X	X	81.50	X	X	79.93	X	X
Imadol	98.89	○	○	98.77	○	○	98.66	○	○	98.54	○	○	98.40	○	○	98.23	○	○	98.06	○	○	97.87	○	○	97.66	○	○	97.42	○	○	97.16	○	○	96.88	○	○
Shankhamul	99.04	○	○	98.96	○	○	98.88	○	○	98.79	○	○	98.69	○	○	98.58	○	○	98.47	○	○	98.33	○	○	98.20	○	○	98.04	○	○	97.87	○	○	97.70	○	X
TEKU S/S																																				
Pulchowk	98.60	○	○	98.50	○	○	98.39	○	○	98.28	○	○	98.16	○	○	98.02	○	○	97.89	○	○	97.72	○	○	97.55	○	○	97.35	○	○	97.15	○	○	96.93	○	○
Kalimati	99.93	○	○	99.93	○	○	99.93	○	○	99.93	○	○	99.93	○	○	99.93	○	○	99.93	○	○	99.93	○	○	99.93	○	○	99.93	○	○	99.93	○	○	99.93	○	○
Kirtipur	99.75	○	○	99.72	○	○	99.71	○	○	99.68	○	○	99.65	○	○	99.62	○	○	99.59	○	○	99.56	○	○	99.52	○	○	99.47	○	○	99.43	○	○	99.38	○	○
Mint	99.00	○	○	98.98	○	○	98.95	○	○	98.93	○	○	98.90	○	○	98.86	○	○	98.83	○	○	98.79	○	○	98.74	○	○	98.70	○	○	98.65	○	○	98.60	○	○
Tahachal	99.57	○	○	99.55	○	○	99.52	○	○	99.49	○	○	99.46	○	○	99.43	○	○	99.36	○	○	99.35	○	○	99.30	○	○	99.26	○	○	99.20	○	○	99.15	○	○
Thankot	99.95	○	○	99.94	○	○	99.94	○	○	99.93	○	○	99.93	○	○	99.93	○	○	99.92	○	○	99.92	○	○	99.91	○	○	99.90	○	○	99.90	○	○	99.89	○	○
Bhimsenthan	99.62	○	○	99.60	○	○	99.59	○	○	99.58	○	○	99.56	○	○	99.54	○	○	99.53	○	○	99.51	○	○	99.49	○	○	99.47	○	○	99.44	○	○	99.42	○	○
Tripureswar	99.88	○	○	99.88	○	○	99.88	○	○	99.88	○	○	99.88	○	○	99.87	○	○	99.87	○	○	99.87	○	○	99.87	○	○	99.86	○	○	99.86	○	○	99.86	○	○
K2 S/S																																				
King's Way	99.24	○	○	99.20	○	○	99.16	○	○	99.12	○	○	99.08	○	○	99.04	○	○	98.99	○	○	98.93	○	○	98.87	○	○	98.81	○	○	98.74	○	○	98.67	○	○
Kamaladi	99.56	○	○	99.53	○	○	99.51	○	○	99.48	○	○	99.45	○	○	99.42	○	○	99.39	○	○	99.35	○	○	99.30	○	○	99.26	○	○	99.22	○	○	99.17	○	○
Singha Durbar	99.59	○	○	99.59	○	○	99.58	○	○	99.58	○	○	99.57	○	○	99.57	○	○	99.56	○	○	99.55	○	○	99.55	○	○	99.54	○	○	99.52	○	○	99.51	○	○
Mahabaudha	99.82	○	○	99.81	○	○	99.81	○	○	99.80	○	○	99.79	○	○	99.78	○	○	99.78	○	○	99.77	○	○	99.76	○	○	99.75	○	○	99.74	○	○	99.73	○	○
City-1	99.85	○	○	99.85	○	○	99.84	○	○	99.84	○	○	99.83	○	○	99.83	○	○	99.82	○	○	99.81	○	○	99.80	○	○	99.79	○	○	99.74	○	○	99.78	○	○
Tangal	98.38	○	○	98.25	○	○	98.15	○	○	98.04	○	○	97.92	○	○	97.80	○	○	97.66	○	○	97.50	○	○	97.34	○	○	97.15	○	○	96.90	○	○	96.75	○	○
Babar Mahal	99.71	○	○	99.71	○	○	99.71	○	○	99.71	○	○	99.71	○	○	99.70	○	○	99.70	○	○	99.69	○	○	99.69	○	○	99.68	○	○	99.67	○	○	99.66	○	○

