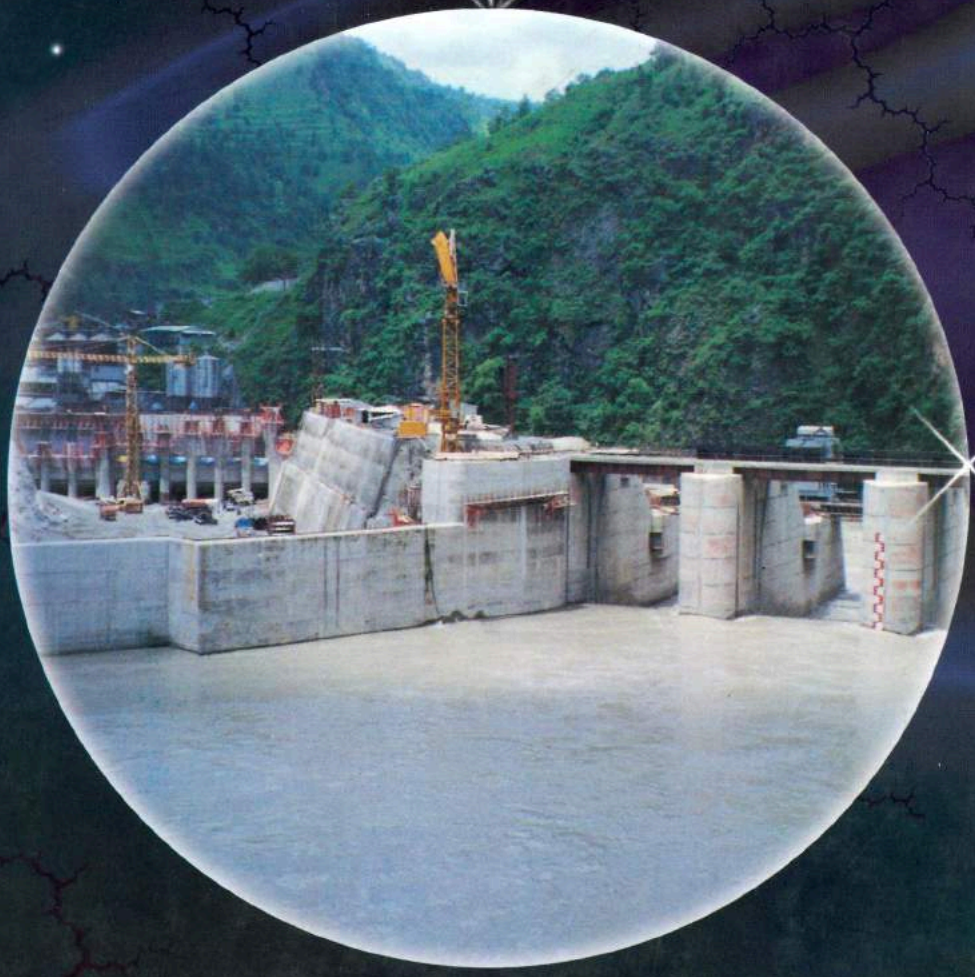
Nepal Electricity Authority

FY 1999/00
A YEAR IN REVIEW



Bhadra 2057(August 2000)
Durbar Marg, Kathmandu

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Cover Photo : Construction of Head Works and Desanding Basin at Kaligandaki 'A' HEP

NEPAL ELECTRICITY AUTHORITY
Head Office: Durbar Marg, Kathmandu, Nepal
Phone: +977-1-227725
Fax: +977-1-227035

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MESSAGE
From The Chairman

Allow me first to congratulate Nepal Electricity Authority for publishing its Annual Review for the fiscal year 1999/2000. For a large organisation like NEA with diverse activities and issues to be handled, I think it is very necessary that a review of the past year's activities be prepared and published for review and references.

I am particularly pleased to be able to send my felicitations in a year that marks the entry into the new millennium. The new millennium has already commenced to bring us good tidings. For instance, we have witnessed generation additions from hydropower projects initiated by Nepal Electricity Authority and by Promoters from the private sector. More hydropower projects are in stages of completion to come on-line in the years to come. Such achievements promise to alleviate power shortage in country, foster industrial growth and aid Nepal Electricity Authority to serve its customers better.

Meanwhile, we, in Nepal, still live in an ironic situation where nature had endowed us with immense hydropower resources but our capacity to use the resources has been minimal within the country and as export. The dimensions of developing the power sector, therefore, exist both within the country and in the regional scenario. As a key player in the present power sector, Nepal Electricity Authority commands an immense responsibility in living up to the country's economic plans and the expectations of the people. In an age when more and more of our daily works depend on the use of electrical appliances, gadgets, instruments and the electronic media, it is essential that electricity is made available to all in the country. It is only when such facilities are available to all our people that we can anticipate an economic growth that is commensurate with the people's expectations.

Energy also needs to be seen as resource that needs to be shared not within political boundaries but by the entire world-somewhat like the air above us. When thinking of energy we must broaden our horizons and think beyond artificial political boundaries. We must conceive our own people living in harmony with the whole world with clean forms of energy that nature has endowed the universe with. For a sustainable environment we must aim towards widespread energy trade throughout the region favouring use of cleaner fuels such as hydropower.

On the regional scene, our approach should be to bring together energy sector players from both the public and private sectors across the region to discuss and resolve issues that impede cooperation and investment in energy development. A programme needs to be designed to catalyse a long-term process of rationalising energy supply and distribution across the region, including the development of the cross-border infrastructure and market mechanisms that will be required for eventual trade in electricity. A regional interconnected power grid needs to be developed with rules governing pricing, access, quality and bringing on new capacity. Programmes need to be initiated to help countries develop the appropriate policy, regulatory and investment environments that will also encourage private sector investment.

I also consider Nepal Electricity Authority as the organisation where the elite of expertise in electrical and hydropower are employed and have gained the experience in local conditions that none can excel. It is therefore necessary that this expertise be fostered for the furtherance of development in the power sector and providing to the people a reliable power supply which even a common man can afford for this essential functions of life. Along with its review of the past year I wish Nepal Electricity Authority all the best over the years to come.

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

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Water Resources.

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Mr. Bishnu B. Malla
Managing Director, NEA

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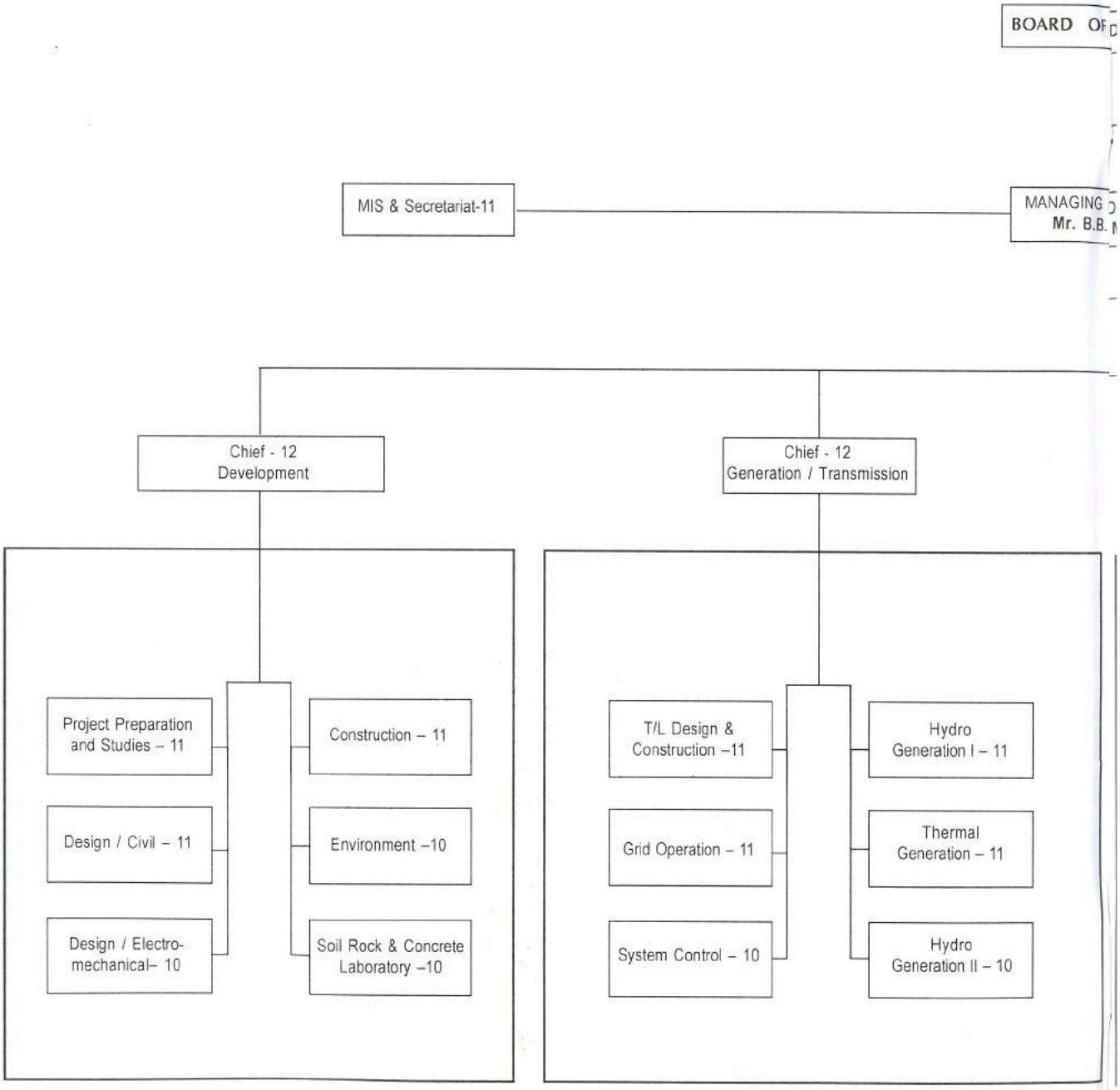

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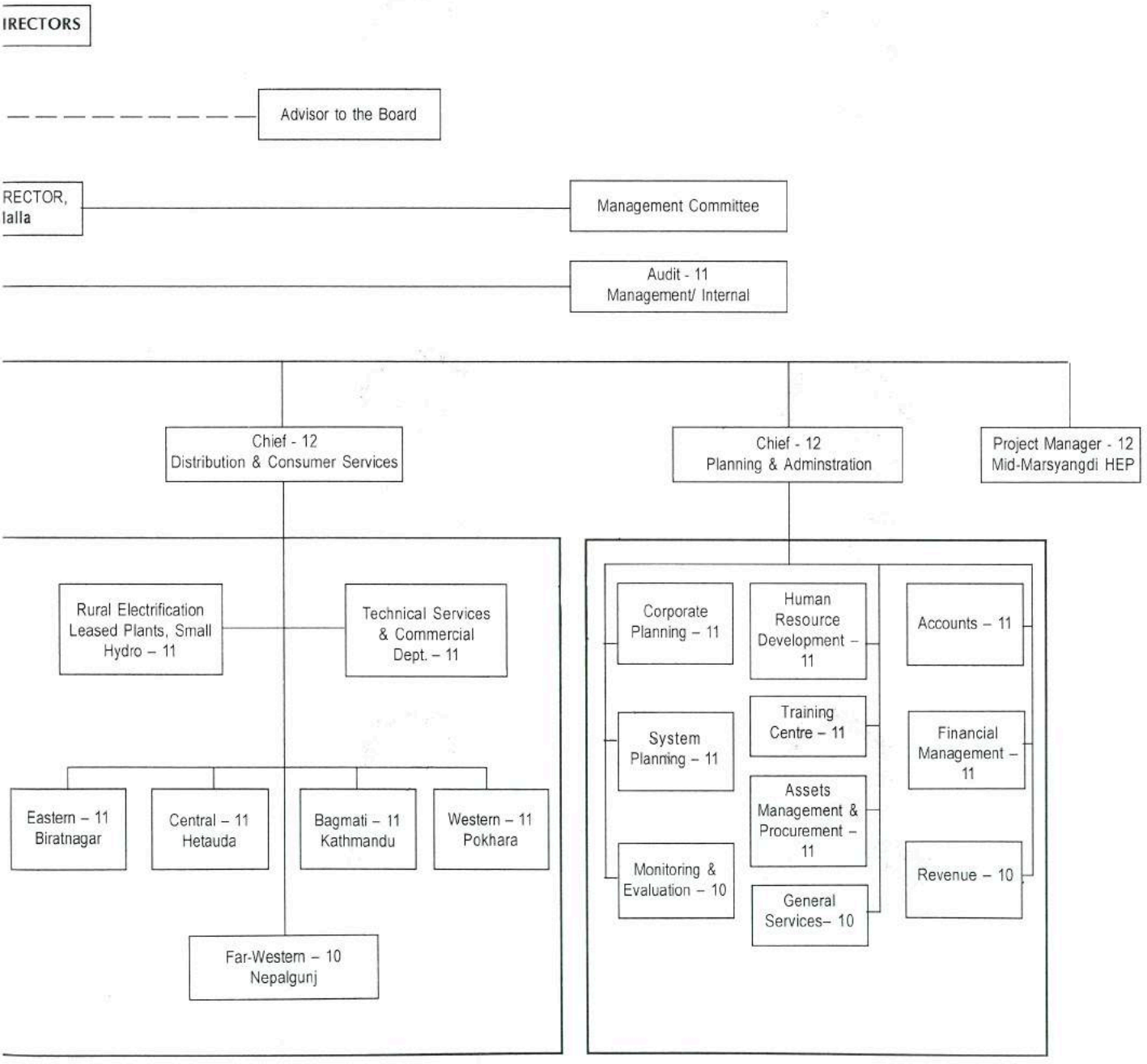

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Generation & Transmission

Mr. P.M.S. Pradhan
Chief
Planning & Administration

Mr. D. B. Thapa
Chief
Development

Mr. D. R. Bhattarai
Project Manager
Middle Marsyangdi
HEP

Dr. N. Kapali
Acting Project Manager
Kaligandaki 'A' HEP

Mr. M. P. Udpadhyay
Officiating Chief
Distribution & Consumer
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Mr S. P. J. Rana


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Mr K.P. Koirala


Mr B. R. Regmi


Mr D. P. Upadhyay


Mr D. N. Singh


Dr J. Jha


Mr G. R. Shrestha

MANAGING DIRECTOR'S REPORT

I am pleased to report on the activities of Nepal Electricity Authority (NEA) over the past fiscal year (1999/2000) – the first year into the new millennium. On a personal note, as a staff member of NEA, I have observed activities of NEA and its predecessors over three decades and I am honored to be reporting the activities of NEA this year as the Managing Director of the organization. I feel equally happy that this report will feature in our Annual Review that is being published on the occasion of the fifteenth anniversary of the founding of NEA.

In summary, our efforts during the past year were aimed to establish NEA on a firm commercial platform capable of undertaking the challenges of development, and to provide to our customers an electrical supply of adequate quality affordable to the average consumer. As was reported in earlier reports by my predecessors, NEA has now divested much of its monopolistic legacy. Emergence of the private sector enterprise has made it imperative that NEA improve its operational efficiency for sustenance in the power sector.

NEA and the Power Sector

In the global energy scene, the growing relation between climate change and detrimental effects of fossil fuels has created chances that renewables will gain acceptance as the future form of clean energy. For NEA, this may be a silver lining to its firm trust on hydropower. With our generation expansion plans now firmly planted, and many more licensed to the private sector, it is probable that investment in hydropower will pay off in the long run as users realise the premium qualities associated.

In the international field, reforms in the power sector were structured to create players in the sector who will operate in an environment of increasing deregulation. In the industrialised world, the trends to deregulate the power sector in the wake of the creation of constructive market forces continued positively. In transitioning countries, reform took the form of unbundling stagnant national utilities and introduction of competition and choice through private sector participation supported by the establishment of an independent regulatory mechanism. Though initiated and promoted in a large number of countries, such forms of deregulation of the power industry and the establishment of regulatory bodies continued in the South Asian countries with mixed results which were largely dependant on the efficacy of a well established regulator.

On the home scene, NEA still maintains its role as the key player in the nation's power sector - a sector that has been identified as a determining economic force in the country's development. Reforms to strengthen this sector were a subject of intense deliberation last year. NEA commanded major focus in a study entitled Power Sector Development Strategy undertaken by the World Bank. Shades of reform are also evident in the draft forms of the Government's Hydropower Policy and the Ninth Five-Year Plan. Further recommendations on reforms are expected from a World Bank funded study on Water resources Strategy Formulation Phase II undertaken with Nepali expertise. USAID is

also a sponsor of studies on private sector participation. With private sector participation already active as Independent Power Producers (IPPs) in the generation field, the thrust of the studies concern themselves with institutional reforms that would allow sustainable operations to the private sector contenders in well-defined conditions.

During the past year, South Asia received considerable attention in terms of regional trade and exchange of energy. United States Agency for International Development (USAID), Trade and Development Agency (TDA) and United States Energy Association (USEA) were prominent in their interest in South Asia Energy and have initiated a well funded program called South Asia Regional Energy (SARE) Initiative to promote regional energy balance by mobilizing latent energy resources in individual countries. Apart from the mobilization of its huge hydropower resources, Nepal could also gain from the concept of the Regional Grid that is one of the concepts advanced by the SARE Initiative The American efforts were highlighted through two high-level conferences held in Kathmandu in December 1999 and March 2000.

The Year's Major Events

Recapitulating the major events of the past year, during the initial months, Minister of Water Resources, Mr. Govind Raj Joshi, led NEA as the Chairman of the Board. After the subsequent political change in the country, the position was delegated to the Minister of Water Resources, Mr. Khum Bahadur Khadka. State Minister for Water Resources, Mr. Ram Bahadur Gurung, also showed interest in NEA's activities by attending its Board meetings. Following shortly after the end of the last fiscal year, and the political adjustments that ensued, the functions the Chairman has been assumed by Minister of State for Water Resources Mr. Ram Bahadur Gurung.

In terms of management reforms within NEA, attempts were made to shorten decision-making time by eliminating two upper levels of the hierarchy and replacing these with four Deputy level posts responsible to the Managing Director in the areas of Planning and Administration, Development, Generation and Transmission and Distribution and Consumer Services.

