



Nepal Electricity Authority

FY 1992/93

A YEAR IN REVIEW

BHADRA, 2050 (AUGUST 1993)
DURBAR MARG, KATHMANDU

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Highlights of 1992/93

Description	1993*	1992**	Increase/Decrease	
			Amount	Percent
Total Revenue (M. NRs)	1,897.3	1,477.4	419.9	28.42
Net Sale of Electricity (M. NRs)	1,805.0	1,436.9	368.1	25.62
Income from Other Services (M. NRs)	92.3	40.5	51.8	127.90
Operating Expenses,				
Including Depreciation (M. NRs)	2,062.2	1,639.0	423.2	25.82
Depreciation (M. NRs) ++	1,054.9	959.0	95.9	10.00
Net Income, after interest befor tax (M. NRs)	(99.2)	(118.2)	19.0	(16.07)
Interest on Long-Terms Loans (M. NRs)	641.7	575.6	66.1	11.48
Long-Term Loans (M. NRs)	12,173.75	10,635.2	1,538.5	14.46
Net Fixed Assets (M. NRs)	24,336.8	23,178.0	1,158.8	5.00
Number of Customers	3,91,000	3,55,953	35,047	9.85
Total Sales Of Electricity (GWh)	733.754	737.352	(3.598)	(0.48)
Internal Sale (GWh)	674.434	651.941	22.493	3.45
Average Customer's Consumption (KWh)+	1724.9	1831.35	(106.45)	(5.81)
Average Price Of Electricity (NRs/KWh)+	2.51	1.98	0.53	26.77
Peak Load Interconnected System (MW)	214.04	216.00	(1.96)	(0.91)
Total Available Electric Energy (GWh)	963.314	981.105	(17.791)	(1.81)
Hydoro Generation (GWh)	804.050	869.980	(65.93)	(7.58)
Purchased Energy (GWh)	111.974	79.585	32.389	40.70
Exported Energy (GWh)	59.320	85.411	(26.091)	(30.55)
Thermal (GWh)	47.290	31.540	15.75	49.94

Note:

- * Figures for 1993 are provisional.
- ** Figures for 1992 are subject to audit.
- + Internal
- ++ On revalued assets

Message From The Chairman



It gives me great satisfaction to note that on Bhadra 1, 2050, Nepal Electricity Authority will complete eight years of active operations and enter into the ninth year. Over this relatively short period of time, NEA has endeavoured to structure itself into an institution oriented towards self-sustainable commercial operations and also meeting social obligations in the nation's interests.

During the past year, NEA has been compelled to resort to power cuts owing to deficits in its generation vis-a-vis the demand. This situation has been aggravated by the breakdown of the Kulekhani hydel plants. It is indeed regretful that such a situation should arise in a country endowed with immense water resources - a great portion of which can be exploited for generation of hydropower. But such a situation unfortunately has arisen owing to NEA's lack of adequate financial resources to undertake its own investment plans. Although the Donor community and multi-lateral agencies are helping HMG and NEA in implementing its investment plans, implementation has been slow owing to the time required to arrange finance through a consortium of banks and bilateral donors.

To assist in the accelerated development of the power sector, the Government has introduced the Water Resource Development Policy which encourages the private sector to undertake generation, transmission and distribution of electricity within the country. Private entrepreneurship is particularly anticipated to participate in small and mid-sized projects. The interest shown so far has been encouraging. These activities will hopefully complement and interface with the efforts made by NEA. To this end, NEA is cooperating with the private sector to develop the Khimti and Modi Khola hydropower projects.

To provide autonomy within NEA as stipulated in the Act, a greater degree of participation of the private sector management has been introduced by reconstituting the NEA Board. In fulfilling the responsibilities of meeting the growing future needs of power, NEA is making necessary efforts to attain greater financial and operational efficiency and capability with a view to launch small and medium hydro projects on its own initiative.

NEA does have its constraints and difficulties which have been aggravated by its share of natural calamities and unfavourable hydrological conditions. The brave attempts made by all levels of staff within NEA to identify the problems associated with the breakdown of the Kulekhani power generation owing to the damage to the penstock pipe at Jurikhet Khola and on the intake structure at Mandu and in trying to rehabilitate the same within minimum time is well appreciated. I am confident that NEA will take the necessary steps to end the regime of load shedding and contribute to development.

To conclude, I wish to thank the Members of the NEA Board and the Management and Staff of the NEA for the dedication they have shown in their work. This will evidently see NEA heading towards success and prosperity in the near future.

(Laxman Prasad Ghimire)
Minister of State for Water Resources; and
Chairman, Nepal Electricity Authority

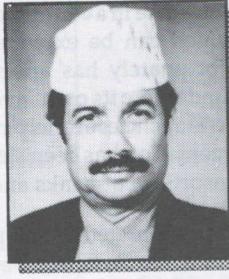
Board of Directors



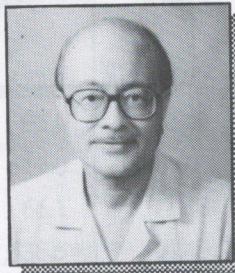
Chairman
Mr L.P. Ghimire
Hon'ble Minister of State
Water Resources



Dr. T.N. Pant
Secretary
Ministry of Finance



Mr S.N. Upadhyay
Act. Secretary
Ministry of Water Resources



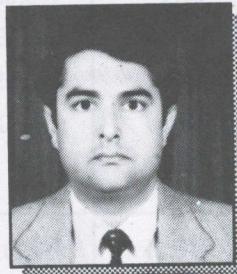
Mr Himalaya S.J.B. Rana
Chairman
Himalaya Bank



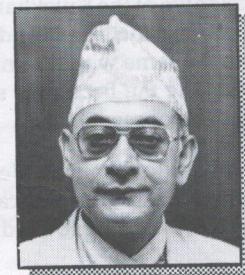
Mr S.N. Pradhan
Advisor
N P C



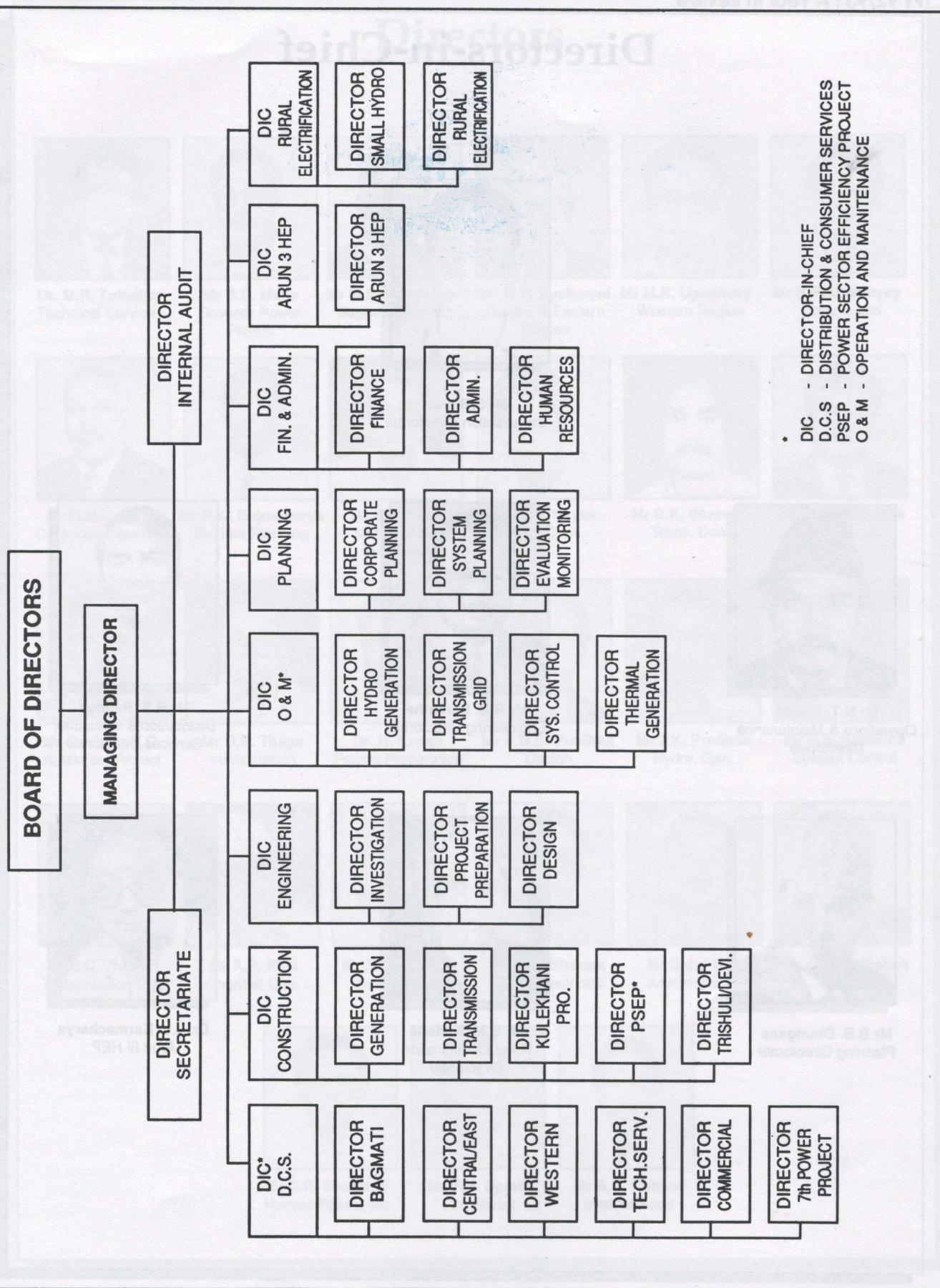
Dr. T.P. Pokharel
Programme Director
Redd Barna



Mr D. Gyawali
Member
RONAST



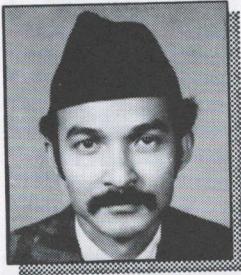
Member Secretary
Mr Ajit N.S. Thapa
Managing Director, NEA



Directors-in-Chief



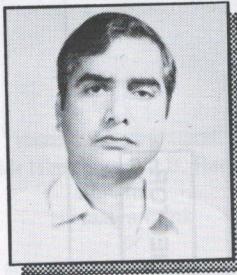
Mr S.B. Pun
Construction Directorate



Mr N.T. Bhutia
Operations & Maintenance
Directorate



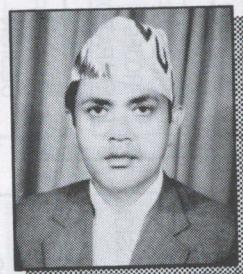
Mr R.B. Shrestha
Engineering Directorate



Mr R.S. Pandey
Distribution & Consumer
Services Directorate



Mr B.B. Dhungana
Planning Directorate

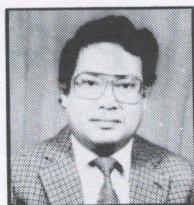


Mr G.M. Kadaria
Rural Electrification
Directorate



Dr. J.L. Karmacharya
Arun III HEP

Directors



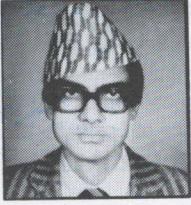
Dr. M.R. Tuladhar
Technical Services



Mr B.B. Malla
Seventh Power Project



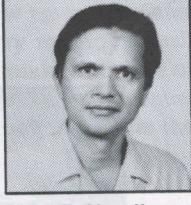
Mr M.P. Upadhyay
Bagamati Region



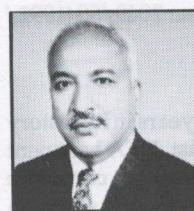
Mr M.P. Pyakuryal
Central & Eastern Region



Mr M.R. Upadhyay
Western Region



Mr S.P. Upadhyay
Commercial



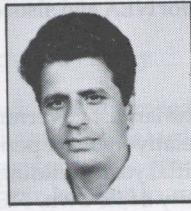
Mr O.M.S. Swar
Corporate Planning



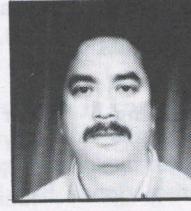
Mr R.K. Bajracharya
System Planning



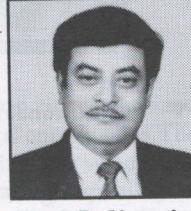
Mr R.P. Shah
Monitoring & Evaluation



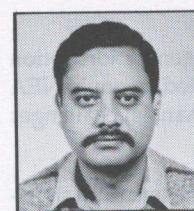
Mr J.N. Nayak
Gen. Cons.



Mr B.R. Shrestha
Trans. Cons



Mr G.B. Shrestha
Trisuli. Devighat



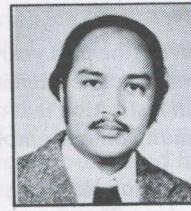
Mr Govinda K.C.
Kulekhani Project



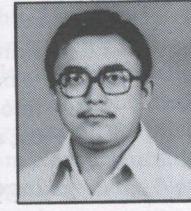
Mr D.B. Thapa
Investigation



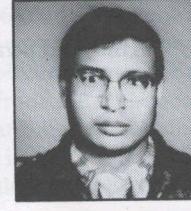
Dr. N. Kapali
Project Preparation



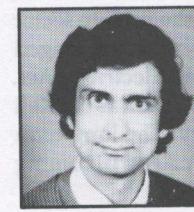
Mr P.M.S. Pradhan
Design



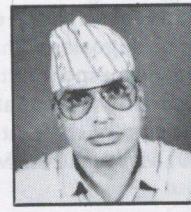
Mr J.K. Pradhan
Hydro. Gen.



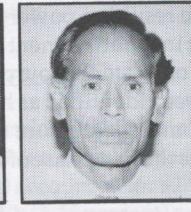
Mr S.B. Shrestha
System Control



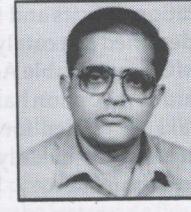
Mr B.C. Thakuri
Transmission Grid



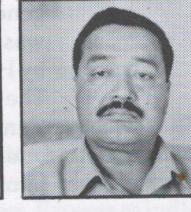
Mr A.P. Rijal
Thermal Gen.



Mr M.S. Budhalya
Small Hydro.