Table 8.1 : Voltage Regulation and Overload of 11kV Feeder (3/3)

NAME OF FEEDER	1989/90			1990/91			1991/92			1992/93			1993/94			1994/95			1995/96			1996/97			1997/98			1998/99			1999/00			2000/01		
	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.	Voltage Regul. at End V.R(%)	Extent of V.R	Cond. Cable Capa.
LAINCHAUR S/S																																				
(Naya Bazar)	99.28	O	O	99.21	O	O	99.14	O	O	99.07	O	O	98.98	O	O	98.90	O	O	98.80	O	O	98.69	O	O	98.58	O	O	98.44	O	O	98.30	O	O	98.15	O	O
Lazimpat	99.19	O	O	99.14	O	O	99.09	O	O	99.04	O	O	98.98	O	O	98.93	O	O	98.87	O	O	98.80	O	O	98.72	O	O	98.64	O	O	98.56	O	O	98.46	O	O
King's Way	99.26	O	O	99.23	O	O	99.19	O	O	99.16	O	O	99.12	O	O	99.07	O	O	99.03	O	O	98.98	O	O	98.92	O	O	98.87	O	O	98.80	O	O	98.74	O	O
Gari Dhara	99.11	O	O	99.06	O	O	99.00	O	O	98.93	O	O	98.87	O	O	98.80	O	O	98.73	O	O	98.65	O	O	98.55	O	O	98.45	O	O	98.36	O	O	98.24	O	O
BHAKTAPUR Sw/S																																				
Byasi	99.25	O	O	99.16	O	O	99.06	O	O	98.94	O	O	98.82	O	O	98.68	O	O	98.52	O	O	98.33	O	O	98.13	O	O	97.90	O	O	97.65	O	X	97.37	O	X
Katunje	98.59	O	O	98.42	O	O	98.26	O	O	98.09	O	O	97.89	O	O	97.65	O	O	97.39	O	O	97.12	O	O	96.82	O	O	96.48	O	O	96.11	O	O	95.71	O	O
Banepa	98.33	O	O	97.98	O	O	97.52	O	O	97.06	O	O	96.49	O	O	95.88	O	O	95.16	O	O	94.33	O	O	93.41	O	O	92.37	X	O	91.18	X	O	89.84	X	O
Nalin Chowk	99.35	O	O	99.23	O	O	99.06	O	O	98.90	O	O	98.68	O	O	98.45	O	O	98.19	O	O	97.90	O	O	97.58	O	O	97.19	O	O	96.77	O	O	96.29	O	O
Brick	99.28	O	O	99.28	O	O	99.22	O	O	99.17	O	O	99.11	O	O	99.04	O	O	98.97	O	O	98.89	O	O	98.81	O	O	98.71	O	O	98.62	O	O	98.51	O	O
Nagarkot	95.91	O	O	95.25	0	O	94.42	O	O	93.58	O	O	92.56	O	O	91.44	X	O	90.10	X	O	88.65	X	O	86.97	X	O	85.11	X	O	82.97	X	O	80.55	X	O
MAHARAJGUNJ Sw/S																																				
King's Way	Faulted																																			
Budhanilkantha	98.43	O	O	98.21	O	O	97.96	O	O	97.72	O	O	97.12	O	O	96.94	O	O	96.82	O	O	96.47	O	O	96.06	O	O	95.64	O	O	95.17	O	X	94.66	O	X
Baluwater	99.81	O	O	99.80	O	O	99.79	O	O	99.78	O	O	99.77	O	O	99.76	O	O	99.75	O	O	99.74	O	O	99.72	O	O	99.70	O	O	99.69	O	O	99.67	O	O
THIMI Sw/S																																				
Thimi	97.56	O	O	97.36	O	O	97.10	O	O	96.84	O	O	96.59	O	O	96.28	O	O	95.94	O	O	95.59	O	O	95.17	O	O	94.74	O	O	94.28	O	O	93.78	O	O
Trolley Bus	99.91	O	O	99.90	O	O	99.89	O	O	99.88	O	O	99.87	O	O	99.86	O	O	99.85	O	O	99.84	O	O	99.82	O	O	99.81	O	O	99.80	O	O	99.78	O	O
THAPATHALI Sw/S																																				
Teku	99.79	O	O	99.79	O	O	99.79	O	O	99.79	O	O	99.78	O	O	99.78	O	O	99.78	O	O	99.77	O	O	99.77	O	O	99.76	O	O	99.75	O	O	99.74	O	O
Patan	99.35	O	O	99.28	O	O	99.21	O	O	99.13	O	O	99.03	O	O	98.93	O	O	98.82	O	O	98.69	O	O	98.55	O	O	98.39	O	O	98.21	O	X	98.01	O	X
Thapathali	99.87	O	O	99.87	O	O	99.87	O	O	99.87	O	O	99.87	O	O	99.87	O	O	99.87	O	O	99.86	O	O	99.86	O	O	99.86	O	O	99.85	O	O	99.85	O	O
Singdharbar	99.60	O	O	99.58	O	O	99.56	O	O	99.55	O	O	99.53	O	O	99.51	O	O	99.49	O	O	99.47	O	O	99.44	O	O	99.41	O	O	99.37	O	O	99.35	O	O
Sanepa	99.52	O	O	99.49	O	O	99.44	O	O	99.40	O	O	99.36	O	O	99.31	O	O	99.27	O	O	99.21	O	O	99.15	O	O	99.09	O	O	99.01	O	O	98.94	O	O