We made every effort to bring about improvement in NEA consumer services by resorting to *load shedding* as the last contingent measure. Despite a full-stocked water at Kulekhani's Indrasarawar reservoir and the commencement of 70M kWh free-power delivery from the Tanakpur powerhouse in India, NEA's system still faced generation shortages and we were obliged to continue the unpopular measure – hopefully for the last winter.

Towards the end of the past fiscal year we saw a long-awaited addition to NEA generation with the commissioning of the 6.2 MW Ilam Hydropower Project – this being the first NEA generation project to be brought on-line after the Marsyangdi Hydropower Project that was commissioned in 1989. We also saw a milestone event in private sector efforts. On July 11, 2000, Promoters, Himal Power Ltd., brought into commercial operations the 60MW Khimti I hydropower project and commenced selling all its generation to NEA in accordance with a Power Purchase Agreement (PPA), which was signed in January 1996.

On a closer regional issue, the fifth meeting of the India-Nepal Power Exchange Committee was held in New Delhi in November 1999 and helped to further strengthen the relation existing between power sector organizations in Nepal and their counterparts in India. A very positive outcome of the meeting was the endorsement by the Committee to put up to their respective government the proposal to enhance the quantum of exchange from 50 MW to 150 MW. In subsequent high level contacts between the two countries it is probable that the study of DC links to facilitate the synchronized operation of grids will be forthcoming.

Another area that is expected to contribute to NEA's institutional building is the Partnership program between NEA and two utilities of the USA– Tacoma Power in Washington and Wisconsin Power from Wisconsin states. Sponsored by the USEA and USAID, the Partnership Program included a visit to the US by NEA officers in December 1999 followed by return visit in May/June 2000 of

representatives from USEA, Tacoma Power and Wisconsin Electric. Areas of cooperation have also been worked out. It is expected that the partnership program will be formalized through a signing ceremony in the near future.

After a space of three years, the Electricity Tariff Fixation Commission awarded NEA with a tariff rise. The tariff rise averaged 26 percent for the industrial consumers and 27 percent for the other category of consumers. The tariff increase was aimed to secure financial indicators such as the rates of return and the capability to self-finance a fixed portion of its investment Following prediction that further adjustments would also be required, NEA made a study to assess the level of capital available for lending in the domestic market and the merits of resorting such loans to bolster NEA financial performance and dampen effects of tariff escalation. Often identified as one of the highest in the region, tariff escalation continued to face considerable public resentment and was a subject of debate on relief from high market prices in a specially convened session of the House of Representatives.

After negotiations in Manila in November and towards the end of the fiscal year the Loan Agreement between HMG/N and ADB and a Project Agreement between NEA and ADB were signed for a US$ 50M loan financing for the extension of transmission, distribution and rural electrification and other institutional development works.

In order to expose our senior staff to world trends and innovations, we arranged for the participation of our staff in events of international significance including a training course on Infrastructure Regulation and Reform organized by the World Bank/USAID/TERI in Agra in April 2000 followed by another international conference held in Bangalore to deliberate on Power Sector Reforms and Privatization issues, in May 2000. Our staff members also participated in a number of training courses in hydropower like the one in Sweden. A delegation from the Norwegian university, NTNU visited NEA to streamline procedures for higher studies in the Norwegian University.

Operational Performance

The past year saw the introduction of NEA distribution in all the 75 districts of Nepal. Two more district headquarters commenced to benefit from an NEA supply viz. in Kalikot through a small hydropower project and Diktel in Khotang district through a 33kV grid extension from Gaighat, Udaipur. Khotang will be remembered as the last district to be electrified by NEA.

Although the population benefited by an electric supply hovered around a figure of 15 percent, NEA's sub-transmission and distribution infrastructure could cover double the figure in NEA had the financial amentities, the generation capacity and demand from the consumers.

The past year also saw welcome addition to the generation capacity in the NEA system both from the NEA sources as well a from private investment. The entries being the 6.2 MW Ilam Hydropower Project and the 60MW Khimti Hydropower Project bringing the total installed capacity 389.574 MW of which approximately 85.41 percent was hydro-based and essentially of the run-of-river configuration. In terms of energy, hydropower projects within Nepal provided 72.48 percent, thermal projects, 3.92 percent, purchase from domestic private power companies, 9.95 percent, and imports from India, 13.65 percent of the total availability.

Over the financial year, the system peak of the interconnected system was recorded on January 20, 2000 at the level of 351.86 MW indicating a 7.80 percent increase over the last winter's figure.

During the past financial year, the electrical energy available for use within the NEA system totalled 1701.45 GWh which was an increase of 226.45 GWh (15.35 percent) over the previous year's figure of 1475.0 GWh. This comprised of 1233.22 GWh obtained from NEA's hydro generation and 66.73 GWh from NEA's thermal generation. A total of 401.50 GWh was purchased from other utilities; comprising of 232.20 GWh imported from India through Power Exchange agreements and 169.30 GWh purchased from Butwal Power Co., the Nepalese private generator. This year again the energy availability was marginal and

required careful planning in our Load Despatch Centre (LDC). In a period of generation deficiency, our generation plants performed well, and aided by efforts from grid maintenance, we managed to pull off with a fair degree of availability.

Electricity sales totalled 1269.274 GWh - an increase of about 155.698 GWh (13.98 percent) over last year's sales figure. Internal sales within Nepal increased to 1174.274 GWh and accounted for 92.52 percent of the total sales and registered an increase of 124.856 GWh (11.9 percent) over the last year's figures. Exports to India increased to 95.00 GWh.

Over the past financial year, the number of consumers grew by an estimated 47,637 (or 7.65 percent) over the previous year's figure to reach a total of 6,700,000 The domestic category accounted for 95.41 percent of the total consumer numbers, 36.80percent of the sales and contributed to 37.90 percent of the revenue. The industrial category formed only 2.39 percent of the total consumers, but accounted for 40.05 percent of sales and contributed to 38.78 percent of the revenue. Non-commercial category constituted 1.19 percent of the consumers, accounted for 5.01 percent of the sales and 6.87 percent of the revenue. Likewise, the commercial category constituted 0.48 percent of the total consumers, accounted for 6.45 percent of the sales and provided 8.77 percent of the revenue.

The financial picture remained encouraging for another year. NEA's total revenue net totalled NRs. 7204.5 million, an increase of 24.60 percent over the figure for the previous year. NEA's net fixed assets increased to reach an estimated NRs. 33.9811 Billion. To improve our financial position, we made concerted efforts to improve receivables and even resorted to the unpopular extreme of terminating supply connections to government and semi-government consumers and taking stern action against those charged on cases of theft and misuse of our supplies. To keep expenditures down, we limited our costs in operation and maintenance. Such efforts on financial control will continue into the coming year.

Development Efforts

Keeping in spirit with the ninth five year development plan adopted by His Majesty's Government we continued another year of development activities to obtain definite targets and to attain desirable performance standards and meet demand patterns in the country. Resources for the projects were met from NEA's own resources and those from HMG in the form of equity participation. A significant portion of the financing however still came as loans from multi lateral lending agencies routed through Subsidiary Loan Agreements with HMG. Some projects were financed through grant contributions to the Government from friendly countries.

As I have mentioned earlier, as a welcome result of development efforts, we witnessed the long-awaited increase in hydropower generation that would input into the NEA grid. The addition came from both the public and private sector efforts- the NEA implemented Puwa Khola adding 6.2 MW and the HPL promoted Khimti I putting in 60 MW. Very soon we will also see the 14MW Modi come on-line and then the Kali Gandaki in 2001. The 70 MW Middle Marsyangdi hydropower project got off to a good start and should be generating electricity to meet the added demand in the system by the year 2004. We also have the Kulekhani III and the 300 MW Upper Karnali hydro power projects licensed in our name and we spent efforts to promote the projects for financing from interested donors. We even showcased the Upper Karnali hydropower project in the Energy South Asia Conference in Kathmandu.

The small hydro projects at Dolpa and Kalikot which we had undertaken finally commenced generation and our subsidiary company, the Chilime Hydropower Co., managed a financial close and is now set to completion by 2002. Activities of IPPs were evident in their attempts to promote several small hydropower projects. We signed PPAs for the purchase of generation from the Daram Khola (5MW), Piluwa Khola (3MW) and the Chaku Khola (980kW) small hydropower projects.

In parallel with NEA's own investment in

the generation field and its commitment to purchase power from a number of IPPs in the future, an interesting development was the MOWR decision to grant generation licenses to 11 more generation project for promotion by the private sector. Although the possibility of NEA buying power from these projects remained remote at the present rate of growth, the prospects of offering NEA's transmission lines for wheeling the IPP power to markets which the IPPs would themselves generate became a possibility.

One notable achievement in the field of transmission was the timely completion of the Khimti-Lamosangu-Bhaktapur-Balaju 132 kV transmission line that would tie-in two IPP projects (Khimti and Upper Bhote Koshi together totaling nearly 100 MW) into the NEA grid. The timely completion of the transmission line was reflected in the Power Purchase Agreements as a likely default and involved high penalties in case of non-completion. However, NEA completed the transmission lines much ahead of the Initial Synchronization Dates stipulated in the PPAs. The stringing of second circuits on the Kusaha-Dhalkebar sector was also completed thereby strengthening the NEA for more flexible power flows.

On the distribution and electrification areas, the completion of the Gaighat-Diktel 33 kV transmission line brought the much-awaited power to the district headquarters of Khotang. The transmission line was inaugurated by the Rt. Hon. Prime Minister Girija Prasad Koirala in June 2000.

Bhadra 1, 2057

Acknowledgements

For the progress we have been able to attain over the past year I wish to thank His Majesty's Government for their co-operation and continued interest and investment in our enterprise. Foremost I also wish to express my sincerest thanks to the dynamic leadership we have obtained from our Chairman and Members of the NEA Board of Directors. I also thank the Donors and Lenders who have provided us the finances, assistance and advice in our activities.

In conclusion, arising also from my affiliation with NEA over thirty year, I cannot restrain from expressing my gratitude for the continued support I have received from all levels of staff here. I have always enjoyed working with staff members in NEA at all levels and categories. I believe the staff members in NEA have the latent talent and the strength to take NEA to enhanced levels of development.

Most importantly, I wish to thank our Customers for their proactive interest in NEA's activities and also for bearing with us during periods of difficulty. We feel confident that the day is not far when we will be able to bring to all our customers an electrical supply that is reliable and adequate for their needs.

(Bishnu Bam Malla)
Managing Director

INTRODUCTION

Along with the rest of the universe, NEA entered the new millennium the past year. Prior to the entry, many a pledge had been made and an equal number of dedications. The anticipation was for the revelation of what the new millennium would really bring about.

In the face of conflicting reviews of NEA's performance, our commitment was to consolidate and serve the consumers better. Like the novelty of the new millennium, many new issues entered into NEA's horizons of operations. To meet the challenges ahead, it became certain that NEA would have to sit down dedicated and do its homework for some years to come.

Over the longer horizon, it became evident that the government would adopt policies to reform the power sector and in the course of reform, NEA would also face some changes. Unbundling of the generation, transmission distribution and dispatch control were needed to allow the private sector investors to function competitively in Nepal's power sector. Indeed, NEA did plan to divest some of its interest from areas such as small hydro and distribution – areas of operation, which others could better. Also, in such a planned situation where purchase of generation could take the form of short-term contracts, the justification of long-term power purchase agreements based on BOOT approach assumed shades of an indefinite future.

Of shorter term was the issue that revolved around the growing generation plan and the additional energy that this would soon plant into the NEA's system. An immediate after-effect following essentially from the run-of-river nature of the hydro projects was the reserve that would gather during the wet season. With the generation planning incorporating hydropower projects which had been optimised for their capacity, it became obvious that this form of secondary energy should be priced for the opportunity that this provides. Whereas NEA had operated for a long period in conditions of supply deficiency, the doors now opened towards an era when NEA would need to adopt rigorous strategies to market its products and rethink its pricing structure.

An equally immediate consequence was the need to distribute this available energy to larger portion of the populace. The political insistence to cover larger portions of the country was overwhelming and reflected the people's choice of electricity as one of the coveted facilities in the lesser-developed districts of the country. The ninth five-year plan also set definite targets for the population to be benefited by the end of the plan period. The immense dimensions in investment that this required inevitably lead to seeking resources from lending institutions such as the World Bank and the Asian Development Bank. These Lenders have in turn insisted on strengthening of NEA and its tariff structure as an assurance of payback guarantee. Covenants attached to the loan agreements turned into very sensitive issues in the highest levels of governance and led to vociferous exchanges refuting the NEA tariff as one of the highest in the region.

With these issues in the horizons, this Annual Review of the fiscal year 1999/2000 attempts to capture the spirit of the efforts and activities that were made and would need to dovetail into the broader prospects of the future.

SECTORAL REVIEW

NEA BOARD AND MANAGEMENT MATTERS

In the beginning of the fiscal year 1999/00 then Minister of Water Resources Mr. Govinda Raj Joshi was the the Chariman of the Board of Directors of Nepal Electricity Authority.

After the changes in the cabinet, Mr. Khum Bahadur Khadka became the Minister of Water Resources on March 22, 2000 (2056/12/9) and assumed the position of the Chairman of the Board of Directors, up to a period of August 8, 2000 (2057/4/24).

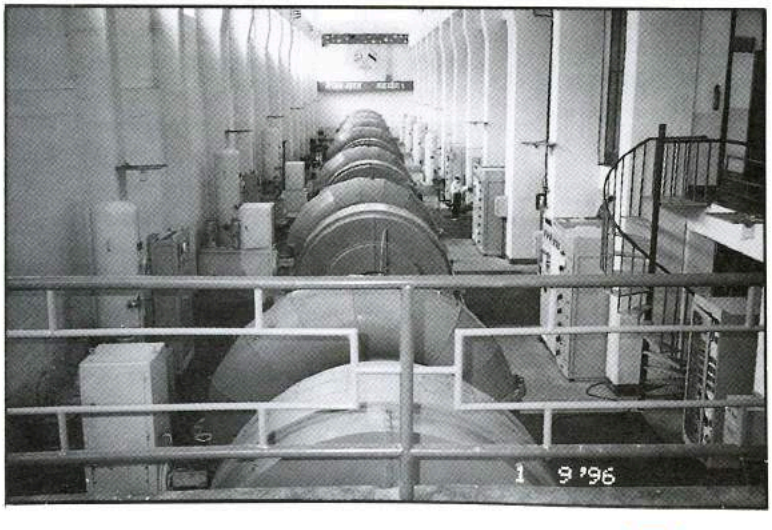
With the recent change in the cabinet the Prime Minister Mr. Girija Prasad Koirala has also taken the portfolio of Water Resources and recently Minister of State for Water Resources Mr. Ram Bahadur Gurung has assumed the Chairmanship of the Board of Directors.

Mr. B. B. Malla who had long career experience in NEA and was Chief of Distribution and Consumer Services was appointed as the Managing Director of NEA on May 22, 2000.

There were changes in the Board members too. Dr. Bimal Prasad Koirala, Secretary, Ministry of Finance replaced Mr. R. B. Bhattarai as Mr. Bhattarai had completed his term as the Secretary of Finance. Mr. Mukunda Raj Gautam was also inducted into the NEA Board of Directors.

GENERATION

In the fiscal year 1999/00, NEA availed 1701.45 GWh of energy (15.35% increase) in its power system and system recorded peak load of 351.86 MW (7.80% increase). In the fiscal year 1998/99, the available energy and peak load are 1475.0 GWh and 326.4 MW respectively. Out of the total available energy in NEA system hydropower contributed 1233.22 GWh (72.48%), thermal energy 66.73 GWh (3.92%), import from India 232.22 GWh (13.65%), and purchase from Nepal was 169.3 GWh (9.95%).



The operation and maintenance work related with the major hydro and thermal power stations are as follows:

Hydro Generation

Marsyangdi Hydro Power Station : The operation and maintenance of this power station has been satisfactory. As part of the scheduled major maintenance works, Unit No. 2 was overhauled between June 10 – July 12, 2000. This period of shutdown is the shortest so far. In this overhauling works, all the severely worn out wearing ring of runner, head cover, etc. were replaced by new ones by the plant staff themselves. Similarly during this shutdown, seal of all the butterfly valves which were leaking were repaired. Repair works on weir gates No. 3 and 5, were carried out. Repair of sluice canal including fixing of new CDP was also done satisfactorily. The generated energy of the fiscal year1999/00 was 457 GWh. With this the total energy generation upto July 15, 2000 (Ashad 31, 2057) has clearly reached to more than 4500 GWh.

Kulekhani - I: The generation of Kulekhani - I in the fiscal year 1999/00 reached to 249.680 GWh, the highest so far. Regular maintenance works of 66 kV Breakers of Hetauda feeder No. 1, water flow relay and station transformer and installation of new protection relays of Hetauda 66 kV feeder line were carried out.

Kulekhani – II: The generation of Kulekhani - II reached to 122.758 GWh in the fiscal year 1999/00, which is also the highest figure so far. This is an increase of 17.36% over that of last year. Regular maintenance works on cooling

water pump, seal ring, control valve and air compressor were carried out. Civil maintenance works for protection of road section near Bhainse which was washed out by last years rainfall was partially completed in order to protect the road from further erosion. Similarly the protection work in power house area which was washed out last year was also carried out. With the installation of telemetric system by Kulekhani Disaster Preven-tion Project, the reservoir water level and spillway of Kulekhani dam can directly be seen in Load Dispatch Centre and Kulekhani -I control room. Rainfall data from Daman, Tistung and Markhu can also be seen in Kulekhani- I control room. This helps the operator in taking emergency measures if they are required due to heavy rainfall.

THERMAL

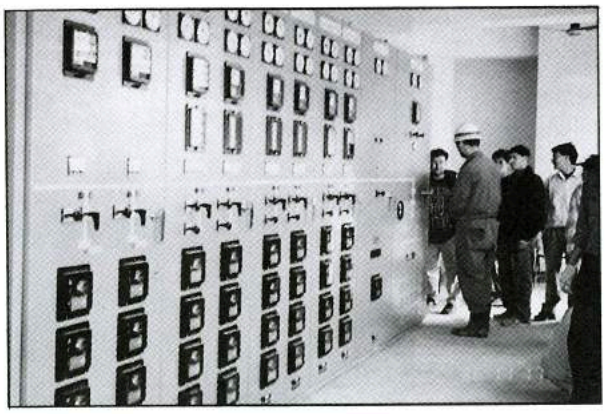
Due to the good monsoon and rainfall during the fiscal year 1999/00, thermal generation had less pressure to generate extra thermal power except during the peak-hours. This is why as compared to that generation of 118.82 GWh in the fiscal year 1998/99, the thermal generation in the fiscal year 1999/00 has come down to 66.73 GWh which is about 56.16 % of last year and 5.13% of the total NEA generation.