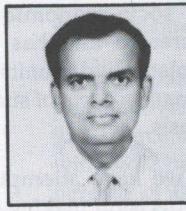
Mr P.N. Sharma
R.E. Directorate



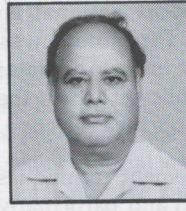
Mr Bidur K.C.
Administration



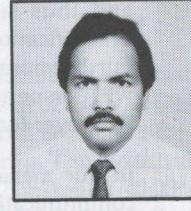
Mr G.P. Rajbahak
Finance



Mr D.R. Bhattarai
Human Resources

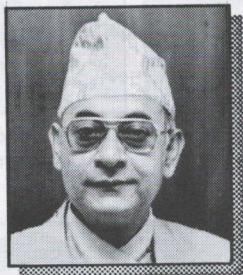


Mr V.N. Upreti
Secretariat



Mr A.B. Chhetri
Internal Audit

Managing Director's Report



▼ Introduction

A month after the closing of the financial year, the first day of the month of Bhadra commemorates the day of establishment of NEA. On this auspicious day of Bhadra 1, 2050, it gives me great pleasure to usher in the new year that will mark the ninth year for NEA and also to report on its activities for the Financial Year 2049/50 (1992/93).

▼ Institutional Building

For the largest government enterprise in Nepal, a period of eight years in its history is a relatively short period to achieve its full potential. Over the past, NEA has spent its initial years building an infrastructure for its institution and creating a corporate identity of its own. NEA is committed to improve the productivity of its human resources, enhance its operational efficiency and strengthen its financial capabilities to enable it to execute the magnitude of investment which it must undertake to meet the rising demands of its consumers.

▼ Aims and Strategy

Primarily, the past year's efforts have been directed to define its generation option to meet forecasted demands. Secondly, the efforts have been directed to mould NEA into an institution that can effectively handle the technical and financial challenges by, among others, emphasizing human resource development.

In generation planning, NEA has attempted to fix its long-term, mid-term and short-term plans. The short-term options were identified as medium sized hydropower projects (5-50 MW) such as the Modi Khola, Bhote Koshi, Puwa and the Khimti Projects along with some thermal generation with their relatively short gestation period and peaking capabilities - this strategy being aimed to alleviate current generation deficits and the resulting power cuts. Participation of the private sector was identified as a catalyst in the attainment of these goals and has been encouraged by HMG's favourable Act on Water Resource Development Act and Electricity Act. The mid-term option has been identified as hydropower generation such as the Kali Gandaki "A" slated for completion before the turn of the century. The long-term option would essentially be the first phase of 201 MW of the 402 MW Arun III coming into line soon after.

In the area of institutional strengthening, we have endeavoured to streamline NEA's financial administration and commence the restructuring of NEA to respond to the changing needs. Also to strengthen its capacity to undertake rural electrification and thus support national and socio-economic development, a new Rural Electrification Directorate was created and has started to function actively. Furthermore, in order to operate isolated hydro units on a self-sustaining basis NEA will pursue a policy of leasing the management of such projects to the private sector wherever feasible on a selective basis.

In our management techniques, we have attempted to introduce openness in communication and participative decision making. We have also commenced to orient the institution along commercial direction so that its financial sustainability is assured. Steps are being taken to end the anomaly of the temporary and daily-wage staff and retain only permanent staff in the future.

▼ Challenges

While grappling with these important issues, NEA has had to face further impediments. Nature has not been favourable and has created additional obstacles in the form of natural calamities and unpredicted hydrological conditions. The hydropower projects of Kulekhani I and II faced the brunt of these hardships with the low rainfall of the previous year resulting in unusually low reservoir water levels during the pre-monsoon days. However, this year heavy monsoon flash floods have washed away the penstock pipe and damaged the intake structure of Kulekhani II resulting in the total loss of generation and substantial revenue. Although burdened to a considerable extent, NEA has continued to pursue the strategy outlined above with undeterred determination.

▼ Performance

In the following paragraphs I wish to present a summary of NEA's performance during the financial year 1992/93. I believe the other sections of this Review will give greater depth of information on NEA's activities :

❖ Generated and Purchased Energy

The past year saw a deficit in generated energy in comparison to the demand necessitating load shedding measures leading to a decrease in total energy sales. The deficit was further aggravated by the poor monsoon and resulting low water level in the Kulekhani reservoir leading to reduced energy generating capability of Kulekhani I & II Hydro Power Stations. The electric energy production capability of other hydroelectric power plants were also generally reduced due to unusually dry hydrological conditions.

The electrical energy available for use within Nepal totalled 963.314 GWh which was a decrease of 17.791 GWh (1.81 percent) from the previous year's figure of 981.105 GWh. This comprised of 804.050 GWh (83.47 percent) obtained from NEA hydro generation and 47.290 GWh (4.91 percent) obtained from NEA thermal generation. A total of 111.974 GWh was purchased from other utilities comprising of 82.223 GWh (8.53 percent) purchased from electrical utilities in India and 29.751 GWh (3.09 percent) from Butwal Power Company in the Nepalese private sector.

The system peak of the interconnected system was recorded at 214.04 MW which is less than that of the previous year by 2 MW implying a decrease of 0.91 percent which was predictable from the load shedding during peak demand hours of winter.

❖ Electricity Sales

Electricity sales which totalled 733.754 GWh was a decrease of about 3.598 GWh (0.5 percent) over last year's sales. Internal sales within Nepal increased to 674.434 GWh and accounted for 91.92 percent of the total sales and registered an increase of 22.493 GWh (3.45 percent) over the last year's figures. Exports to India, however, decreased to 59.320 GWh, which is 26.09 GWh (30.55 percent) lower than that of the previous year.

❖ Consumers

Over the past financial year, the number of new consumers grew by 35047 or 9.85 percent, over last year, to reach a total of 391,000. Domestic consumers represented 95.13 percent of NEA consumers and accounted for 39.88 percent of internal sales with 36.42 percent of internal revenue. The industrial consumers formed only 2.45 percent of the total number but consumed 40.03 percent of internal sales and accounted for 37.22 percent of internal revenue. Commercial and non-commercial categories constituted 2.01 percent of the consumers.

❖ Financial Performance

NEA's total revenue of NRs 1897.3 million incorporated an increase of about NRs 419.9 million, or 28.42 percent over the previous year's figure. The growth in revenue was also the result of the overall tariff increase effective from the billing for the month of Chaitra 2049 (March 14, 1993).

NEA's operating expenses, including depreciation on revalued assets, was estimated to be NRs 2062.2 million registering an increase of about NRs. 423.2 million (25.82 percent) over the previous year. The operating deficit for the year 1991/92 showed a loss of about NRs 806.6 million.

The interest on long-term loans amounted to NRs 641.7 million and transfer from revaluation surplus was NRs 707.4 million. The resulting net loss is estimated to be NRs 99.20 million, in spite of the tariff increase.

❖ Assets

NEA's net fixed assets, after revaluation, were estimated to be NRs 24,336.8 million registering an increase of about NRs 1158.8 million or 5 percent of the previous year's assets.

❖ Investment

NEA's total investment on capital expenditure through self-financing for the year in review was estimated at NRs 320.88 million. Apart from this, about NRs 2309.6 million was financed by HMG.

❖ Audit

Audits for the fiscal years 1989/90 and 1990/91 were completed during the past year and the audit of fiscal year 1991/92 is ongoing.

▼ Development Activities

The past year saw the continuation of development works intended to extend NEA's infrastructure to meet forecasted growth. A number of projects in the transmission and distribution sectors were completed and inaugurated. Notable among these was the Nepalganj-Mahendranagar 132 kV Transmission Line Project which was inaugurated by the Rt. Hon. Prime Minister Mr. G.P.Koirala. The Pokhara Rural Electrification Project was likewise completed and inaugurated by Hon. Minister of State for Water Resources, Mr. L.P.Ghimire.

In the generation sector, the year saw the test commissioning of the 600 kW isolated Namche Small Hydropower Project which has been in a stage of construction for extended number of years - the initial construction having been washed away by a flash flood in 1985. The Namche SHPP was financed with grant assistance from the Austrian Government and it is envisaged that the project will operate along community ownership lines.

Projects commencing construction included the Power Sector Efficiency Project (PSEP) undertaken with financing from the World Bank and the Nordic Development Fund. Major components of the PSEP include the rehabilitation of the Trishuli-Devighat HEP and the Kathmandu Valley HV Network. Similarly, detailed design works were completed and procurement commenced with the ADB assisted Seventh Power Project. Construction works were also well under way with the Disaster Prevention Works in Kulekhani HEP which is financed by OECF, Japan.

The past year saw positive moves from the Donor Community for the financing of the first stage of the 402 MW Arun III HEP. After a successful meeting of the Donors in Paris in December 1992, a joint Donor pre-appraisal was held in Kathmandu in June 1993 to be followed by an appraisal mission in early September 1993. Loan

negotiations are expected in October/November 1993, followed by IDA and ADB Board presentation in December 1993 and KfW financing approval scheduled for February 1994. Prior to approval of financing from the Donors, tenders for the construction of the access road and civil works of Lot C1/C3 of Arun III HEP have since been received and are being evaluated.

In preparation for implementation in the near future, engineering studies conducted during the past year included the detailed design of the 14 MW Modi Khola HEP, and the feasibility study of the 36 MW Bhote Koshi HEP. Detailed engineering design of the Kali Gandaki 'A' HEP with an enhanced capacity of 140 MW was also completed and presented to the Panel of Experts who recommended the project for implementation with some engineering modifications.

▼ Outlook for the Coming Years

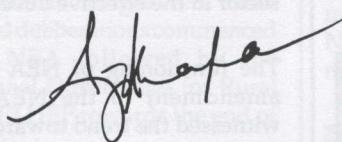
It is hoped that the new year will see the commencement or definite solutions to NEA's investment plans for its short-term, mid-term and long-term generation projects. More specifically, we hope to see the commencement of a number of private sector ventures in hydro-generation such as the Khimti and the Modi Khola. Last but not the least, we also hope to see the commencement of the construction of the long awaited Arun III HEP project and Kali Gandaki "A".

In the operation and maintenance front, financial year 1993/94 casts a somewhat sombre picture with the breakdown of the Kulekhani I and II HEPs owing to the destruction of the penstock pipe caused by heavy monsoon flash floods. But NEA's response to the challenge has been prompt and extremely encouraging and NEA hope to have the projects in operation by December 1993. We are hopeful that NEA will continue to be successful in its quest to provide a high level of service to its consumers in an efficient, timely and responsible manner.

▼ Acknowledgement

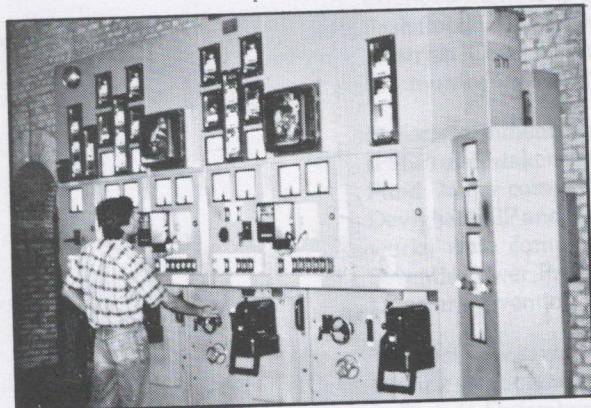
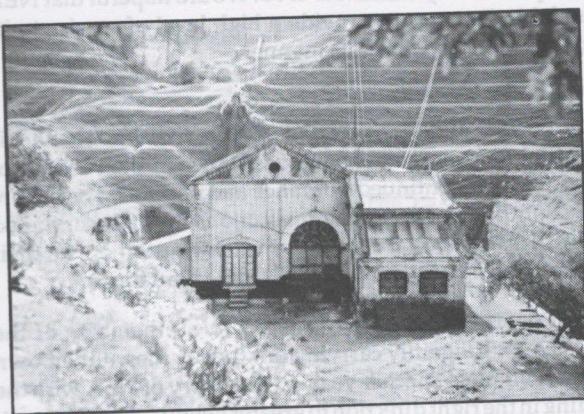
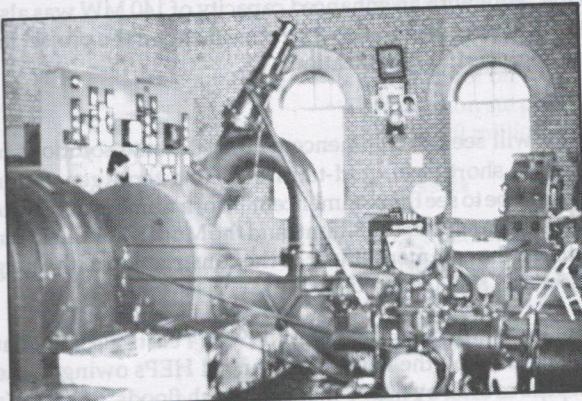
In conclusion, on behalf of the Staff and Management of NEA I wish to thank His Majesty's Government for their encouragement and assistance in the running of NEA and the Board of NEA for their continued guidance and support. Thanks are also directed to the Donor countries and financing institutions for their continued goodwill and support. We also owe a special debt to our valued customers for their sympathy and understanding during our hours of trials and tribulations.

Finally, I wish to end this Report with a note of thanks to all members of the Management and Staff of NEA for diligently carrying out their duties at their own levels and making possible to complete another year in the history of NEA with the conviction that we are heading in the right direction to greater heights of achievement.



(Ajit N.S. Thapa)
Managing Director
Nepal Electricity Authority

Introduction



Created in August 1985 with the responsibility to undertake all planning, construction, operations and maintenance of electrical services such as generation and transmission and distribution throughout the nation, the Nepal Electricity Authority completes its eight year of active operations and now commences its ninth year of operations on Bhadra 1, 2050 (August 17, 1993). Increasingly affiliated with all walks of the Nepalese life and economy, the Nepal Electricity Authority maintains its status as the largest government undertaking in terms of human resources, capital investment and assets.

In retrospect, the year 1992/93 that has passed saw the pressures of consumer demands and the acute need for added generation bring about a marked transformation of NEA from a fledgling utility to one manifesting increasing maturity in a strongly competitive world. To add to its challenges, this transformation has had to occur in the environs of meagre internal resources and the looming prospects of increasing generation deficits.

As a measure to alleviate the problems arising from load shedding, NEA has initiated a programme of energy conservation through public awareness campaigns. The co-operation of the customers is eagerly anticipated to make this a success.

The year also saw NEA consolidating its role in the power sector and adjusting itself with the policies of His Majesty's Government which saw increasing role of the private sector in the effective development of the power sector.

The functioning of NEA was further defined by the amendment to the NEA Act. Amendments made witnessed the trend towards greater participation of the private sector in the NEA Board and thereby in its functioning, and greater delegation of authority to operate independently.

Despite the apparent constraints, the year FY 1992/93 was a year which saw, within NEA, the advent of a new openness in communication, dynamism in functioning, strengthening of institutional strategy and an entry into commercial orientation.

