



# NEPAL ELECTRICITY AUTHORITY

FY 1993/94  
A YEAR IN REVIEW

BHADRA, 2051 (AUGUST 1994)  
DURBAR MARG, KATHMANDU

## CONTENTS

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▲ Highlights	
▲ Chairman's Message	
▲ Board of Directors	
▲ Organizational Chart	
▲ Chief Executives	
▲ Directors	
▲ Managing Director's Report	8
▲ Introduction	13
▲ Sectoral Review	14
▲ Project Highlights	21
▲ Project Studies	25
▲ Tariff Studies	27
▲ Balance Sheet	28
▲ Profit & Loss Statement	30
▲ Statistics	31

# Highlights of 1993/94

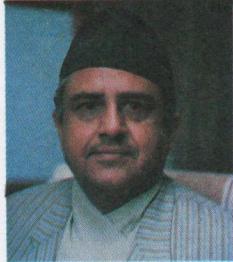
Description	1994*	1993	Increase/Decrease Amount	Increase/Decrease Percent
Total Revenue (M. NRs)	2408.9	1904.4	504.5	26.5
Net Sale of Electricity (M. NRs)	2256.6	1786.8	469.8	26.3
Income from Other Services (M. NRs)	152.3	117.6	34.7	29.5
Operating Expenses,				
Including Depreciation (M. NRs)	2197.5	1853.5	344.0	18.6
Depreciation (M. NRs) ++	1182.1	1026.0	156.1	15.2
Net Income, after interest before tax (M. NRs)	366.7	106.2	260.5	245.3
Interest on Long-Term Loans (M. NRs)	671.8	625.5	46.3	7.4
Long-Term Loans (M. NRs)	14,293.4	11,649.6	2,643.8	22.7
Net Fixed Assets (M. NRs)	26,890.4	24,126.2	2,764.2	11.5
Number of Customers	4,26,350	3,91,000	35,350	9.04
Total Sales Of Electricity (GWh)	765.875	709.385	56.49	7.96
Internal Sale (GWh)	694.754	663.248	31.51	4.75
Average Customer's Consumption (KWh)*	1629.5	1696.3	(66.8)	(3.9)
Average Price Of Electricity (NRs/KWh)*	3.08	2.59	0.49	18.92
Peak Load Interconnected System (MW)	231	214.04	16.96	7.92
Total Available Electric Energy (GWh)	1034.163	963.314	70.849	7.35
Hydro Generation (GWh)	839.711	804.05	35.661	4.43
Purchased Energy (GWh)	132.25	111.974	20.276	18.1
Exported Energy (GWh)	71.121	46.137	24.984	54.2
Thermal (GWh)	62.203	47.290	14.913	31.5

Note:

- \* Figures for 1994 are provisional.
- + Internal
- ++ On revalued assets

## Message From The Chairman

I am happy to note that Nepal Electricity Authority will be entering its tenth year of service on Bhadra 1, 2051



Adequate, reliable and economically affordable supply of electricity is a prerequisite for the development of any nation. In the case of Nepal, harnessing her abundantly available water resources is the preferred means of generating electricity. This task essentially requires an appropriate institutional arrangement. In this regard, NEA is striving to be an institution of repute dedicated to render efficient services to the nation.

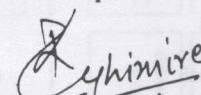
Despite resource constraints, human as well as financial, considerable headway has been made by NEA in promoting power generation, transmission and its distribution to Nepali consumers as well as managing the mutually beneficial exchange of power between Nepal and India. The revenue generated by NEA's commercial structure has greatly contributed to the national exchequer.

Viewing the performance of NEA in retrospect, Sunkosi, Marsyangdi, Kulekhani and Trishuli-Devighat power plants are outstanding achievements of NEA. NEA has also proved its mettle at crisis management as demonstrated by its ability to rehabilitate in record time the Kulekhani Hydropower Plants following the severe disaster of 1993.

NEA has been trying to prove itself as a capable institution in coping with the new policy guidelines of the elected democratic Government by adapting itself within the framework of HMG objectives aimed at liberalisation of the economy and a transition to a market oriented economy based on competition and efficiency. The initiatives towards commercialization should ensure that the utility will adapt itself resiliently to the new environs and contribute towards creating a competitive environment for the development of power sector in the country.

NEA has contemplated and initiated the implementation of plans to augment its generation capacity to overcome the present load shedding and remove the discontent of the public. I am confident about the successful completion and materialization of the plans undertaken by NEA. HMG is committed to the strengthening and improvement of the organization.

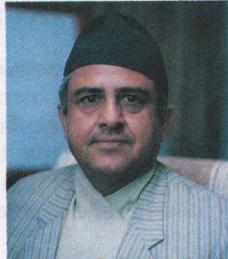
Finally, I express my appreciation for the professionalism and diligence that the management and staff of NEA have put into their work. I also express my thanks to the Members of the Board of Directors of NEA for their sagacity in guiding the Authority in the right direction. I wish NEA every success in its future endeavour to contribute its best to the appropriate and effective growth of the power sector of Nepal.

 24.4.051

(Laxman Prasad Ghimire)

Minister of State for Water Resources  
and Chairman, Nepal Electricity Authority

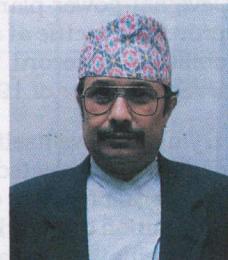
## Board of Directors



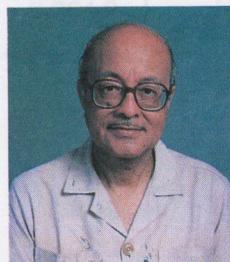
Chairman  
**Mr L.P. Ghimire**  
Hon'ble Minister of State  
Water Resources



**Dr. T.N. Pant**  
Secretary  
Ministry of Finance



**Mr S.N. Upadhyaya**  
Secretary  
Ministry of Water Resources



**Mr Himalaya S.J.B. Rana**  
Chairman  
Himalayan Bank Ltd.



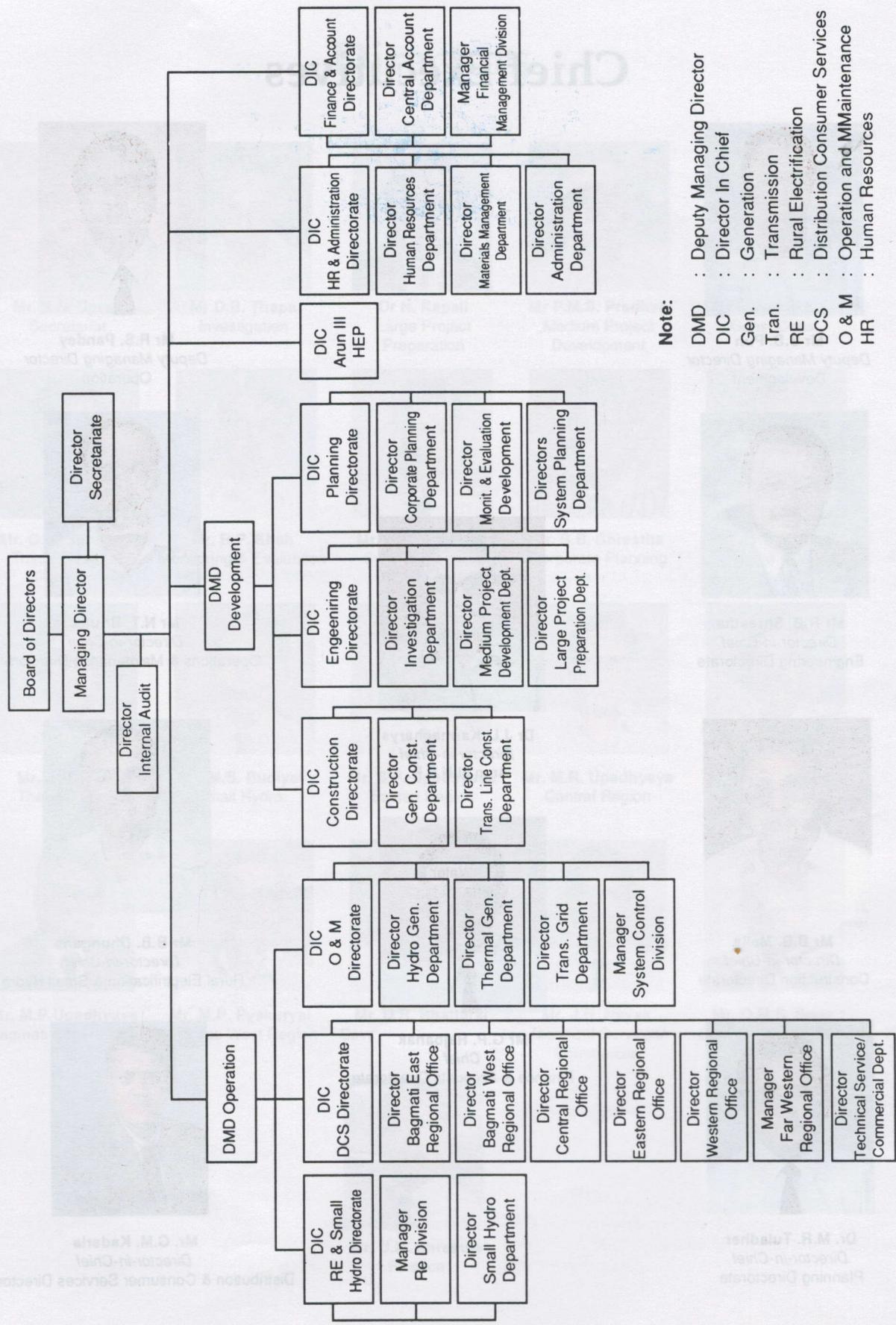
**Mr S.N. Pradhan**  
Advisor  
National Planning Commission



**Dr. T.P. Pokharel**  
Member Secretary  
Social Welfare Council



**Member Secretay**  
Managing Director, NEA



Note:

DMD	Deputy Managing Director
DIC	Director In Chief
Gen.	Generation
Tran.	Transmission
RE	Rural Electrification
DCS	Distribution Consumer Services
O & M	Operation and MMaintenance
HR	Human Resources

## Chief Executives



**Mr S.B. Pun**  
Deputy Managing Director  
Development



**Mr R.B. Shrestha**  
Director-in-Chief  
Engineering Directorate



**Mr B.B. Malla**  
Director-in-Chief  
Construction Directorate



**Dr. M.R. Tuladhar**  
Director-in-Chief  
Planning Directorate



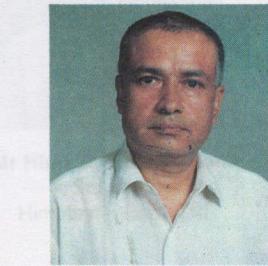
**Mr R.S. Pandey**  
Deputy Managing Director  
Operation



**Mr N.T. Bhutia**  
Director-in-Chief  
Operations & Maintenance Directorate

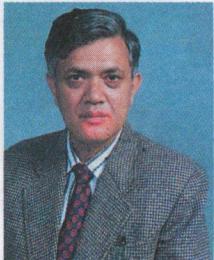


**Dr J.L. Karmacharya**  
Director-in-Chief  
Arun III H.E.P.



**Mr B.B. Dhungana**  
Director-in-Chief  
Rural Electrification & Small Hydro

*Chief*  
Finance & Accounts Directorate



**Mr. G.M. Kadarla**  
Director-in-Chief  
Distribution & Consumer Services Directorate

## Directors



**Mr. V.N. Upreti**  
Secretariat



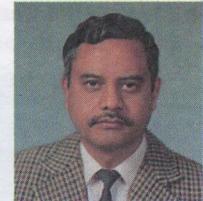
**Mr. D.B. Thapa**  
Investigation



**Dr N. Kapali**  
Large Project  
Preparation



**Mr P.M.S. Pradhan**  
Medium Project  
Development



**Mr Govinda K.C.**  
Gens. Cons.



**Mr. G.B. Shrestha**  
Trisuli-Devighat



**Mr. R.P. Shah**  
Monitoring & Evaluation



**Mr. B.R. Shrestha**  
System Planning



**Mr. S.B. Shrestha**  
Corporate Planning



**Mr. J.K. Pradhan**  
Hydro.Gen.



**Mr. A.P. Rijal**  
Thermal Gen.



**Mr. M.S. Budiyal**  
Small Hydro.



**Mr. S.P. Upadhyaya**  
Eastern Region



**Mr. M.R. Upadhyaya**  
Central Region



**Mr. B.C. Thakuri**  
Western Region



**Mr. M.P. Upadhyaya**  
Bagmati East Region



**Mr. M.P. Pyakuryal**  
Bagmati West Region



**Mr. D.R. Bhattarai**  
Seventh Power Project



**Mr. J.N. Nayak**  
Technical Services/  
Commercial

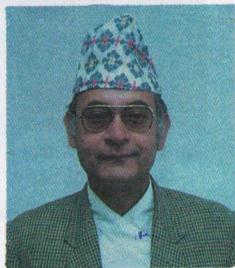


**Mr. O.M.S. Swar**  
Deputation to WECS



**Mr. U.K. Shrestha**  
Finance

# Managing Director's Report



## ▲ Introduction

As NEA steps on the threshold of its first decade of service, it gives me great pleasure to report on the activities of its ninth year. The fiscal year 1993/94 will be remembered as a year when we accepted unprecedented challenges and we succeeded in meeting them. This has given us the impetus to face even greater challenges in the future.

Our successful tackling of events over the year have made us bold and confident, and I firmly believe that we have the personnel, the competency and the enthusiasm to achieve what we must. I am, therefore, confident that we can enter our tenth year as a mature institution which has been organised, reinforced and strengthened to achieve world class performance.

## ▲ The Power Environment

The process of improving our operational efficiency and achieving productivity norms comparable to international power utilities must be undertaken as a continuous process. Over the past years, we have deliberated on our targets, our capabilities, our shortcomings and options available to achieve these targets. We have started this process during the fledging years of institution building and have found the encouraging acceptance within our organisation.