During the fiscal year 1999/00, major maintenance plans has been approved and maintenance works are in progress to bring all machines in good operating conditions before winter so that the thermal plants can contribute to maximum generation during the winter when shortage in generation is expected.

GRID OPERATION & MAINTENANCE

In the fiscal year 1999/00, in addition to the routine preventive maintenance works and operation of the grid substations, the following major works were carried out:

- A temporary T-connection between 132 kV Khimti and Marsyangdi Transmission Line was carried out as the GIS switchgear at Balaju substation is still in progress;
- The replacement of damaged 12 kV SF_6 circuit breakers by vacuum circuit breakers at Bardaghat S/S;
- Installation of 33 kV switch board with relays at Damauli S/S;
- Installation and testing of more than 80 energy meters in various substations including installation of new meters and testing of meters at Khimti Power House and Lamosangu S/S belonging to independent power producers (IPP);
- More than 200 relay were tested in the Eastern, Western and Bagmati regional offices;
- Necessary arrangements were made for isolating the Far-western and part of Mid-western regions to consume the 70 GWh of energy received from Tanakpur power house in India;
- Damaged 66 kV towers of the Sunkoshi-Bhaktapur transmission line were replaced;
- Improvement in the Earthing System at New Chabel S/S and the improvement of Power Factor at Siuchatar S/S were carried out;
- Spare parts for diesel generators at Royal Palace and circuit breakers were procured;



- TV sets were installed in all the thirty-five substations as an incentive to the substation operators.

LOAD DISPATCH CENTRE

With the delivery of all the five units of Khimti Power Station, a new dimen-sion was added to the dispatching task. Notwithstanding the constrains imposed by the PPA, Load Dispatch Centre employed the best of its efforts in the optimum utilisation of its generating capabilities. The result was very much visible in the generation of Sunkoshi and Kulekhani-I power station. Working in a concerted way, Sunkoshi power station with a design capacity of 62.73 GWh could generate 66 GWh in this year beating all its past records. Similarly, Kulekhani-I power station (design capacity – 146 GWh) broke all its past records by generating about 250 GWh in this year.

DISTRIBUTION & CONSUMER SERVICE

Distribution and Consumer Services (DCS) is responsible for design and construction of distribution system, distribution of electricity and consumer services, operation and maintenance of distribution system, meter reading, billing and revenue collection etc. All the 75 districts of the kingdom (74 districts NEA, and in Solukhumbu district joint venture with private company) now have electricity supply, however, at present only 57 districts are connected with the central grid, 2 districts have solar electric supply and the remaining 16 districts receive electricity from small hydro power projects. With only about 15% of the population having electricity supply NEA is actively engaged in providing electricity to the remaining parts of the kingdom.

DCS is continually making efforts to maintain good relations with consumers by providing better and

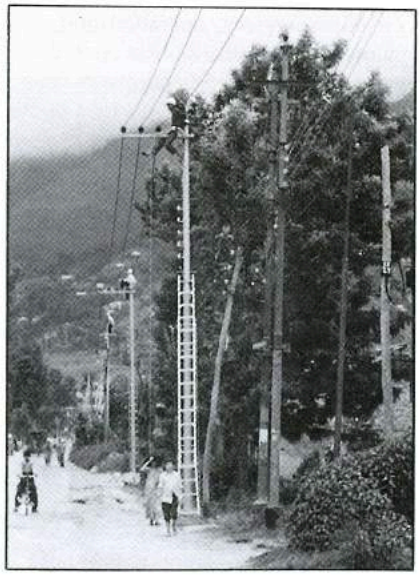
more efficient consumer services.

In order to reduce system losses, DCS has carried out activities such as installing ABC cables, rehabilitation and sealing of meters, installing electronic meters in the premises of big consumers and educating the consumers on efficient energy consumption.

During the past year DCS conducted a seminar under the chairmanship of the then Honorable Minister (Ministry of Water Resources) regarding the activities and safety of DCS. Seminars were also organised in different regional offices and all the branch offices actively took part in them.

Identified as the sector with the potential to be the major profit center in a commercialised NEA, DCS maintains its priority to provide more efficient services by computerising its billing and revenue accounting systems and also continues to implement the concept of profit center in different branches of DCS to improve the revenue collection and cut costs and losses. Financed by ADB as a component of the Kaligandaki "A" Hydro Electric Project, the Loss Reduction Project is under implementation. The main activity of this project is to design and implement a program to reduce non-technical losses of NEA.

Electricity sales, which totaled 1269.274 GWh, was an increase of about 155.698 GWh (13.98%) over last year's sales figure. Internal sales within Nepal registered an increased to 1174.274 GWh and accounted for 92.52 % of the total sales and registered an increase of 124.856 GWh (11.9%) over the last year's figure. Exports for India is 95 GWh which is higher than last year's export of 64.158 GWh by 30.842 GWh (48.07 % increase). During the year in review 1999/00 the number of consumers grew by an estimated 47637 over the previous year 1998/99 figure to reach a total of 670,000. The domestic category accounted for 95.41% of the total consumers, 36.80% of the total sales and contributed to 37.90% of the revenue. The industrial category formed only 2.39% of the total consumers, but accounted for 40.05% of sales and contributed to 38.78% of the revenue. Non-commercial category constituted 1.19% of the consumers, accounted for 5.01% of the sales and 6.86% of the revenue. Likewise, the commercial category constituted 0.48% of the total consumers, accounted for 6.45% of the sales and provided 8.77% of the revenue.



NEA is aware of high loss of electricity in its system. It is undertaking various measures to reduce the technical and non-technical losses. So far electricity pilferage is non-cognizable offence and to make it cognizable offence NEA has formulated Electricity Misuse and Leakage Control Act 2057 which has been approved by HMG and is in process of parliamentary approval.

DEVELOPMENT:

Project Preparation and Studies

Under project preparation and studies following programmes were undertaken in the fiscal year 1999/00.

Project Identification Programme

The Project Preparation and Studies Department carried out desk studies of 21 projects, reconnaissance of 4 projects and preliminary study of 1 project in different development regions of Nepal. Out of 21 desk study projects, the following 4 projects : Likhu-6 (12.5 MW), Likhu- 4A (22 MW), Nyasem (14 MW) and Upper Chameliya "A" (30 MW) were studied to the reconnaissance level and 1 project Likhu- 5 (24 MW) was studied to the preliminary level.

Sediment Monitoring of Kulekhani Reservoir

The sediment monitoring programme of Indra Sarowar (Kulekhani Reservoir) is being carried out on regular basis since 1996. The sediment survey work of Kulekhani was carried out in the last fiscal year in November and the survey report was published in April 2000.

The surface area of the reservoir has been calculated and the result obtained from the method was compared with that from last year and is tabulated as below:

Survey Date (Month/Year)	Dead Volume (Mm^3)	Total Volume (Mm^3)	Total Reduction in Reservoir Capacity (Mm^3)	Sediment Deposited in the last year (Mm^3)
Nov. 1998	7.42	63.3	22.00	-
Nov. 1999	6.98	62.64	22.66	0.66

According to the survey report of 2000 (FY 2056/57) 0.66 Mm^3 of sediment was deposited during the rainy season of 1999. Out of the original gross reservoir capacity of 85.3 Mm^3, 22.66 Mm^3 (26.56%) has been filled with sediment so far.

ENVIRONMENT

With a mandate for carrying out environmental studies, monitoring and implementation of mitigation measures related to power generation, transmission and distribution projects, NEA- Environment Division (ED) conducted the following works in the Fiscal Year 1999/00.

Environmental Studies:

- Coordinated the Environment Impact Assessment (EIA) study of Middle Marsyangdi Hydroelectric Project (MMHEP) carried out by joint venture. consultants TAEC and NESS.
- Coordinated and supervised the EIA of Kulekhani-III Hydroelectric Project conducted by the consultants NEPECON.
- Coordinated and supervised the work of NEPECON for EIA of Jagatpur Madi 33 kV sub-transmission line project in Chitwan district.
- Coordinated and supervised the work of the consultants GEOCE for carrying out the EIA of Upper Modi-A Hydroelectric Project.
- Coordinated and supervised the Initial Environmental Examination (IEE) work of Kanchanpur Kailali Rural Electrification Project conducted by NEPECON.
- Completed the preparatory works for carrying out the IEE of Lalitpur 33 kV sub-transmission line and sub-station project. Supervised the environmental works of Kali Gandaki-A Hydroelectric Project.

Policy input was provided to the Ministry of Population and Environment regarding the changes in Environment Protection Regulation 1997 and Amendment 1999.

Staffs were deputed to Kali Gandaki-A Hydroelectric Project and Soil Rock and Concrete Laboratory for carrying out environmental monitoring works and environmental studies.

NEA-ED participated in the environmental fair organized by Ministry of Population and Environment to celebrate the World Environment Day 2000. Environmental study and monitoring report of different projects, video documentation, maps and other information were displayed. Brochures of different projects were distributed to the public.

On the occasion of world environment day, plantation programme was conducted in 1.5 ha (about 3900 plants of different species including the protected species such as khair and chanp) area of Marsyangdi Hydroelectric Project. The plantation programme was participated by local VDC officials, school teachers, representatives of political parties and staff of NEA-ED.

HUMAN RESOURCES

The total approved positions of staff in NEA during the fiscal year 1999/00 is 9402 and total number of permanent, temporary and daily wage staff currently being employed is 9289. The details of staff situation is as follows.

NEA has undertaken many personnel welfare activities to boost the morale of its staff. These welfare activities include personal loans, financial assistance to the needy staffs and supports to the families of staffs who died during accidents. Personnels have been covered under life insurance and accidental insurance policies also. In the fiscal year 1999/00, 1684 staffs received loan facilities amounting to NRs. 8,99,66,218; four needy staffs received NRs. 1,00,000 each; three staffs who met accidents received NRs. 1,50,000 each. Under life insurance policies premium of NRs. 6,50,00,000 has been paid to National Insurance Corporation and insurance claims have been received for NRs. 1,32,65,240.15. In addition, staffs including their families are entitled for the reimbursement of medical expenditure incurred in the nursing home and government hospital up to NRs. 52,600 per annum. Staffs of officer level and non-officer level are insured against accidents for an amount of NRs. 2,25,000 and NRs. 1,50,000 respectively.

During the year under review (1999/00) 14 staffs have resigned, 88 staffs have been retired and 35 staffs have died as detailed below:

Personnel Status Fiscal Year 1999/00

Level	Service	Approved Position				Existing Situation		
		Regular	Pool	Total	Permanent	Temporary	Daily Wage	Total
Officer Level	Technical	766	46	812	635	93	3	731
	Administration	361	0	361	279	12	1	292
	Total	**1127**	**46**	**1173**	**914**	**105**	**4**	**1023**
Assistant Level	Technical	5049	173	5222	4222	324	647	5193
	Administration	2714	293	3007	2497	247	329	3073
	Total	**7763**	**466**	**8229**	**6719**	**571**	**976**	**8266**
Grand Total		**8890**	**512**	**9402**	**7633**	**676**	**980**	**9289**

Resignations, Retirement and Death				
Level	Resignation	Retirement	Death	Total
12	0	10	0	10
11	0	0	0	0
10	0	2	0	2
9	0	1	1	2
8	0	2	1	3
7	1	7	0	8
6	0	3	1	4
5 ADM	0	2	0	2
TECH	0	12	0	12
4 ADM	1	1	1	3
TECH	3	16	1	20
3 ADM	0	2	0	2
TECH	0	10	6	16
2 ADM	2	2	2	6
TECH	2	8	9	19
1 ADM	3	10	7	20
TECH	2	0	6	8
Total	14	88	35	137

PLANNING

The planning activities of NEA includes updating of data and system plan of NEA, preparation of corporate plans and carrying out of monitoring and evaluation of projects in NEA.

As a part of system planning activities, System Planning Department carried out generation expansion plans using different scenarios. Also it has been providing technical assistance to other departments of NEA for carrying out system studies such as load flow study and other contingency analysis of the power system.

The Corporate Planning Department has been busy in dealing with independent power producers (IPPs) and has signed power purchase agreements (PPAs) for Daramkhola (5 MW), Piluwakhola (3 MW) and Chakukhola (0.91 MW) hydropower projects. It has also prepared the short term Corporate Development Plans (upto FY 2005/06). Its other activities include compilation of the Nepal Electricity Utility Statistics 2000, which is an enormous task to collect all relevant power system and consumer data upto the 11 kV level. The terms of reference (TOR) for preparing GIS maps for Lalitpur district has been completed and the project is expected to be uderway soon.

A partnership programme with Tacoma Power and Wisconsin Electric sponsored by United States Energy Association (USEA) made further progress with reciprocal exchange visits and finalisation of areas of cooperation.

NEA TRAINING CENTRE

NEA considers human resources as one of the important assets and has given high priority for their development. During the fiscal year under review (1999/00), NEA Training Centre executed several number of management, technical and functional enhancement training programmes based upon NEA's need. Special emphasis was given towards management training for the officer level employees of NEA. During this period 36 training programmes were conducted in 21 different courses for 366 NEA's staffs, out of which 169 were officers. In addition to its regular training programmes, the Training Centre conducted special On-the-Job training course for the members of Lamjung Electricity Board also.

NEA AND ITS LEGAL ASPECT

Since 1998 and till the end of the fiscal year 1999/00, a total of 86 cases are registered at the Supreme Court, appellate courts and district courts of the country. Most of these cases belong to misuse of electricity, additional billing, land acquisition, termination of services, etc. Of the verdicts from the courts, 17 are in favour, and 5 against NEA and the rest are in judicial process in the courts.

Apart from providing legal advice to the management, the Legal and Arbitration Division of NEA is involved in providing advice on power purchase agreements, contract agreements with different hydropower companies and drafting of legal documents.

FINANCE AND ACCOUNTS

NEA's financial performance remained encouraging for fiscal year 1999/00. NEA's total revenue increased by NRs. 1421.8 million (24.6% increase) to reach a figure of NRs. 7204.5 million as compared to NRs. 5782.7 million in the previous year. NEA's revalued assets increased to 33981.1 million as compared to NRs. 30527.3 million in the previous year 1998/99. Expenditure in operation and maintenance have increased by only 4.4% reaching a figure of NRs. 5364.8 million as compared to NRs. 5138.5 million in fiscal year 1998/99. Overall, NEA registered a net profit before tax of 1427.5 million as compared to NRs. 589.9 million in FY 1998/99.

In FY 1999/00, NEA has invested NRs. 2621.24 million in capital works and projects, the funding of which comprised of NRs. 771.93 million equity, NRs. 1439.05 million from borrowing and the rest from NEA's own resources. NEA also has invested NRs. 252.26 million in the Chilime hydroelectric project which is being developed by a subsidiary company. By the end of FY 1999/00 NEA's total borrowing stood at NRs. 31471.1 million and a total of NRs. 23919.5 million as debt service.

The financial audit for FY 1997/98 has been completed and the audit report for FY 1998/99 has been submitted to the Board. The audit for the year 1998/99 was undertaken by auditors M/S Price Waterhouse, India, M.R. Sharma & Co. of Nepal. For the financial audit of FY 1999/00 auditors M/S Price Waterhouse, New Delhi and M/K Sharma & Co., Nepal have been appointed. Tax assessment for the fiscal year 1994/95, 1995/96 and 1996/97 are in process.

MANAGEMENT INFORMATION SYSTEM

With a view to improving efficiency and achieving cost-effectiveness in operation and to create culture for knowledge and sharing them by allowing the flow of information, knowledge and best practices across the boundaries of different business units, NEA is establishing a computerized network within NEA headquarters and link it with some offices of NEA outside Kathmandu Valley via telephone network system. This network system will be used for providing management information system (MIS) reports also on regular basis. Towards this, contracts have been already awarded for supply, delivery installation of computer hardware and development of customized application software for producing MIS reports.

To improve revenue performance in some of the branches under distribution and consumer services, MIS Department has undertaken to extend Computerized Billing System in Nepalgunj, Bhairahawa, Birgunj, Kirtipur, Janakpur and Biratnagar. For this purpose contract has been awarded for supply, delivery and installation of computer hardware and standard software.

Licensing and Tax Implication for Existing NEA System

(resume)

A. **For Small Hydropower Projects 1000 kW or less**

- no license required
- no royalty
- no corporate income tax

B. **For Hydropower Plants greater than 1000 kW**

- **LICENSE**

  issued by MOWR March 20, 1995

  license period 50 years

- **ROYALTY**

  for first 15 years :

  NRs 100/ kW installed capacity/annum

  2% of energy sales

  after first 15 years :

  NRs 1000/kW installed capacity/annum

  10% of energy sales

- **CORPORATE INCOME TAX**

  15 year tax holiday thereon 10% less than normally levied

- **IMPORT FACILITIES**

  (equipment, machinery, tools and spares)

  1% customs duty on items not manufactured in Nepal;

  import license fee and sales tax exempted

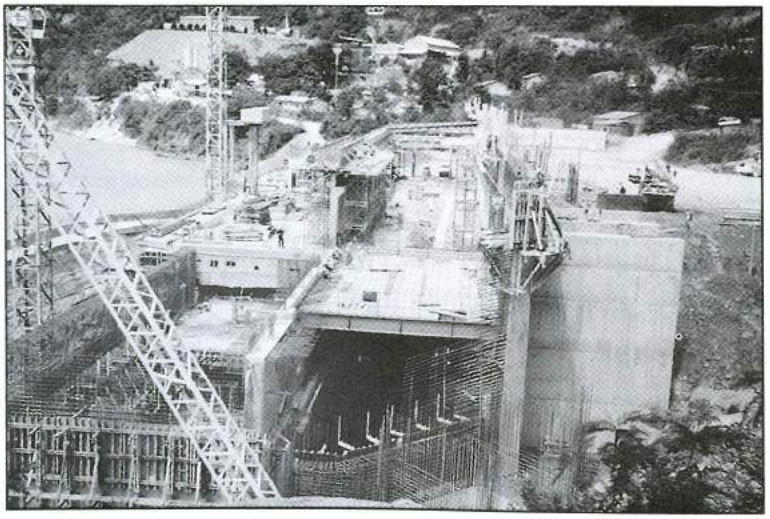
- effective from the date of commercial operation

PROJECT HIGHLIGHTS

Kaligandaki-A Hydroelectric Project

Kaligandaki-A is located approximately 180 km west of Kathmandu on the southern edge of Middle Mountains on the Kaligandaki River in Gandaki Zone. This project is a run-of-river type hydroelectric scheme, with an installed capacity of 144 MW. The Project will generate 842 GWh of energy annually using a power tunnel of about 6 km length. The power generated from the project will be evacuated to the central grid through 132 kV transmission lines to Pokhara and Butwal. The total cost of the project is estimated to be US$ 452 million which is being funded by HMG, NEA, Asian Development Bank and Japan Bank for International Cooperation.