Sectoral Review

◆ The NEA Board

A streamlined organisation and dynamic administration procedures are the requisites for the improved efficiency and greater productivity from NEA personnel. The past year saw milestone events directed towards this direction. Organisational changes relating to the constitution of the NEA Board were part of the amendment of the NEA Act promulgated on October 22, 1992. The NEA Board occupancy is now as follows :

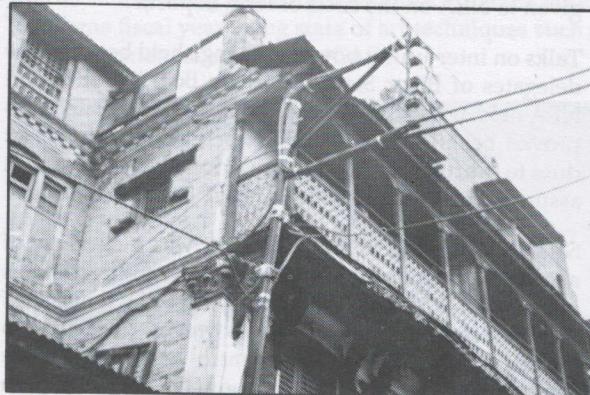
The Minister/State Minister of Water Resources or Person appointed by HMG	: Chairman
Secretary, Ministry of Finance	: Member
Secretary, Ministry of Water Resources	: Member
Two prominent persons from the commerce or industry sector	: Members
Two prominent persons from the power sector	: Members
Managing Director, NEA	: Member-Secretary

◆ NEA Administration

NEA also saw significant changes in its management with the appointment of the present Managing Director on November 20, 1992. Additional changes were made among the senior level staff and deliberations commenced on the restructuring of NEA followed by the establishment of two additional Directorates for Rural Electrification and the Arun III HEP towards the end of the financial year.

The past year also saw the commencement of steps to formulate a new set of Rules and Regulations for more dynamic personnel administration within NEA. To further enhance personnel administration, steps were taken to prepare a computerised Personnel Data Base (PDB) as part of the Twinning activities with EDF International.

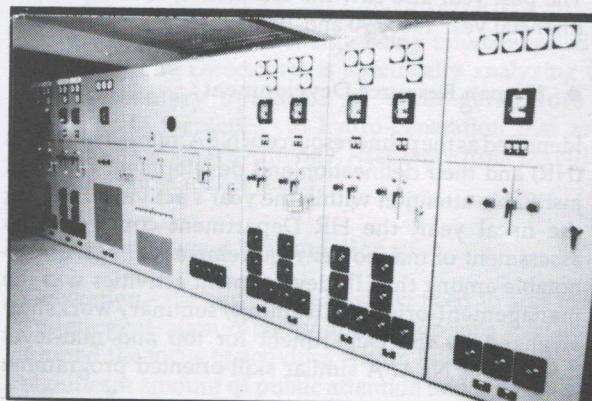
During the year in review concrete steps were taken to fill in vacant permanent posts and end the anomaly arising from the large number of temporary and daily wage staff. This in effect has also resulted in the reduction



of excess staff and is a step towards improving staff productivity.

◆ Finance

For NEA which has the status of a corporate body with the country's highest capital investment, it is essential that its financial administration is geared to bring about the desired level of capability and efficiency to undertake the extensive investment. A number of positive steps were taken during the past financial year to streamline NEA's financial administration. Two organisational moves included the amalgamation of the Revenue Division into the Finance mainstream and the channelising of on-lending and financing from HMG into NEA activities through NEA's Finance Department. These adjustments are expected to make it possible to monitor and control finances within NEA and thereby improve performance and decision making.



A noteworthy achievement of the past year was the reconciliation of accounts with HMG which concluded with HMG paying NRs 129.0 million to NEA. The collection of sales revenue from Branch Offices of Kathmandu East and West, Patan, Biratnagar and Birgunj was also expedited through agreements with national commercial banks whereby they would undertake the collection of daily sales and have it transferred weekly to an on-call deposit account in the same Bank with interest given to NEA on the basis of term deposits.

Talks on inter-utility power exchange held between the delegates of Bihar State Electricity Board (BSEB) and NEA held at Patna in the month of December 1992, also proved beneficial with BSEB clearing up their import dues to the tune of Rs 50 million (Indian Currency) with assurance that regular payments will be made in future.

Sales which totalled 733.754 GWh was a decrease of about 0.5 percent over last year. However, internal sales increased to 674.434 GWh and registered an increase of 3.45 percent. Exports to India, however, decreased to 59.320 GWh, which is 30.55 percent lower than that of the previous year. NEA's total revenue of NRs 1897.3 million saw an increase of 28.42 percent over the previous year's figure. The accounts receivables made a very encouraging improvement from last year's figure of 4 months sales to 3.1 months sales.

NEA's operating expenses, including depreciation on revalued assets, was estimated to be NRs 2062.2 million an increase of 25.82 percent over the previous year. The operating deficit for the year 1992/93 showed a loss of about NRs 806.6 million. The interest on long-term loans amounted to NRs 641.7 million and transfer from revaluation surplus was NRs 707.4 million. The resulting net loss is estimated to be NRs 99.20 million.

NEA's net fixed assets, after revaluation, were estimated to be NRs 24,336.8 million registering an increase of 5 percent over the previous year. NEA's investment on capital expenditure through self-financing was estimated at NRs 320.88 million and that from HMG at NRs 2309.6 million.

The past year also saw the completion of audit for the financial year 1989/90 and 1990/91.

◆ Human Resource Development :

Identified as the prime resource of NEA, human resources (HR) and their delineation and development captured justifiable attention within the year's activities. During the fiscal year, the HR Department completed its assessment of manpower requirements for NEA. Also notable among the HR development activities was the management-oriented training/seminar/workshop arranged by the Department for top and mid-level managers of NEA. A similar skill-oriented programme

was conducted for the supervisory level administrative and accounts staff. These programmes were conducted with the affiliation of the Nepal Administrative Staff College (NASC) with financing from the World Bank.



Contribution to the HR development continued to come from the NEA Training Centre with its regular training programmes in meter reading, generation, distribution and computer applications. Contribution also came in the form of seminars such as ones arranged by ADB and World Bank on the Use of Consulting Services and Procurement in March 1993. Other donor countries also continued to sponsor specific power sector related training for NEA staff.

◆ Planning

Notable activities of the past year undertaken by the Planning Directorate include the signing of the Performance Agreement between HMG and NEA on August 26, 1992. The agreement chalks out the mutual obligations of the contracting parties and sets out indicators which NEA must attain within stipulated time. Additional strategy oriented activities include the development of Corporate Plans for NEA and the development of a strategic plan for the commercialisation of NEA with an accent on operation of the institution to achieve healthy financial performance.

Besides continuing the Twinning Arrangement financed through the IDA and French Protocol with the Electricite de France International, the Planning Directorate also undertook the updating of the NEA Investment Plan and Tariff study, the latter leading to introduction of new tariff rates commencing with the billing for the month of Chaitra 2049 (March 14, 1993).

The concept of privatisation in the power sector continued to influence NEA corporate perspectives and introduced the need to consolidate its position as the buyer of the energy produced by the private entrepreneur. The requirement to formulate a buy-back policy therefore emerged.

Faced with extended prospects of energy shortage, the Planning Directorate conducted system studies on the availability of Intermediate Generation Options incorporating thermal generation as the short term resort to the current power crisis.

Other System Planning activities include the 1993 update of the Load Forecast accounting for current trends such as load management and the policy trends towards greater privatisation in the industry sector. The forecast does not consider load shedding in its assessment. The forecasted load in the system will help to assess demand not served as a result of loading shedding.

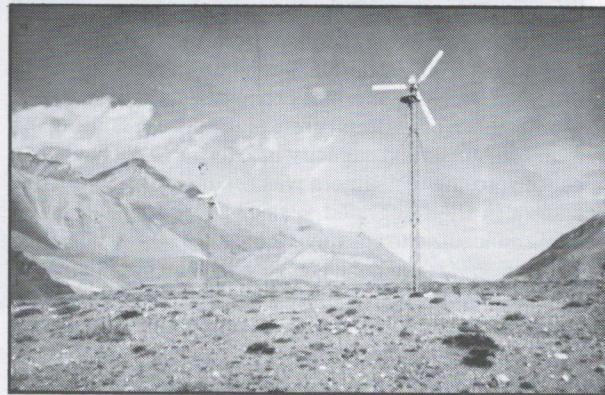
◆ Engineering

The past year saw new vigour instilled into the Engineering Directorate, which is dedicated to strengthening the technical foundations of a predominantly engineering institution. Continued generation inventory study activities were adjusted to conform with overruling policies which called for future projects to be financially viable and capable of attracting the private enterprise. This meant projects capable of self-sustainable operation - a criteria sought to be achieved by the selection of projects in the medium-capacity range (10 - 50 MW) near road terminals and the Integrated National Power System (INPS). Such a framework was created to achieve easily accessible projects within the range of financing by private entrepreneurs, the proximity to the INPS enabling power exchange for improved financial performance.

More importantly, activities were also oriented to mobilise, motivate and train in-house engineering



expertise and develop a multi-disciplinary work force to achieve well integrated project conceptions. An exemplary activity that applied these aims was the reconnaissance study of the Upper Modi Khola, Upper Bhote Koshi, Upper Marsyangdi, Upper Kaveli and the Puwa medium-capacity projects utilising available engineers guided by senior staff. After an orientation and training period for the new engineers at Sun Kosi HEP, the reconnaissance study was completed in time to commence and complete the feasibility study of the upper Bhote Koshi HEP within the same fiscal year using state of art techniques such as the Computer Aided Design (CAD).

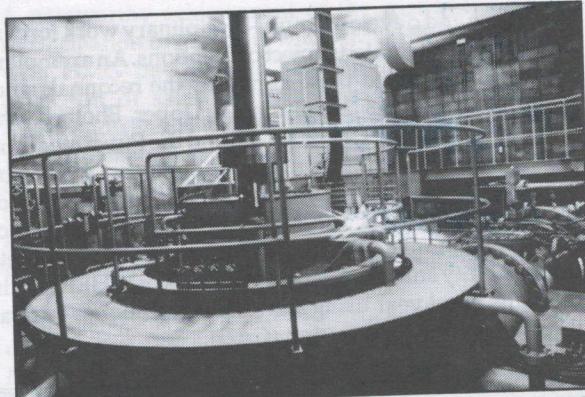


In other medium-capacity project studies, the Modi Khola project has attracted promoters from the private sector and has progressed with the detailed engineering with assistance from Korean International Corporation Agency (KOICA). Similarly, the Upper Bhote Kosi project is soon to enter the stage of detailed engineering and has also attracted promoters from the private sector. The feasibility study of the Puwa Khola project is being undertaken with assistance from JICA. The Directorate intends to commence the feasibility studies of two more of the reconnoitred projects in the coming year.

Apart from hydropower, the Directorate is also attempting to salvage lost investment by reinstating the wind power project at Kagbeni of Mustang district. Warned by an earlier failure, the present strategy involves rigorous study of wind patterns prior to any project work, which will be aimed at creating wind farms instead of isolated plants - the generated electrical energy being interconnected to the INPS. The Directorate is specifically analyzing the complementary operation of wind generators to compensate for deficit in hydro-generation that arise from poor seasonal hydrology. Assistance from DANIDA is forthcoming in this sector.

◆ Generation and Transmission :

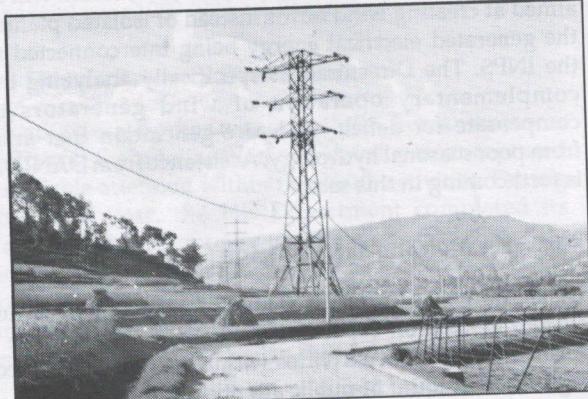
Generation - the current deficits, the need to add to the system generation capacity and the options available - formed the focus of activities within NEA and attracted significant amount of public attention and comment.



During the past year, 600 kW from the Namche SHPP was added to the total NEA generation capacity, and a total of 7.305 MW thermal capacity was retired due to obsolescence of various diesel plants, thus resulting in a total NEA installed capacity of 281.371 MW. The major concern to the consumers was the increasing deficit of energy in the integrated system in comparison to the demand leading to contingent load shedding measures. The deficit was further aggravated by the poor monsoon of the previous year resulting in low water level in the Kulekhani reservoir and general reduction of generation of other hydro projects.

The electrical energy available for use within Nepal totalled 963.314 GWh which comprised of 804.050 GWh (83.47 percent) obtained from NEA hydro generation and 47.290 GWh (4.91 percent) obtained from NEA thermal generation. The remaining was obtained from purchase. The system peak of the interconnected system was recorded at 214.04 MW which was less than that of the previous year which was predictable from the load shedding during peak demand hours of winter.

In this scenario of deficits, short-term options in generation addition were identified as medium capacity hydropower (5-50 MW) such as the Modi Khola, Upper Bhote Koshi, Puwa and the Khimti Projects along with some thermal generation. Participation of the private sector was identified as a catalyst in the attainment of these goals and has been encouraged by HMG's policy on Water Resource Development.



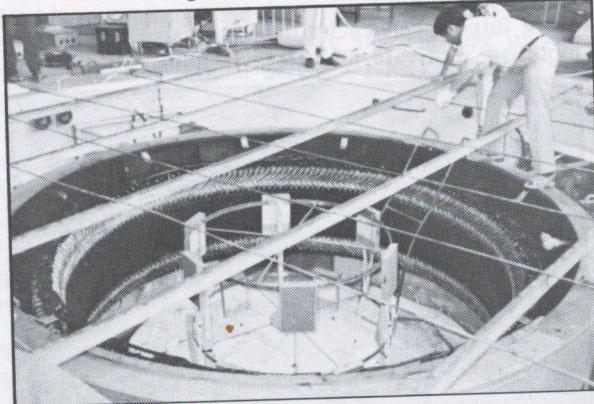
The mid-term option has been identified as hydropower generation such as the Kali Gandaki "A" slated for completion before the turn of the century. The long-term option would essentially be the first stage of 201 MW of the 402 MW Arun III coming into line soon after. The Donor Community made definite moves for the financing of Arun III HEP. After a meeting of the Donors in Paris in December 1992 and a joint Donor pre-appraisal held in Kathmandu in June 1993. Loan negotiations, Board presentations and financing approval are now scheduled to completion by early 1994.