We have also spent considerable time in earnest soul-searching to assess our position in the ever changing environs and have oriented our targets through the analysis of a maze of concepts and studies and corporate strategies. We have now reached a stage where we must think of quality improvement and productivity enhancements. We now need to give more attention to important corporate components such as establishing an MIS, introducing sound financial and administrative management techniques, deepening human resources development at all levels, intensifying effective communication within the organisation and without, and improving public relations, our corporate image and consumer appreciation.

The changing socio-economic development and HMG policies in the power sector requires us to co-exist with the private enterprises in this sector. In other words, NEA has no longer the monopoly of power generation, transmission and distribution. The entry of Australia's Snowy Mountain Engineering Corporation with their venture to design and implement the 360 MW West Seti, Butwal Power Company's enterprise with the 60 MW Khimti, and the possible joint venture of HARZA Engineering of the USA with a local group to promote the 36 MW Bhotekoshi HEP are examples of the gradual mushrooming of the private enterprise in large, medium and small hydro electric projects.

In order to meet the challenges of the future and to meet our goals, we will be required to mobilise and develop our own resources in terms of finance and expertise. This is the only long term option.

## ▲ The Year in Perspective

I am firmly of the opinion that the year has been very encouraging in terms of achievements. It has instilled a great deal of optimism into our institution.

This is a good feeling to have on Bhadra 1 - the day NEA was formed nine years ago.

An example of our capability to undertake tasks under very constrained situations was the rehabilitation of the flash-flood devastated Kulekhani I and II. The mid-July 1993 catastrophe occurred by the ripping away of the penstock pipe across Jurikhet river and the virtual washing away of the KLII headworks at Mandu. In a work that has received unanimous acclamation, the entire repair works were completed within a period of four months against initial estimates which ranged from eight months to a full year. We have expressed our appreciation for the efforts made by rewarding deserving personnel from NEA, the Consultant's team and the Contractor's crew, albeit modestly.

Focus was also given towards strengthening the administrative machinery with the bringing into effect the Employees Service Rules and Regulations (2050) and, later in the year, the introduction of the restructured NEA organisation with two Deputy Managing Director overseeing the sectors of Operations and Development respectively. The supporting functions of Administration and Finance were also upgraded to the level of Directorates. After approval of the revised organisation, we made a rapid series of corporate promotions commencing from the top level positions. We will continue the staff promotions over the current financial year to cover all staff levels. I firmly believe that the promotions will provide the motivation to deserving candidates for boosting production and productivity.

During the year 1993/94, we witnessed our financial position strengthen considerably. We now have the resources to make modest but critical investments without going to the Government or Donor Agencies. In future, NEA is expected to gradually increase its share of self-financing in the investment programme. We were able to pay off all dues to the Government arising from subsidiary loan agreements (SLA). Our revenue collection has improved over the year and it is now at three months of billing. Even with all interests paid, we produced profits - a relief after a period in the financial doldrums. With the improvement in our resources, we are optimistic of financing, to some extent, small generation projects such as the Puwa Khola and the Modi Khola. We will also promote with the private sector other such feasible projects like Upper Modi and Chilime HEPS.

Although the past year saw no appreciable addition to the system generation capacity, we analyzed our system to optimise on the available run-of-river (ROR) projects, the thermals and the storage plant at Kulekhani and obtained a creditable result with minimum resort to contingency plans and loading shedding.

We also took a fresh initiative to improve our services to the consumers and went closer to areas of consumer concentration with the opening of several new collection and no-light offices. To provide swifter service to consumers wanting to pay their electricity bills, the cash collection counters at some centres within Kathmandu opened for business from eight o'clock in the morning during rush days. Along with our services we continued to solicit the consumers cooperation to conserve energy.

NEA also undertook a number of steps to reduce system losses through the strengthening of distribution systems, installation of new meters and miniature circuit breakers (MCB) and also deputing inspection squads to detect pilferage. This has resulted in good dividends and we were able to reduce losses and bring it down to the current level of 23.96 percent.

On the more disturbing side, we were faced with a number of deaths by electrocution. These incidents have pointed to the need to adhere to adequate safety standards in our erection and maintenance works. We have since taken steps to channel funds to systematically eliminate deficiencies from our installation. We have also decided to observe the financial year 1994/95 as the Year of Safety. We wish to get across a clear message within NEA : we cannot compromise with safety, and we have to do everything within our means to provide safe and reliable electricity.

We remained the country's most capital intensive institution and our requirement for external financing continued. The interest shown by the international donor community in power development is appreciated. The detailed engineering for the Kali Gandaki 'A' will be completed by October 1994 and the negotiations with the World Bank on Arun III, which remains our candidate project to tide us through our energy problems by the early years of the twenty-first century was completed in July. The construction of Arun III is expected to commence in January 1995, and if financing is available, Kali Gandaki 'A' will take off in January 1996.

#### ▲ Performance

In the following paragraphs I wish to present a summary of NEA's performance figures for the financial year 1993/94. I believe the other sections of this Review will give greater depth of information on NEA's activities :

#### ■ Generated and Purchased Energy

The extensive monsoon rains of the last year resulted in high water level in the Kulekhani reservoir leading to good energy generating capability of Kulekhani Hydro Power Stations. This has reduced load shedding measures and is now limited to two hours, twice a week. The electric energy production capability of other hydroelectric power plants was also generally good.

The electrical energy available for use within Nepal totalled 1034.163 GWh which was an increase of 70.849 GWh (7.35 percent) from the previous year's figure of 963.314 GWh. This comprised of 835.511 GWh (81.20 percent) obtained from NEA hydro generation and 62.203 GWh (6.01 percent) obtained from NEA thermal generation. A total of 132.250 GWh was purchased from other utilities comprising of 101.520 GWh (9.82 percent) purchased from electrical utilities in India and 30.730 GWh (2.97 percent) from Butwal Power Company in the Nepalese private sector.

The system peak of the interconnected system was recorded at 231 MW which is greater than that of the previous year by 16.96 MW implying a significant increase of 7.92 percent made possible by thermal generators being pressed into service and additional power imported from India.

#### ■ Electricity Sales

Electricity sales which totalled 765.875 GWh was an increase of about 56.49 GWh (7.96 percent) over last year's sales. Internal sales within Nepal increased to 694.754 GWh and accounted for 90.71 percent of the total sales and registered an increase of 31.51 GWh (4.75 percent) over the last year's figures. Exports to India, also increased to 71.121 GWh, which is 24.98 GWh (54.14 percent) higher than that of the previous year.

#### ■ Consumers

Over the past financial year, the number of new consumers grew by 35,350 or 9.04 percent, over last year, to reach a total of 426,350. Domestic consumer formed 95.15 percent of consumers and accounted for 39.61 of internal sales

with 38.58 percent of internal revenue. The industrial consumers formed only 2.53 percent of the total number but consumed 41.94 percent of internal sales and accounted for 38.13 percent of internal revenue. The commercial consumers formed 0.57 percent of the total number but consumed 6.86 percent of internal sales and accounted for 10.30 percent of internal revenue.

### ■ Financial Performance

NEA's total revenue of NRs 2,273.317 million incorporated an increase of about NRs 479.298 million, or 26.72 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 2050 (March 14, 1994).

NEA's operating expenses, including depreciation on revalued assets, was estimated to be NRs 2,197.562 million and the operating surplus for the year 1993/94 showed a profit of about NRs 211.417 million.

The interest on long-term loans amounted to NRs 671.881 million and transfer from revaluation surplus was NRs 827.140 million. The resulting net profit is estimated to be NRs 366.676 million.

### ▲ Development Activities and Prospects :

A very important event of the past year was the negotiations held at the World Bank, Washington, for the financing of the 201 MW Arun III HEP. Submission to the World Bank Board for the project financing is scheduled now for September/October, 1994. Tenders for the construction of the access road and civil works of Lot C1/C3 of Arun III HEP have since been approved and negotiations completed with the approved contractor.

The detailed engineering design of the 140 MW Kali Gandaki 'A' HEP is nearing completion and prospects of financing for the project continued to be encouraging both from the donor community as well as the private entrepreneurs.

The past year saw the continuation of development works to extend NEA's infrastructure to meet forecasted growth. Some of these projects aim to reinforce or rehabilitate existing facilities to obtain enhanced performance. For instance, the Trisuli-Devighat Upgradation Project aims to improve the energy generation of the plants by 95 GWh and the Kathmandu High Voltage Reinforcement Project plans to improve the 66 kV and 132 kV grid within the Kathmandu valley to obtain better regulation and distribution system handling capabilities. Similarly, the Duhabi-Bhantabari 132 kV transmission line project will make it possible for the import or export of additional power. Similar works to enhance generation are also planned for plants at Gandak, Devighat, Tinau and the Multifuel plant at Duhabi.

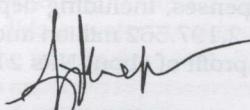
Transmission and distribution line projects such as the Seventh Power Project, the Dumre-Besisahar and Tulsipur-Salyan 33 kV Transmission Lines and the Atariya-Dipayal 66 kV transmission line projects continued to be implemented. The first phase of the Kathmandu Valley power System Reinforcement Project was completed. Several small hydro projects continued construction and the Computerised Billing Project with its capability to boost consumer services, streamline revenue accounting and provide a large percent of the MIS at the corporate level finally got implemented.

Continuing the feasibility studies of viable hydropower projects within the country, studies were conducted for the Upper Modi Khola, Middle Marsyangdi and the Chilime Khola HEPs. I am confident that these projects will also find financing for early design and implementation along the lines of the Upper Bhote Koshi, Modi Khola and Khimti HEPs.

▲ Acknowledgement

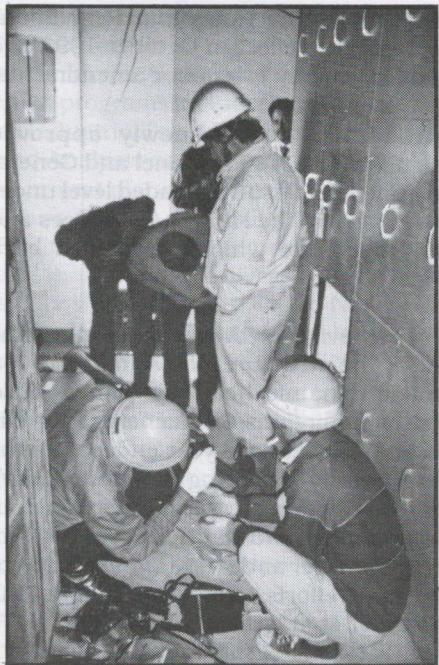
I wish to express my appreciation for the perseverance and diligence shown by my colleagues at all levels of NEA. They have made it possible to qualify fiscal year, 1993/94, as the year of optimism and success. My special thanks to those engaged in the rehabilitation works at Kulekhani for their selfless and untiring efforts to put back the Kulekhani generation in - line in a record time.

I also wish to thank the Chairman and Members of the Board of Directors for steering NEA skilfully towards achieving success. Finally, I wish to thank His Majesty's Government for its continued help in the running of this institution and also the members of the Donor Community for providing generous support to develop the power sector in Nepal.



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

# Introduction



Nepal Electricity Authority (NEA) was created in 1985 under the NEA Act 2041 as an entirely HMG-owned undertaking in the power sector. The Act delegated NEA with the responsibility to undertake all planning, construction, operation and maintenance of all electrical services such as generation, transmission and distribution throughout the country. Performance along these lines over the years, complemented by NEA's burly 7000-strong staff strength, created the image of NEA being the the largest and a very important corporate institution in the country- a factor much in favour of NEA.

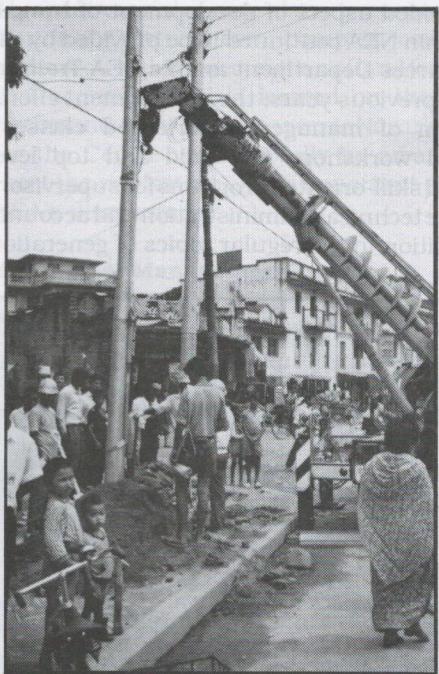
The latter part of the nine years saw the advent of HMC's policy to encourage private sector participation in the power sector. To allow NEA to orient itself to the changing scenario, the NEA Act was amended by involving greater participation of the private sector in the NEA Board and introducing provisions to allow NEA to function with greater autonomy.

On August 17, 1994, NEA completes its ninth year of operations and enters into the tenth, and the last before reaching its first decade. Over this time span, NEA has matured considerably in its operational strategy and understanding that it is required to perform its functions with technical and managerial efficiency and provide returns on the investment made by the Government for NEA's capital operations. Self-sustainability, efficiency, autonomy, commercialisation and transparency in management have thus become phrases that underscore the intense soul-searching that NEA has resorted to during the last year.

The financial year 1993/94 has been a very memorable and successful year for NEA. It has met engineering challenges posed by even the worst natural catastrophe and succeeded with flying colours. In a period of generation deficiency, it has minutely analyzed its generation capabilities, capacities and consumer characteristics to provide services with minimum disruptions to the consumer. Positive steps have also been taken to improve consumer services and create a more favourable corporate image.

The year also saw NEA emerge stronger in corporate strength with a new organisation structure that renewed staff motivation with prospects of promotions. The past year also saw financial performance of NEA emerge with a profit after a number of years of operations in the red.