The contract for consulting services for design and construction supervision works was awarded to Morrison Knudsen International Inc. in association with Norconsult International and IVO International. All the construction work such as civil works, hydraulic steel works, electrical and mechanical works and 132 kV transmission lines and substations are in place. The contract for civil works was awarded to Impregilo SpA of Italy; contract for hydraulic steel works to Noell Stahl of Germany; electrical works to Mitsui/Toshiba/Alstom Joint Venture; mechanical works to Mitsui/Toshiba Joint Venture and 132 kV transmission lines and substations to TATA/Marubeni Joint Ventrue.



Though the project was originally supposed to be completed by the end of 2000, due to unfavorable geological conditions, delay in the commencement of civil works and several local problems delayed the project. The interim time extension has been approved up to February 2001. The latest review of the work schedule carried out by the Consultants shows that the wet testing of first unit will be started around September 2001 while the project is anticipated to be completed by December 2001. So far 74% progress has been achieved in the construction of diversion dam and desander basin. Similarly, 53% and 82% progress has been achieved in the construction of headrace tunnel and powerhouse respectively. Electro-mechanical works, transmission line towers erection and construction of substation at Lekhnath, Pokhara are going on. The overall progress of the project achieved so far is about 65%.

Middle Marsyangdi Hydroelectric Project

The Middle Marsyangdi Hydroelectric Project (MMHEP), with an installed capacity of 70 MW, is a peaking run-of-river type of hydropower development scheme located on Marsyangdi River. The project site is situated about 170 km west of Kathmandu, in Udipur and Bhoteodar VDCs of Lamjung district, Gandaki zone in the Western Development Region of Nepal.

His Majesty's Government of Nepal (HMG/N), NEA and the Government of Federal Republic of Germany (FRG) are jointly financing the project. HMG/N and the Government of FRG have already signed the Financial Agreement. NEA and the German funding agency KfW have also signed the necessary agreements for the implementation of this project.

The work of tender design and preparation of tender documents (Stage I) of MMHEP is being carried out by NEA employing the German consulting firm Fichtner Joint Venture. After carrying out necessary field surveys, geological investigations and laboratory tests, the consultant has prepared the Basic Design

Report in April 2000. The draft of tender design and tender documents have been submitted by the consultant in June 2000, and the project has prepared comments on it. The final tender design and tender documents are excepted from the consultants very soon.

NEA has entrusted a local consulting firm (TAEC-NESS) for the tender design stage, and Environmental Impact Assessment (EIA) of this project. The consultants have submitted the Environmental Management Action Plan (EMAP), Scoping as well as Terms of Reference (ToR) of the EIA study. Notice for the Scoping and ToR has been already been published in the national daily newspaper. The environmental consultants have submitted the draft EIA report recently.

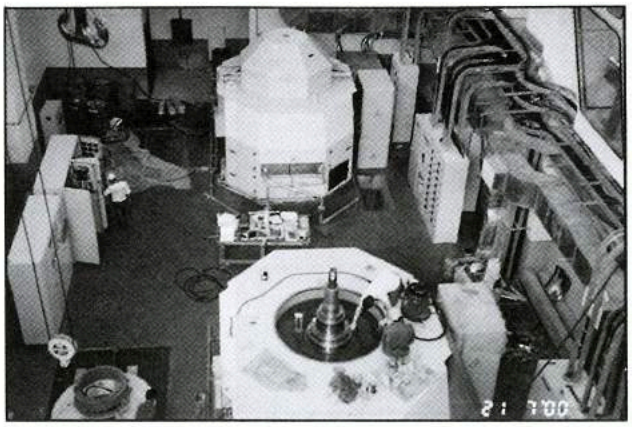
To disseminate the information about the MMHEP to the local people, a public hearing program was organized in the project area in January 2000.

Since some houses are to be acquired at the dam site, plots will be distributed to the families losing their houses for resettlement at the already acquired land at Udipur. The preparation of plots, as well as other physical facilities at the resettlement area is under construction. Similarly, relocation of the temple, cremation site and post office, which lie within the construction area at the dam site, is under progress. The project has acquired land for NEA and consultant camp at Phedikuna, Udipur. Similarly, acquisition of land and houses at the headwork site is under progress.

Nine individual and joint venture companies have been pre-qualified for the civil construction of MMHEP and the list of pre-qualified contractors has already been published. Notice of tender for the Civil Works, Lot C has been published.

Modi Khola Hydroelectric Project

The construction of this 14 MW Hydroelectric Project was initiated in 1996. The Project is being implemented in Deupur VDC of Parbat



District on the Pokhara-Baglung Highway. Main features of the project includes a 7.5 high, 33m long diversion weir, which diverts 27.5m³/sec of water from Modi Khola into a 155m long desanding basin through four gated 30m wide intake and a 250m long underground box culvert. An open canal of 63m length, conveys 25m³/sec of water to a regulating pondage of 32,900 m³ capacity located at the right bank of Modi Khola. The semi-underground power house, housing two generating equipment, is connected to this pondage through a 1,507m long headrace tunnel of 3.15m diameter, 41m long horizontal tunnel (below the surge tank) of 4.24m diameter, 38m high surge tank of 9m diameter, vertical shaft of 51m height with 4m diameter, 123m long pressure tunnel with 4m diameter and 328m long underground penstock pipe with 3.2~3.5m diameter. A 282m long underground tailrace releases the water into the Modi Khola. The generated power will be evacuated to the national grid through a 40 km long 132 kV transmission line to Pokhara.

Because of weak geological condition encountered during tunnel excavation the length of the underground works was increased from 1888m to 2409m and that of steel penstock was increased from 90m to 328m.

The estimated construction cost of the Project is US$ 30 million. A loan agreement with the Government of Korea was signed on 10th November 1997 for an amount of 12,441 million Korean Won for funding the electro-mechanical works, transmission line and technical assistance. HMG/N and NEA are funding the remaining cost.

Originally, two units of 7 MW capacity vertical shaft turbines was planned to be installed and with a net head of 67m and total installed capacity of 14 MW the plant was to generate 91 GWh of energy annually. But due to the high efficiency of the installed generating equipment, the installed capacity of the units has been increased up to 7.4 MW each making the total plant capacity of 14.8 MW. Thus the plant will generate 92.5 GWh of electric energy annually.

The construction of the Project is already completed. The water filling test of the water conveyance system of the Project was initiated by Honorable Minister of State for Water Resources Mr. R.B. Gurung on 1st July, 2000. The electricity generation from the plant is expected to be started in the month of August 2000.

Ilam (Puwakhola) Hydropower Project (IHPP):

Implementation of the 6.2 MW Hydropower project has been recently completed with the in house capability of NEA. The main civil works of the project commenced on October 1995 and was completed on December 1999. Similarly, the hydromechanical and electromechanical works of the project commenced on February 1996 and June 1996 respectively. Testing and commissioning of the project was successfully made on April 4, 2000 and the hydropower station is under commercial operation since then. The feasibility study of the project was carried out with the assistance of JICA in the year 1993. Further detailed design and subsequent implementation of the project have

been carried out by NEA.

The main civil work consists of the construction of 30m long diversion weir, undersluice and intake facilities, two underground desanding basins, spillway tunnel and flushing tunnel, 3238 m long headrace tunnel, headtank, regulating pond (capacity 2057 m^3), penstock supports, power house and switchyard facilities located at the right bank of Maikhola.

Two units of horizontal axis Pelton turbines have been installed at the power house. The power plant will generate 48 GWh energy annually, that will be transmitted to Ilam substation through 3.5 km long 33 kV transmission line. The civil work of the project was awarded to a joint venture of a Chinese and a Nepalese construction company - China National Water Resources and Hydropower Engineering Corporation and Laxmi Shrestha & Co. (CWHEC-Laxmi J/V). Construction of civil works faced myriad of problems particularly in the tunnel / underground works. The adverse geological conditions encountered during the construction were far different and more difficult than the envisaged ones during the project design phase. The extremely unfavorable geological conditions not only delayed the original schedule but also entailed significant additional cost. Similarly, the nearly complete penstock had to be relocated from its original to a new more stable location.

Nepal Hydro and Electric (NHE) Butwal carried out the hydromechanical works of the project. The work mainly comprised of design, manufacture, transportation, installation, erection, testing and commissioning of the various components namely, gates, stop logs, valve, penstock, bends, bifurcation and other accessories.

Similarly, the contract for the electromechanical works of the project was awarded to Dongfang Electric Corporation (DEC), China. DEC completed the work regarding the design, manufacturing, transportation, installation, erection, testing & commissioning of the hydro generating equipment and accessories i.e. turbines, generators, control and relay equipment, switchyard and substation equipment and accessories.

Ilam Hydropower Project is a run of river development and most of the infrastructures are located undergound. The negative impact of the project construction on the local environment is thus insignificant.

The total revised cost on project completion has been estimated at US$ 15.7 million. The original project cost was estimated at US$ 12 million. The incremental cost component has been mainly attributed to the unfavorable geological conditions encountered in the underground works and penstock relocation works. Also the restoration and refurbishment of temporary as well as permanent infrastructures in the aftermath of the tragic flood disaster on August 10, 1997 consumed quite some time and incurred additional cost. The total project expenditures as of the end of the last FY 1999/00 (2056/57) is nearly 1000 million NRs. The power station so far (Ashad 31, 2057) has generated more than 3 GWh of energy.

Chameliya Hydroelectric Project:

The project is located in Darchula district of Far-western Development Region, 18 km north east of Gokuleshwor, the nearest road head on Baitadi-Darchula road. In 1997/98, the detailed study of the project was carried out for 30 MW peaking run-of river type scheme by Civil Design Department, NEA in association will with Soil Rock and Concrete Laboratory (SRCL), NEA. The project will generate 196 GWh energy annually. The main features of the project are 23 m high diversion weir with 3 numbers of 13m high gates, surface dufour type desanding basin with 2 chambers, 4075 m long headrace tunnel, restricted orifice type surge tank with three units of 10 MW vertical shaft Francis turbines each and 265 m long box culvert type tailrace. Power will be evacuated by 127 km long 132 kV transmission line from Chameliya switchyard to Attariya substation. Out of total 18 km long access road, the earthwork and the structural work of 14 km portion and construction of 40 m span bailey bridge over Chameliya river at Karkale have been completed by the end of FY 1999/00 (2056/57) The total cost of the project is estimated at US$ 77 million. In response to the request of His Majesty's Government of Nepal, an official agency of the Government of the Republic of Korea, Korean International Co-operation Agency (KOICA) has already chosen consortium of Hyundai and KOWACO as the consultant to conduct the detailed design and preparation of tender documents of the project.

Small Hydro Projects (SHP)

Various works under the small hydropower projects have been completed and carried out during the year in review. These include:

- Dolpa SHP (200 kW): Undertaken with the funding from HMG/N at an estimated cost of NRs. 67 million, this project was started in FY 1993/94 and has now been completed.
- Kalikot Small Hydropower Project (500 kW): This project was started in FY 1993/94 with

funding from HMG/N at an estimated cost of NRs. 76 million and has also been completed.

- Gamgad Small Hydropower Project (400 kW): The preparatory works of this project was started in 1998/99 and the technical evaluation is now in progress. The estimated cost of the project is NRs. 132 million and it is slated for completion by FY 2002/03.
- Heldung Small Hydropower Project (500 kW): The preparatory works for this project started in FY 1998/99 and the technical evaluation is now in progress. The project is estimated to cost NRs. 103.5 million and is slated for completion by FY 2002/03.
- Small Hydropower Master Plan Project: To assess the potential of small hydropower projects ranging from 100 kW to 5000 kW, the Small Hydropower Masterplan Project (SHMP) was initiated in 1990. Various works have been carried out since then and the project has been successful in identifying feasible projects.
- 33 kV Transmission Line Projects Related with Small Hydropower Projects: Following 33 kV Transmission Lines Projects related with Small Hydropower Projects have been undertaken.
  - Devighat-Dhading 33 kV transmission line is complete except for the substation portion.
  - Sindhuwa-Khandbari 33 kV transmission line will be completed in the fiscal year 2000/01.
  - Sindhuli-Ramechhap 33 kV transmission line has been completed.
  - Gaighat-Diktel 33 kV transmission line project is complete and has been inaugurated by the Rt. Hon. Prime Minister on June 2, 2000 (20 Jestha 2057).
  - Buipa-Okhaldhunga 33 kV and Ilam-Phidim-Taplejung 33 kV transmission lines are under construction.

Kulekhani Disaster Prevention Project (II):

The 60 MW Kulekhani-I and 32 MW Kulekhani-II hydropower stations together presently contribute about 30% of the power requirement of the country. Some important structures of Kulekhani-I were seriously damaged by the floods of July 1993. A sediment survey of the Kulekhani reservoir carried out in March 1993 revealed that about 7.71 million m^3 of reservoir was already filled with sediment. This meant about 66% of the dead storage was reduced in the last 13 years. Considering the urgent need of sediment control works in the reservoir and permanent restoration works of Kulekhani-I, the Kulekhani Disaster Prevention Project (II) was implemented. The project commenced from November 1996 and is schedule for completion by June 2001.

The main features of the project include the construction of a sloping intake, check dams, project inspection road, Rapti outlet tunnel, modification of Mandu head pond and the installation of telemetering systems and other related systems. The bell mouth intake of Kulekhani-I was converted into a sloping intake. The sloping intake is approximately 100 m long and concrete stoplogs can be lowered from the stoplog lowering device at the top of intake to prevent clogging due to sedimentation. Check dams were constructed on the upstream side of reservoir and at the mouth of Darkot to mitigate sediment inflow into the reservoir. In addition, to trap sediment at the upstream edge of reservoir the check dam No. 1 was constructed.

The construction of Mandu embedded head pond, Mandu submerged intake, Rapti pump up intake and outlet tunnel were also completed to avoid direct attack of debris flow, to take submerged water of Mandu river and to pump up water from Rapti river to the intake of Kulekhani-II power station.

The construction of the project inspection road between Bhimphedi and Kulekhani (15km) is being carried out and about 77% progress has been achieved as scheduled. To utilize the Kulekhani reservoir water efficiently, the installation of telemetering system and other related system has been completed by June 25, 2000.

The overall progress of the Project

is about 90% and the Project is scheduled to be completed within fiscal year 2000/01(2057/58). The estimated construction cost of the project is approximately 4060 million Japanese Yen. To meet the project cost, a loan agreement between His Majesty's Government of Nepal and OECF for an amount of 3,484 million Japanese Yen was signed. HMG/N and NEA will fund the remaining cost.

LDC and Balaju Subtation Extension Project:

Civil works of Balaju substation expansion was completed on time. Delivery and installation of electromechanical equipment are underway now. Completion of Balaju substation expansion works will greatly facilitate the evacuation of generated power from Khimti, Bhotekoshi and Chilime power stations. Under the same project, a new LDC is coming up at Siuchatar substation. The new LDC will be interlinked with all the major power stations and substations in the country through SCADA system enabling efficeint and systematic supevision of the operation of expanding electrical network in the country. The project is also expected to establish a strong back-bone of communication capabilities with the use of digital communication technology. Negotiations are underway with Nepal Telecommunication Corporation with the view to capitalise soon-to-be-added communication capabilities of NEA.

Kusaha-Dhalkebar 132 KV Second Circuit Transmission Line Project:

The Indo-Nepal power exchange agreement has a provision of importing power from India to the extent of 50 MW. After interlinking of the Indo-Nepal 132 kV grid system through the Duhabi-Kataiya line, about 30 MW of power is being imported. Since this power could be received only at Duhabi sub-station, the supply from India is limited only to eastern zone. For the purpose of importing additional power from India, stringing of the second circuit from Kusaha to Dhalkebar was carried out under this project so as to transfer power to Lahan and Dhalkebar sub-station as well.

The major works carried out under this project are (a) stringing of 120 km. of 132 kV second circuit line between Dhalkehar and Kusaha on the existing towers. (b) installation of 132/66 kV, 20 MVA transformer at Hetauda sub-station. (c) installation of 132/33 kV, 15 MVA transformer and one 132 kV line bay at Dhalkebar sub-station. (d) installation of two 132 kV line bays at Lahan sub-station (e) construction of a switching station at Kusaha and (f) replacement of 11 kV switchgear panels at Dhalkebar and Duhabi sub-station. These works have been carried out by NEA without the involvement of consultants.

The cost of the project, which is about NRs. 210 million, has been jointly financed by the World Bank, HMG/N and NEA. All the works have been completed on June 2000.

Hetauda-Dhalkebar & Butwal-Bardaghat 132 KV Second Circuit Transmission Line Porject:

This project is part of the Hetauda-Biratnagar 132 kV Transmission Line 2nd Circuit Stringing Project. With this line the power imported from India (during power shortages) can be utilized in an even wider-area. Along with increasing the flexibility of power export and import when necessary, it will serve to transfer power generated from Kaligandaki-A hydropower project to the eastern zone. It constitutes of 174 km of 132 kV line, 2nd circuit stringing on the existing transmission line towers from Butwal to Bardaghat and from Hetauda to Dhalkebar. NEA and HMG are funding the Project which is estimated to cost US$ 5 million.

So far 118 km (Amlekhganj to Dhalkebar) stringing works have been completed. The necessary 132 kV line bays at Hetauda, Dhalkebar, Butwal and Bardaghat are also to be constructed soon.