In the transmission sector, efforts continued to construct transmission lines for exchange of power to the agreed level of 50 MW with Indian utilities, the Duhabi-Bhantabari 132 kV link with Kataiya in India taking a definite shape under the PSEP. After its completion in 1995 the added exchange more possible by the link is expected to assist in reducing the generation deficits within NEA. Inter-government talks are expected to result in the construction of additional inter-utility links in the future.

◆ Maintenance of Plants and Equipment

Major maintenance and allied efforts in generating plants and equipment included the following major undertakings

- * at the Sunkoshi HEP : maintenance works included the overhauling of two turbine-generators including the changing of runners, cleaning of boulders downstream and repair and maintenance of gates and hoisting devices;



- * at the Marsyangdi HEP : maintenance works included the overhauling of one of the turbine-generators and the installation of an auto-lubrication system, repair of steel lining of radial gates including the changing of arms and bearings, construction of a heavy equipment store and construction of additional control building to enhance operational space and house facilities for sediment monitoring;

- * at the Multi-Fuel Plant : the manufacturers of the plant have taken over the responsibility of rectifying operational snags in two of the 6.5 MW generators

- which have continued to hamper the proper operation of the 26 MW plant at Duhabi; and
- * a symposium was held in April 1993 within the premises of Marsyangdi HEP to deliberate over O & M aspects in NEA.

◆ Distribution and Consumer Services (DCS)

Identified as one of the important resources within NEA, the DCS completed another hectic year serving the consumers and being paid for it. Characterised by generation deficit and the onset of unfavourable hydrological conditions with resulting power cuts, few noteworthy indications were seen in terms of growth in unit consumption within the country and thereby the sales. The overall rise in tariff rates from the billing of the month of Chaitra 2049 (March 14, 1993) helped to reduce the operating loss of NEA.

Over the past financial year, the number of new consumers grew by 35047 or 9.87 percent, over last year, to reach a total of 391,000. Domestic consumers represented 95.13 percent of NEA consumers and accounted for 39.88 percent of internal sales with 36.42 percent of internal revenue. The industrial consumers formed only 2.45 percent of the total number but consumed 40.03 percent of internal sales and accounted for 37.22 percent of internal revenue. Commercial and non-commercial categories constituted 2.01 percent of the consumers.

The past year also saw a number of very important institutional aspects being introduced into the DCS services. The first was the safety regulation in reticulation. Last year saw the completion of the Draft of the safety regulations which are expected to be made effective in the near future. The second was putting into force the construction engineering standards for distribution at 400V and 11 kV as prepared by the Technical Services Department. The third was conservation among the consumers through radio, television and news publications.

Projects to extend and strengthen distribution included the Fifth and Sixth Power Projects which reached their

completion stages and the commencement of the Seventh Power Project. Preliminary works also continued with the Kathmandu Valley Distribution Reinforcement Project.

Efforts towards loss reduction, both technical and non-technical, were an important part of activities undertaken and was supported by the commencement of the third phase of the Loss Reduction Project (LRP) undertaken with IDA loan. Another area of strengthening was the



degree of monitoring and surveillance from the LRP and DCS Branch Offices resulting in fines from consumers of NRs 2,085,867 for misuse of electricity and several cases of legal action. DENSET paint, capable of forming a hard insulating coat over bare overhead conductors was also tried out in a number of locations to control illegal hooking onto supply mains.

◆ Rural Electrification (RE)

Electrification of Nepal's extensive rural areas as a means for upliftment of the poor economic conditions receives high priority in governmental development policy. However, it is evident that RE cannot provide financial returns as from the urban sector. To accommodate such a provision into a commercially oriented NEA the requirements for a more socio-economic outlook on RE, a separate RE Directorate was created towards the end of the year. Essentially, the RE Directorate will undertake nationally important RE schemes on Government directives and investment and will charge HMG with all costs that overrun the operational returns. The Directorate is also in the process of leasing out the management of selected isolated small hydropower projects to the private sector to operate there on a self-sustaining basis.

The new Directorate has two Departments, namely the RE Department and the Small Hydro Power Department (SHPD). The SHPD is responsible for all services related to isolated small hydropower and the RE Department for all grid connected schemes. New and renewable energy (NRE) schemes such as wind and solar plants will also come under the jurisdiction of this Directorate.





◆ Other Electricity Companies & Privatisation :

NEA continued to maintain cordial relations with other power companies in Nepal and has encouraged their establishment. More private power companies are expected to be formed with the encouragement received from HMG's new policy on Water Resources Development. The Nepal Investment Forum sponsored by HMG/UNIDO in November 1992, concluded with several private entrepreneurs often in joint venture with foreign partners took interest in projects such as the Modi Khola HEP, small hydro projects and solar photovoltaic (PV) plants. The Hydropower Development Corporation has since been established within the private sector for the undertaking of the Modi Khola HEP.

Among the existing companies, the Butwal Power Company (BPC) presently owns and operates the 5.1 MW Andhi Khola Hydroelectric Project (AHREP) and an agreement was concluded with NEA for the exchange of power and energy from this project. BPC is also presently constructing the 12 MW Jhimruk HEP at Pyuthan and intends to finance the 60 MW Khimti Khola HEP, generation from which will be purchased by NEA.

NEA also continued to be a Board Member of the Salleri Chalsla Electric Company (SCECO) constructed and

groomed with assistance from the Swiss Development Corporation (SDC). SCECO which prides itself with almost 100 percent annual plant availability expanded its operations this year with the addition of 200 kW generation capacity to the existing 200 kW plant.

◆ Power Exchange with India

Inter-utility power exchange between NEA and the neighbouring utilities of Bihar State Electricity Board (BSEB) and Uttar Pradesh State Electricity Board (UPSEB), in India, continued on a cordial note. A delegation from NEA, led by the Managing Director, visited BSEB in Patna in January 1993 to discuss matters of mutual interest and prospects of increased import from India during the dry months in winter. Of particular interest was preparation of modalities for the construction of the 44 kM, 132 kV exchange link between Duhabi in Nepal and Kataiya which is 3 kM within Indian territory. This transmission facility is a component of facilitation to make possible the exchange of up to 50 MW of power as provided by an earlier inter-governmental power exchange agreement. Another 132 kV link between Dhalkebar and Sitamarhi was also identified for presentation in future inter-governmental talks.

The talks in Patna was also noteworthy from the point of view of the large account receivables which were cleared by BSEB with assurances to continue in the same spirit in the future.

◆ The Donor Community

Bilateral and multi-lateral assistance in the forms of grant, loan, technical assistance and commodity assistance has been an integral part of NEA development from its inception stages. Still faced with limited internal financial resources, investment in NEA's projects continued to obtain the encouraging participation of a large community of Donors as summarised in the table below:

DONOR	AREAS OF INTEREST
The World Bank Asian Development Bank	Arun III, Power Sector Efficiency Project and the Loss Reduction Power Projects V, VI and VII including Computerised Billing and Kali Gandaki "A" studies.
KFW, Germany FINNIDA, Finland	Arun III and Small Hydropower Master Plan Studies.
DANIDA, Denmark	Pokhara Rural Electrification, Thermals and Arun III.
BITS, Sweden	Wind Power
NORDIC Dev. Fund	Arun III
Govt. of France	Dumre-Besishahar 33 kV Transmission Line
ODA, United Kingdom JICA, Japan	Twinning Arrangement, West Seti studies, Atariya-Dipayal 66 kV Transmission Line and Arun III.
KOICA, South Korea OECF, Japan USAID	Thermals and Arun III, Environmental Impact Assessment (EIA). Kathmandu Distribution Reinforcement, Special Assistance for Project Sustainability (SAPS) and Puwa Khola feasibility studies.
	Modi Khola detailed engineering
	Arun III, Kulekhani Disaster Prevention
	Power Sector Studies.

Project Highlights

Kali Gandaki "A" Hydro Electric Project

The past year saw the initiation of the detail engineering design of this project financed through funds made available by ADB, UNDP, and FINNIDA. Additional site investigations required for this were carried out under the "Bridging Site Investigations" programme with the financial assistance of UNDP.

Interpretation of hydrological data collected after the period reported in the Detailed Feasibility Study along with correction of errors in previous data revealed increased minimum flows in the Kali Gandaki river at the proposed dam site. According to the Consultant's recent Project Formulation Report No. 1, the improved hydrology has enhanced the installed capacity to 140 MW and the annual energy procession capacity to 840 GWh. An International Panel of Experts (IPE) which reviewed the Project Formulation Report has endorsed these new figures.

Considering the geological site condition and the results of additional site investigations, the IPE has recommended the use of surface type sedimentation basins instead of the previously recommended underground ones. It has expressed its confidence that this change will produce some reduction in costs, making the project even more attractive.



Realising the importance and urgency of this project, construction of a 28 km long access road was started in March 1993. As of now, the excavation works are almost complete and it is hoped that this road will be jeepable by February 1994.

The detailed engineering design will be ready by May 1994 and, if funding is arranged by then, this project could be brought in line by the middle of 1999 to contribute appreciably towards meeting the large shortfalls in energy supply.

Arun-III Hydro Electric Project

Proposed to be developed in two equal stages of 201 MW each, the Arun-III project is a run-of-river plant located in Sankhuwasabha District. The first stage will develop the dam, intake structure, outlet structure and access road in full while only half the numbers of desanding basins, head race tunnel, surge tank and tailrace tunnel required in totality will be constructed. The annual average and firm energy corresponding to this first stage development will be 1745 GWh and 1513 GWh respectively and evacuation of this power will be effected by a 120 km, 220 kV transmission line to Duhabi.

The joint donor's mission comprising of representatives from IDA, ADB, BITS (Sweden), KfW and the Government of Finland (GOF) with observers from GTZ and the Government of Japan (GOJ), recently appraised the project and acknowledged that major progress had been made in the project preparation. The mission also agreed upon the project processing schedule according to which IDA credit and ADB loan negotiations are set for October and November 1993 respectively and IDA and ADB Board presentation in December 1993.

Evaluation of six bids received for the construction of civil structures, camp facilities and access road is in progress and is expected to be complete by September 1993.

Kulekhani Disaster Prevention Project

Implemented with the primary objective of slope stabilisation and erosion control in the areas around the Kulekhani I and II power stations, this project financed under a loan assistance from the Overseas Economic Co-operation Fund (OECF), Japan, is scheduled for completion by 1995/96.

Under the slope stabilisation works which is now complete, the year saw the execution of some major works such as

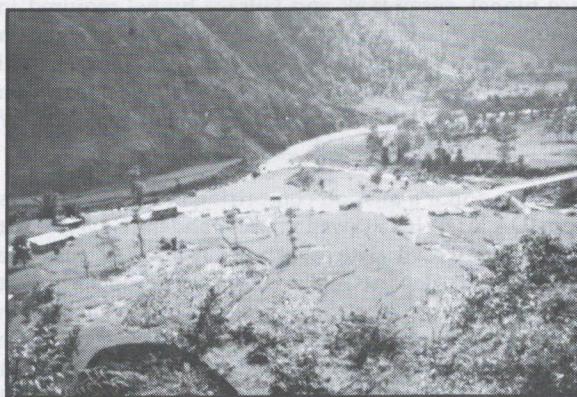
- installation of 98 pieces of 28m long PC anchor with crib concrete,

- shotcreting of 4461 sq m and installation of 713 pieces of rock bolt, each 5.5m long.

Similarly under the erosion control scheme, two concrete check dams of heights 12m and 16.7m were constructed in Kali Khola and Khani Khola with a concrete volume of 1240 and 4122 cu m respectively. A 15m high consolidation check dam with a concrete volume of 6547 cu. m. was also completed in front of the Kulekhani I power station. The remaining 40 percent of the erosion control works and the rehabilitation of the Bhainse-Bhimphedi-Damsite road is in progress.

Modi Khola Hydro Electric Project

The Modi Hydro Electric Project, being taken up by the private sector, is located in Parbat District of Dhaulagiri Zone, about 42 km north-west from Pokhara on the Pokhara-Baglung highway. This run-of-river scheme utilises the waters of the Modi River with a catchment area of 510 sq km and is one of the major tributaries of the Kali Gandaki River.



The feasibility study prepared by NEA was reviewed by Korea International Cooperation Agency (KOICA) technical team and the plant capacity increased from 11 MW to 14 MW. The total estimated cost of the project is US\$ 29.9 million. The detail design is currently being carried out by Hyundai Engineering under a technical grant from KOICA.

Achham Small Hydropower Project

Undertaken initially with the financial assistance of HMG with an additional support in the past year from the Debt Relief Fund (DRF) of Japan, the Achham Small Hydropower Project (ASHP) will divert the waters of the Kailash Khola of Achham District through a 655 m long tunnel to generate 400 KW of electricity. Estimated to cost NRs. 71.7 million, this project will supply power to Mangalsen, the district headquarters (DHQ), Bayal Pata and Sanfe Bagar through a 16 km transmission and 12 km distribution network. The last year saw the completion of about 70 percent of tunnel excavation and 90 percent

of canal construction works. The forebay is ready and the project is scheduled for completion in the FY 1993/94.

Namche Small Hydropower Project

All civil and electro mechanical works of the Namche SHP were completed and trial generation was also carried out. About 80 percent of the 13 km transmission and 21 km distribution system is complete. Implemented under the financial grant assistance of the Austrian government, this project with a capacity of 600 KW, located on the Thame Khola, is at an altitude of about 4000 m in Solukhumbu District. Estimated to cost NRs. 72.76 million, this project will electrify Namche Bazaar, Kumde, Khumjung and Thame areas.

Kalikot Small Hydropower Project

Undertaken with the financial assistance of HMG, the Kalikot Small Hydropower Project utilises the waters of the Sanigad river in Kalikot District to generate 500 KW of electricity. It aims to electrify Manma, the district headquarters, and some tentative load centres currently identified are the surrounding villages of Khadgachakra, Mehalmure, Mumra, Rakhu and Rigel. To electrify these areas, 20 km of transmission and 8 km of distribution lines are proposed. Construction activities are to commence in the current FY/1993/94 and the project is scheduled to be completed by 1996/1997.

Dolpa Small Hydropower Project

Construction of the Dolpa Small Hydropower Project on the Jairigad Khola in Dolpa District is to go into stream from the current FY 1993/94 to electrify Dunai, the district headquarters of Dolpa District. Having an installed capacity of 160 KW and estimated to cost a total of NRs. 54.9 million, this project has also identified additional load centres of Meharshera and Upallodunai to be electrified through a 3 km transmission and 2 km distribution network. The project is slated to be completed by 1996/97.