In the following pages of this Review, attempts are made to provide an insight of the important corporate events that patterned the past financial year. This is followed by brief description of projects and studies NEA has in hand and the outputs that they will have in NEA's operations. Graphical and pictorial exhibits of NEA's performance have been appended to give a ready reckoning of the year's achievements.



## Sectoral Review

### ▲ Planning

The correct approach NEA must make to adjust itself to the changing demands of market forces has been the subject of critical deliberation within the Planning Directorate. Major determining factors that have been identified are NEA's relations with the Government, the extent of autonomy required for its smooth operations and the degree of commercialisation NEA must operate with to interact competitively with its consumers and with other power companies that are gradually mushrooming in the private sector. For an institution steadily gaining efficiency, it has also been considered timely to inject into the system the correct management techniques to channel operations and procedures along accepted modes.

During the past year, the Planning Directorate steered the institution towards a well structured corporate strategy and organisation. To achieve its ends, it used the expertise available inside NEA and also commissioned indigenous think-tanks such as the Nepal Administrative Staff College (NASC). Outputs achieved included the NEA Corporate Plan for a three year period and the structure of NEA's upper level organisation along with the manpower requirements. Studies continue to the lower level structures and assessment of staff numbers. Preparation the job descriptions of posts suitable for their place in the organisation also comprises an important work ahead in corporate planning. Job descriptions will assist in the effective evaluation of an employee in terms of the job assigned to him.

The Directorate also undertook the required groundwork for the introduction of the new electricity tariff rates that went into effect from mid-March 1994. The tariff structure brings the electricity prices closer to the studied marginal cost of electrical energy and power in the country and will help NEA emerge profitable after an interval in financial doldrums.

### ▲ Personnel Administration.

The Administration Department was much in the focus of interest the past year with the major effort being taken to introduce the Employee's Service Rules and Regulations as provisioned under Art. 35

of the NEA Act (2041). The Rules and Regulations (2050) initially came into effect in October 1993 and have since been followed by two minor amendments.

After the introduction of the newly approved organisation structure, NEA's Personnel and General Administration functioned at an upgraded level under the broader framework of the Human Resources and Administration Directorate which is headed by a Director-in-Chief (DIC).

After approval of the revised NEA organisation and the posts required for the structure, the Administration Department made dynamic headway with a rapid series of corporate promotions commencing from the top level positions. The financial year ended with the promotion of two Deputy Managing Directors (DMD), seven DICs and twenty Directors with work well in hand for early promotions to the mid-level posts of Manager, Deputy Manager and Assistant Manager, or equivalent. The same efforts in staff promotions will continue to the lower staff levels.

### ▲ Human Resources Development

The much needed aspect of development of human resources within NEA continued to be provided by the Human Resources Department and its NEA Training Centre. As in previous years, the development efforts took the form of management-oriented classes/seminars and workshops for mid and top level managers, and skill-oriented programs for supervisory level staff in the technical, administration and accounts sector. In addition to the regular topics of generation



and distribution, consumer connection, meter reading, loss elimination, and computers, training efforts the past year included novel areas such as administration and financial management, audit, protection systems and maintenance of transformers and Bradma cash register machines.

In addition, specialised subjects of topical interest were addressed through seminars and talk programs in affiliation with the Tribhuban University (TU), the Nepal Administrative Staff College (NASC), Kathmandu University and institutions in India. Such programs included very interesting workshops on Industrial Trade Relations, Financial Management and Analysis and Critical Path/ PERT methodology in project planning. Similarly, a lecture program on Power System Reliability was conducted for NEA Engineers in association with Tribhuban University and the Canadian University. A very timely in-house symposium on Safety within NEA was organised at Panauti and was attended by most senior level officers of NEA.

Apart from initiations within the country, the Human Resources Department also continued to encourage NEA's participation in seminars and workshops held on a regional or international level and nominate competent staff from within NEA for higher academic or professional study opportunities abroad.

A unit of the Training Centre at Panauti, housing the pedagogical equipment to simulate desired training aspects of hydro generation, transmission and distribution was commissioned on June 10, 1994. The past year also saw plans to construct the NEA Training Centre's own complex come closer to realisation with the acquisition of land for the complex. The acquired land is located on the outskirts of Kathmandu, on the way to scenic Nagarkot. Financing for the Centre will hopefully be arranged soon to meet the realisation of this important component to NEA's development.

#### ▲ Material Management

Material management, comprising of the processes of procurement, stores and inventory management has received due recognition with the establishment of a Materials Management Department in NEA's new organisational structure. The new Department will hopefully improve the process of procurement by introducing standardisation of equipment and help in the limiting costs through quantity concessions obtained with bulk purchases. Other expectations are effective inventory control in stores throughout NEA, streamlining of essential supplies to all NEA outlets and the timely disposal from NEA stores of obsolete and unserviceable items which have

unrealistically increased NEA's asset value in its books of accounts.

#### ▲ Public Relations

For an institution entering into the commercial world, public relations are of prime importance for effective communication within and without and for the creation of a proper corporate image amongst the sector related authorities and consumers amongst whom it must work.

Public Relation activities within NEA received additional support the past year with the active participation from the Managing Director's Secretariat. Apart from creating a focal point where the press and the general public can expect to obtain NEA's viewpoints on topical events, internal communications were also bolstered with the revival of the monthly NEA News Bulletin in the Nepali language. Another effort initiated the past year was the preparation of a video documentary on NEA's activities in affiliation with Nepal Television (NTV).

#### ▲ Finance

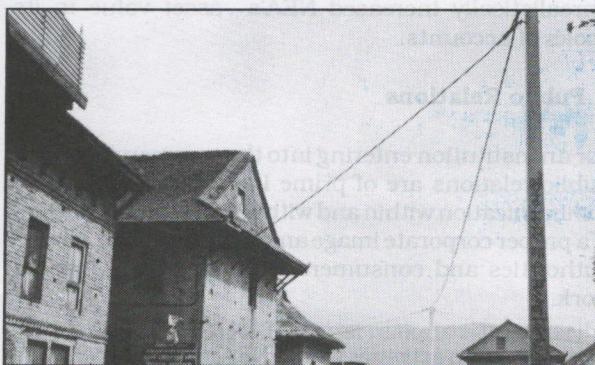
As with the Administration Department, NEA's new structure saw the upgrading of the Financial functions to the level of a Directorate. The restructuring has also seen the creation of a Central Account Department.

Over the past year, the Finance Department made considerable headway in the realisation of effective financial management. Noteworthy events included the completion of the special audit for the financial year 1992/93 and initiation of audit for the year 1993/94. The Finance Department has also progressed with the undertaking of several institutional studies including the documentation of an accounting manual and the formulation of a Master Plan for accounts management within NEA.

A notable event for the past year in the area of finance was the payment of all interests owing to His Majesty's Government arising from subsidiary loans to NEA. The amount of debt so cleared amounted to NRs 1,004.642 million. Also of considerable importance in financial management was the concerted effort to achieve reconciliation of consumer accounts which had been a glaring weakness for some years in the past. Such a reconciliation will also greatly assist computerisation of consumer accounts in the near future.

#### ▲ Distribution and Consumer Services.

In NEA's corporate restructuring, the DCS Directorate, headed by a Director-in-Chief (DIC), falls under the



direction of the Deputy Managing Director (Operations). Extending the Directorate's functions over the country are six Regional Offices with jurisdiction as shown in the table below.

Regional Office	Office Location	Jurisdiction
Eastern Regional Office	Biratnagar	Jhapa, Morang, Sunsari, Dhankuta, Siraha, Udayapur
Central Regional Office	Janakpur	Dhanusa, Mahottari, Sindhuli, Sarlahi, Rautahat, Bara, Parsa, Makwanpur, Chitwan
Bagamati (West) Regional Office	Kathmandu	Kathmandu, Rasuwa, Nuwakot, Dhading
Bagamati (East) Regional Office	Lalitpur	Kavrepalanchok, Bhaktapur, Lalitpur, Ramechhap, Dolakha, Sindhupalchowk
Western Regional Office	Butwal	Nawalparasi, Rupandehi, Kapilbastu, Palpa, Gulmi, Arghakhanchi, Syangja, Kaski, Tanahu, Gorkha
Far West Regional Office	Nepalgunj	Dang, Banke, Bardiya, Surkhet, Kailali, Kanchanpur

During the past year, DCS initiated the policy to split the functions of a branch once the consumer number served exceeds 25,000. To provide more effective and convenient services to its consumer, DCS also went closer to areas of consumer concentration with the opening of several new offices. Examples within Kathmandu valley include collection centres opened at Naxal, Chabahil, Budanilkantha and Luvu. To provide swifter service to consumers wanting to pay their electricity bills, the cash collection counters at some centres within Kathmandu opened for business from eight o'clock in the morning during rush days.

In the near future, DCS intends to adopt a one-window system to cater to consumer enquiries and provide prompt consumer services without unwarranted follow-up by the consumer.

DCS initiated attempts to rationalise its meter reading services by introducing tri-monthly meter reading in rural areas where consumption is relatively low and the sales do not justify the work load of meter reading on a monthly basis. Action was also initiated to consolidate its existing metering systems by organising work teams to check LT/HT meters and multiplying factor of the meters installed in larger consumer premises in Kathmandu. This exercise was very effective in assuring the consumer that he will be billed in accordance with his consumption.

Identified as the sector with the potential to be the "major profit centre in a commercialised NEA, the DCS Directorate also maintained its priority to provide more efficient services by computerising its billing and revenue accounting system. Such a computerisation will make available useful management reports and control procedures for use within DCS and generate almost half the data required for a corporate-wide MIS system.

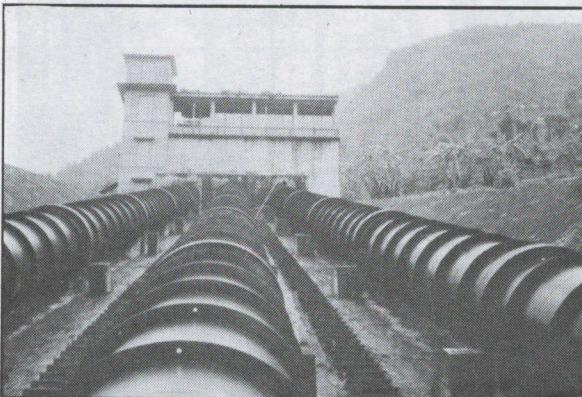
During the past year, DCS also maintained its continued efforts to reduce line losses, both technical and those involving pilferage. Activities were continued to install aerial bundled cables (ABC) cables, rehabilitate and seal meters and provide meters in sub-stations as measures to curb losses. The past year also saw commencement of meter testing in the newly equipped laboratory at Swayambhu, Kathmandu. To aid in its efforts, the NEA Board approved the Electricity Loss Control Rules and Regulations (2050). These will provide guidelines for actions to be taken and norms to be followed in cases of electricity theft.

On the darker side, the DCS Directorate was the focus of public resentment in a number of distressing accidents that lead to death by electrocution, thereby accentuating the need to adhere to adequate safety standards in erection and maintenance works. The accidents were identified as resulting essentially from sub-standard or over-loaded installations that have reached their vulnerable state from inadequacy of funds for rehabilitation. Steps have since been taken to channel funds to gradually eliminate such deficiencies from NEA installations. Aspects of safety were addressed during a seminar organised by the Human Resources Department at Panauti. To demonstrate NEA's concern, it was decided to observe the financial year 1994/95 as the Year of Safety. To commemorate the spirit of Safety, DCS Directorate plans to organise an important seminar in the early part of the coming financial year.

In terms of statistics, over the past financial year, the number of new consumers grew by 35,350 or 9.04 percent, over last year, to reach a total of 4,26,350. Domestic consumers represented 95.15 percent of NEA consumers and accounted for 39.61 percent of internal sales with 38.58 percent of internal revenue. The industrial consumers formed only 2.53 percent of the total number but consumed 41.94 percent of internal sales and accounted for 38.13 percent of internal revenue. Commercial and non-commercial categories constituted 2.01 percent of the consumers.

#### ▲ Generation

With no appreciable addition to the system generation capacity over the past year, system control can be credited with doing a creditable job making the best of the available generation options- the run-of-river (ROR) projects, the thermals and the storage plant at Kulekhani to provide optimised supply with the minimum resort to contingency plans and load shedding.



A number of projects to obtain energy and capacity additions from existing plants proceeded as planned. Under the World Bank financed Power Sector Efficiency Project (PSEP), construction works progressed at Trisuli Devighat HEP to obtain an additional 95.3 GWh by redesign of civil structures. Because of limited contribution from the Project, additional finance is being sought to undertake a greater overhaul of the electro-mechanical equipment at the Devighat Plant. Plans were also made to boost energy production of the Gandak Plant from its present figure of 35 MWh to 107 MWh by replacing aging electro-mechanical components. With financial assistance from the British Government, works also progressed to rejuvenate the Ruston and English Electric diesel plants at Hetauda to achieve a generation of 90 percent of its rated capacity from the 33 percent generated.

With no appreciable hydro-generation additions

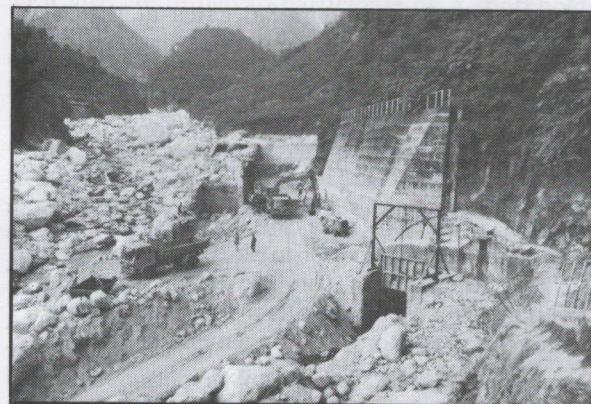
expected in the near future, NEA made plans to take advantage of the short gestation period of thermal plants as the short-term measure to meet the rising system peak. Proposals were invited from private entrepreneurs for the establishment of thermal plants in Nepal under various financing and management options. Proposals will be opened for evaluation early next year.