Birgunj Corridor Reinforcement:

Birgunj corridor which comprise of Simra and Parwanipur also, is one of the major industrial area in Nepal. The corridor's power demand is presently being supplied from Hetauda substation through a double circuit 66 kV transmission line. This overloaded line has created a serious low-voltage problem along the corridor. At the same time, additional power for new industries is putting increasing pressure on the 66 kV system. The proposed scheme requires construction of the following:

a. 132 kV, double circuit transmission line from Pathlaiya to Parwanipur.

b. 132/11 kV substation in Parwanipur.

c. 132/33 & 132/11 kV substation in Chandranighapur.

The project is estimated to cost US$ 15 million and the necessary funding arrangement is being sought. The implementation of the project is expected to commence from 2001, and be completed by the end of 2003.

Chilime-Trishuli-Devighat 66 KV Transmission Line Project

A 39 km. long 66 kV single circuit line is in the final stage of construction for evacuating the 20 MW of power to be generated by Chilime hydropower project. The line will be linked with the national grid at Trishuli 66 kV switchyard. A 4.56 km. 66 kV line connecting Trishuli and Devighat powerhouse has been completed in April 2000. Similarly, three separate 66 kV line bays (two at Trishuli and one at Devighat) have been constructed for the purpose of grid connection of the line. The project is scheduled for completion by September 2000. The entire cost of the project, estimated at NRs. 264 million is to be borne by HMG/N and NEA.

Construction and installation work of the 34.5 km. portion of the 66 kV line connecting Trishuli and Chilime

power houses is in the final stage of completion.

About 50 percent of the total length of the line fall in Langtang National Reserve. To minimize environmental impact, the line is routed mostly along the Trishuli-Somdang Road at an additional cost of the line due to the increased number of tension towers.

One of the challenges of this project was the construction of a 1250 m long span across Trishuli river at Dhunche, which has been successfully completed by the local manpower.

Khimti-Bhaktapur-Balaju 132 kV Transmission Line Project:

The objective of the project is to evacuate power from Khimti-I (60 MW) and Upper Bhotekoshi (36 MW) both being undertaken by the private produces, to the National Grid. The project has completed all construction works by December 3, 1999, well in advance of the completion of Khimti-I hydropower project.

The scope of the works includes the construction of 104 km long 132 kV transmission line, 132/66 kV, 3x16.5 MVA transformer substation at Bhaktapur and 132 kV switching substation at Lamusangu. The Khimti-Lamusangu sector, passing through Ramechhap, Dolkha and Sindhupachok district is 45 km long single circuit line while the 48 km Lamusangu-Bhaktapur sector, passing through Sindhupalchok, Kavrepalanchok and Bhaktapur districts, and the 10 km long Chapali-Balaju sector in Kathmandu district are both double circuit lines.

After completion, the lines and substations were successfully test-charged on December 3, 1999 (17, Mangsir 2056) and the evacuation of power from Khimti-I Hydel Project started from April 14, 2000 (31 Chaitra, 2056).

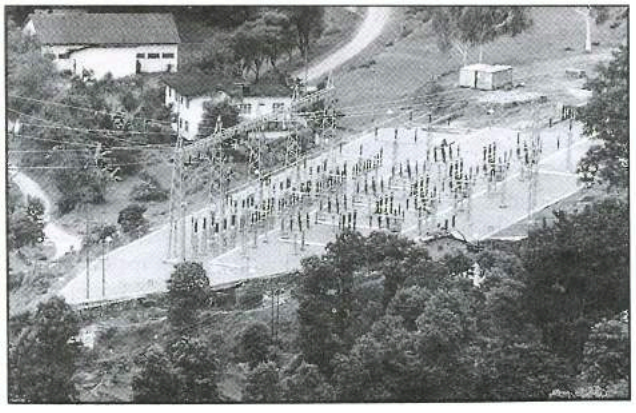
Funded by the Nordic Development Fund (Finland), HMG/N and NEA, the total projects cost is 1200 million Nepalese Rupees.

Lalpur-Gaddachowki 132 KV Transmission Line Project:

Construction of 12 km long 132 kV transmission line from the existing 132 kV substation at Lalpur near the Indo-Nepal border has been completed by NEA to receive the annual 70 million units of energy from the Tanakpur hydropower project in India under the Mahakali Treaty between His Majesty's Government of Nepal and the Government of India. The 132 kV line interconnection with Tanakpur has been established since 29th December 1999. Currently, the power from Tanakpur is evacuated in radial mode up to Kohalpur 132/33 kV substation in the Far and Mid-western 132 kV grid. Funded jointly by HMG/N and NEA, the complete project cost amounts to NRs. 111 million.

Banepa Panchkhal Substation Project:

Two 66/11 kV substations at Banepa and Panchkhal are going to be constructed under this Project. Banepa Substation with a 10/12.5 MVA, 66/11 kV Transformer has been planned to improve the 11 kV distribution network of Banepa & Dhulikhel munici-palities. This substation will receive power from the existing Sunkoshi-Bhaktapur 66 kV line and will provide backup supply to Khopasi powerhouse. Tender for the supply and construction of this substation has been awarded. Construction works will start shortly.



National Hydroelectric Power Company is undertaking construction of Indrawati hydropower plant in the Indrawati basin. NEA has concluded the power purchase agreement to procure the energy from this power plant at Panchkhal substation. For this purpose the Panchkhal substation has to be reconstructed within the agreed time frame. A 5 MVA transformer will be installed at this substation for local distribution. Tender for the supply and construction of this substation has been floated.

The total estimated project cost is NRs. 228 million and will be financed by HMG/N and NEA.

Seventh Power Project:

The Seventh Power Project, jointly funded by the Asian Development Bank, HMG/N and NEA at an estimated cost US$ 70.468 million was started in 1990 and is now almost complete with only minor work remaining. ADB loan No. 1011 NEP (SF) for this project was wound up in December 1998 and all activities relating to investment from ADB have been completed within the grace period i.e. June 1999. The rural electrification works performed through local funding of HMG/N and NEA have nearly been completed now. The 25 districts benefiting from the project are Ilam, Jhapa, Morang, Sunsari, Siraha, Udaypur, Dhanusha, Mahottari, Sarlahi, Rautahat, Bara, Parsa, Chitwan, Dhading, Nuwakot, Tanahun, Sindhupalchok, Nawalparasi, Gulmi, Arghakhanchi, Palpa, Kapilvastu, Rupandehi, Banke and Surkhet. To achieve the target to electrify 970 villages in those districts, the project has implemented all activities under the programme including reinforcement and rehabilitation of 11 Nos. of existing 132 kV and 33 kV substations, construction of 15 Nos. of new 33 kV substation, construction of 337 km of

33 kV transmission lines, construction of 2456 km of 11 kV lines and 3311 km of 400/230 volt distribution lines, procurement of material and equipment for rural electrification, procurement of office support equipment, procurement of vehicles and establishment of a new pre-stressed pole plant. The pole plant has manufactured 46130 Nos. of 11m, 9m and 8m. PSC poles within a span of four years, thus contributing a lot to the distribution system of NEA. With the completion of the project about 2,00,520 houses of the 25 districts shall receive electrical onnections, benefiting about 12,00,000 people. The total investment made by the project till May 2000 is US$ 66.902 million.

Rural Electrification, Distribution and Transmission Project:

The Asian Development Bank (ADB) has agreed to provide a credit assistance of about US$ 50 million from the Bank's Special Fund resources, to HMG/N for the implementation of the Rural Electrification, Distribution and Transmission Project.

The objectives of the project are to develop rural electrification, to reinforce NEA's distribution systems and to improve NEA's performance. The major components included in the project are:

- **Rural Electrification**: To aid rural development, 240 village development councils (VDC), 1,54,000 rural households are to be connected. 9 Nos. of 33/11KV substations will be constructed for electrification in new areas. 694 distribution transformers (11kV/LV); 1150 km of 11 kV lines, 117 km of 33 kV lines; and 1314 km of low voltage line will also be constructed.
- **Distribution System for Isolated Power Project**: Under this component electricity distribution system for small isolated power supply projects off the intigrated NEA distribution grid to be developed.
- **Distribution System Reinforcement**: This component will serve load growth in existing service areas in the Eastern, Central and Western regions. This component includes 9 new 33/11 kV area substations; and upgrading for 11 other area substations; construction of 74 km of new 33 kV line, and 998 km of new or upgraded 11 kV line; installation of new or replacement of 481 distribution transformers with a total capacity of 63.2 kVA; and construction or replacement of 545 km of LV line.
- **Transmission Development**: To strengthen transmission in the Kathmandu valley (expansion of existing 132 kV substation at Bhaktapur, Patan, Balaju and New Chabel), 132 kV ring around the entire valley will be completed and provisions for a new transmission interconnection with India will be made.
- **Computerised Billing Systems**: Out of the 50 branches and 65 sub-branches, NEA is conducting manual billing and revenue collection activities. For improvement of revenue collection performance of NEA, introduction of computerised billing system in these branches and sub-branches is very important. Out of these branches, 15 larger distribution branches located within and outside the Kathmandu Valley have been designated as Profit Centres. Bank has allocated a total of US$ 1.875 million (foreign component cost of US$ 1.25 million and local component cost of US$ 0.625 million) for computerised billing system of these larger distribution branches. The initial work on this task has been already initiated and short-listing of consultants is currently in progress.

  Initially this task was conceptualised as Computerised Billing Project Phase-II and was initiated with financial assistance of the World Bank from the saving of the loan to the power sector efficiency project to computerise 15 revenue collection centres in Kathmandu valley. However, after the closing of this loan at the end of December 1998, implementation of the project could not proceed and ADB was approached for financing.
- **Other Institutional Strengthening**: Under this component, NEA's institutional capacity will be strengthened, distribution profit centres will be established, revaluation of its fixed assets will be done and computer database for these assets will be established.

In order to operate in a commercial manner, NEA has introduced profit centre concept in 1998 in its 15 distribution divisions. These divisions account for 64% of NEA's consumers and 81% of revenues. The main objectives of profit centre concept are as follows:

- Establish a commercial basis and orientation for NEA's distribution operation with profit centre accounting, to improve distribution efficiency and reduce cost;
- Establish reasonable employee performance schemes;
- Determine the appropriate performance measures and bench marks for each centre;
- Review and analyze the cost accounting system of NEA and then establish suitable cost accounting system for each profit centre;
- Determine the bulk transfer price to each profit centre;

- Determine the delegation of authority in profit centre;
- Establish energy audit and vigilance system.

The total cost of this component is US$ 4,50,000 (Foreign Loan US$ 3,00,000 and HMG/N, NEA US$1,50,000). Preparation of terms of reference, short listing and invitation of proposal for the consulting services are in progress.

The project will begin in 2000 and will be completed by the end of 2004 at an estimated cost of US$ 94.5 million. OPEC Fund for International Development will provide US$ 10 million while the remaining US$ 34.5 million will be from HMG/N and NEA.

Loss Reduction Project:

Financed by ADB as a component of the loan to the Kaligandaki-A hydro electric project, the Loss Reduction Project is under implementation since the fiscal year 1996/97. The main activities of this project is to design and implement a programme to reduce non technical losses of NEA. The consulting service for this project was conducted by the International consultant NRECA International Ltd. USA since March 1998 to November 1998. The final report of consulting services was submitted by the consultant and it was reviewed by NEA management. A detailed list of materials and equipment required to implement the program for reducing non-technical losses was prepared jointly by NEA and the consultant.

Procurement of 1200 electronic meters for replacement of electromechanical meters of large consumers including CTPT metering units, software for distribution planning and loss analysis, 150 km ABC cables, 500 km ACSR conductors and other hardware have already been done. About 400 km of ACSR conductors, 300 electronic meters and 100 km of ABC cables have already been installed in the selected areas. This project is expected to be completed by FY 2000/01.

Kailali-Kanchnapur Rural Electrification Project:

As per the agreement signed between DANIDA and His Majesty's Government of Nepal (HMG/N) in February 2000, implementation of the Kailali-Kanchanpur Rural Electrification Project is now at the detail engineering design stage.

The Project includes the construction of 3 new 33/11 kV Sub-stations, rehabilitation of 2 existing sub-stations, construction of 600 km 11 kV overhead lines and the construction of 300 km of 400/230 volt distribution lines.

The project is expected to be completed in three and half years and it will electrify 29 VDCs and 271 load centres providing electricity to 16000 new consumers. Independent User's Co-operative Group shall manage the distribution system.

Data Based Digitized GIS Mapping System

To prepare data based digitized GIS mapping system, a Pilot Project at Kathmandu West Branch has been undertaken from NEA's own financial resources and it has been completed. The objectives of this project is to develop and strengthen the analytical capability for calculating technical losses in the distribution system by using information technology. The benefits from this project are following:

- Availability of digitized GIS maps in digital format and hardcopy.
- A complete set of consumers data in hard and softcopy.
- Various recommendations to reduce technical losses.
- Physical inventory.

These GIS data will be integrated with Milsoft WindMil software to carry out loss analysis.

In the fiscal year 2000/01 it has been planned to prepare GIS Mapping System of Electrical Network of Lalitpur district covering approximately 47,000 consumers.

Nepal Electricity Utility Statistics - 2000 Project

NEA is planning to compile data of an entire electricity network covering powerhouse to distribution transformer level. The data shall include the history, salient features and maps based Auto CAD and GIS (ARC VIEW/ARC INFO) software.

The various data and electrical network diagrams will be collected from respective branches and department thus it will be a historical document of electricity utility of Nepal covering a period of 90 years. This document will be useful to all who are concerned with electricity business.

Training Centre Establishment Project:

Started in the year 1997, NEA Training Centre Establishment Project is now heading towards its final stage of completion. The project was basically intended for establishing a permanent modern training institution of NEA with appropriate infrastructure facilities.

For executing this project a Training Centre Complex Master Plan for the physical establishment and a Training Master Plan for the academic programs were prepared and finalized. The construction of physical facilities has been completed. The facilities include academic block (comprising of 22 lecture halls, 2 large lecture halls, 2 seminar halls, 5 workshops, 2 computer rooms, 4 electrical laboratories, 2 technical drawing rooms, 4 instructor's rooms, 6 syndicate rooms, 3 stores), administrative block cum library, cafeteria, warden's quarter and trainee's hostel. The remaining works of the project such as installation of pedagogical equipment and landscaping shall be carried out in the current fiscal year 2000/01. Academic activities in the Training Centre shall also start from the fiscal year 2000/01.

PROJECT STUDIES

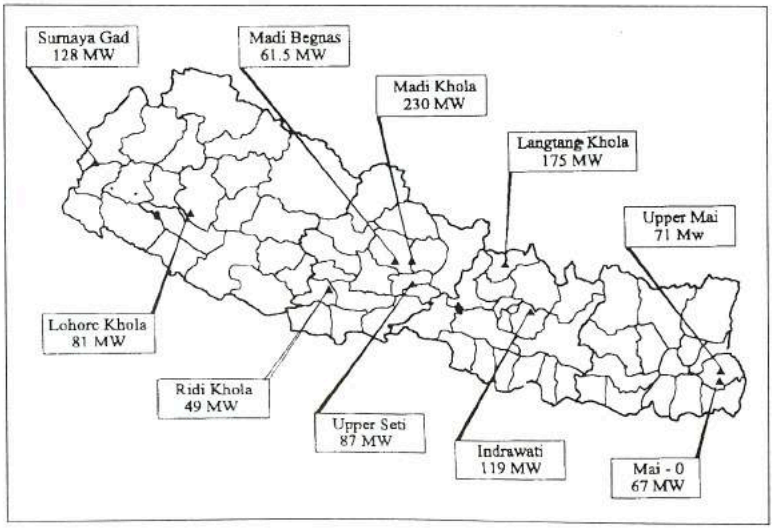
Indentification & Feasibility Study of Storage Project:

The "Identification & Feasibility Study of Storage Project" is undertaken with the objective of recommending medium sized storage projects that are economically viable & environmentally sustainable in the long run. Inventory study of 102 shemes were carried out, of which 44 are in the eastern, 30 are in the central and 28 are in the western river basins of Nepal. These projects were ranked on the basis of technical, economic and environmental criteria. Eight of these projects were recommended for fine screening study which are as follows:

Mai-0 (67 MW, Ilam), Upper Mai (71 MW, Ilam), Madi Begnas (61.5 MW, Kaski), Madi (230 MW, Kaski), Seti (86.6 MW, Tanahu), Ridikhola (49 MW, Gulmi), Indrawati (119 MW, Sindhupalchok) and Surnayagad (128 MW, Baitadi).

Two more projects which have been studied to pre-feasibility level were also recommended for the fine screening study. These are: Langtang (175 MW, Rasuwa) and Lohare (81 MW, Dailekh). Site investigation for all the 10 schemes have been carried out in early 2000.

Based on the preliminary design project optimization, environmental impact assessment, project economics, etc., two of the ten best projects will be recommended for feasibility study which will be carried out in the year 2000/01.



Andhi Khola Storage Hydroelectric Project (180 MW):

Andhi Khola HEP is a storage type project with an installed capacity of 180 MW and capable of generating 693 GWh including 394 GWh of firm energy annually. This project is located in Syangja district near Galyang bazar in the Western Development Region. The cost of the project according to the 1998 price level is US$ 374 milliion. The benefit/cost (B/C) ratio is estimated to be 1.56 with an internal rate of return (IRR) of 15.11%.

According to the feasibility study, the salient features of the project is 157 m high concrete faced rock fill dam capable of storing 335.5 Mm^3 of water, out of which 238.7 Mm^3 is live storage. The water from Andhi Khola reservoir will be conveyed by a 3395 m long headrace tunnel, 230 m high drop shaft and 1350 m underground powerhouse equipped with three 60 MW Francis turbines and the water is to be discharged into the Kali Gandaki river through a 85 m long tailrace.

Tama Koshi-3 Hydroelectric Project (330 MW):

This is a storage type project on Tama Koshi river in Dolakha district of Central Development Region. The project site is located about 140 km east of Kathmandu. The dam site is located about 2.5 km upstream from Nayapul on the Lamosangu-Jiri road and the powerhouse is located about 5 km downstream from Nayapul and 500 m upstream from the confluence of Dholi Khola with Tama Koshi. In the FY 1998/99 the preliminary investigation works and conceptual level design including dam height optimisation of the project was carried out.