Power Sector Efficiency Project

Over the past year, the Power Sector Efficiency Project (PSEP) was finally oriented towards implementation after a loan effective agreement was signed on January 15, 1993. Undertaken with a loan assistance totalling US\$ 60.8 million from IDA and Nordic Development Fund (NDF), the project aims to increase NEA's effective supply capacity by improving technical and operational efficiency, upgrade existing generation capacity, improve system load factor and address environmental concerns from Marsyangdi Hydro Electric Project. The project is composed of several components, some major ones being described below.

■ Generation Rehabilitation

The Trishuli-Devighat Rehabilitation Project finally progressed towards its construction phase in spite of an

agreement being signed with the civil and electro-mechanical contractors in May 1992, subject to the IDA loan being effective. The loan actually became effective only from January 15, 1993.

Estimated to cost a total of NRs. 1167.3 million, the project aims essentially to refurbish the civil and electro-mechanical aspects of the 26 year old Trishuli and 11 year old Devighat Hydropower stations with current capacities of 18 MW and 14.1 MW respectively.



By increasing the spillway height by 1.32m, adding one new aqueduct on the Trishuli river and enhancing the capacity of the canal, the project aims to raise the canal discharge from the present 31 cumecs to 45 cumecs to facilitate the generation of an additional 95.3 GWH of energy to aid the current energy deficit in the power system. In addition, the project life is expected to increase by another 30 years.

After the IDA loan became effective, work orders were issued to the contractors on February 15, 1993 and mobilisation and infrastructure building works are in progress.

■ Kathmandu High Voltage Reinforcement

The Kathmandu Valley HV Reinforcement Project, under the IDA credit is estimated to cost NRs. 768.6 million and aims to reinforce the 132 kV and 66 kV system of the Kathmandu Valley. This will aid in studying current tendencies towards overloading in the HT network and also enhance the effectiveness of the distribution rehabilitation works being undertaken separately under the Kathmandu Valley Power Systems Reinforcement Project with a grant assistance of Japan.

Some of the major works involved in this project include reinforcement of ten existing substations, construction of new 66/11 kV, 20 MVA substation at Bhaktapur and 36 MVA at Teku, 17 km of 132 kV and 4 km of 66 kV transmission lines. Towards this, land

acquisition at Bhaktapur and appointment of a consultant are complete and contractual agreement awaits the concurrence of the World Bank.

■ The Duhabi-Bhantabari 132 kV TL Project

This project aims to ease the current energy crisis by importing power from India under the Nepal-India power exchange agreement. Undertaken with a loan assistance from the IDA and having an estimated cost of NRs. 86.43 million, the project is scheduled for completion by the end of 1994/95. The project involves the stringing of a second circuit on a 27 km portion of the existing Hetauda-Biratnagar 132 kV transmission line from Duhabi to Kushaha, construction of a 14 km single circuit 132 kV line from Kushaha to Bhantabari on the Nepal-India border and a 3 km stretch up to Kattaiya in Indian territory.

Land acquisition along with tender evaluation works are complete while actual construction activities await the concurrence of IDA.

■ Dumre-Beshishahar Rural Electrification Project

This project is financed under a loan agreement with Nordic Development Fund (NDF) and estimated to cost NRs. 104.65 million, this project is an extension of the wider Marsyangdi Watershed Project under the PSEP. Involving a 30 km extension of a 33 kV transmission line from Dumre to Udipur, Beshishahar, the district headquarters of Lamjung district, will be electrified through a 33/11 kV, 1.5 MVA substation at Udipur. A network of 70 km of 11 kV and 50 km of 0.4/23 kV distribution lines will electrify 34 villages in Tanahu and Lamjung districts benefitting about 2600 households in that region. Currently, land acquisition and line survey works are complete. The project is scheduled for completion by the end of FY 1995/96.

The prominent feature of this rural electrification scheme is that it aims at handing over the operation and maintenance of the system including meter reading and billing to a consumer group formed from the local community. The year saw the acquisition of 10 rapanies of land, completion of plans and profiles of 98 km of 11 kV network and negotiations for the appointment of a consultant.

■ Attaria-Dadeldhura-Dipayal 66 kV TL Project

Undertaken with a mix of financial loan and grant assistance from the Government of France, this project aims to connect Dipayal to the 132 kV grid substation at Attaria, via Dadeldhura, by a 66 kV transmission line. The total project is estimated to cost NRs. 265 million and is slated for completion by 1994/95. The past year saw the completion of 40 numbers of tower foundations.

Seventh Power Project

Undertaken with a loan assistance from ADB, this project aims to carry out rural electrification in ten different districts and reinforce the existing systems of five towns. Estimated to cost a total of US\$ 64 million, the project is scheduled for completion by 1998/99.

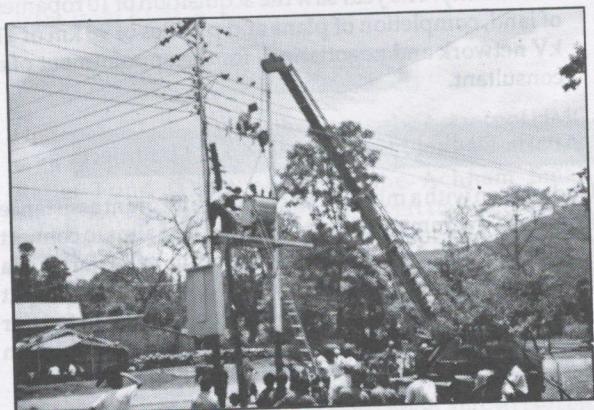
Included in this project are construction of Anarmani-Ilam, Anarmani-Buluchowk, Lahan-Bishnupur, Nijhgadh-Harshaha, Nawalpur-Haripur, Bharatpur-Chanauli, Bharatpur-Parsa, Bharatpur-Kawasoti and Birgunj-Pokharia 33 kV transmission lines totalling about 260 km. Reinforcement of existing 66/11 kV substations at Birgunj and Parwanipur and addition of a 132/33 kV transformer at Bharatpur substation are other major features of the project.

In the distribution and rural electrification sector about 1400 km of 11 kV and 2000 km of 0.4 kV new lines will be constructed while 200 km of 11 kV and 500 km of 0.4 kV lines will be rehabilitated. About 95000 people of 485 villages will benefit from this project.

The planning and economic study as well as design works are complete and some tenders for supply of materials have been approved by the NEA Board. Contract documents for a concrete pole production plant at Amlekhgunj with an annual capacity of 14000 poles has also been signed.

Pokhara Rural Electrification Project

Undertaken with a grant assistance of a total of 80 million Finnish Marks from GOF and executed in two stages, the Pokhara Rural Electrification Project was completed by December 1993, eight months ahead of schedule. The project was started in December 1985 and the first stage completed in July 1988. With the objective of electrifying the villages located in the hilly terrain around the Pokhara valley, the first stage of the project saw the completion of 58 km of 11 kV, 163 km of 0.4 kV distribution lines and 46 distribution transformer substations to connect 4000 new rural customers to a new source of energy.



The second stage of the project saw the completion of an additional 144 km of 11 kV, 500 km of 0.4 kV distribution lines and 139 distribution transformer substations connecting about 10,000 rural households to the Pokhara distribution system. Aerial Bundled Cables were introduced to the country for the first time through this project.

Lahan-Jaljale 33 kV TL Project

Financed by a loan from HMG/ADB and completed at a total cost of NRs. 160.3 million, this project commenced supply of power to the Udayapur Cement Factory and Gaighat, the district headquarters of Udayapur District. The past year saw the completion of distribution lines in Gaighat and protection works around tower foundations of the 33 kV transmission line. A total of 23.58 km of 33 kV double circuit line, 20 MVA substations each at Lahan and Jaljale and about 40 km of distribution lines were constructed. Also 20 MVAR static condensers were connected to the 132 kV grid at Lahan substation.

Kathmandu Valley Power System Reinforcement project

With the primary objective of increasing the system capacity to meet the growing demand and increase power supply reliability in the Kathmandu Valley power system, the Kathmandu Valley Power System Reinforcement Project has been undertaken with a grant assistance of the Government of Japan (GOJ). To be executed in two phases, GOJ will provide 934 million Japanese Yen to implement the Phase I (Stage I) of the project which is scheduled for completion in FY 1994/95. In continuation of this grant assistance, GOJ and HMC signed a second Exchange of Note on June 29, 1993 under which GOJ will provide an additional 1752 million Japanese Yen for the implementation of Phase I (Stage II) of the project. The works under the phase I (stage I) of the project includes laying of underground cables between K-2 and Lainchaur, reinforcement of six 11 kV main feeders and provision of tools and measuring equipment. Construction works are slated to commence from September 1993.

Computerised Billing Project

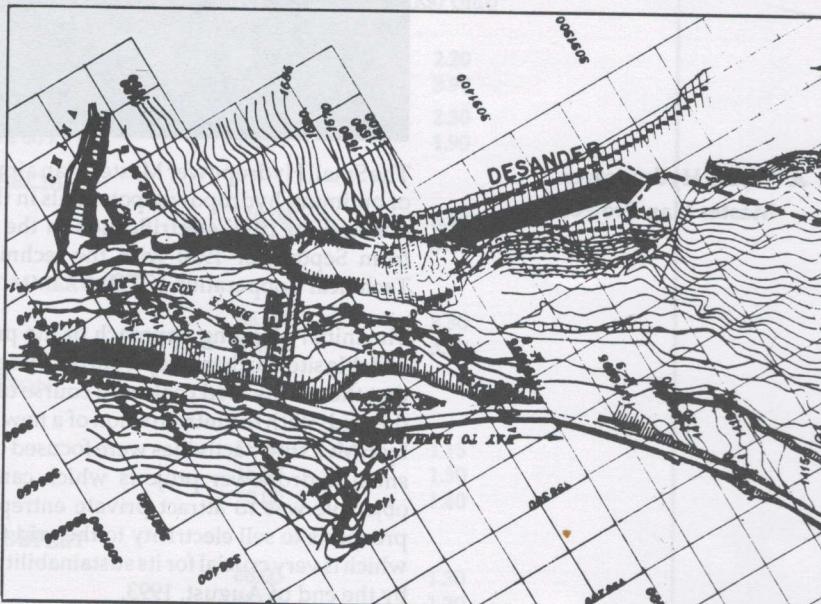
The Computerised Billing Project, being undertaken with a US\$ 1.761 million loan from the ADB faced setbacks in its implementation schedule because of the disconcerting notice of withdrawal from the selected Consultant. Coming towards the final stages of contract negotiation. The withdrawal was unforeseen and subsequently, in accordance with the NEA Board decision, the withdrawal has necessitated the repetition of the entire cycle of procedures for the selection of a new consultant in accordance with ADB rules and regulations. The project seeks to computerise the billing and accounting system in 28 different branches of NEA in a phased manner.

Project Studies

▲ Upper Bhote Koshi Hydro Electric Project

A reconnaissance study of the Bhote Koshi River was carried out by NEA in early 1993 which identified several attractive schemes on the upper reaches of the river. It was observed that cascade development of this stretch could produce nearly 150 MW of power. With this revelation, the NEA Board approved the allocation of NRs 0.65 million as incentive for the feasibility study of the Upper Bhote Koshi HEP to be undertaken by a team of professionals and supporting staff from seven different Departments of NEA, supported by two local consulting firms.

The Upper Bhote Koshi HEP is basically a run-of-river scheme on the Bhote Koshi River, located about 110 km north of Kathmandu near the Sino-Nepal border in Sindhupalchowk District. The river is one of the tributaries of the Saptakoshi and has a catchment area of about 2132 sq. km. at the proposed intake site, 96 percent of it lying in the Tibetan region. Easy access to the Arniko highway and proximity to the national grid are plus points of this scheme.



The planned headwork consisting of a 40m wide, 7.5m high weir and three intake gates located near the Jung Khola is connected through two underground desanding basins, and 3.5 km long headrace tunnel to a surface type power house at Jhirpu. With an installed capacity of 36 MW at a design discharge of 32 cumecs, it is estimated to generate an annual average energy of 244 GWh. The power will be evacuated by a 70 km 132 kV double circuit transmission line to Bhaktapur in Kathmandu Valley. The total cost of the project including this transmission line is estimated at US\$ 68.8 million.

▲ Puwa Khola Hydro Electric Project

Puwa HEP development site is located in Ilam District of Mechi Zone in eastern Nepal, about 78 km north-west from Charali on the Charali-Phidim highway.

The site lies on the Puwa Khola, one of the major tributaries of the Kankai-Mai River.

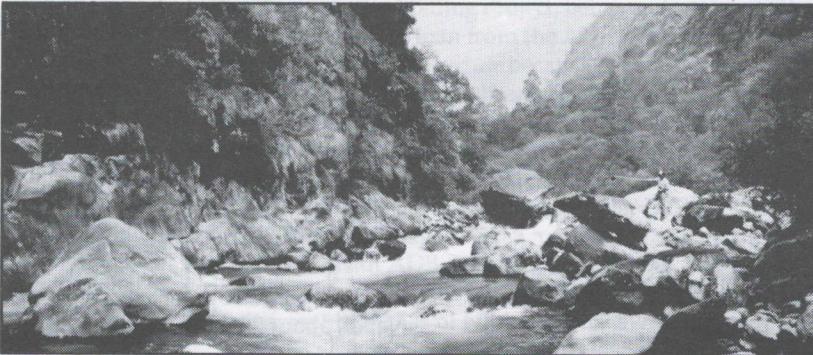
This run-of-river scheme diverts the Puwa Khola through a inverted D-shaped 3.35 km long tunnel to the Mai Khola to generate 5 MW at a design discharge of 2 cumecs and a 300m net head. The estimated annual average energy output is 38GWh which will be evacuated by a 4.5 km long 33 kV single circuit transmission line to the Ilam, which is being connected to the national grid under the Seventh Power Project. The feasibility study of this scheme is being carried out by a JICA technical team and their final report is expected by February 1994. Currently, the review of an interim feasibility study report is in progress.,



▲ **Small Hydropower Master Plan Project**

The Small Hydropower Master Plan aims to establish a systematic identification of optimum hydropower potentials in the range of 100 to 5000 kW to match the demand for rural electrification in the hills and mountains of Nepal. Started from September 1990 with the technical and financial support of German Technical Cooperation (GTZ).

The initial planning approach of the project was targeted on identification of suitable sites farther away from the Integrated National Power System assuming that the nearby load centres in course of time would eventually be served from the grid. With the introduction of a new Hydropower Development Policy 1992 by HMG, study activities were focused on the identification of financially viable small hydropower projects which can be easily connected to the grid. The objective was to attract private entrepreneurs and provide them with more prospects to sell electricity to the grid thereby improving the plant load factor which is very crucial for its sustainability. The project is estimated to be complete by the end of August, 1993.