Efforts were also made to rectify all faults seen in the operation of the 26 MW multifuel unit at Duhabi and increase its capacity by a further 13 MW, financing for the works being expected from FINNIDA, and the Nordic Development Fund.

Electrical energy available for use within Nepal totalled 1034.163 GWh which was an increase of 70.849 GWh (7.35 percent) from the previous year's figure of 963.314 GWh. This comprised of 835.511 GWh (81.20 percent) obtained from NEA hydro generation and 62.203 GWh (6.01 percent) obtained from NEA thermal generation. A total of 132.250 GWh was purchased from other utilities comprising of 101.520 GWh (9.82 percent) purchased from electrical utilities in India and 30.730 GWh (2.97 percent) from Butwal Power Company in the Nepalese private sector.

#### ▲ Operations and Maintenance

The most memorable achievement of the past year in the O & M and Construction sectors is no doubt the rehabilitation works at Kulekhani I and II. Serious damage to the plants resulted from unprecedented flash-floods after a cloudburst during the mid-July monsoon rains of 1993, the most dramatic incidents being the ripping away of a 100 meter section of the KLI penstock pipe over Jurikhet Khola and the destruction of the KLII headworks at Mandu. The catastrophe resulted in the loss of almost half of NEA's generation capacity and was tantamount to a national crisis. In a very successful project, which has been widely acclaimed, the entire rehabilitation work was completed within a record period of four months and a few days ahead of schedule.





As a step towards preventive maintenance, the O&M Directorate intends to undertake a complete overhaul of electro-mechanical equipment in Kulekhani I and II, an agreement having been signed on October 15, 1993 between HMG and JICA within a program called Special Assistance for Project Sustainability (SAPS). The overhauling works, scheduled so as not to effect the supply and demand situation, commenced in June 1994 and will be completed by September 15, 1994.

The O&M directorate also undertook a notable capacity enhancement work at Bharatpur 132/11 KV sub-station using entirely in-house expertise. The capacity enhancement was effected by repairing unused single phase 10 MVA, 132/66 KV transformers from Hetauda and redundant 6MVA, 66/11KV transformers from Patan and installing these at the Bharatpur substation to obtain a 132/66/11 KV voltage transformation. The reinforced sub station was charged on June 7, 1994 and went into successful operation soon after.

A similar achievement credited entirely to NEA's expertise was the overhaul of a 23 MW turbine generator (Machine No. 2) at Marsyangdi HEP the works being completed within a record 40 days. The overhauling of the machine augmented by the cleaning of the bed level of the tailrace and repair works to the sluice and radial gates at the weir resulted in the record post-commissioning generation of 1737.7 MWh from the plant on May 29, 1994. Yet another assignment completed was the repairs to civil structures at Sunkoshi HEP that stopped water seepage and improved the plant generation capacity.

The past year also saw the organisation of a Symposium on Optimisation in Electricity Generation and Transmission in the Present Context at Kulekhani which ended with a number of topical recommendations to the management.

### ▲ Rural Electrification

During the past year, the newly created Rural Electrification Directorate consolidated its functions that incorporates areas where NEA is required to play a more service oriented role to serve the economically less privileged rural populace-resorting to subsidy financing from HMG under specific conditions.



A welcome step towards involving private entrepreneurs as attempted by the Small Hydro Power Department (SHPD), consisted of leasing out the operation of five small hydropower projects (SHPR) at Jomosom (240 KW), Khandbari (250 KW), Darchula (300 KW), Bhojpur (250 KW), and Bajhang (200 KW) to private operators, thereby alleviating the maintenance obligations NEA had continued to bear, without returns, on the operation and maintenance of these plants. The leased SHP were reported to be operating well and generating financial profits for the entrepreneurs. A few more years of observation will, however, be necessary to qualify the success of the arrangement.

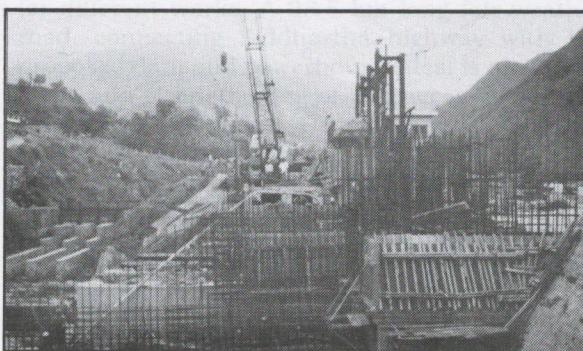
In the same spirit, the management of the 600 KW SHPP constructed at Thame, Syangboche, with grant assistance from the Austrian Government has been entrusted a consumer owned company called OKO Himal, setup with NEA holding 15 percent of the

equity shares and a membership in the Board of Directors. Yet another local consumer ownership company is being formed to manage the electrical distribution and consumer services at Besishahar, Lamjung, after electrification becomes possible with the construction of the 30 KM Dumre-Besishahar 33 KV transmission line.

The past year also saw the continuation of reconnaissance and feasibility studies in the preparation of a Master Plan of SHPPs in the country and the laying of the foundation stone for the 160 KW Dolpa SHPP by the State Minister, Mr. L.P. Ghimire, on June 7, 1993

### ▲ Engineering

Contrary to the comment that in the past the Engineering Directorate was virtually the dumping ground for engineering expertise in NEA, recent enhancements in management techniques and introduction of work-related incentives have proved that the in-house expertise available in the Directorate is in fact, a veritable 'profit centre' within NEA.



This rich engineering expertise has been the prime reason for solicitation from promoters, Power Development (Nepal) of the Modi Khola HEP, that NEA accept the role of a lead technical partner in their undertaking of the private venture.

In fact, expertise and facilities available in the Directorate's Soil, Stone and Concrete Laboratory has commenced to earn handsome dividends for NEA. During the past year, clear management rules and regulations were drawn up and approved by the NEA Board for the autonomous operation of the Laboratory under an Executive Committee chaired by the Managing Director of NEA. The rules stipulate a revolving fund of Rs30,00,000 to cover its operating funds. Earnings in excess of the amount would be handed over to NEA. The Laboratory is seen as a pioneering effort from NEA to branch out into providing Consulting services.

Noteworthy assignments undertaken by the Engineering Directorate using entirely in-house expertise include the completion of the exemplary feasibility study of the Upper Bhote Kosi HEP (36 MW) which has found ready acceptance for development by private entrepreneurs in the USA. Other feasibility studies of hydro power projects currently being undertaken are the Middle Marsyangdi (42MW), Upper Modi Khola (14 MW) and Chilime (17 MW). The Directorate intends to follow up the feasibility study of the 6.2 MW Puwa Khola HEP, undertaken with Japanese expertise, with an in-house venture of the detailed design and subsequently, the entire implementation.

### ▲ Other Power Companies

The past year saw power companies gradually shaping up in the private sector, signalling NEA of the assertive strategy it must adopt to co-exist with these ventures. An energy 'buy-back' agreement, the first significant one of its kind, was reached with Butwal Power Company (BPC) to become effective after the completion of the 60 MW Khimti HEP, which BPC is promoting. Smaller hydropower projects, such as the 36MW Bhote Koshi, also continued to create interest for development by private entrepreneur, HIPCO in association with HAZRA of the USA. The 14 MW Modi Khola HEP is another venture in the pipeline that should pull off once the problem with equity shares is solved by promoter, Power Development (Nepal).

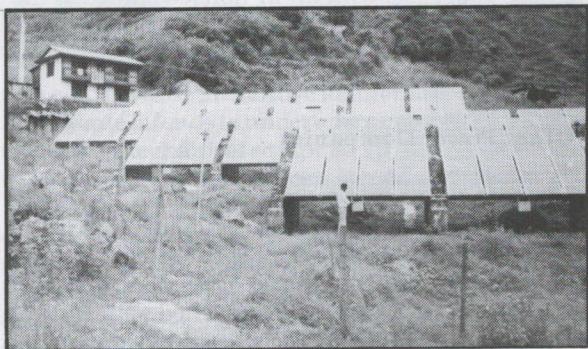
A very significant step in foreign investment in the power sector came towards the end of the financial year with the Snowy Mountain Engineering Corporation (SMEC) of Australia entering into agreement with HMG for the detailed design and development of the 360 MW West Seti storage hydroplant. It will be recalled that NEA had undertaken the feasibility study of the project using financial and technical expertise from France.

NEA also continued to participate as a shareholder and member of the Board of Directors in the Salleri Chalsala Electricity Company (SCECO) which increased its generating capacity by a further 200 KW. NEA will assume a similar role as shareholder (15 percent equity) and a Member Board of Directors member in a company called OKO Himal that will run the 600 KW small hydro power project at Thame, the project being constructed by NEA with grant assistance from the Austrian Government. NEA also continued to purchase power and energy from BPC through their 5.1 MW Andhi Khola Hydroelectric Project (AHREP); and NEA will need to prepare for another purchase agreement with the coming on-line of the 12 MW Jhimruk HEP early next financial year.

### ▲ Power Exchange with India

Power exchange at several points along the Nepal-India border continued under cordial terms with the Bihar and Uttar Pradesh State Electricity Boards (BSEB and UPSEB) under a governmental agreement that allows for an exchange of up to 50 MW of power between the two countries.

The intra governmental Power Exchange Committee met in Kathmandu last year to deliberate on topics



of mutual interest. The talks also sought to expedite the construction of about three kilometres of 132 kV transmission line within Indian territory that would interconnect 132 kV facilities at Duhabi in Nepal and Katalya in India and allow greater magnitude of power exchange.

### ▲ The Donors

NEA remained the country's most capital intensive institution and saw the continued requirement to depend on external financing made available through subsidiary loan agreements (SLAs) with HMG. Among the multi-lateral financiers, the World Bank, the Asian Development Bank, the OECF and the KfW were the principal donors offering soft loans, while the Governments of France and Austria, ODA, FINNIDA, DANIDA, JICA, KOICA, Nordic Development Fund were principal among the bilateral donors offering assistance in the form of grants and soft loans. In general, the interest shown by the international donor community was very encouraging. The areas of interest are summarised below :

DONOR	AREAS OF INTEREST
The World Bank	Arun III, PESP
Asian Development Bank	Kali Gandaki A, Arun III, Power Projects VII, VI And V (Computerised Billing)
KfW, Germany	Arun III
OECF, Japan	Kulekhani Disaster Prevention, Kulekhani Rehabilitation, Arun III
FINNIDA, Finland	Multifuel, Expansion of Multifuel, Arun III
BITS, Sweden	Hetauda-Kusaha 132 kV TL; Training, Arun III
DANIDA, Denmark	Wind Power Development
NORDIC Dev. Fund	Dumre-Besisahar 33 kV TL, Expansion of Multifuel
ODA, UK	Hetauda Thermals
JICA, Japan	Kathmandu Distribution Reinforcement, SAPS, Puwa Khola SHPP feasibility study
KOICA, South Korea	Modi Khola detailed design
Govt of France	Arun III transmission line
Govt. of Austria	Thame Small Hydro Project and Management

## Project Highlights

### Kaligandaki "A" Hydroelectric Project

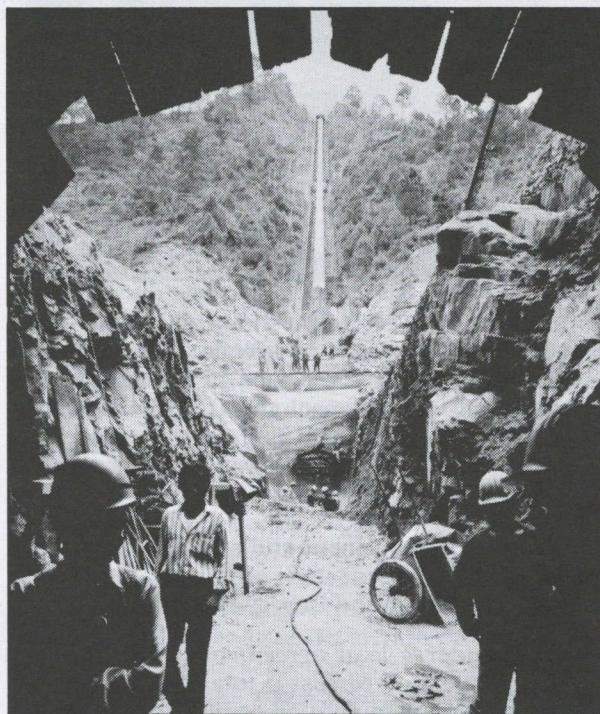
The 140 MW Kaligandaki "A" HEP is a run-of-river scheme located on the Kali Gandaki River in the Western Development Region. Estimated to cost a total of US\$ 316 million, the project will provide the power system annually with an additional average energy of 840 GWh. The power generated will be evacuated to the central grid through 132 kV transmission lines to Pokhara and Butwal.

Detail Engineering Design and preparation of tender documents for the project is nearing its completion and civil contractors have been invited to prequalify for different works. A 28.5 km long fair weather road, connecting Siddhartha highway with the proposed dam and powerhouse sites, is already in place and strengthening of this access road is in progress. The Asian Development Bank has reiterated its commitment to provide US\$ 125 million for implementation of this project. ABB Generation and Kvaerner, manufacturers of electro-mechanical equipment, recently expressed their support and offered assistance to arrange additional funding from Nordic countries. The project is expected to be in service by the end of 1999.

Being a run-of-river scheme the environmental impacts of the project will be minimal and manageable. Considerable efforts have been given to incorporate various measures to minimize these impacts in the planning and design stage itself.