Table 8.2 Existing 11kV Distribution Transformers

Name of Feeder		No. of Unit	Total Capacity (kVA)
Siuchatar S/S:	Kirtipur (Ropeway)	43	8,525
	Kalimati	19	2,750
	Kalanki	3	350
	Thankot	56	5,470
	Tahachal	14	2,400
	Total	135	19,495
New Chabel S/S:	Maharajgunj	23	2,800
	Airport	17	3,750
	Sundarijal	70	4,640
	Boudha-Jorpati	38	5,300
	Total	148	16,490
Old Patan SW/S:	Ring Road	13	1,075
	Radio Nepal	10	3,200
	Patan	13	1,900
	Jawalakhel	20	2,250
	Pharping	42	4,445
	Mangal Bazar	9	1,250
	Total	107	14,120
K2 SW/S:	King's Way	38	9,050
	Kamaladi	16	3,900
	Singha Durbar	48	8,445
	Mahaboudha	12	3,375
	City-1	23	5,600
	Tangal	30	5,200
	Babar Mahal	4	550
	Total	171	36,120
Bhaktapur SW/S:	Byasi	16	2,600
	Katunje	20	1,725
	Nalin Chowk	13	1,520
	Khopasi (Banepa)	n.a	n.a
	Brick or Inacho	15	2,400
	Nagarkot	30	1,725
	Total	94	9,970
Thimi S/S:	Thimi	41	4,170
	Trolley		
	Total	41	4,170

Name of Feeder		No. of Unit	Total Capacity (kVA)
Balaju S/S:	Dharmasthali	42	2,909
	Swayambhu	26	4,129
	B.I.D.	23	7,465
	Nayabazar	30	3,960
	Total	121	18,463
New Baneswar S/S:	Baneswar	29	5,450
	Airport	48	7,649
	Godawari-1	43	5,403
	Godawari-2	50	5,753
	Imadol	17	2,560
	Shankhamul	14	2,150
	Total	201	28,955
Teku SW/S:	Pulchowk	31	3,575
	Kirtipur	12	1,775
	Mint	21	4,100
	Tahachal	n.a	n.a
	Thankot	16	1,750
	Bhimsenthan	23	5,200
	Tripureswar	9	1,715
	Total	112	18,115
Lainchaur S/S:	Lazimpat	17	3,280
	Gairi-Dhara	26	4,029
	Total	43	7,309
Chabel SW/S:	Baneswar	10	1,950
	Nazal	31	4,679
	Tangal	9	1,200
	Total	50	7,829
Maharajgunj SW/S:	Bhudhanilkantha	44	4,415
	Baluwatar	10	1,700
	Total	54	6,115
Thapathali S/S:	Teku	13	1,690
	Thapathali	8	900
	Patan	21	3,400
	Sanepa	13	1,700
	Total	55	7,690

Grand Total of Transformer Units	1,332	–
Grand Total of Transformer Capacity	–	194,841

Source : Submitted data from each division of NEA