TARIFF RATES

(effective March 14, 1993)

CATEGORY A : DOMESTIC CONSUMERS

A. 1 Minimum Monthly Charges :

Meter Capacity	Minimum Charge (NRs.)	Exempt (KWh)
Upto 5 ampere	30	20
6-30 ampere	90	40
31-60 ampere	210	80
Three phase supply	570	200

A. 2 Energy charge (in excess of exempt units)

Upto 250 units	Rs. 3.00 per unit
Above 250 units	Rs. 4.50 per unit

CATEGORY B : TEMPLES

Minimum monthly charge	Rs. 39.00 (20 units exempt)
Energy charge	Rs. 1.95 per unit (units in excess of exempt units)

CATEGORY C : INDUSTRIAL

Sub-category	Demand fee (Rs/kW)	Energy charge (Rs/Unit)
C.1 Low voltage (400/230 volt)		
Cottage	10.00	2.20
Small industry	40.00	3.90
C.2 Medium voltage (11 & 33 kV)	90.00	2.30
C.3 High voltage (above 66 kV)	80.00	1.90

CATEGORY D : COMMERCIAL

D.1 Low voltage	110.00	3.90
D.2 Medium voltage	100.00	3.65

CATEGORY E : NON-COMMERCIAL

E.1 Low voltage	55.00	3.80
E.2 Medium voltage	50.00	3.60

CATEGORY F : IRRIGATION

F.1 Low voltage		
Upto 10 kVA	10.00	1.15
Above 10 kVA	15.00	1.50
F.2 Medium voltage	20.00	1.40

CATEGORY G : WATER SUPPLY

G.1 Low voltage	66.00	1.30
G.2 Medium voltage	60.00	1.20

CATEGORY H : TRANSPORTATION

H.1 Medium voltage	60.00	1.50
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CATEGORY I : STREET LIGHT

I.1 Street lights with meter		2.30
I.2 Without meter	828.00	-

CATEGORY J : TEMPORARY SUPPLY

J.1 With meter		6.00
J.2 Without meter	2256.00	-

Balance Sheet as of July 15

	in million NRs					
ASSETS	1991	1990	1989	1988	1987	1986
Fixed assets						
Land	537.7	499.9	478.4	46.1	42.5	31.9
Buildings	534.9	451.7	433.7	169.7	136.9	95.9
Hydraulic Plant & Machinery	14,568.3	9,872.3	9,617.0	25,87.1	2,571.6	1,871.4
Internal Combustion P & M	178.1	177.6	185.5	52.0	51.3	46.5
Solar Power Plant	45.1	46.2	32.8	-	-	-
Transmission Line & S/S:						
On or above 33 KV Line	1,797.6	1,696.4	1,717.5	993.2	623.5	353.4
S/S on or above 33 KV	2,404.5	2,408.4	2,434.4	-	-	-
Below 33 KV Line	108.5	112.6	115.9	-	-	-
Distribution Line	2,034.3	1,366.6	536.1	409.3	384.2	202.5
Meter & Metering Equipment	50.4	40.6	30.9	22.2	17.6	12.8
Consumer Service	52.9	51.9	46.8	42.1	32.1	28.9
Public Lighting	15.9	16.3	15.4	14.8	1.7	1.8
Tools and Instrument	5.3	5.4	6.2	3.3	3.0	2.4
Vehicles	18.9	26.9	27.4	22.3	24.0	11.6
Furniture & Office Equipment	14.0	12.3	13.8	9.5	8.0	4.7
Miscellaneous	0.3	0.2	0.1	0.2	0.1	0.2
Total Fixed Assets	22,366.7	16,785.3	15,691.9	4,371.8	3,896.5	2664.0
Other Assets						
Capital Works in Progress	2,890.0	1,498.4	778.7	723.2	51.8	85.5
Investment in Securities	8.1	8.1	4.1	4.2	2.7	2.7
Total Other Assets	2,898.1	1506.5	782.8	727.4	54.5	88.2
Deffered Expenditure	169.8	226.3	-	-	-	-
Current Assets						
Inventories	250.8	217.0	198.2	141.1	113.2	83.2
Accounts Receivable	556.1	357.0	285.5	239.9	165.0	120.5
Advances Recoverable	122.2	154.2	74.1	69.7	67.9	77.0
Cash & Bank	174.5	142.4	75.7	56.6	79.6	59.1
Total Current Assets	1,103.6	870.6	633.5	507.3	425.7	339.8
TOTAL ASSETS	26,538.2	19,388.7	17,108.2	5,606.5	4,376.7	3,092.0

Balance Sheet as of July 15

in million NRs

EQUITY AND LIABILITIES	1991	1990	1989	1988	1987	1986
Equity						
Share Capital	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Share Allotment Suspense	3,916.8	3,146.4	2,502.6	2,615.3	1,657.0	424.2
Capital Reserve	67.6	56.8	44.9	35.2	15.1	7.7
Reserves & Surplus	(500.3)	(75.6)	39.5	36.1	41.7	37.8
Revaluation Surplus	12,369.4	12,065.3	11,091.5	-	-	-
Total Equity	16,853.5	16,192.9	14,678.5	3,686.6	2,713.8	1,469.7
Long-Term Liabilities						
Long-Term Loan	8,812.3	2,422.8	1,890.2	1,541.7	1,378.8	1,263.3
Total Long-Term Liabilities	8,812.3	2,422.8	1,890.2	1,541.7	1,378.8	1,263.3
Current Liabilities & Provisions						
Deposit from Customers	24.8	20.4	12.4	13.6	8.1	11.0
Other Deposit	21.3	14.7	11.9	7.8	7.1	8.3
Creditors for Goods	10.3	11.6	19.1	30.9	35.3	39.6
Other Creditors	59.4	36.3	2.2	1.8	1.8	4.4
Payable to Others for power purchase	106.6	136.8	126.3	78.1	29.6	28.1
Payable to HMG for Interest	266.0	198.9	143.1	78.8	69.4	140.3
Payable to HMG for Other	44.8	45.7	9.5	0.0	3.1	22.2
Provision for Bonus	2.4	3.3	4.8	4.8	4.3	2.8
Provision for Gratuity & Pension	140.3	140.3	112.7	86.5	65.8	65.8
Provision for Medical Facilities	20.7	20.7	20.7	20.7	20.7	20.7
Provision for Accumulated Leave	13.4	13.4	13.4	13.4	13.4	13.4
Inventories Received from Project	-	-	-	-	22.1	2.4
Provision for Tax	7.2	28.4	35.0	35.8	3.4	-
Project Accounts Payable	-	-	28.4	6.0	0.0	-
Payable to HMG for Power Purchase	83.5	83.5	-	-	-	-
Branch Reconciliation	71.7	19.0	-	-	-	-
Total Current Liabilities & Provisions	872.4	773.0	539.5	378.2	284.1	359.0
TOTAL LIABILITIES AND EQUITY	26,538.2	19,388.7	17,108.2	5,606.5	4,376.7	3,092.0

Profit and Loss for the Year ended July 15

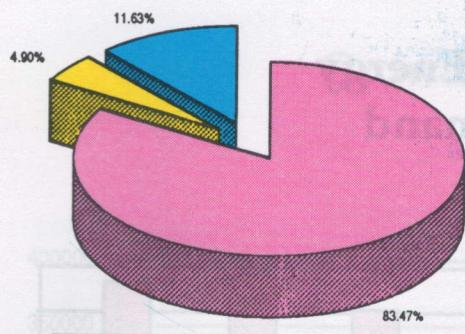
in million NRs

Particulars	1993**	1992*	1991	1990	1989	1988	1987	1986
A. Revenue								
Net Sale of Electricity	1,805.0	1,436.9	960.9	760.1	690.3	551.5	452.4	377.0
Income from Other Services	65.0	40.5	18.2	15.9	18.0	11.8	9.8	7.4
Interest & Other Income	27.3	-	13.5	9.4	3.6	4.2	1.4	1.1
Total-A	1,897.3	1,477.4	992.6	785.4	711.9	567.5	463.6	385.5
B. Operation & Maintenance Expenditure								
Operation & Maintenance & General Expenses	778.9	512.9	379.7	291.0	284.8	206.4	180.0	134.9
Power Purchase	174.2	112.9	50.5	171.5	138.8	63.8	7.1	11.5
Provision for Expenses	-	-	-	48.8	26.2	26.8	6.3	15.7
Bad debts written off	-	-	-	0.3	0.2	-	-	-
Depreciation	1,054.9	959.0	879.7	683.9	578.7	134.7	114.8	80.0
Deffered Expenditure Written off	54.2	54.2	56.6	56.6	-	-	-	-
Total-B	2,062.2	1,639.0	1,366.5	1,252.1	1028.7	431.7	308.2	242.1
C. Net Operations								
Surplus (Deficit) (A-B)	(164.9)	(161.6)	(373.9)	(466.7)	(316.8)	135.8	155.4	143.5
D. Interest on Long-Term Loans								
641.7	575.6	635.1	129.0	130.3	125.8	120.8	103.2	
E. Profit and (Loss) Prior Year's income & Expenses Adjustment								
(806.6)	737.2	(1009.)	595.7	(447.1)	10.0	34.6	40.2	
F. Prior year Income / Expenses Adjustment								
-	-	(15.4)	(41.4)	33.3	(1.8)	(11.0)	0.0	
G. Profit & (Loss) after Prior Year Adjustment								
-	-	(993.6)	(637.1)	(413.8)	-	-	-	
H. Transfer from Revaluation Surplus								
707.4	619.0	568.9	522.0	424.2	-	-	-	
I. Net Profit (Loss) Before Tax								
(99.2)	(118.2)	(424.7)	(115.1)	10.4	8.2	23.6	40.2	
J. Corporate Tax								
-	-	-	-	7.0	13.8	11.4	2.4	
K. Net Profit/(Loss) after tax								
(99.2)	(118.2)	(424.7)	(115.1)	3.4	(5.6)	12.2	37.8	

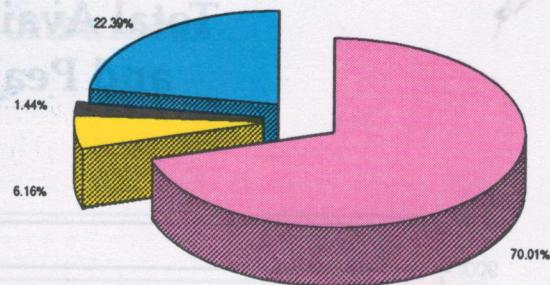
Note: * The figures for 1992 are subject to audit.