### Kulekhani I & II Rehabilitation Project

Electro-mechanical components of the Kulekhani I and Kulekhani II Power Stations are being completely overhauled under a grant assistance of the Japanese Government through the Special Assistance for Project Sustainability (SAPS). Major overhauling of the electro-mechanical parts and components was initiated from June 10, 1994 and is scheduled for completion by September 15, 1994. The overall project shall be complete by the end of March 1995. Overhauling works are currently being implemented on one machine of each power station and have been so planned so as not to effect the supply to the



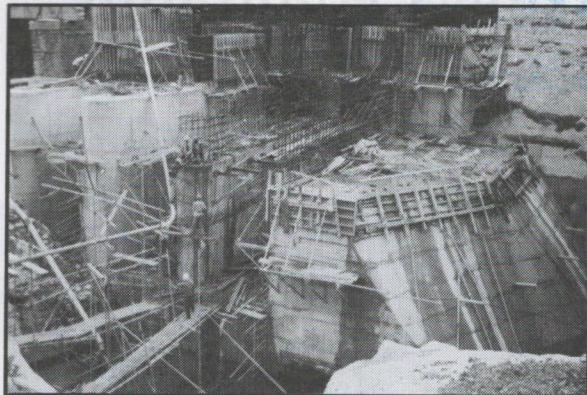
power system. The total cost of this project is estimated at Japanese Yen 748 million.

### Trishuli-Devighat Hydropower Upgrading Project

Implemented with the primary objective of increasing the dependable intake discharge from 31.15 to 45.6 cumecs to produce an additional 95.3 GWh of energy, considerable progress was achieved in the civil construction works of the Trishuli-Devighat Hydropower Upgrading Project. Both power stations were shut down for a period of about two months from April 4, 1994 to June 5, 1994 to facilitate major civil works at the barrage, water conducting system and the desilting basin by the contractor, Larsen and Toubro Ltd., of India. The power stations are scheduled for a second shutdown from September 15, 1994 for a period of about three months.

The year saw the completion of the access road at the balancing reservoir, the erection of additional gates

in the enhanced Head Regulator, the raising of the 92m long weir, removal of sediment from the forebay of the Devighat Power Station and the availability of all project support facilities.



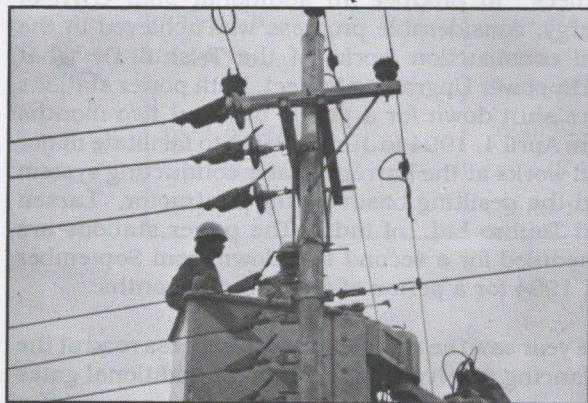
Contract for the electro-mechanical works was awarded to Multipower Hydroelectric Development Corporation of China. Except for the turbine parts, fabrication of electro-mechanical equipment is complete and some of them such as transformers, circuit breakers and switchgear cubicals have already arrived at the Trishuli site.

Construction management and supervision of the project is being carried out by Canadian International Water and Energy Consultant.

Financed under a loan agreement with IDA the project is estimated to cost a total of US\$ 30.74 million and is scheduled for completion by July 1995.

#### Kathmandu Valley Power System Reinforcement Project

With the objective of improving the transmission and distribution system in the Kathmandu valley a Master Plan and Feasibility Study was prepared by Japan International Cooperation Agency (JICA) in



1991. Based on this report the Government of Japan has been extending assistance for the reinforcement of the transmission and distribution system in the Kathmandu Valley in a phasewise manner. Consisting of two phases with each phase having two stages, the year saw the completion of Phase-I, Stage I works. Under this scheme some 11 kV and 0.4 kV lines and distribution transformers were added to the system. Double circuit 11 kV underground cables were also laid from Lainchaur substation to K2 switching station via the Royal Palace Substation.

Construction works under Phase-I, Stage-II will commence from September 1994 and is expected to be complete by March 1995. Under this Stage new 11kV panels shall be installed in three substations. Addition of some 11kV feeders, 0.4kV distribution lines and distribution transformers are also additional features of this stage.

The Basic Design Report of Phase-II is ready and Stage-I of this phase is to begin in the current year and is scheduled for completion by March 1996. In this stage apart from the addition of 11 kV feeders, 0.4 kV distribution lines and distribution transformers the Maharajgunj Switching Station will be completely renewed by installing 11 kV panels for the existing as well as well as proposed additional feeders. Similarly Baneswor substation will be equipped with four new 11 kV feeders.

#### Dolpa Small Hydropower Project

Undertaken with the financial assistance of HMG, construction of the Dolpa Small Hydropower Project was initiated by Minister of State for Water Resources, Mr. Laxman Prasad Ghimire in a foundation stone laying ceremony on June 7, 1994. This project, located near Dunai, the district headquarter of Dolpa District, will utilize the waters of the Jairi Khola through a 1.1 km headrace canal, a forebay and a penstock with a drop of 48m, to generate 160 kW of electricity, discharging it finally into the Bheri River. The proposed 30 km of transmission and 10 km of distribution lines will electrify Dunai, Shahartara, Tarakot and Juphal, directly benefitting about 4000 people. The possibility of the development of herbal processing and lift irrigation schemes is promising and the project is expected to have a strong impact in the development of agro-based industries. Estimated to cost a total of NRs 60.7 million the project is slated for completion by 1996/97.

#### Kalikot Small Hydropower Project

The year saw the initiation of the civil construction works of the Kalikot Small Hydropower Project which

is located in Mumra village Development committee of Kalikot District. Undertaken with the financial assistance of HMG, the project comprises of an intake structure on the Sanigad River, a 11.7km long headrace canal, a forebay, a penstock with a drop of 100m and a powerhouse having an installed capacity of 500 kW. It aims to electrify Manma, the district headquarter along with adjoining villages of Khadgachakra, Mehalmudi, Mumra, Rakhu, Regil, Sipkham and Fukot by 20 km transmission and 8 km distribution lines. Additional load centers such as Kotbana, Mumargaon, Ruma, Malgaon, Lalu and Nanikot requiring an extensive distribution network are currently under study. The project is estimated to cost a total of NRs 70.4 million and is scheduled for completion by 1996/97.



#### **Tatopani Small Hydropower Project (Phase II)**

The 1 MW Tatopani SHEP (Phase I) located at Gerap village of Myagdi District is serving more than 2600 consumers of Myagdi, Baglung and Parbat Districts through a 71 km, 33 kV transmission line since 1991. Construction works of the second phase of the project, to increase the installed capacity of the plant by an additional 1 MW, is in progress. Undertaken with a loan assistance of ADB the scheme also aims to interconnect and rehabilitate the 175 kW Baglung HEP, enhancing its capacity to 200 kW, interconnect the Jomsom HEP's isolated system to its network and supply the national grid through a 3 MVA, 33/11 kV substation at Pokhara. This Second Stage will add 124 km of 33 kV transmission lines, 5 km of 11 kV, 83 km of 0.4 kV distribution lines and install 51 distribution transformers to electrify about 51 villages enroute. Most of the concreting of the equipment foundations and procurement and delivery at site of equipment and material is complete. Estimated to cost a total of NRs 180 million the project is targeted for completion by 1994/95.



#### **Computerised Billing Project**

The Computerised Billing Project, undertaken with a US\$ 1.76 million loan assistance from the ADB, seeks to computerise the billing and accounting system in 28 different branches of NEA in a phasewise manner. Although delayed considerably during its initial stages, the progress of the project over the year was heartening. The entire cycle of procedures in selecting a consultant in accordance with ADB guidelines was finally completed and the Consulting Firm comprising of Tata Consulting Engineers, India, in association with EDF International, France, was awarded the contract for the consulting works.

The Consultants reviewed the project specifications developed by NEA and prepared bid documents for five short-listed suppliers of hardware and software for the Pilot Computerised Billing Project at Kathmandu West Division. The bids received have been evaluated and the award of contract is in its final shape.

The project is expected to have considerable impact on the effective management of revenue accounts, consumers billing and formation of reliable consumer and meter database.



#### **Arun-III Hydro Electric Project**

In connection with the project processing of the Arun-III HEP, the Joint Donors' Mission appraised the project in May/June 1993. The mission comprised of representatives of IDA, ADB, BITS (Sweden), KFW and Government of Finland with observers from GTZ and the Government of Japan. The donors reviewed the technical, procurement and environmental aspects of the project preparation and acknowledged that major progress had been made in these aspects of project preparation.

During ADB's General Board Meeting, held in France in the first week of May, 1994, a bilateral meeting was also held between the representatives of the French Government and the high level delegation of HMG/N. The French Government decided to provide US\$ 20 million for financing some portions of the transmission line package of the project. Representatives of the project also interacted with different International Non Governmental Organizations and the Bank members on various issues related to the project.

HMG/N and IDA have concluded negotiation for the construction of access road, dam, desanding basins, headrace tunnel and NEA camp, which IDA will finance jointly with ADB and the Government of Germany. ADB and KFW participated in the negotiations as observers.

Contract negotiations with the lowest evaluated contractor for the civil works, Cogefar Joint Venture, and negotiation with construction supervision consultant, JV Arun III are complete. Letter of intent for both parties await the effectiveness of financial loan/grant.



#### **Seventh Power Project**

Undertaken with the financial assistance of ADB, the Seventh Power Project basically comprises of rural electrification, rehabilitation and extension of existing

substation and construction of sub-transmission lines and distribution network in ten different district of Nepal. Estimated to cost US\$ 64 million the completion of this project will connect an estimated 83,500 new rural consumers to the NEA system. The main features of the project are

- rehabilitation and extension of sub-transmission and distribution networks in the towns of Hetauda, Birgunj, Butwal, Bhairahawa and Dharan and in load centers between Hetauda and Birgunj and between Butwal and Bhairahawa.
- rural electrification of Ilam / Damak, Dharan, Siraha, Malangawa / Gaur, Bharatpur / Parasi, Tamghas / Sandhikharka areas by the extension of sub-transmission and distribution networks.
- provision of facilities, equipment, plants and material including a pole manufacturing plant.

Almost all tenders under International Competitive bidding have been awarded and the pole manufacturing plant at Amlekhgunj is at the completion stage. Contractors for the construction of substations and 33 kV transmission lines have started preliminary works and initial consignments of distribution materials are being received.



#### Duhabi-Bhantabari 132 kV TL Project

Construction of this transmission line project was finally launched under the Power Sector Efficiency Project, after an IDA loan assistance was declared effective on January 15, 1993. It provides for improved power exchange facilities at the 132 kV level between Nepal and India in the eastern region. Construction contractors of the project is Indian Railway Construction Company Ltd. of India and consultancy services are being provided by Tata Consulting Engineers of India. The project involves the

- stringing of 27 km of 132 kV second circuit overhead line from Duhabi Substation to Kusaha on existing double circuit towers of the Dhalkebar-Duhabi line, positioned with only one circuit at present
- erection of 1.5 km of 132 kV double circuit line from tower no. 759 to Kusaha
- erection of 14 km of 132 kV single circuit overhead line from Kusaha to Bhantabari on the Nepal-India border. Construction of a 3 km stretch of line on the Indian side of the border shall be undertaken by the Government of India.

Stringing of the 27 km second circuit and soil investigation of tower foundations is complete. Estimated to cost a total of NRs 63 million the project is scheduled for completion by November 1995

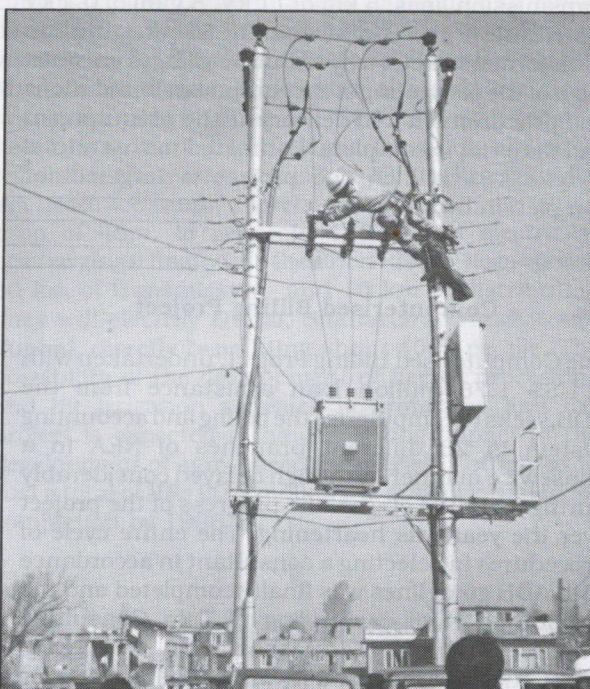


#### Kathmandu Valley Network Reinforcement Project

Financed under an IDA loan assistance declared effective on January 15 1993, this Kathmandu Valley Network Reinforcement Project is a component of the Power Sector Efficiency Project. It aims to improve the power system stability, increase the network capacity, improve technical and operational efficiency of the power system and provide support for interconnection facilities at 132 kV and 66 kV levels.

The project is divided into two major lots. Lot 1 involves the extension and reinforcement of nine existing substations located in or close to Kathmandu Valley, the extension and reinforcement of Duhabi substation in Eastern Nepal and construction of two new 66/11 kV substations in Kathmandu Valley. Construction contract for this portion was awarded to CWE of China. Lot 2 which was awarded to CNEEC of China, comprises of the construction of 15.24 km and 4km of 132 kV double circuit overhead lines in the suburban and urban areas of Kathmandu Valley respectively.

The year saw the completion of conceptual design works for new and existing substations, soil testing and preliminary civil works. The project is scheduled for completion by December 1995.



## Project Studies

### ▲ Middle Marsyangdi Hydroelectric Project

A reconnaissance study of Middle Marsyangdi hydroelectric schemes, carried out by NEA in early 1993, revealed that simple diversion and ponding of the Marsyangdi river could produce nearly 42 MW of power with a 62 m net head. As it was found to be suitable for peaking power during the lean season, the year saw the completion of a feasibility study of the Middle Marsyangdi HEP which is upstream of the existing Marsyangdi Hydropower Plant. Easy and short access to the project area from the Kathmandu-Pokhara highway and the Dumre-Besi Sahar seasonal road along with proximity to the national grid were additional plus points of this scheme.