With a catchment area at the dam site of 2752 km^2, a 160 m high rock fill dam, a 7.5 km tunnel, gross head of 214.5 m, and with an installed capacity of 330 MW and a mean

annual flow of 144.2 m^3/s, it will generate about 1466 GWh of energy annually. It will have a storage capacity of about 500 Mm^3.

For the additional investigation works 100 m of core drilling, hydrological survey and reservoir area mapping was carried out.

Kulekhani III Hydroelectric Project

Kulekhani-III Hydroelectric Project is a peaking power station located 115 km southwest of Kathmandu. It lies at Bhainse VDC, Makawanpur district on the right bank of Rapti river which is situated near the Hetauda - Bhainse road.

Kulekhani-III HEP primarily utilizes the tailwater from Kulekhani-II (13.3m^3/s). A discharge of 1.5 m^3/s from Khanikhola shall be added to it. With the help of a 3.4 km long connecting tunnel a total discharge of 14.8m^3/s shall be conveyed to Yangrang Khola reservoir. In addition, Yangrang Khola river discharge (0.5m^3/s) shall be added to it. A 45m high regulating dam across Yangrang Khola will be constructed to create the reservoir. All these discharge comprises of a pondage of about 0.5 million m^3 in the regulating reservoir. Afterward, this water shall be taken to an underground power house through a headrace tunnel of 4.5m diameter and 350m long to generate 42 MW of power for 4 hours peaking. The water shall be discharged into the Rapti Khola through a 2.10 km long tailrace tunnel of diameter 4.5m. The annual energy generation of this project shall be 50 GWh.

For the investigation purpose various works have been completed. These works include core drilling and seismic refraction survey at tailrace site, topographic survey of the whole project area and test-adit (340m) at different locations. The Environment Impact Assessment (EIA) study of this projects is being carried out.

The estimated cost of the project is US$ 53 million. Nepal Electricity Authority has approached the Ministry of Water Resources to request Japanese Government to provide technical and financial assistance for the detailed design work of the project.

Upper Modi-A HEP (42 MW):

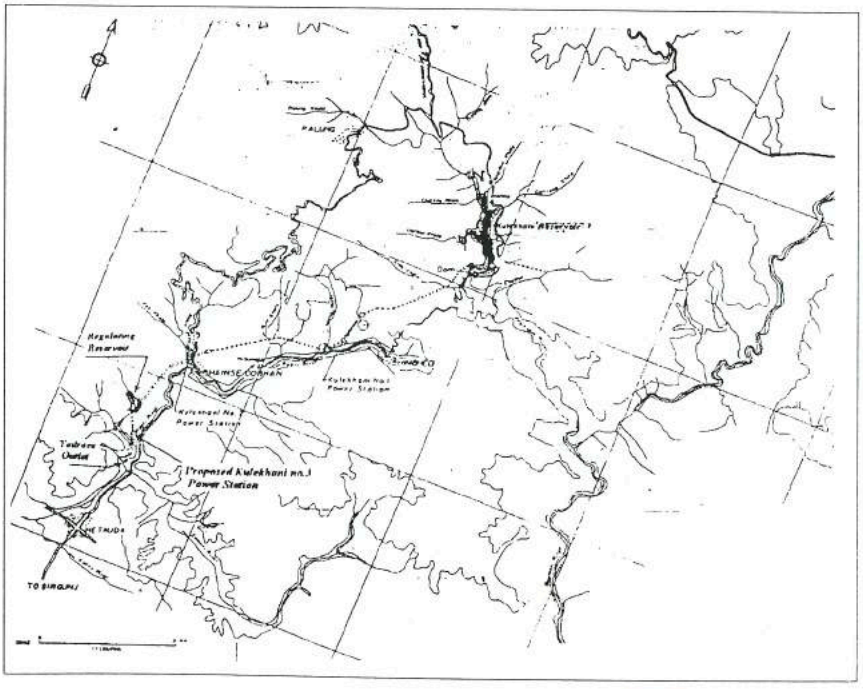
The Upper Modi-A HEP is a 42 MW run-of-river scheme with one hour peaking facility. The project site is situated in the Kaski District of Gandaki Zone in the Western Development Region of Nepal. It is located just upstream of Upper Modi HEP. The feasibility study of this project was carried out during the fiscal year 1999/00 by NEA from its financial resources.

The project has a catchment area of 330 km^2, mean annual flow of 35.3 m^3/s, design discharge of 16.71 m^3/s, headrace tunnel of 6085 m lenght and a surface powerhouse with two Francis Turbines of 21 MW each. The project is capable of generating average annual energy of 283.2. GWh including 144.1 GWh of firm energy.

The estimated cost of the project is US$ 60.72 million the estimated IRR is 22.74% and the B/C ratio is 2.51.

Distribution Network Development Project:

The project has completed the techno-feasibility study for Rural Electrification and Distribution System Reinforcement (RE/DSR) scheme of 19 districts of Far-western, Mid-western, Western and Central Regions of Nepal under His Majesty's Government of Nepal and Nepal Electricity Authority financing. The total cost estimate for the implementation of RE/DSR schemes of all the above districts is US$ 136 million (1998 cost). These districts are Darchula, Baitadi, Dadeldhura, Doti, Achham, Dailekh, Surkhet, Bardiya, Banke, Salyan, Rolpa, Dang and Pyuthan from the Far and Mid-western Regions. Baglung, Parbat and Syanja from the Western Region and Lalitpur, Bhaktapur and Kavreplanchok from the Central Region. More detailed studies are necessary before implementing the schemes. So NEA has initiated the Initial Environmental Examination (IEE) and detail engineering design for RE/DSR of Lalitpur, Bhaktapur Kavreplanchok districts with funding from HMG/NEA. Request have been made to the World Bank for financing RE/DSR schemes for implementation of Lalitpur, Bhaktapur and Kavreplanchok districts. More financing arrangements are needed for further RE/DSR of the remaining 16 districts.



BALANCE SHEET AS OF JULY 15

in million NRs

EQUITY AND LIABILITIES	1999*	1998	1997	1996	1995	1994	1993	1992	1991
Equity									
Share Capital	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0
Share Allotment Suspense	12418.6	11324.3	9952.6	8231.6	7122.9	5796.7	5190.6	3956.8	3916.8
Capital Reserve	158.8	158.8	158.8	158.6	147.9	137.6	120.9	88.3	67.6
Reserves & Surplus	1536.1	1200.0	1046.5	359.0	(319.5)	(346.0)	(444.6)	(550.8)	(500.3)
Revaluation Surplus	10637.9	11965.6	13421.4	14799.3	14286.1	14238.3	13988.0	13421.7	12369.4
Insurance Fund	160.0	140.0	120.00	100.0	80.0	0	0	0	0
Total Equity	**25911.4**	**25788.8**	**25699.3**	**24648.5**	**22317.4**	**20826.6**	**19854.9**	**17916.0**	**16853.5**
Long-Term Liabilities									
Long-Term Loan	23919.2	20848.4	17403.2	14900.4	13367.2	12880.6	11649.5	10070.4	8812.3
Total Long-Term Liabilities	23919.2	20848.4	17403.2	14900.4	13367.2	12880.6	11649.5	10070.4	8812.3
Current Liabilities & Provisions									
Deposit from Customers	76.6	59.5	76.8	61.6	90.5	36.0	42.4	25.5	24.8
Other Deposit	783.3	677.5	407.7	359.3	235.0	183.2	84.5	42.5	21.3
Creditors for Goods	15.2	49.3	32.4	15.7	28.9	5.9	11.2	12.8	10.3
Other Creditors	266.1	201.6	429.1	26.1	22.6	31.1	16.8	40.3	59.4
Payable to Others for power purchase	595.4	377.6	4.3	6.6	8.3	11.6	4.6	18.4	106.6
Payable to HMG for Interest (Other)	777.5	877.1	647.6	319.0	407.8	270.0	224.5	21.4	192.7
Payable to HMG for Other (int)	1585.7	914.4	440.4	102	263.2	648.8	171.8	80.1	201.6
Royalty Payable	752.1	398.7	473.8	585.0	358.0	–	–	–	–
Provision for Bonus	48.6	39.4	38.1	31.5	16.6	11.9	6.4	2.4	2.4
Provision for Gratuity & Pension	140.3	140.3	140.3	140.3	140.3	140.3	140.3	140.3	140.3
Provision for Medical Facilities	20.7	20.7	20.7	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	13.4	13.4	13.4
Provision for Wealth Tax	–	28.5	22.5	17.5	14.5	11.5	8.5	2.5	–
Provision for Income Tax	191.9	207.0	178.1	104.8	34.4	34.5	7.2	7.2	7.2
Total Current Liabilities & Provisions	**5266.8**	**4005.0**	**2925.2**	**1803.7**	**1654.2**	**1416.9**	**752.3**	**427.5**	**800.7**
Inter Unit Balance (Net)	–	–	–	–	–	34.9	52.7	71.7	19.0
TOTAL LIABILITIES AND EQUITY	**55097.4**	**50642.2**	**46027.7**	**41352.5**	**37338.8**	**35124.1**	**32291.6**	**28466.6**	**26538.2**

* *Subject to final audit*

BALANCE SHEET AS OF JULY 15

in million NRs

ASSETS	1999*	1998	1997	1996	1995	1994	1993	1992	1991
Fixed assets									
Land	765.2	727.0	696.1	706.0	665.3	636.4	611.4	578.9	537.6
Buildings	906.1	885.5	789.7	798.8	755.1	646.4	601.3	573.7	535.0
Hydraulic Plant & Machinery	15876.3	16619.5	16180.3	16174.1	15951.7	15802.5	15490.0	15171.2	14568.0
Internal Combustion P & M	1496.2	594.1	651.0	708.0	716.9	737.2	752.0	175.6	178.4
Solar Power Plant	33.3	34.7	36.2	37.6	39.0	40.5	41.9	43.3	45.1
Transmission Line	2669.1	2656.0	2837.9	3057.3	3024.9	2704.6	1815.0	1825.8	1797.6
Substation	2914.6	2432.9	2651.5	2901.0	2959.5	3038.4	2414.2	2436.4	2404.5
Distribution Line	5554.8	5630.6	4535.0	4750.1	3983.4	3042.6	2244.0	2226.5	2142.8
Meter & Metering Equipment	82.7	89.4	85.8	100.3	112.5	97.4	59.7	56.3	50.4
Consumer Service	20.5	25.6	31.2	37.0	42.8	48.4	50.3	52.7	52.9
Public Lighting	22.6	18.1	17.5	16.3	16.3	14.4	15.0	15.5	15.9
Tools and Instrument	23.8	20.2	17.0	13.3	12.4	7.6	5.2	5.4	5.3
Vehicles	79.7	80.5	55.8	92.4	85.4	37.9	10.8	8.9	18.9
Furniture & Office Equipment	81.1	76.0	46.3	43.4	46.4	39.8	14.8	13.9	14.0
Miscellaneous	1.3	1.2	2.1	3.0	2.0	0.4	0.2	0.3	0.3
Total Fixed Assets	**30527.3**	**29891.3**	**28633.4**	**29438.3**	**28413.6**	**26894.5**	**24126.2**	**23184.6**	**22366.7**
Other Assets									
Capital Works in Progress	17838.7	14179.0	11974.6	7362.7	5229.1	5439.3	6250.1	3816.4	2890.0
Investment in Securities	326.1	247.7	150.6	54.0	30.5	356.7	79.0	30.4	8.1
Total Other Assets	**18164.8**	**14426.7**	**12125.2**	**7416.7**	**5259.6**	**5796.0**	**6329.1**	**3846.8**	**2898.1**
Deferred Expenditure	608.1	443.3	267.3	410.8	588.5	98.6	108.6	121.0	169.8
Inter Unit Balance (Net)	426.6	188.7	133.2	335.7	144.5	143.7	–	–	–
Current Assets									
Inventories	788.8	914.9	804.0	617.9	429.1	340.4	289.5	270.4	250.8
Accounts Receivable	1697.1	1435.4	1209.1	1,040.0	682.6	569.9	474.8	576.0	556.1
Advances Recoverable	1891.0	1709.6	1329.0	848.4	471.7	149.8	145.8	113.8	122.2
Cash & Bank	993.7	1632.3	1526.5	1244.7	1349.2	1131.2	817.6	354.0	174.5
Total Current Assets	**5370.6**	**5692.2**	**4868.6**	**3751.0**	**2932.6**	**2191.3**	**1727.7**	**1314.2**	**1103.6**
TOTAL ASSETS	**55097.4**	**50642.2**	**46027.7**	**41352.5**	**37338.8**	**35124.1**	**32291.6**	**28466.6**	**26538.2**

* *Subject to final audit*

HIGHLIGHTS OF 1999/00

Description	2000**	1999*	Increase/Decrease Amount	Percent
Total Revenue Net (M. NRs)	7204.5	5782.7	1421.8	24.59
Net Sale of Electricity (M. NRs)	6850.1	5396.8	1453.3	26.93
Income from Other Services (M. NRs)	354.4	385.9	(-)31.5	(-)8.16
Operating Expenses, Including Depreciation (M. NRs)	5364.8	5138.5	226.3	4.40
Depreciation (M. NRs) + +	1870.0	1853.6	16.4	0.88
Net Income, after interest befor tax (M. NRs)	1427.5	589.9	837.6	141.99
Interest on Long-Terms Loans (M. NRs)	1312.2	1206.5	105.7	8.76
Long-Term Loans (M. NRs)	31471.1	23919.5	7551.6	31.57
Net Fixed Assets (M. NRs)	33981.1	30527.3	3453.8	11.31
Number of Customers	670,000	622363	47637	7.65
Total Sales Of Electricity (GWh)	1269.274	1113.576	155.698	13.98
Internal Sale (GWh)	1174.274	1049.418	124.856	11.90
Average Consumer's Consumption (KWh)+	1752.66	1686.18	66.48	3.94
Average Price Of Electricity (NRs/KWh)+	5.70	5.01	0.69	13.77
Peak Load Interconnected System (MW)	351.86	326.4	25.46	7.80
Total Available Electric Energy (GWh)	1701.45	1475.0	226.45	15.35
Hydro Generation (GWh)	1233.22	1046.51	186.71	17.84
Purchased Energy (GWh) India	232.22	232.39	(-) 0.17	(-) 0.07
Nepal	169.30	77.28	92.02	119.07
Exported Energy (GWh)	95.00	64.158	30.842	48.07
Thermal Generation (GWh)	66.73	118.82	(-) 52.09	(-) 43.82
Internal consumption (Gwh)	29.884	23.600	6.284	26.63
Net System Losses (Percentage)	23.90	22.90	1.00	4.36

Note:

* Subject to final audit
** Provisional figures
\+ Internal
+ + On revalued assets

TARIFF RATES

(effective from November 17, 1999)

CATEGORY A : DOMESTIC CONSUMERS

A.1	Minimum Monthly Charge:	**Minimum Charge**	**Exempt**
	METER CAPACITY	**(NRs.)**	**(KWh)**
	Upto 5 ampere	78.00	20
	6-30 ampere	208.00	40
	31-60 ampere	468.00	80
	Three phase supply	1248.00	200

A.2	Energy charge:	
	Upto 20 units	Rs. 3.90 per unit
	21-250 units	Rs. 6.50 per unit
	Over 251 units	Rs. 9.25 per unit

CATEGORY B : TEMPLES

	Energy charge	Rs. 4.65 per unit

CATEGORY C : INDUSTRIAL

	SUB-CATEGORY	Demand Charge	Energy rates (Rs/unit)		
		(Rs/kVA)	Peak time*	Off-Peak	Average
C.1	Low voltage (400/230 volt)				
	Rural and cottage	25.00	-	-	5.00
	Small Industry	50.00	-	-	6.10
C.2	Medium voltage (11 & 33kV)	105.00	6.30	3.85	5.50
C.3	High voltage (66 kV and above)**	95.00	5.00	3.00	4.35

CATEGORY D : COMMERCIAL

D.1	Low voltage (400/230 volt)	125.00	-	-	7.25
D.2	Medium voltage (11 & 33 kV)	120.00	8.15	4.95	7.10

CATEGORY E : NON-COMMERCIAL

E.1	Low voltage (400/230 volt)	88.00	-	-	7.50
E.2	Medium voltage (11 & 33 kV)	98.00	8.50	5.15	7.40

CATEGORY F : IRRIGATION

F.1	Low voltage (400/230 volt)	-	-	-	3.25
F.2	Medium voltage (11 & 33 kV)	26.00	3.70	2.25	3.25

CATEGORY G : WATER SUPPLY

G.1	Low voltage (400/230 volt)	78.00	-	-	3.90
G.2	Medium voltage (11 & 33 kV)	83.00	4.35	2.65	3.80

CATEGORY H : TRANSPORTATION

H.1	Medium voltage (11 & 33 kV)	98.00	4.60	2.80	4.00

CATEGORY I : STREET LIGHTS

I.1	Street lights with meter	-	-	-	4.65
I.2	Without meter	1690.00	-	-	-

CATEGORY J : TEMPORARY SUPPLY

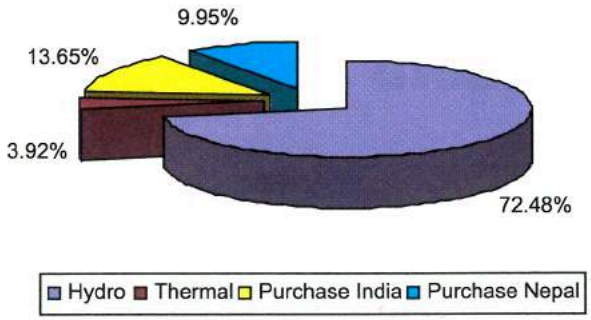
J.1	With meter	-	-	-	12.00

Note : If demand meter reads kilowatts (kW) then kVA = kW/0.8

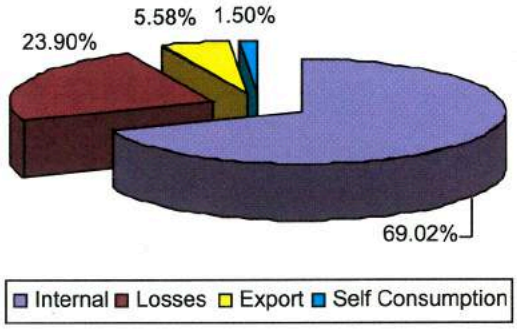
* Peak time : 1800-2200 hrs; Off peak : 2200-0600 hrs; Normal : 0600-1800 hrs.