** Provisional

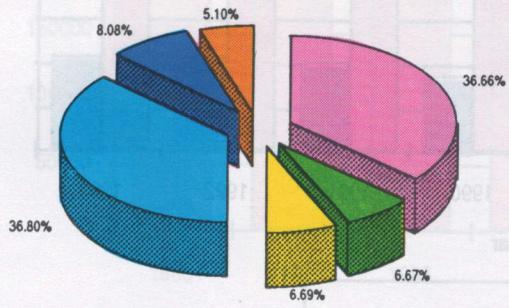
Availability FY1993



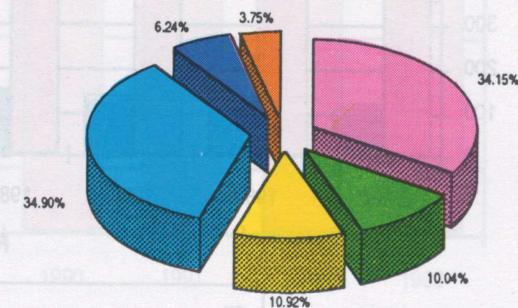
Utilization FY1993



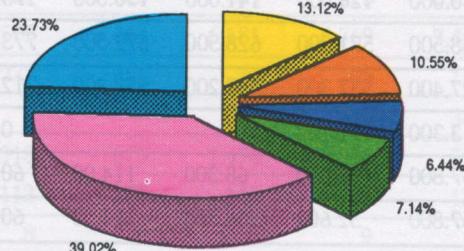
Sales FY1993



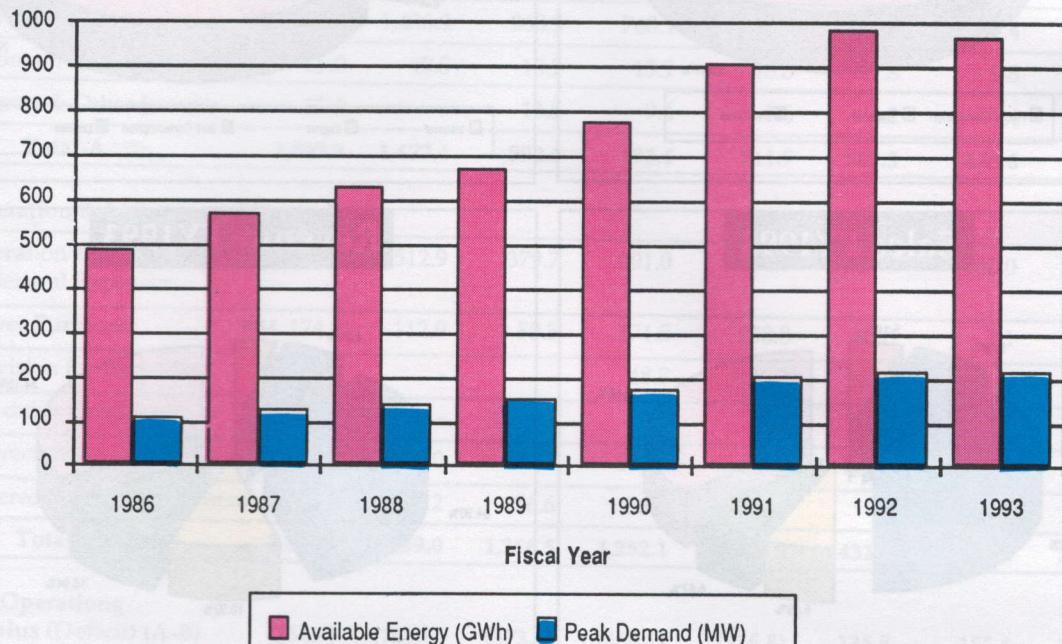
Revenue FY1993



Expenditure FY1993



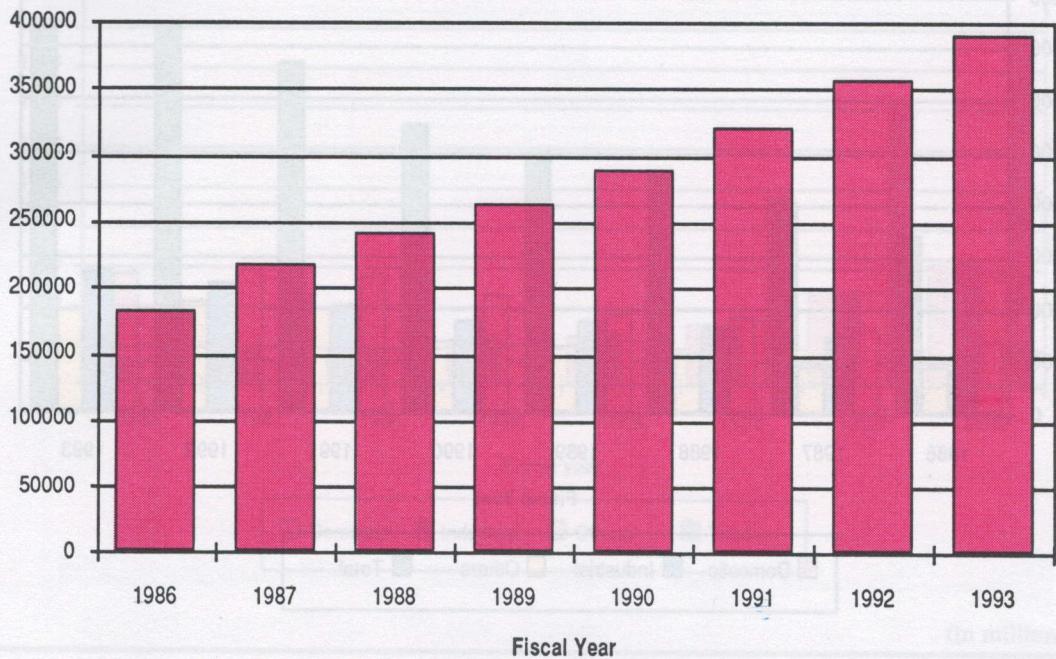
Total Available Energy and Peak Demand



Particulars	1986	1987	1988	1989	1990	1991	1992	1993
Peak Demand (MW)*	110.000	126.000	141.000	150.000	176.000	204.000	216.000	214.04
Available Energy (GWh)	488.500	571.000	628.500	672.300	773.842	906.283	981.105	963.314
1. Hydro	427.400	537.300	560.200	558.300	712.312	870.203	869.980	804.050
2. Diesel	3.300	1.100	-	-	0.858	0.800	31.540	47.290
3. Purchase from	57.800	32.600	68.300	114.00	60.672	35.280	79.585	111.974
(a) India	57.800	32.600	68.300	114.00	60.672	33.700	54.938	82.223
(b) Butwal Power Co.	-	-	-	-	-	1.580	24.647	29.751

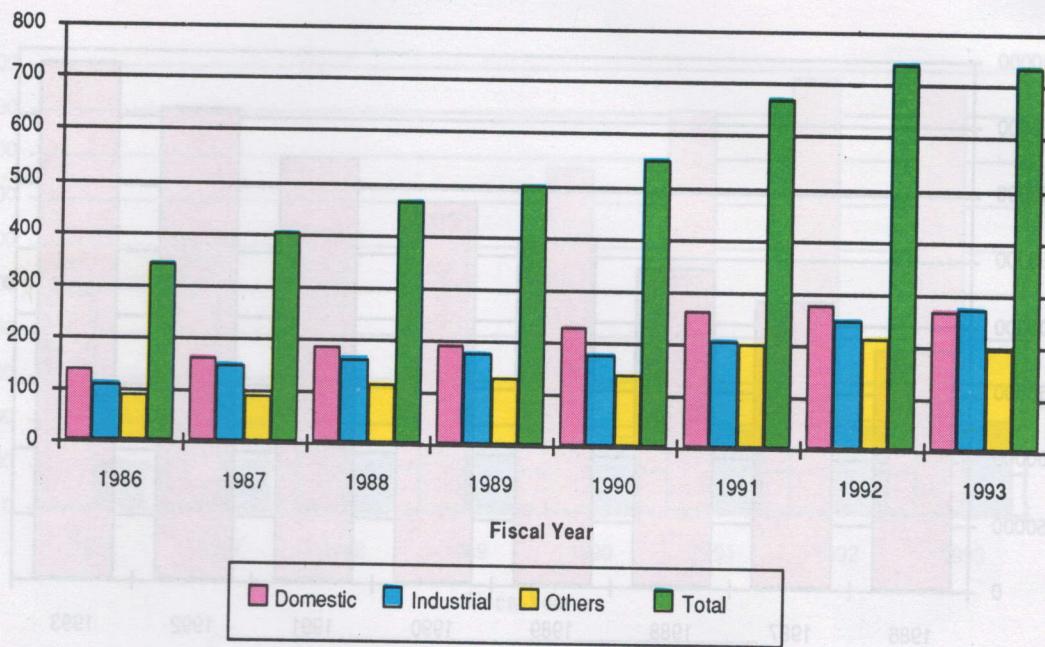
Note :- * Peak demand is for all areas covered by integrated system including supply to India.

Growth of Consumers



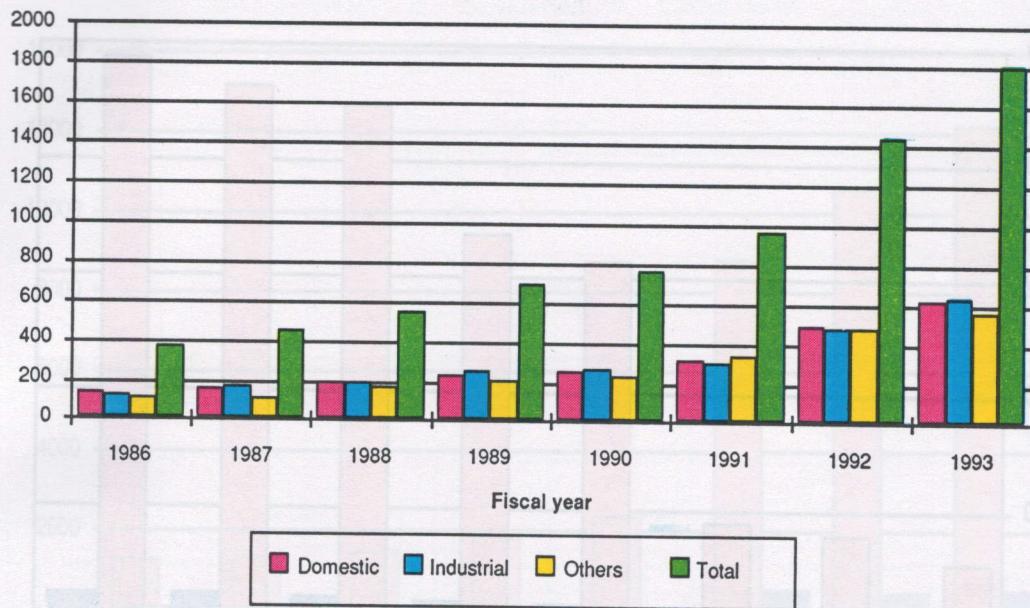
Particulars	1986	1987	1988	1989	1990	1991	1992	1993
Domestic	1,75,860	2,08,870	2,30,178	2,51,758	2,74,921	3,04,480	3,37,715	3,71,975
Non-Commercial	1,881	1,768	2,403	3,477	4,506	5,633	6,065	6,340
Commercial	527	315	641	1,678	1,758	1,827	1,378	1,536
Industrial	4,575	5,464	6,181	6,769	7,482	8,382	9,113	9,595
Water Supply	277	351	77	105	112	119	124	131
Irrigation	-	-	311	343	382	420	512	463
Street Light	318	675	1,474	385	517	532	547	367
Temporary Supply	113	275	145	104	123	136	191	183
Transport	8	8	8	9	9	9	8	8
Temple			59	152	205	247	335	398
Total (Internal Sales)	1,83,559	2,17,726	2,41,477	2,64,780	2,90,015	3,21,785	3,55,988	3,90,996
Bulk Supply (India)	3	4	2	4	4	5	5	4
Grand Total	1,83,562	2,17,730	2,41,479	2,64,784	2,90,019	3,21,790	3,55,953	3,91,000

Electricity Sales



Category	1986	1987	1988	1989	1990	1991	1992	1993
Domestic	140.596	162.329	185.746	193.308	231.396	261.399	275.248	268.987
Non-Commercial	31.462	27.390	52.358	48.059	47.433	46.230	46.684	48.937
Commercial	19.336	21.963	25.401	30.778	33.712	36.640	45.200	49.125
Industrial	110.382	148.477	161.577	175.262	178.321	206.881	246.374	269.979
Water Supply	11.268	15.312	7.016	7.344	11.928	15.831	14.936	14.530
Irrigation	-	-	9.358	15.626	11.965	11.851	12.769	11.627
Street Light	3.667	3.858	6.163	5.091	7.295	7.308	7.802	8.180
Temporary Supply	1.533	1.240	0.705	0.677	0.403	0.428	1.003	1.101
Transport	1.716	1.569	0.763	2.287	2.060	1.825	1.506	1.497
Temple	-	-	0.005	0.109	0.270	0.369	0.419	0.469
Total (Internal Sales)	319.960	382.138	449.092	478.541	524.782	588.760	651.941	674.434
Bulk Supply	21.458	20.458	16.053	17.596	23.287	80.640	85.411	59.320
Grand Total	341.418	402.596	465.145	496.137	548.069	669.400	737.352	733.754

Revenue

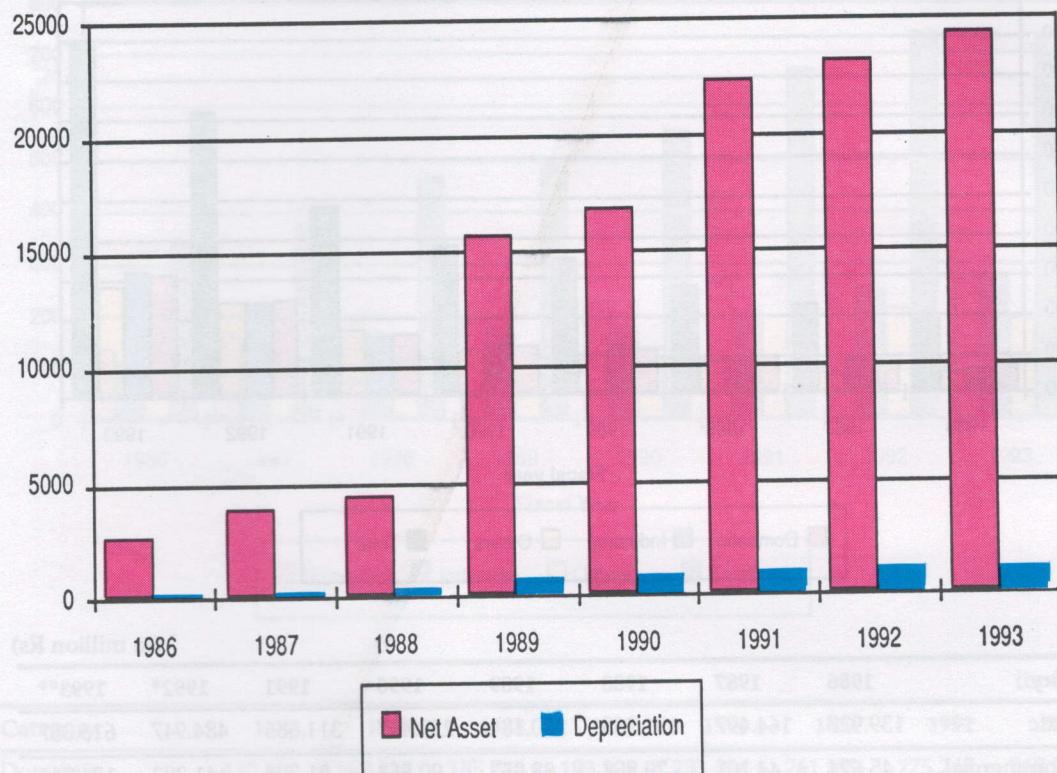


Category	1986	1987	1988	1989	1990	1991	1992*	1993**
Domestic	139.928	164.497	191.205	230.184	259.417	311.686	484.947	616.387
Non-Commercial	45.624	44.101	79.852	88.853	90.553	91.708	141.382	181.344
Commercial	31.343	35.077	41.792	59.920	67.792	75.634	136.135	197.204
Industrial	128.867	173.315	193.840	254.518	267.254	307.005	475.175	630.007
Water Supply &			9.237				17.427	24.674
Irrigation	15.595	19.800	13.200	24.284	26.433	27.530	17.484	19.743
Street Light	5.972	6.487	7.121	6.388	8.832	8.767	12.353	16.032
Temporary Supply	3.307	2.999	1.863	2.449	1.454	1.483	4.062	4.175
Transport	1.613	1.567	1.591	2.022	1.809	2.138	1.908	2.204
Temple	-	-	0.007	0.113	0.381	0.182	0.600	0.898
Total (Internal Sales)	372.249	447.843	539.708	668.731	723.925	826.135	1,291.474	1,692.668
Bulk Supply (India)	4.887	4.812	12.009	23.076	36.738	135.064	145.484	112.344
Grand Total	377.136	452.655	551.717	691.807	760.663	961.199	1,436.958	1,805.012