The Middle Marsyangdi HEP is a run-of-river scheme located at Phaliya Sangu near the confluence of the Marsyangdi and Dordi rivers in Lamjung District of western Nepal. The Marsyangdi River is one of the tributaries of the Saptarishu and its catchment area is 2729 sq km at the



proposed intake site. The weir is proposed at 36 km from the town of Dumre on the Kathmandu-Pokhara highway and the powerhouse near the roadhead at the Marsyangdi-Dordi confluence 106 km from Kathmandu.

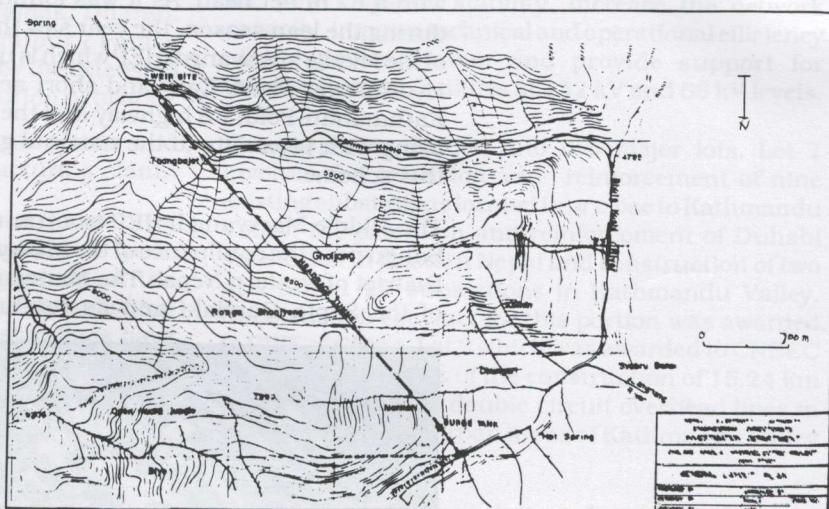
The proposed headworks consists of a 36 m long 46 m high gated dam, a 360 m long diversion tunnel and intake structure. The scheme also has three underground desanders, a 3.3 km headrace tunnel with a diameter of 5.7 m, a single 325 m long penstock and a powerhouse on the right bank of the Marsyangdi River. With an installed capacity of 42 MW at a design discharge of 78 cumecs, it is estimated to generate an average annual energy of 255 GWh. The power will be evacuated by a 45 km single circuit 132 kV transmission line to the existing switchyard of the

Marsyangdi Power Plant. The total cost of the project is estimated at US\$ 109 million at 1994 prices.

## ▲ Chilime Hydroelectric Project

The Chilime River, a tributary of the Bhote Kosi (Trishuli), originates from the eastern slopes of Salasungl Himal, a part of the Himalayan range in the southern region of the Tibetan highland.

According to a feasibility study conducted by NEA, this run-of-river scheme with a four hour peaking capacity will have a 10 m long 3.3 m high diversion weir along with twin surface desanders, a 3.5 km long headrace tunnel with a diameter of 2 m, a 460 m long penstock and an underground powerhouse. Having an installed capacity of 17 MW the



project will generate an estimated average annual energy of 98 GWh at a design discharge of 6 cumecs and net head of 346 m. Power will be evacuated by a 32 km 33 kV double circuit transmission line to Devighat on the national grid. The total cost of the project is estimated at US\$ 28 million at current prices.

## ▲ Upper Modi Khola Hydroelectric Project

The year saw the completion by NEA of a Feasibility Study Report of the Upper Modi Khola HEP. This scheme envisages to harness the hydropower potential of the Modi River, a tributary of the Kaligandaki, with a catchment area at the proposed intake site of 385 sq km. Easy accessibility, proximity to the NEA transmission grid along with a requirement of moderately sized structures are additional plus points of this scheme.

The Upper Modi HEP is located in Kaski District of Gandaki Zone about 8 km north of Nayapool at 36 km from Pokhara on the Pokhara-Baglung highway. It is basically a run-of-river scheme with a two hour daily peaking storage. The proposed headworks at Kimche Besi consists of a 30 m long 10 m high diversion weir and the powerhouse is located at Birenthanti near the confluence of Bhuringdi and Modi rivers. It will also have twin dufour type surface desanders, a 3.3 km headrace tunnel with a diameter of 3 m and 255 m long penstock. With an installed capacity of 14 MW at 17 cumecs design discharge, the estimated average annual energy is 87.3 GWh which will be evacuated by a 11 km 33 kV transmission line to the switchyard of the Modi Khola HEP, being implemented further downstream in the private sector. The total cost of the project is estimated at US\$ 30.27 million at current price levels.

## TARIFF RATES

( effective March 14, 1993 )

### CATEGORY A : DOMESTIC CONSUMERS

A.1 Minimum Monthly Charges:	Minimum Charge (NRs)	Exempt (KWh)
METER CAPACITY		
Upto 5 ampere	50	20
6-30 ampere	130	40
31-60 ampere	290	80
Three phase supply	770	200
A.2 Energy charge:		
Upto 20 units	Rs. 2.50 per unit	
21-250 units	Rs. 4.00 per unit	
Over 251 units	Rs. 6.20 per unit	

### CATEGORY B : TEMPLES

Energy charge	Rs. 2.80 per unit
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### CATEGORY C : INDUSTRIAL

Sub-category	Demand fee (Rs/kVA)	Energy charge (Rs./unit)
C.1 Low voltage (400/220 volt)		
Rural and cottage	16.00	3.30
Small industry	32.00	4.00
C.2 Medium voltage (11 & 22kV)	72.00	3.50
C.3 High voltage (> 66 kV)	64.00	2.80

### CATEGORY D : COMMERCIAL

D.1 Low voltage	88.00	4.70
D.2 Medium voltage	80.00	4.60

### CATEGORY E : NON-COMMERCIAL

E.1 Low voltage	56.00	4.70
E.2 Medium voltage	64.00	4.60

### CATEGORY F : IRRIGATION

F.1 Low voltage		
Upto 10 KVA	8.00	2.00
Above 10 KVA	12.00	2.20
F.2 Medium voltage	16.00	2.20

### CATEGORY G : WATER SUPPLY

G.1 Low voltage	48.00	2.20
G.2 Medium voltage	53.00	2.20

### CATEGORY H : TRANSPORTATION

H.1 Medium voltage	64.00	2.20
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### CATEGORY I : STREET LIGHTS

I.1 Street lights with meter		
I.2 Without meter	1000.00	2.80

### CATEGORY J : TEMPORARY SUPPLY

J.1 With meter	7.50	
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Note: If demand meter reads kilowatts (kW) : kVA = kW / 0.8

## Balance Sheet as of July 15

in million NRs

ASSETS	1993	1992	1991	1990	1989	1988	1987
<b>Fixed assets</b>							
Land	611.4	578.9	537.7	499.9	478.4	46.1	42.5
Buildings	601.3	573.7	601.3	573.7	534.9	451.7	433.7
Hydraulic Plant & Machinery	15,490.0	15,171.2	14,568.3	9,872.3	9,617.0	2,587.1	2,571.6
Internal Combustion P & M	752.0	175.6	178.1	177.6	185.5	52.0	51.3
Solar Power Plant	41.9	43.3	45.1	46.2	32.8	-	-
Transmission Line & S/S:							
On or above 33 KV Line	1,814.9	1,825.8	1,797.6	1,696.4	1,717.5	993.2	623.5
S/S on or above 33 KV	2,414.2	2,436.4	2,404.5	2,408.4	2,434.4	-	-
Below 33 KV Line	108.0	110.0	108.5	112.6	115.9	-	-
Distribution Line	1,121.8	2,136.3	2,034.3	1,366.6	536.1	409.3	384.2
Meter & Metering Equipment	59.7	56.2	50.4	40.6	30.9	22.2	17.6
Consumer Service	50.3	52.6	52.9	51.9	46.8	42.1	32.1
Public Lighting	15.0	15.5	15.9	16.3	15.4	14.8	1.7
Tools and Instrument	9.8	8.5	5.3	5.4	6.2	3.3	3.0
Vehicles	10.8	8.9	18.9	26.9	27.4	22.3	24.0
Furniture & Office Equipment	5.2	5.4	14.0	12.3	13.8	9.5	8.0
Miscellaneous	0.2	0.3	0.3	0.2	0.1	0.2	0.1
<b>Total Fixed Assets</b>	<b>24,126.2</b>	<b>23,184.6</b>	<b>22,366.7</b>	<b>16,785.3</b>	<b>15,691.9</b>	<b>4,371.8</b>	<b>3,896.5</b>
<b>Other Assets</b>							
Capital Works in Progress	6,250.1	3,816.4	2,890.0	1,498.4	778.7	723.2	51.8
Investment in Securities	79.0	30.4	8.1	8.1	4.1	4.2	2.7
<b>Total Other Assets</b>	<b>6,329.1</b>	<b>3,846.8</b>	<b>2,898.1</b>	<b>1506.5</b>	<b>782.8</b>	<b>727.4</b>	<b>54.5</b>
Deferred Expenditure	108.6	121.0	169.8	226.3	-	-	-
<b>Current Assets</b>							
Inventories	289.5	270.4	250.8	217.0	198.2	141.1	113.2
Accounts Receivable	474.8	576.0	556.1	357.0	285.5	239.9	165.0
Advances Recoverable	145.7	113.8	122.2	154.2	74.1	69.7	67.9
Cash & Bank	817.6	354.0	174.5	142.4	75.7	56.6	79.6
<b>Total Current Assets</b>	<b>1,727.7</b>	<b>1,314.2</b>	<b>1,103.6</b>	<b>870.6</b>	<b>633.5</b>	<b>507.3</b>	<b>425.7</b>
<b>TOTAL ASSETS</b>	<b>32,291.6</b>	<b>28,466.6</b>	<b>26,538.2</b>	<b>19,388.7</b>	<b>17,108.2</b>	<b>5,606.5</b>	<b>4,376.7</b>

## Balance Sheet as of July 15

in million NRs

<b>EQUITY AND LIABILITIES</b>	<b>1993</b>	<b>1992</b>	<b>1991</b>	<b>1990</b>	<b>1989</b>	<b>1988</b>	<b>1987</b>
<b>Equity</b>							
Share Capital	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Share Allotment Suspense	5,190.6	3,956.8	3,916.8	3,146.4	2,502.6	2,615.3	1,657.0
Capital Reserve	120.9	88.3	67.6	56.8	44.9	35.2	15.1
Reserves & Surplus	(444.6)	(550.8)	(-500.3)	(-75.6)	39.5	36.1	41.7
Revaluation Surplus	13,988.0	13,421.7	12,369.4	12,065.3	11,091.5	-	-
<b>Total Equity</b>	<b>19,854.9</b>	<b>17,916.0</b>	<b>16,853.5</b>	<b>16,192.9</b>	<b>14,678.5</b>	<b>3,686.6</b>	<b>2,713.8</b>
<b>Long-Term Liabilities</b>							
Long-Term Loan	11,649.5	10,070.4	8,812.3	2,422.8	1,890.2	1,541.7	1,378.8
<b>Total Long-Term Liabilities</b>	<b>11,649.5</b>	<b>10,070.4</b>	<b>8,812.3</b>	<b>2,422.8</b>	<b>1,890.2</b>	<b>1,541.7</b>	<b>1,378.8</b>
<b>Current Liabilities &amp; Provisions</b>							
Deposit from Customers	42.4	25.4	24.8	20.4	12.4	13.6	8.1
Other Deposit	84.4	42.5	21.3	14.7	11.9	7.8	7.1
Creditors for Goods	11.2	12.8	10.3	11.6	19.1	30.9	35.3
Other Creditors	16.8	40.3	59.4	36.3	2.2	1.8	1.8
Payable to Others for power purchase	4.6	18.4	106.6	136.8	126.3	78.1	29.6
Payable to HMG for Interest	224.5	21.4	266.0	198.9	143.1	78.8	69.4
Payable to HMG for Other	124.9	31.5	44.8	45.7	9.5	0.0	3.1
Provision for Bonus	6.4	2.4	2.4	3.3	4.8	4.8	4.3
Provision for Gratuity & Pension	140.2	140.2	140.3	140.3	112.7	86.5	65.8
Provision for Medical Facilities	20.6	20.6	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	13.4
Wealth Tax	8.5	2.5	-	-	-	-	-
Inventories Received from Project	-	-	-	-	-	-	22.1
Provision for Tax	7.2	7.2	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	5.4	7.2	83.5	83.5	-	-	-
Branch Reconciliation	34.9	52.7	71.7	19.0	-	-	-
<b>Total Current Liabilities &amp; Provisions</b>	<b>787.2</b>	<b>480.2</b>	<b>872.4</b>	<b>773.0</b>	<b>539.5</b>	<b>378.2</b>	<b>284.1</b>
<b>TOTAL LIABILITIES AND EQUITY</b>	<b>32,291.6</b>	<b>28,466.6</b>	<b>26,538.2</b>	<b>19,388.7</b>	<b>17,108.2</b>	<b>5,606.5</b>	<b>4,376.</b>