** Applicable to consumers of all category

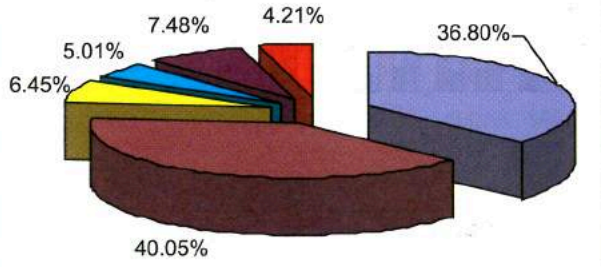
AVAILABILITY FY2000



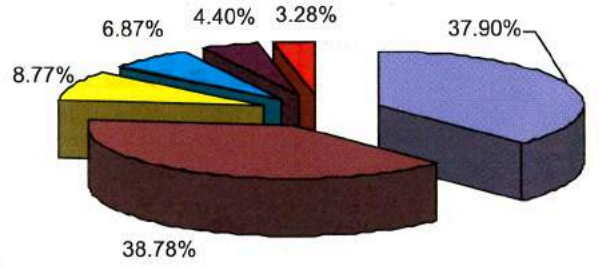
UTILIZATION FY2000



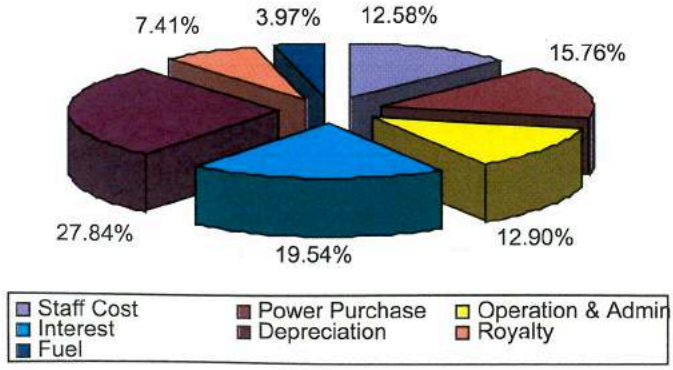
SALES FY2000



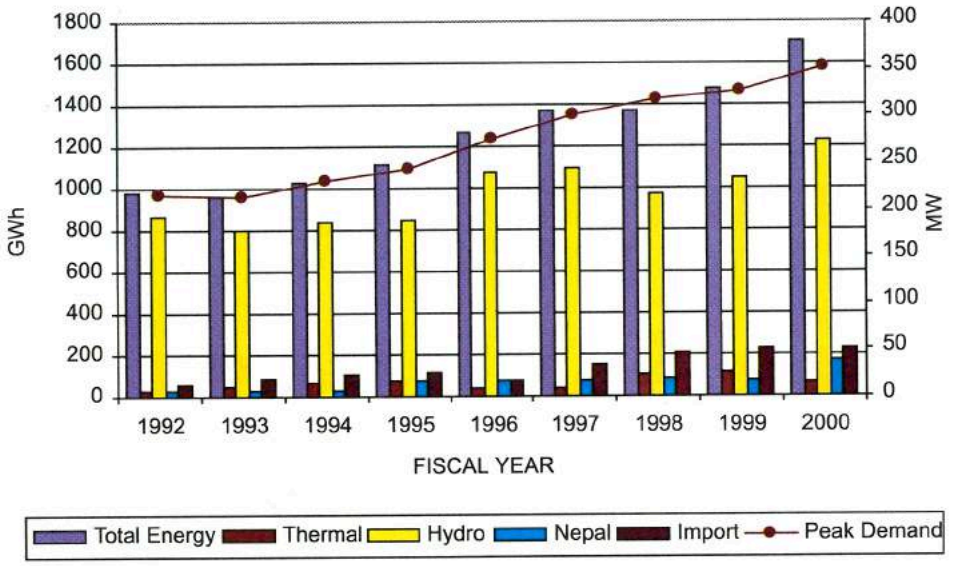
REVENUE FY2000



EXPENDITURE FY2000



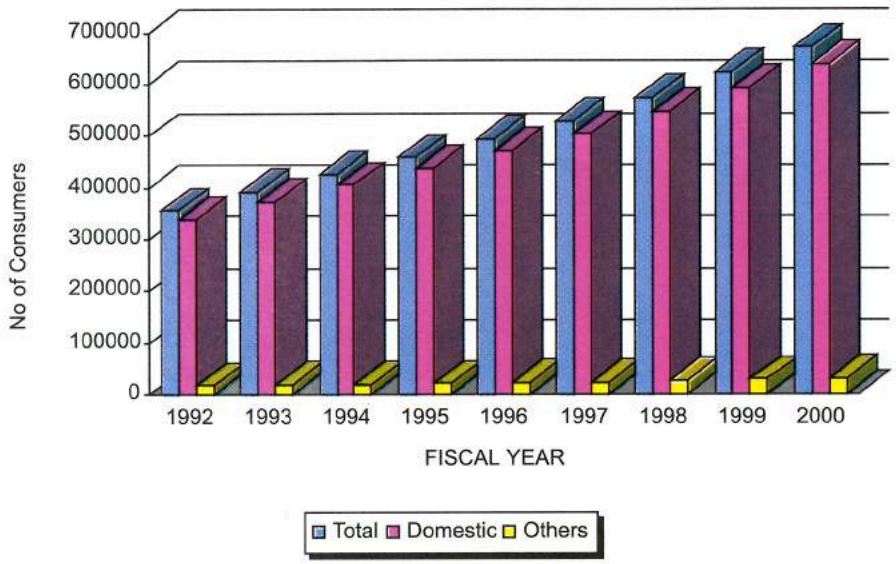
TOTAL ENERGY AVAILABLE AND PEAK DEMAND



Particulars	1992	1993	1994	1995	1996	1997	1998	1999*	2000**
Peak Demand (MW)*	216.000	214.04	231.0	244.0	275.0	300.11	317.00	326.4	351.86
Available Energy (GWh)	981.105	963.314	1030.89	1,117.46	1,261.96	1,368.58	1,373.17	1475.00	1701.45
1. Hydro	869.980	804.050	835.48	848.74	1,072.75	1,096.64	971.96	1046.51	1233.22
2. Diesel	31.540	47.290	62.20	80.92	36.64	39.73	107.45	118.82	66.73
3. Purchase from	79.585	111.974	133.21	187.80	153.57	232.21	293.76	309.67	401.50
(a) India	54.938	82.223	102.77	113.84	72.96	153.98	210.29	232.39	232.20
(b) Nepal	24.647	29.7511	30.44	73.96	80.61	78.23	83.47	77.28	169.30

Note :- Peak demand is for all areas covered by integrated system including supply to India.
* Subject to final audit
** Provisional figures

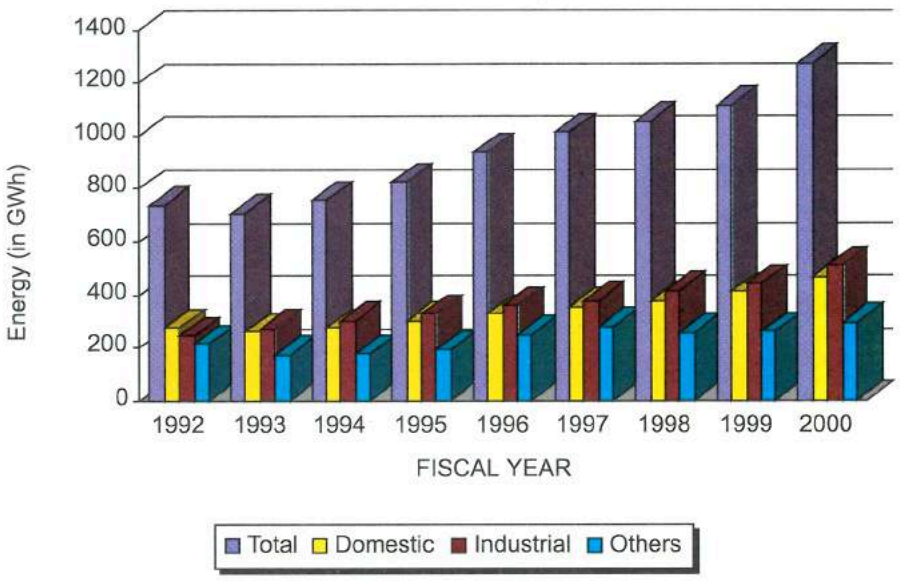
GROWTH OF CONSUMERS



Particulars	1992	1993	1994	1995	1996	1997	1998	1999*	2000**
Domestic	3,37,715	3,71,975	4,04,452	4,36,631	4,71,599	503,330	548,110	593,468	639,233
Non-Commercial	6,065	6,340	6,321	6,369	6,548	6338	7,192	7,654	7,950
Commercial	1,378	1,536	1,848	2,008	2,162	2441	2,637	2,948	3,200
Industrial	9,113	9,595	10,737	11,480	12,329	12928	14,062	14,996	16,000
Water Supply	124	131	155	166	177	190	205	215	230
Irrigation	512	463	590	630	712	713	776	876	935
Street Light	547	367	375	420	456	482	683	842	950
Temporary Supply	191	183	188	189	187	155	175	207	160
Transport	8	8	15	8	8	8	12	21	38
Temple	335	398	525	698	782	867	992	1,131	1,300
Total (Internal Sales)	3,55,988	3,90,996	4,25,206	4,58,599	4,94,960	527,452	574,844	622,358	669,995
Bulk Supply (India)	5	5	4	5	5	5	5	5	5
Grand Total	**3,55,993**	**3,91,001**	**4,25,211**	**4,58,604**	**4,94,965**	**5,27,457**	**574,849**	**622,363**	**670,000**

Note :- * Subject to final audit
** Provisional figures

ELECTRICITY SALES

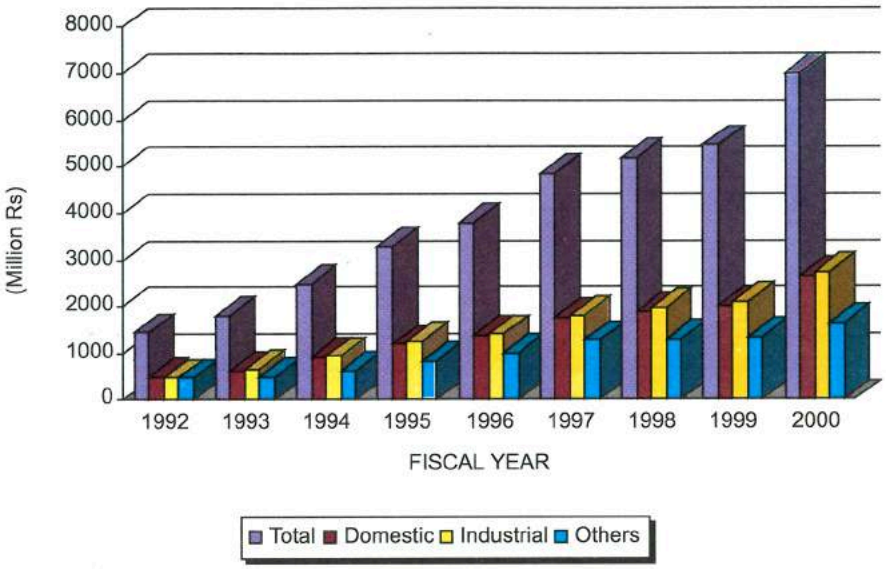


(in GWh)

Category	1992	1993	1994	1995	1996	1997	1998	1999*	2000**
Domestic	275.248	259.833	275.050	301.611	328.730	355.118	378.778	410.566	467.049
Non-Commercial	46.684	47.607	47.148	53.225	53.464	57.991	60.227	62.931	63.592
Commercial	45.200	47.607	48.988	58.574	62.916	67.606	71.471	77.343	81.822
Industrial	246.374	273.753	303.991	328.316	358.672	376.742	413.738	440.996	508.357
Water Supply & Irrigation	27.705	24.113	19.401	27.636	25.091	27.978	29.045	22.831	15.742
Street Light	7.802	8.068	8.857	12.173	16.720	20.929	26.585	29.405	31.741
Temporary Supply	1.003	0.924	0.561	1.225	1.154	0.844	0.711	0.766	0.927
Transport	1.506	1.395	1.338	1.455	1.432	1.483	1.663	2.598	2.678
Temple	0.419	0.460	0.658	0.892	1.503	1.691	1.801	1.982	2.366
Total (Internal Sales)	651.941	663.248	705.992	785.108	849.682	910.382	984.019	1.049.418	1174.274
Bulk Supply (India)	85.411	46.137	50.514	39.479	87.014	100.218	67.410	64.158	95.000
Grand Total	**737.352**	**709.385**	**756.506**	**824.587**	**936.696**	**1010.600**	**1051.429**	**1113.576**	**1269.274**

Note :- * Subject to final audit ** Provisional figures

REVENUE



(in million Rs)

Category	1992	1993	1994	1995	1996	1997	1998	1999*	2000*
Domestic	490.642	621.398	916.332	1,195.389	1,379.456	1769.839	1895.845	2013.589	2657.509
Non-Commercial	140.909	181.076	219.807	284.478	307.246	386.359	405.142	414.948	481.391
Commercial	136.319	186.005	235.781	310.911	349.628	446.964	477.044	512.287	615.301
Industrial	473.082	669.244	936.901	1,260.125	1,406.731	1801.576	1973.372	2105.896	2719.710
Water Supply & Irrigation	31.406	36.194	39.526	70.091	68.400	95.701	100.277	77.939	61.079
Street Light	15.629	16.949	27.625	41.835	53.042	80.111	101.977	110.492	137.121
Temporary Supply	3.980	4.880	3.699	6.886	11.840	7.991	7.170	7.208	10.197
Transport	2.429	2.118	2.985	3.993	4.198	6.090	6.511	9.512	11.810
Temple	0.441	0.693	1.480	3.320	4.556	6.208	6.711	7.354	9.937
Total (Internal Sales)	1,294.837	1,718.557	2,384.136	3,177.028	3,585.097	4600.839	4974.049	5259.225	6704.056
Bulk Supply (India)	145.783	75.462	91.364	97.566	206.720	249.292	199.915	201.933	308.750
Gross Revenue	**1,440.620**	**1,794.019**	**2,475.500**	**3,274.594**	**3,791.817**	**4850.131**	**5173.964**	**5461.158**	**7012.806**

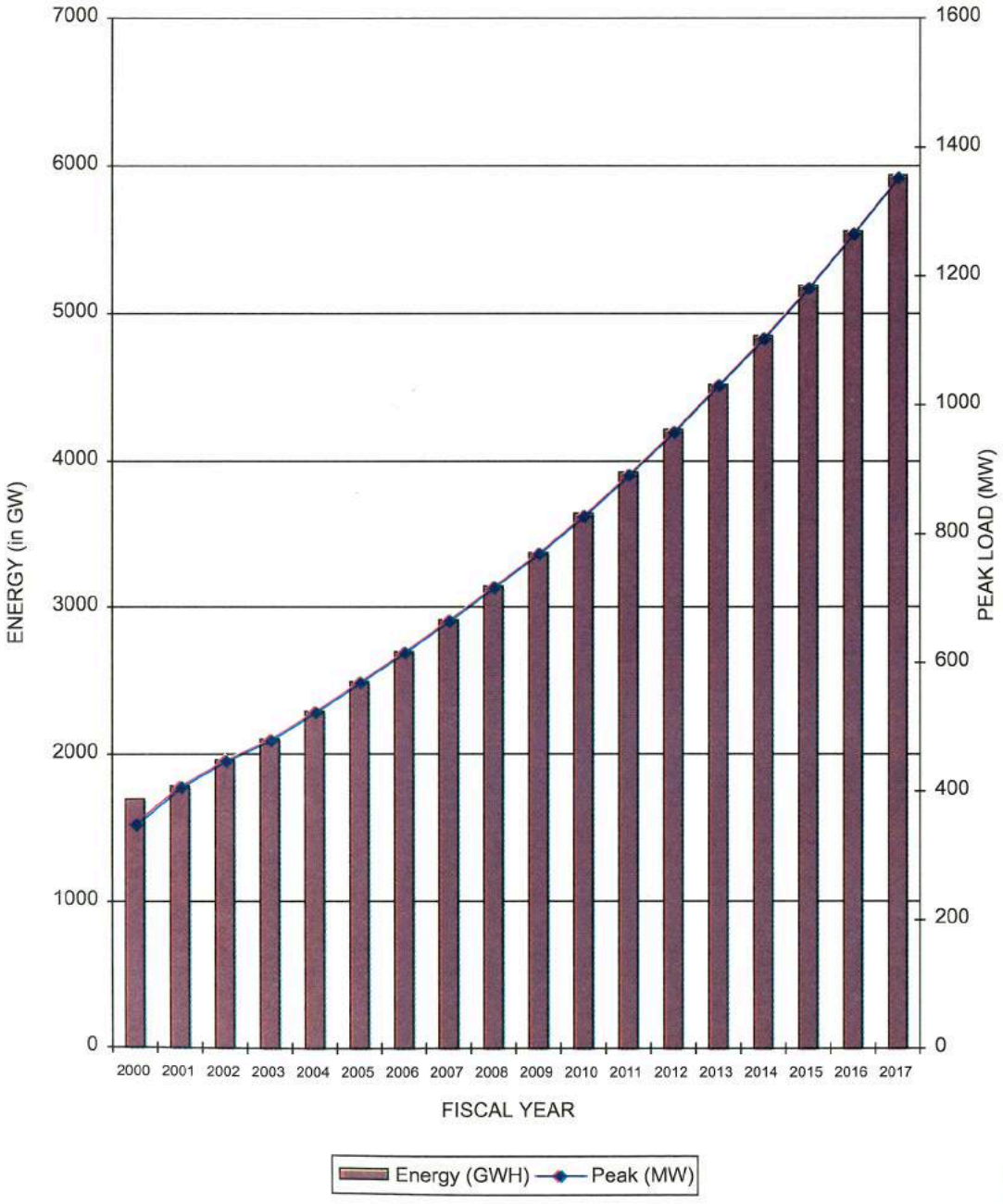
Note :- * Subject to final audit
** Provisional figures
The Revenue figures do not include rebate and penalty

LOAD FORECAST

for Integrated Nepal Power System (INPS)