* Figures are subject to audit

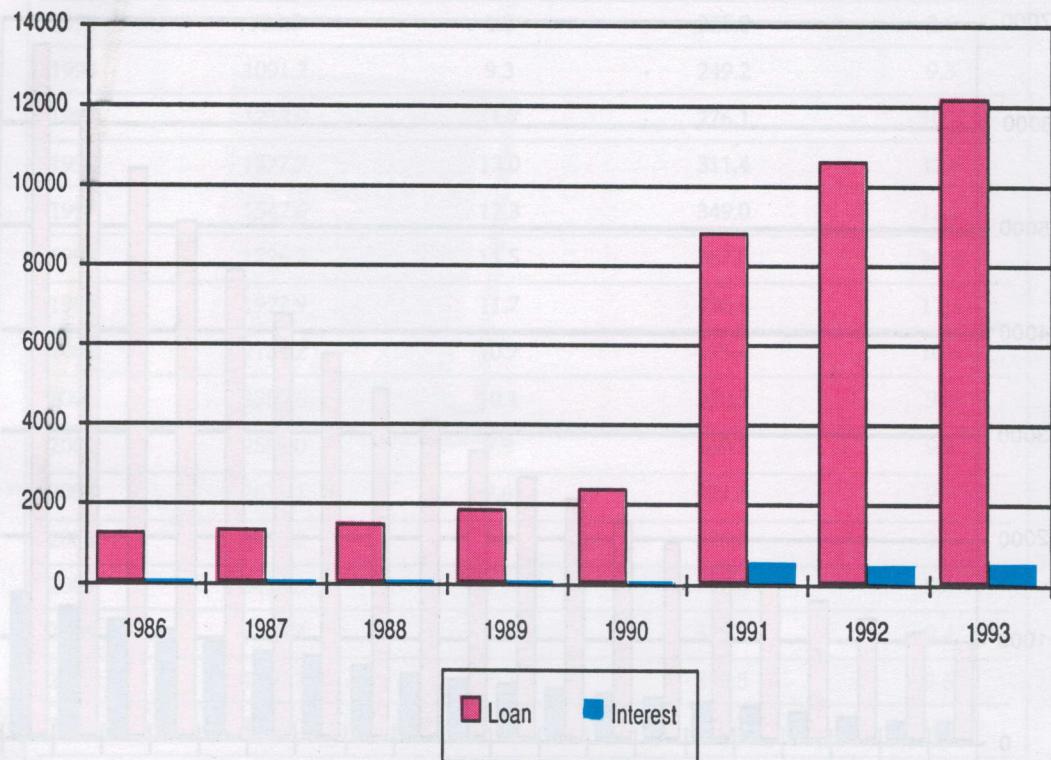
** Figures are provisional

Asset Formation



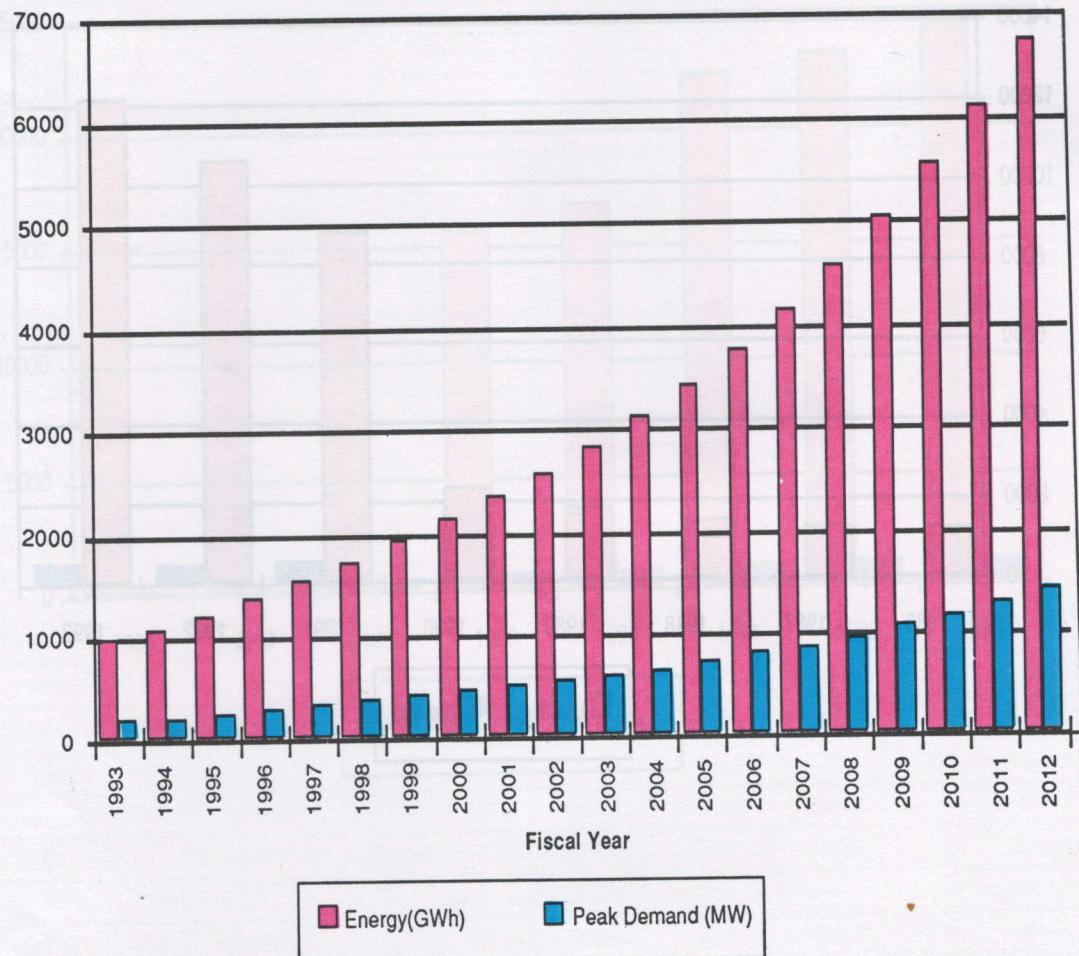
Fiscal Year	1986	1987	1988	1989	1990	1991	1992	1993
Net Asset	2,663.9	3,896.5	4,371.8	15,691.9	16,785.3	22,366.7	23,178.0	24,336.8
Depreciation	80.1	114.8	134.7	578.7	683.9	879.7	959.0	1,054.9

Long-term Loan and Interest



Fiscal Year	in million Rs							
	1986	1987	1988	1989	1990	1991	1992	1993
Loan	1,263.3	1,378.8	1,541.7	1,890.2	2,422.8	8,812.3	10,635.2	12,173.7
Interest	103.2	120.8	125.8	130.3	129.0	635.1	575.6	641.7

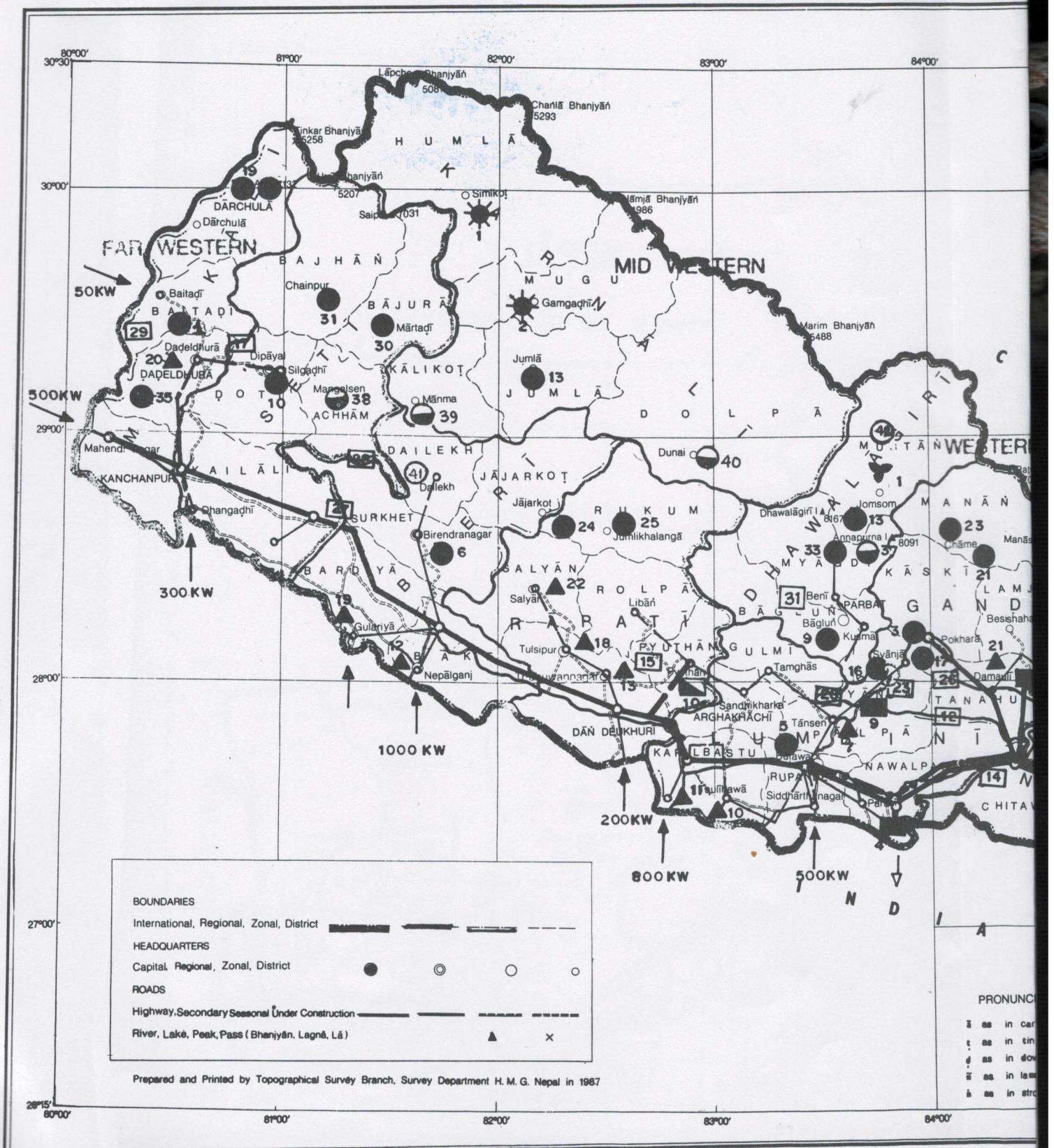
Load Forecast



Load Forecast for Integrated Nepal Power System (INPS)

Year	Energy (GWH)	Growth (%)	Peak (MW)	Growth (%)
1993	998.5	1.8	228.0	2.6
1994	1091.7	9.3	249.2	9.3
1995	1218.9	11.7	276.1	10.8
1996	1377.7	13.0	311.4	12.8
1997	1547.6	12.3	349.0	12.1
1998	1726.2	11.5	387.0	10.9
1999	1927.9	11.7	430.0	11.1
2000	2134.2	10.7	475.4	10.6
2001	2350.6	10.1	520.9	9.6
2002	2582.0	9.8	569.5	9.3
2003	2831.1	9.6	621.1	9.1
2004	3110.0	9.9	679.0	9.3
2005	3418.8	9.9	742.8	9.4
2006	3758.3	9.9	812.7	9.4
2007	4136.2	10.1	890.5	9.6
2008	4557.0	10.2	976.5	9.7
2009	5024.7	10.3	1071.3	9.7
2010	5543.1	10.3	1176.3	9.8
2011	6114.7	10.3	1292.3	9.9
2012	6745.7	10.3	1420.1	9.9
Average Growth		10.6		10.1

Installed capacity in Nea: 288076 KW (excludes Andriki Nidia, Sami, etc.)

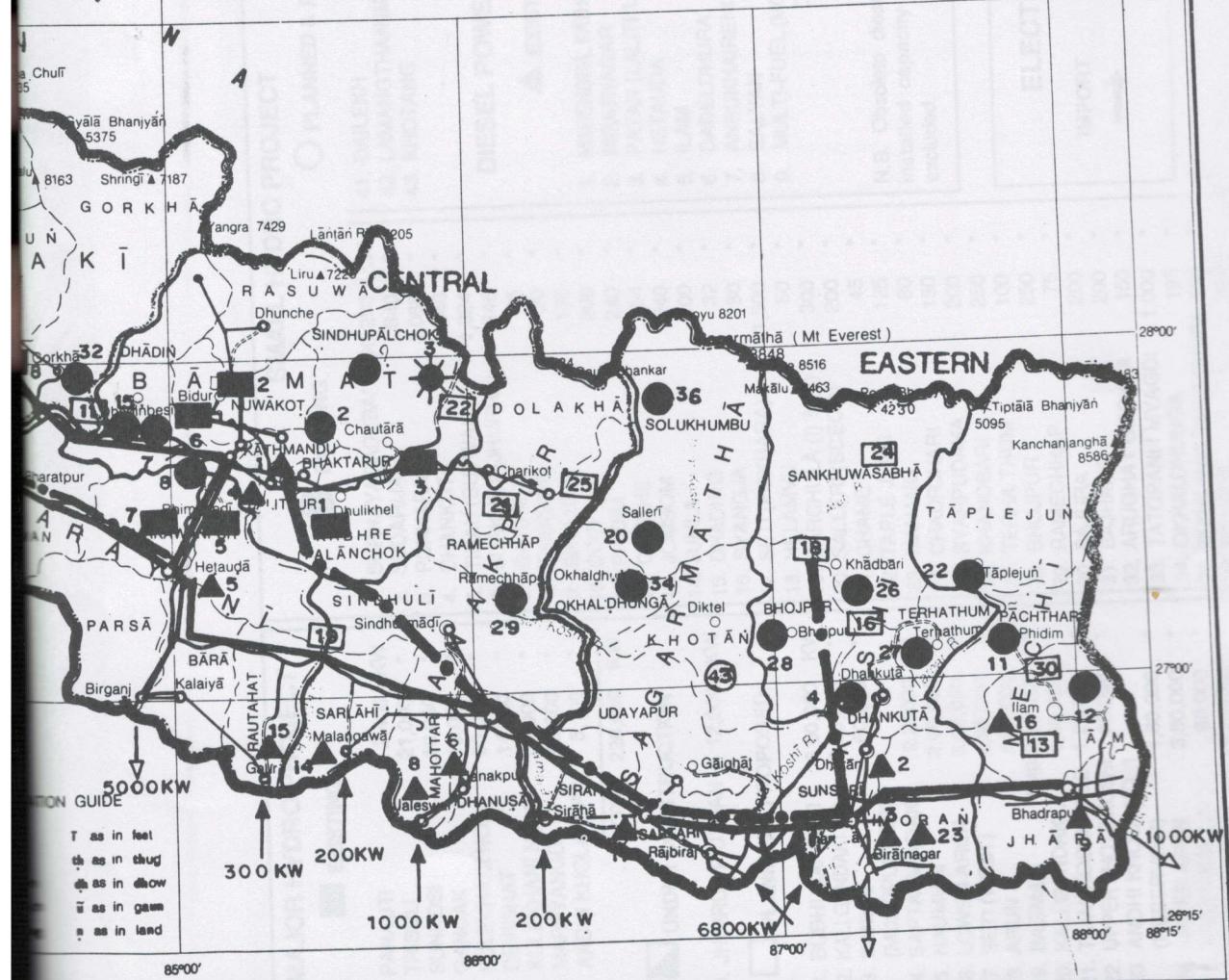


NEPĀL

POWER DEVELOPMENT

Kilometres 40 20 0 40 80 120 160 Kilometres

Scale 1 : 2,000,000



29. PANCHESHWAR (MAHAKALI)	10,00,000	33. KV LINE
30. PUWA KHOLA	5,000	66 KV LINE
31. MODIKHOLA	14,000	132 KV LINE
		220 KV LINE
37. TATOPANI II MYAGDI	1,000	
38. ACHHAM	400	
39. KALIKOT	500	
40. DOLPA	160	

Installed capacity in Nea: 288076 KW (excludes Andhi Khola, Salleri and Kagbeni)