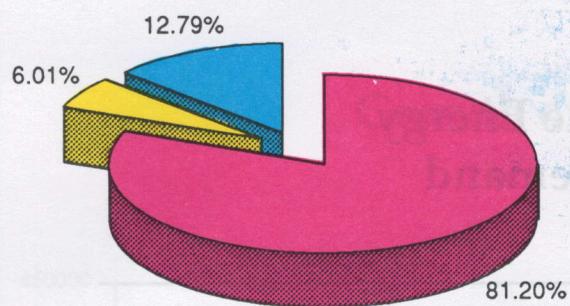
## Profit and Loss for the Year ended July 15

in million NRs

Particulars	1994*	1993	1992	1991	1990	1989	1988	1987
<b>A. Revenue</b>								
Net Sale of Electricity	2256.6	1,786.8	1,440.4	960.9	760.1	690.3	551.5	452.4
Income from Other Services	98.0	8.6	5.6	18.2	15.9	18.0	11.8	9.8
Interest & Other Income	54.3	109.0	68.2	13.5	9.4	3.6	4.2	1.4
<b>Total-A</b>	<b>2408.9</b>	<b>1,904.4</b>	<b>1,514.2</b>	<b>992.6</b>	<b>785.4</b>	<b>711.9</b>	<b>567.5</b>	<b>463.6</b>
<b>B. Operation &amp; Maintenance Expenditure</b>								
Operation & Maintenance & General Expenses	764.6	604.8	499.3	379.7	291.0	284.8	206.4	180.0
Power Purchase	196.6	162.1	111.3	50.5	171.5	138.8	63.8	7.1
Provision for Expenses	-	7.0	8.7	-	48.8	26.2	26.8	6.3
Bad debts written off	-	-	-	-	0.3	0.2	-	-
Depreciation	1,182.1	1,026.0	953.6	879.7	683.9	578.7	134.7	114.8
Deferred Expenditure Written off	54.2	53.6	45.1	56.6	56.6	-	-	-
<b>Total-B</b>	<b>2,197.5</b>	<b>1,853.5</b>	<b>1,618.0</b>	<b>1,366.5</b>	<b>1,252.1</b>	<b>1028.7</b>	<b>431.7</b>	<b>308.2</b>
<b>C. Net Operations Surplus (Deficit) (A-B)</b>								
<b>Surplus (Deficit) (A-B)</b>	<b>211.4</b>	<b>50.9</b>	<b>(103.8)</b>	<b>(373.9)</b>	<b>(466.7)</b>	<b>(316.8)</b>	<b>135.8</b>	<b>155.4</b>
<b>D. Interest on Long-Term Loans</b>								
<b>Interest on Long-Term Loans</b>	<b>671.8</b>	<b>625.5</b>	<b>632.2</b>	<b>635.1</b>	<b>129.0</b>	<b>130.3</b>	<b>125.8</b>	<b>120.8</b>
<b>E. Profit and (Loss) Prior Year's income &amp; Expenses Adjustment</b>								
<b>Profit and (Loss) Prior Year's income &amp; Expenses Adjustment</b>	<b>(460.4)</b>	<b>(574.6)</b>	<b>(736.0)</b>	<b>(1009.)</b>	<b>595.7</b>	<b>(447.1)</b>	<b>10.0</b>	<b>34.6</b>
<b>F. Prior year Income / Expenses Adjustment</b>								
<b>Prior year Income / Expenses Adjustment</b>	-	48.8	75.6	(15.4)	(41.4)	33.3	(1.8)	(11.0)
<b>G. Profit &amp; (Loss) after Prior Year Adjustment</b>								
<b>Profit &amp; (Loss) after Prior Year Adjustment</b>	<b>(460.4)</b>	<b>(623.4)</b>	<b>(660.4)</b>	<b>(993.6)</b>	<b>(637.1)</b>	<b>(413.8)</b>	-	-
<b>H. Transfer from Revaluation Surplus</b>								
<b>Transfer from Revaluation Surplus</b>	<b>827.1</b>	<b>729.6</b>	<b>610.0</b>	<b>568.9</b>	<b>522.0</b>	<b>424.2</b>	-	-
<b>I. Net Profit (Loss) Before Tax</b>								
<b>Net Profit (Loss) Before Tax</b>	<b>366.7</b>	<b>106.2</b>	<b>(50.4)</b>	<b>(424.7)</b>	<b>(115.1)</b>	<b>10.4</b>	<b>8.2</b>	<b>23.6</b>
<b>J. Corporate Tax</b>								
<b>Corporate Tax</b>	-	-	-	-	-	7.0	13.8	11.4
<b>K. Net Profit/(Loss) after tax</b>								
<b>Net Profit/(Loss) after tax</b>	<b>366.7</b>	<b>106.2</b>	<b>(50.4)</b>	<b>(424.7)</b>	<b>(115.1)</b>	<b>3.4</b>	<b>(5.6)</b>	<b>12.2</b>

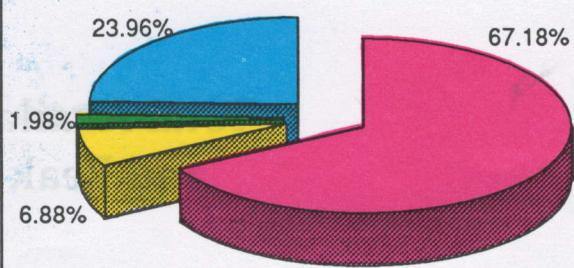
Note : \* Provisional Figures

**Availability FY1994**



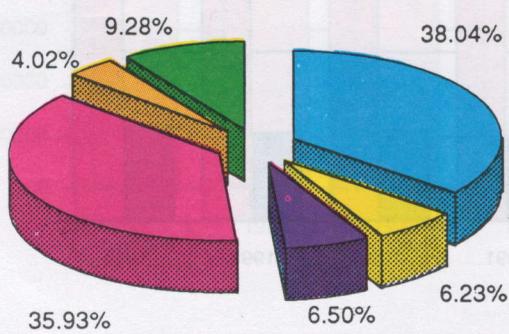
Hydro   Thermal   Purchase

**Utilization FY1994**



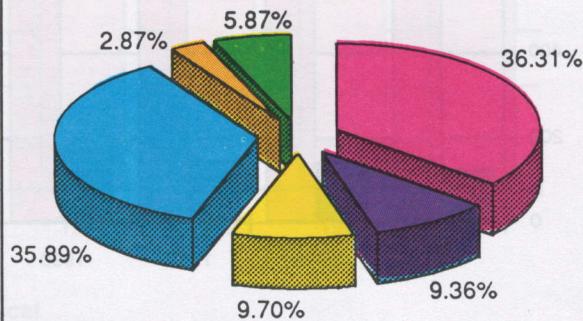
Internal   Export   Self Consumption   Losses

**Sales FY1994**



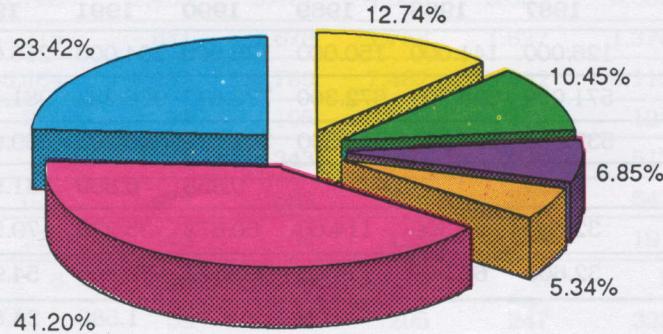
Domestic   Non-Commercial   Commercial  
Industrial   Export   Others

**Revenue FY1994**



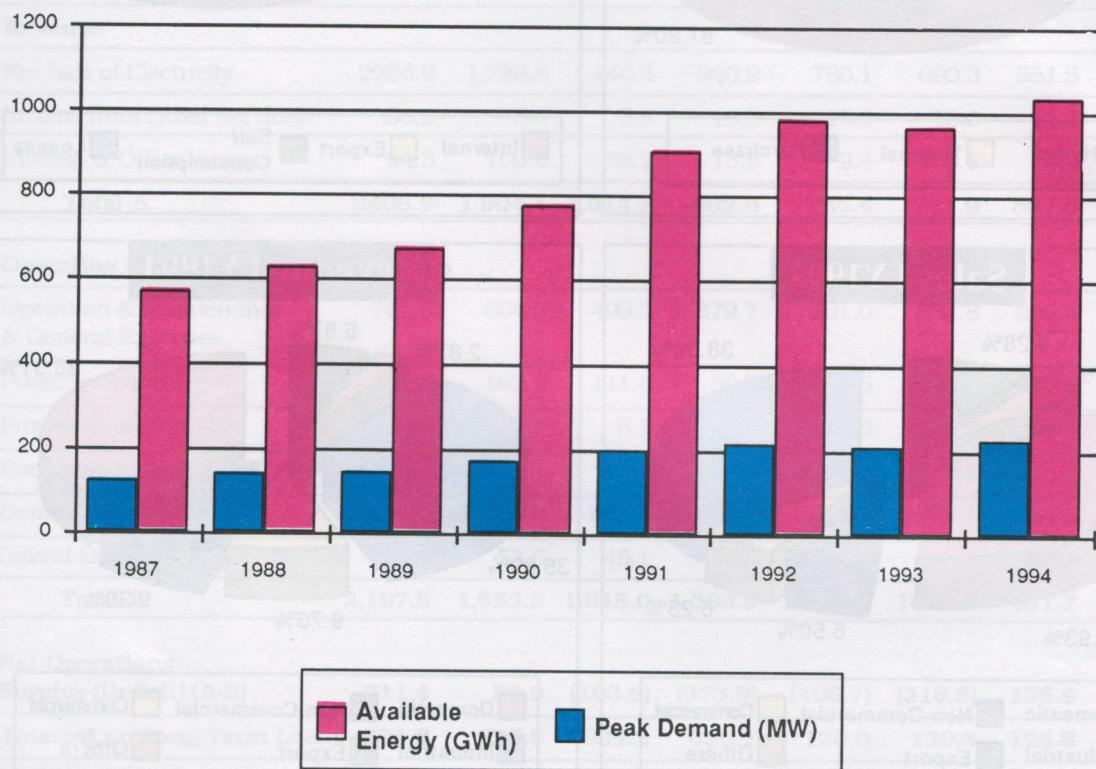
Domestic   Non-Commercial   Commercial  
Industrial   Export   Others

**Expenditure FY1994**



Staff Cost   Operation & Adm.   Fuel  
Depreciation   Energy Purchase   Interest

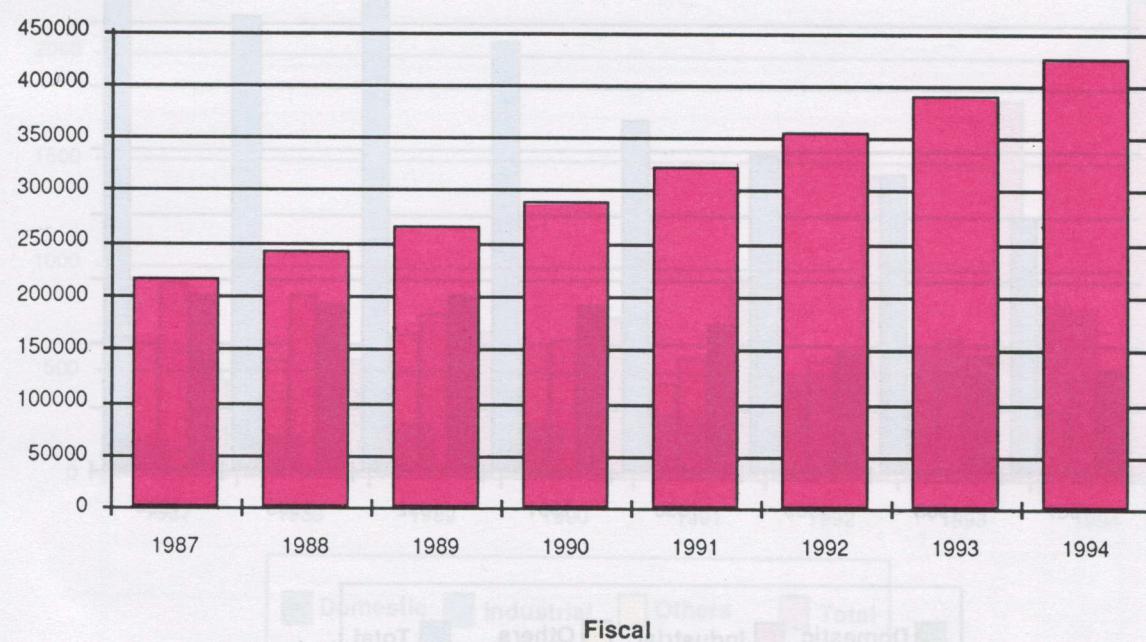
## Total Available Energy and Peak Demand



Particulars	1987	1988	1989	1990	1991	1992	1993	1994
Peak Demand (MW)*	126.000	141.000	150.000	176.000	204.000	216.000	214.04	231.0
Available Energy (GWh)	571.000	628.500	672.300	773.842	906.283	981.105	963.314	1034.163
1. Hydro	537.300	560.200	558.300	712.312	870.203	869.980	804.050	839.711
2. Diesel	1.100	-	-	0.858	0.800	31.540	47.290	62.203
3. Purchase from	32.600	68.300	114.00	60.672	35.280	79.585	111.974	132.250
(a) India	32.600	68.300	114.00	60.672	33.700	54.938	82.223	101.520
(b) Butwal Power Co.	-	-	-	-	1.580	24.647	29.7511	30.730

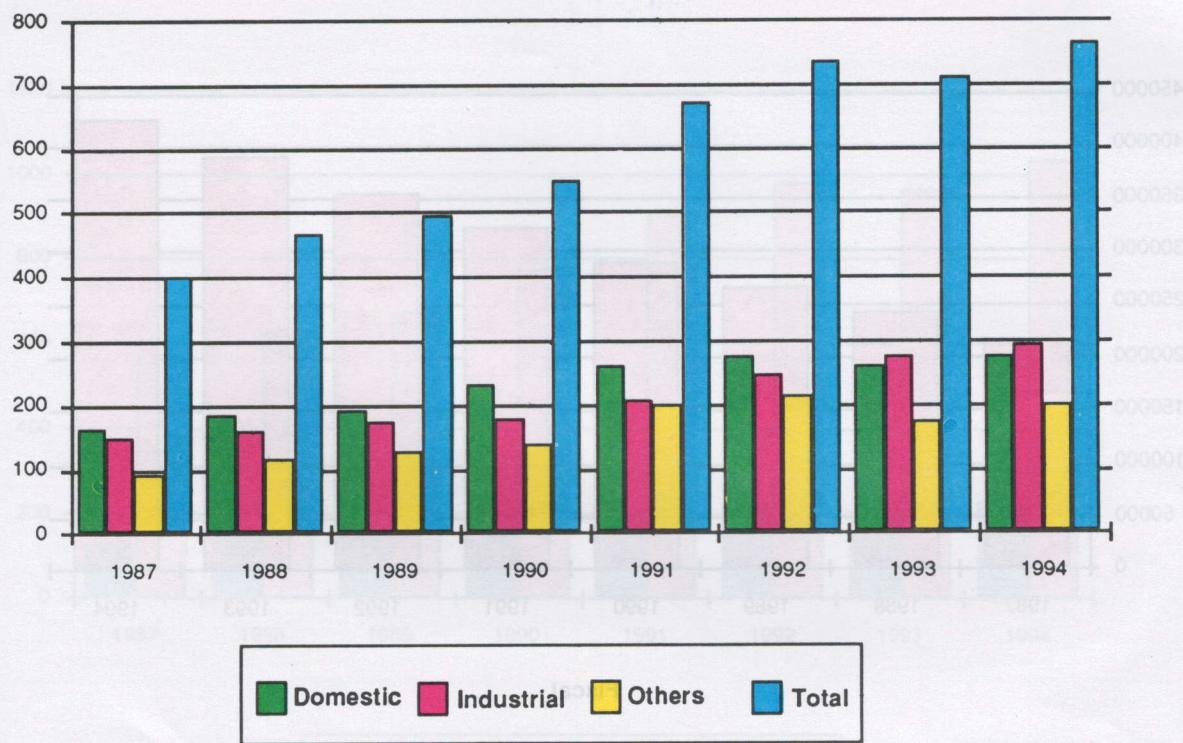
Note :- \* Peak demand is for all areas covered by integrated system including supply to India.