Year	Energy (GWH)	Growth (%)	Peak (MW)	Growth (%)
2000*	1701	_	351.86	-
2001	1788	5.11	408	10.57
2002	1967	10.01	449	10.05
2003	2110	7.27	482	7.35
2004	2300	9.00	525	8.92
2005	2502	8.78	571	8.76
2006	2702	7.99	617	8.06
2007	2922	8.14	667	8.10
2008	3150	7.80	719	7.80
2009	3377	7.20	771	7.23
2010	3637	7.70	830	7.65
2011	3914	7.62	894	7.71
2012	4205	7.43	960	7.38
2013	4514	7.35	1031	7.40
2014	4840	7.22	1105	7.18
2015	5185	7.13	1184	7.15
2016	5550	7.04	1267	7.01
2017	5937	6.97	1355	6.95
Average Growth				
* Historical		7.63		8.25

LOAD FORECAST



LEGEND FOR POWER DEVELOPMENT OF NEPAL

MAJOR HYDRO PROJECT

EXISTING

1. PANAUTI	2,400	KW
2. TRISULI	24,000	"
3. SUNKOSI	10,050	"
4. GANDAK	15,000	"
5. KULEKHANI NO. 1	60,000	"
6. DEVIGHAT	14,100	"
7. KULEKHANI NO. 2	32,000	"
8. MARSYANGDI	75,000	"
9. ANDHI KHOLA (BPC)	5,100	"
10. JHIMRUK PIUTHAN	12,300	KW
11. CHATARA	3,200	"
12. PUWA KHOLA	6,200	KW
13. KHIMTI KHOLA (HPL)*	60,000	KW
TOTAL	**319,350**	**KW**

UNDER CONSTRUCTION

14. MODI KHOLA	14,000	KW
15. CHILIME (CPC)*	20,000	KW
16. KALI GANDAKI "A"	144,000	KW
17. BHOTEKOSHI(BKPC)*	36,000	KW
18. INDRAWATI (NHPC)*	5,000	KW
19. MIDDLE MARSYANGDI	70,000	KW
TOTAL	**289,000**	**KW**

PLANNED & PROPOSED

20. SETI (WEST)	750,000	"
21. ARUN 3	402,000	"
22. BUDHI GANDAKI	600,000	"
23. KALI GANDAKI No 2	660,000	"
24. LOWER ARUN	308,000	"
25. UPPER ARUN	335,000	"
26. KARNALI (Chisapani)	10,800,000	"
27. UPPER KARNALI	300,000	"
28. CHAMELIA	30,000	"
29. PANCHESHWAR	6,480,000	"
30. THULO DHUNGA	25,000	"
31. TAMUR/MEWA	100,000	"
32. DUDH KOSHI (Storage)	300,000	"
33. BUDHI GANGA	20,000	"
34. RAHUGHAT KHOLA	27,000	"
35. LIKHU-4	40,000	"
36. KABELI "A"	30,000	"
37. UPPER MARSYANGDI "A"	121,000	"
38. UPPER MODI (GITEC)*	14,000	"
39. KULEKHANI NO. 3	42,000	"
40. ANDHI KHOLA (Storage)	180,000	"
41. KHIMTI II	27,000	"
42. DARAM KHOLA (GHP)*	5,000	"
43. PILUWA KHOLE (AVHP)	3,000	
TOTAL	**21,599,000**	**KW**

SMALL HYDRO PROJECT

EXISTING

1. PHARPING***	500	KW
2. SUNDARIJAL	640	"
3. PHEWA (Pokhara)	1,088	"
4. DHANKUTA	240	"
5. TINAU (BUTWAL)	1,024	"
6. JHUPRA (Surkhet)	345	"
7. BAGLUNG	200	"
8. DOTI	200	"
9. PHIDIM**	240	"
10. GORKHE***	64	"
11. JOMSOM**	240	"
12. JUMLA**	200	"
13. DHADING***	32	"
14. SYANGJA***	80	"
15. SETI (POKHARA)	1,500	"
16. HELAMBU	50	"
17. SALLERI (SCECO)#	400	"
18. DARCHULA (I) & (II)**	300	"
19. CHAME	45	"
20. TAPLE JUNG**	125	"
21. MANANG	80	"
22. CHAURJHARI** (Rukum)	150	"
23. SYARPUDAHA** (Rukum)	200	"
24. KHANDBARI **	250	"
25. TERHA THUM**	100	"
26. BHOJPUR **	250	"
27. RAMECHHAP	150	"
28. BAJURA	200	"
29. BAJHANG**	200	"
30. ARUGHAT GORKHA	150	"
31. TATOPANI/MYAGDI (I+II)	2,000	"
32. OKHALDHUNGA**	125	"
33. RUPALGAD (Dadeldhura)	100	"
34. SURNAIYAGAD (Baitadi)	200	"
35. NAMCHE*(KBC)#	600	"
36. ACHHAM	400	"
37. KALIKOT	500	KW
38. DOLPA	200	KW
TOTAL	**13,368**	**KW**

UNDER CONSTRUCTION

39. GAMGAD	400	"
40. HELDUNG	500	"
TOTAL	**900**	**KW**

PLANNED & PROPOSED

1. CHAKU KHOLA (APCO)*	910	KW
2. RAWAKHOLA (Khotang)	2300	"
3. MOLUNGKHOLA	1200	"
4. NAUGARGAD (Darchula)	1800	"
5. GANDIGAD (DOTI)	1800	"
6. PHOIGAD (DOLPA)	150	"
7. KOLTI (BAJURA)	150	"
TOTAL	**8310**	**KW**

DIESEL POWER STATIONS

EXISTING

1. MAHENDRA	1,728	KW
2. BIRATNAGAR	1,028	"
3. HETAUDA	12,750	"
4. MARSYANGDI	2,250	"
5. DUHABI MULTIFUEL-1	26,000	"
5. DUHABI MULTIFUEL-2	13,000	"
TOTAL	**56,756**	**KW**

SOLAR POWER STATIONS

EXISTING

1. SIMIKOT	50	KW
2. GAMGADHI	50	"
TOTAL	**100**	**KW**

TRANSMISSION LINE LENGTH

1. 132 K. V. Single Circuit	1171.80	KM
2. 132 K. V. Double Circuit	198.10	KM
3. 66 K. V. Single Circuit	165.76	KM
4. 66 K. V. Double Circuit	161.30	KM
5. 66&132 K.V. Double Circuit	22.00	KM
6. 66 K.V. Four Circuit	2.50	KM
7. 33 K.V. Single Circuit	1505.70	KM

SUB-STATION CAPACITY

132/11	KVA	-	28.50 MVA
132/33	KVA	-	210.00 MVA
132/66	KVA	-	220.10 MVA
66/11	KVA	-	330.00 MVA
66/33	KVA	-	25.00 MVA
TOTAL			**813.60 MVA**

NOTE

* Private & Others

** Leased to the private sector

*** Not in normal operation

Installed Capacity in Nepal Electricity Authority System : 389.574 MW
(including private & others)

POWER DEVELOPMENT MAP OF NEPAL

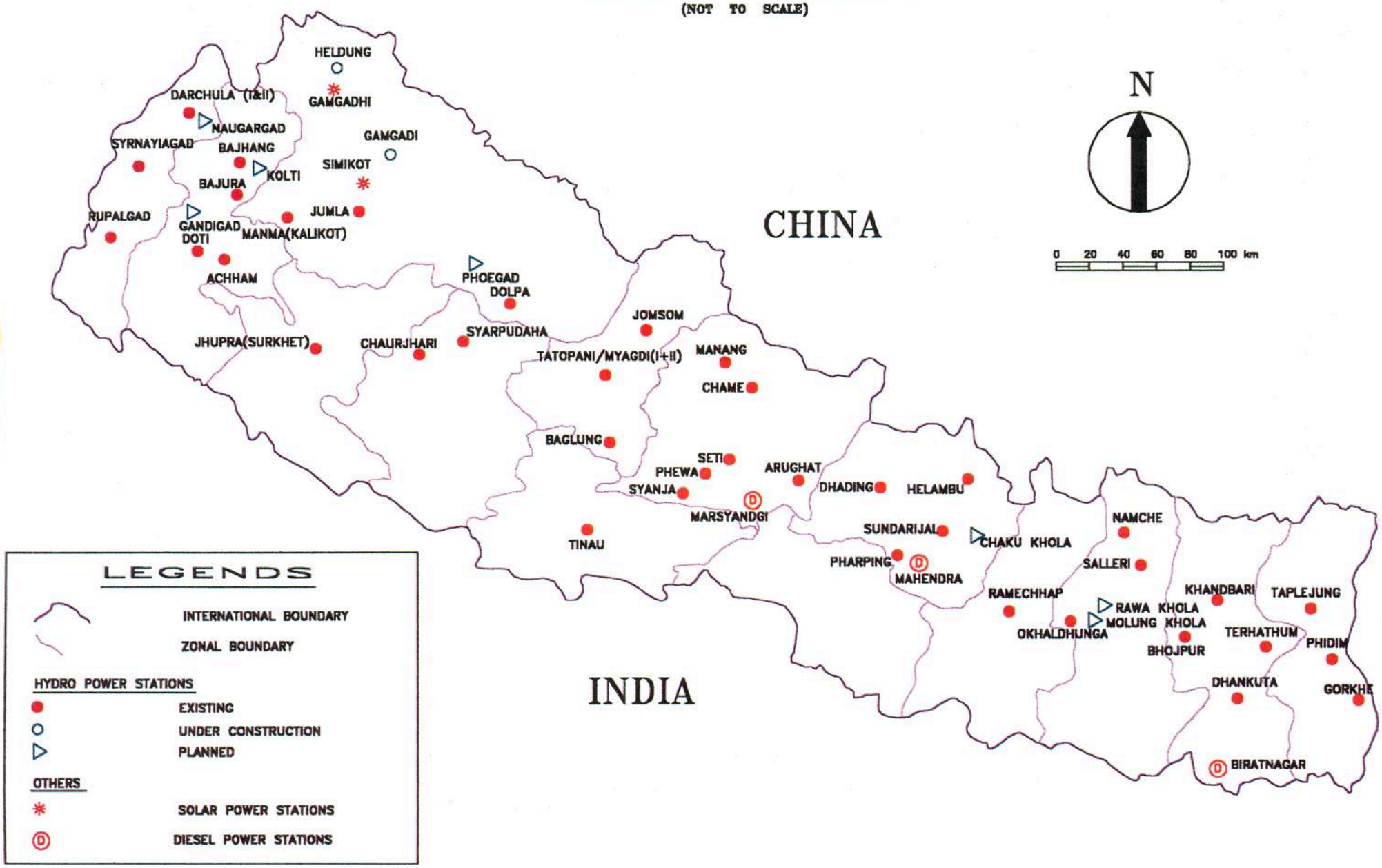
MAJOR POWER STATIONS ,TRANSMISSION LINES & SUBSTATIONS

(NOT TO SCALE)

POWER DEVELOPMENT MAP OF NEPAL

SMALL HYDRO POWER STATIONS, ISOLATED SOLAR & DIESEL POWER STATIONS

(NOT TO SCALE)



LEGENDS

- INTERNATIONAL BOUNDARY
- ZONAL BOUNDARY

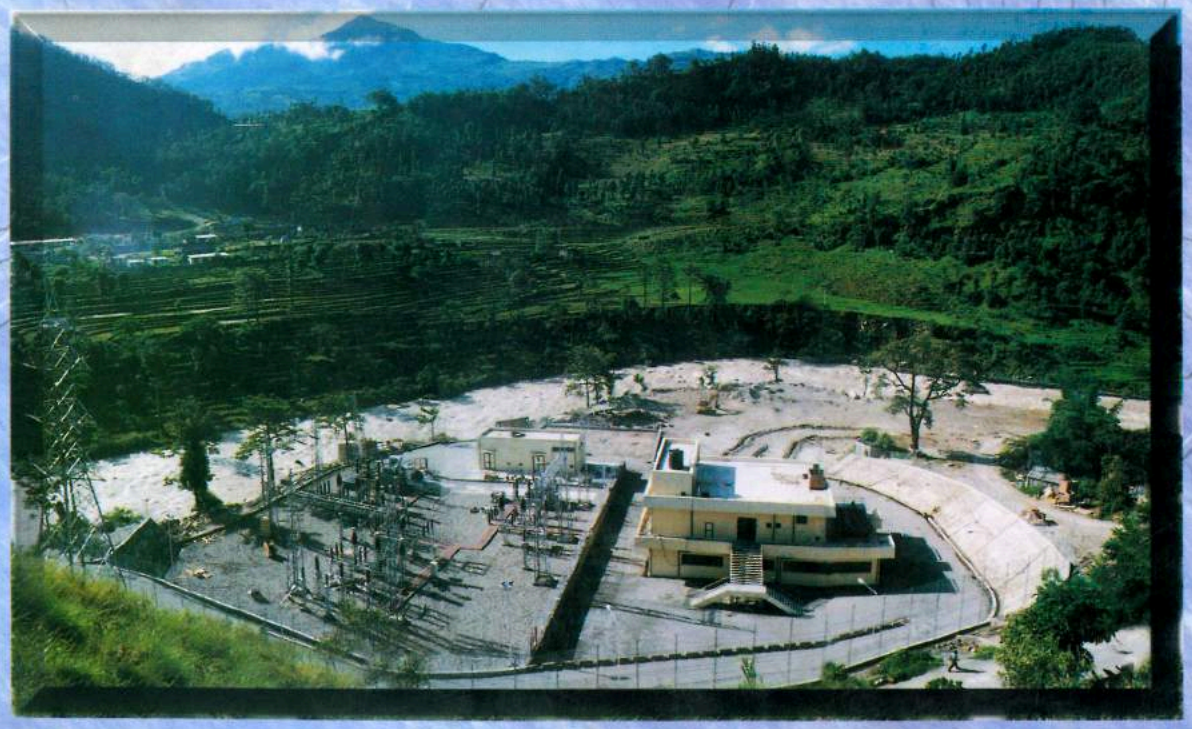
HYDRO POWER STATIONS

- EXISTING
- UNDER CONSTRUCTION
- PLANNED

OTHERS

- SOLAR POWER STATIONS
- DIESEL POWER STATIONS

132 KV Substation at Bhaktapur



Modi Khola Power House

Layout, Design and Printing: Modern Printing Press, P.O. Box 10629

PROFIT & LOSS FOR THE YEAR ENDED JULY 15

in million NRs

Particulars	2000**	1999*	1998	1997	1996	1995	1994	1993	1992	1991
A. Revenue										
Net Sale of Electricity	6850.1	5396.8	5082.5	4767.3	3728.9	3218.5	2437.4	1786.8	1440.4	960.9
Income from Other Services	229.4	180.6	157.6	135.0	111.2	99.9	13.8	8.6	5.6	18.2
Interest & Other Income	125.0	205.3	192.6	181.3	172.0	145.1	160.5	109.0	68.2	13.5
Total-A	**7204.5**	**5782.7**	**5432.7**	**5083.6**	**4012.1**	**3463.5**	**2611.7**	**1904.4**	**1514.2**	**992.6**
B. Operation & Maintenance Expenditure										
Operation & Maintenance & General Expenses	1688.5	1714.5	1554.5	1049.4	942.0	838.3	697.1	604.8	499.3	379.7
Power Purchase	1058.9	802.0	845.6	659.5	359.6	340.0	214.1	162.1	111.3	50.5
Provision for Expenses	30.0	109.9	105.5	80.5	45.9	7.7	8.5	7.0	8.7	–
Bad debts written off	–	–	–	–	–	–	–	–	–	0.3
Royalty	497.4	423.4	348.9	268.8	227.0	186.8	–	–	–	–
Depreciation	1870.0	1853.6	1541.4	1482.2	1455.3	1296.0	1202.4	1026.0	953.6	879.7
Deferred Expenditure Written off	220.0	235.1	270.1	188.7	204.4	162.0	66.5	53.6	45.1	56.6
Total-B	**5364.8**	**5138.5**	**4666.0**	**3729.1**	**3234.2**	**2830.8**	**2188.6**	**1853.5**	**1618.0**	**1366.5**
C. Net Operating Surplus (Deficit) (A-B)	**1839.7**	**644.2**	**766.7**	**1354.5**	**777.9**	**632.7**	**423.1**	**50.9**	**(103.8)**	**(373.9)**
Loss of Capital Assets	–	–	–	–	–	35.8	–	–	–	–
Interest on Long-Term Loans	(1312.2)	(1206.5)	(1317.2)	(1207.5)	(813.5)	(797.0)	(716.6)	(625.5)	(632.2)	(635.1)
Profit and (Loss) before Prior Year's income & Expenses Adjustment	527.5	(562.3)	(550.5)	147.0	(35.5)	(164.2)	(329.3)	(574.6)	(736.0)	(1009.0)
Prior year Income / Expenses Adjustment	(100)	133.6	(91.7)	(176.6)	(99.0)	(397.0)	(411.7)	(48.8)	75.6	15.4
Profit & (Loss) after Prior Year Adjustment	427.5	(428.7)	(642.2)	(29.6)	(134.5)	(561.4)	(741.0)	(623.4)	(660.4)	(993.6)
Transfer from Revaluation Surplus	1000	1018.6	844.7	883.3	907.5	671.6	869.2	729.6	610.0	568.9
Excess Provision Corporate Tax written back (1993-94)	–	–	–	–	–	10.4	–	–	–	–
Net Profit (Loss) Before Tax	**1427.5**	**589.9**	**202.5**	**853.7**	**773.0**	**120.7**	**128.2**	**106.2**	**(50.4)**	**(424.7)**
Interest Tax	–	3.5	5.0	5.0	7.7	3.9	2.4	–	–	–
Corporate Tax	425.4	230.4	23.8	141.3	66.7	10.4	27.2	–	–	–
Net Profit/(Loss) after Tax	**1002.1**	**356.0**	**173.7**	**707.4**	**698.6**	**106.4**	**98.6**	**106.2**	**(50.4)**	**(424.7)**
Transfer to Insurance Fund	20.0	20.0	20.0	20.0	20.0	80.0	–	–	–	–
Net Profit/(Loss) after Appropriation	**982.1**	**336.0**	**153.7**	**687.4**	**678.6**	**26.4**	**98.6**	**106.2**	**(50.4)**	**(424.7)**

* *Subject to final audit* ** *Provisional Figures*