## Growth of Consumers



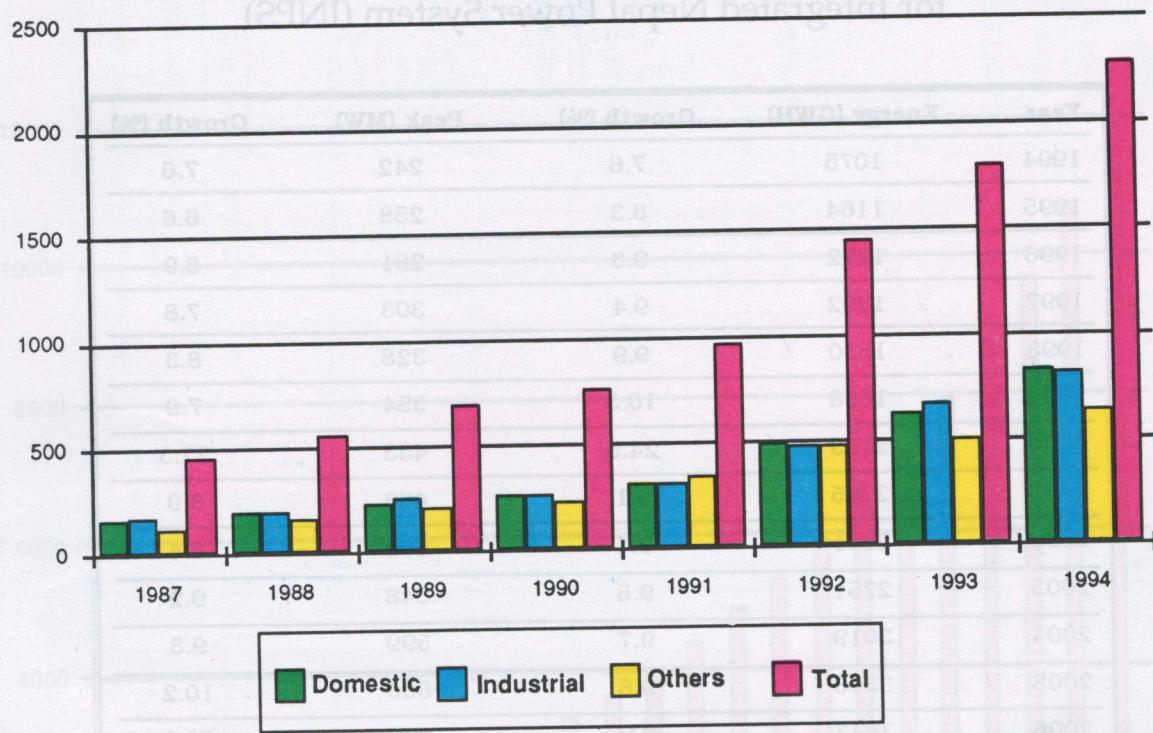
Particulars	1987	1988	1989	1990	1991	1992	1993	1994
Domestic	2,08,870	2,30,178	2,51,758	2,74,921	3,04,480	3,37,715	3,71,975	4,05,663
Non-Commercial	1,768	2,403	3,477	4,506	5,633	6,065	6,340	5,725
Commercial	315	641	1,678	1,758	1,827	1,378	1,536	2,409
Industrial	5,464	6,181	6,769	7,482	8,382	9,113	9,595	10,798
Water Supply	351	77	105	112	119	124	131	130
Irrigation	-	311	343	382	420	512	463	505
Street Light	675	1,474	385	517	532	547	367	404
Temporary Supply	275	145	104	123	136	191	183	111
Transport	8	8	9	9	9	8	8	65
Temple		59	152	205	247	335	398	536
Total (Internal Sales)	2,17,726	2,41,477	2,64,780	2,90,015	3,21,785	3,55,988	3,90,996	4,26,346
Bulk Supply (India)	4	2	4	4	5	5	4	4
<b>Grand Total</b>	<b>2,17,730</b>	<b>2,41,479</b>	<b>2,64,784</b>	<b>2,90,019</b>	<b>3,21,790</b>	<b>3,55,953</b>	<b>3,91,000</b>	<b>4,26,350</b>

## Electricity Sales



Category	1987	1988	1989	1990	1991	1992	1993	1994
Domestic	162.329	185.746	193.308	231.396	261.399	275.248	259.833	275.156
Non-Commercial	27.390	52.358	48.059	47.433	46.230	46.684	47.607	49.714
Commercial	21.963	25.401	30.778	33.712	36.640	45.200	47.607	47.682
Industrial	148.477	161.577	175.262	178.321	206.881	246.374	273.753	291.383
Water Supply &	15.312	7.016	7.344	11.928	15.831	14.936		
Irrigation	-	9.358	15.626	11.965	11.851	12.769	24.113	19.168
Street Light	3.858	6.163	5.091	7.295	7.308	7.802	8.068	9.164
Temporary Supply	1.240	0.705	0.677	0.403	0.428	1.003	0.924	0.557
Transport	1.569	0.763	2.287	2.060	1.825	1.506	1.395	1.314
Temple	-	0.005	0.109	0.270	0.369	0.419	0.460	0.616
Total (Internal Sales)	382.138	449.092	478.541	524.782	588.760	651.941	663.248	694.754
Bulk Supply	20.458	16.053	17.596	23.287	80.640	85.411	46.137	71.121
<b>Grand Total</b>	<b>402.596</b>	<b>465.145</b>	<b>496.137</b>	<b>548.069</b>	<b>669.400</b>	<b>737.352</b>	<b>709.385</b>	<b>765.875</b>

## Revenue



Category	1987	1988	1989	1990	1991	1992	1993	1994*
Domestic	164.497	191.205	230.184	259.417	311.686	490.642	621.398	825.468
Non-Commercial	44.101	79.852	88.853	90.553	91.708	140.909	181.076	212.776
Commercial	35.077	41.792	59.920	67.792	75.634	136.319	186.005	220.291
Industrial	173.315	193.840	254.518	267.254	307.005	473.082	669.244	815.872
Water Supply &			9.237					
Irrigation	19.800	13.200	24.284	26.433	27.530	31.406	36.194	34.187
Street Light	6.487	7.121	6.388	8.832	8.767	15.629	16.949	23.368
Temporary Supply	2.999	1.863	2.449	1.454	1.483	3.980	4.880	3.431
Transport	1.567	1.591	2.022	1.809	2.138	2.429	2.118	2.904
Temple	-	0.007	0.113	0.381	0.182	0.441	0.693	1.312
Total (Internal Sales)	447.843	539.708	668.731	723.925	826.135	1,294.837	1,718.557	2,139.609
Bulk Supply (India)	4.812	12.009	23.076	36.738	135.064	145.783	75.462	133.707
Grand Total	452.655	551.717	691.807	760.663	961.199	1,440.620	1,794.019	2,273.317

\* Figures are subject to audit

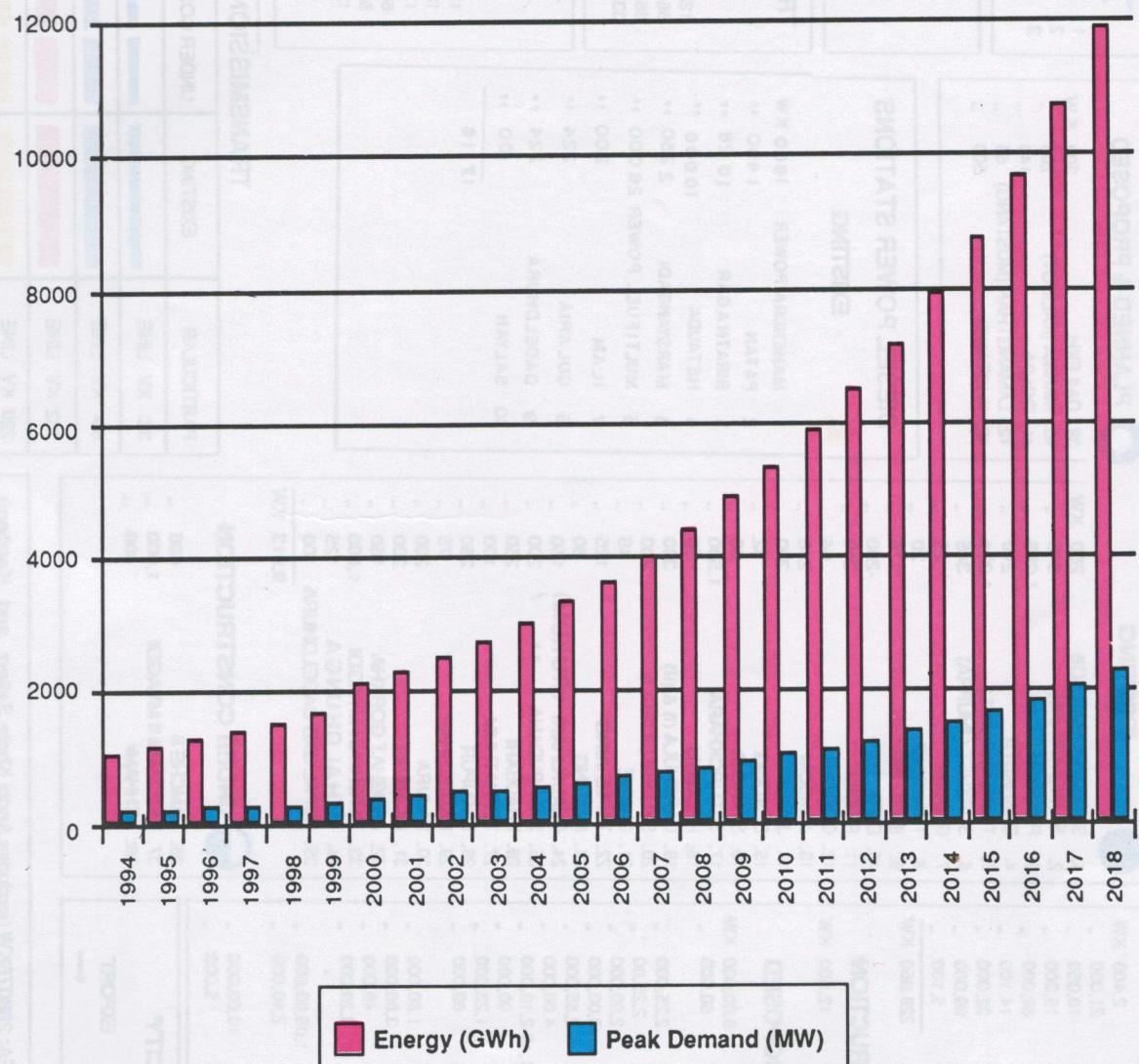
## Load Forecast\*

### for Integrated Nepal Power System (INPS)

Year	Energy (GWH)	Growth (%)	Peak (MW)	Growth (%)
1994	1075	7.6	242	7.6
1995	1164	8.3	258	6.6
1996	1272	9.3	281	8.9
1997	1392	9.4	303	7.8
1998	1530	9.9	328	8.3
1999	1688	10.3	354	7.9
2000	2103	24.5	433	22.3
2001	2295	9.1	463	6.9
2002	2511	9.4	502	8.4
2003	2751	9.5	548	9.2
2004	3019	9.7	599	9.3
2005	3316	9.8	660	10.2
2006	3643	9.9	726	10.0
2007	4008	10.0	798	9.9
2008	4405	9.9	874	9.5
2009	4864	10.4	959	9.7
2010	5335	9.7	1052	9.7
2011	5871	10.0	1154	9.7
2012	6472	10.2	1265	9.6
2013	7136	10.3	1390	9.9
2014	7899	10.7	1533	10.3
2015	8745	10.7	1692	10.4
2016	9687	10.8	1856	10.2
2017	10732	10.8	2059	10.4
2018	11893	10.8	2282	10.8
Average Growth		10.4		9.7

\* Supply Constrained Load Forecast

## Load Forecast



Installed capacity in NEA: 288076KW (excludes Andhra Pradesh and Nagaland)

