

## Message from the Chairman

I am happy to note that Nepal Electricity Authority will be entering its nineteenth year of service on Bhadra 1, 2060. With eighteen years of service behind it NEA has matured into an able utility exhibiting its capability to successfully shoulder its immense responsibilities in the execution of its duties towards its consumers. I must therefore congratulate NEA for its achievements despite the troubling times it faced in the past year.

Rapid changes are taking place around the world in the power sector, which is increasingly being considered a domain of the private sector. The South Asia region has also taken rapid steps towards this direction as a means to provide relief to the persistent problem of energy shortage. We in Nepal also recognize the participation of private enterprises in the power sector as a pragmatic approach towards mobilization of resources to meet the ever-increasing domestic demand for power. The establishment of a few hydropower generating plants in the country in the last decade with private equity financing has laid the foundations for private sector participation and the continuing keen interest shown by both domestic and foreign private investors is an encouraging sign of the favorable investment climate in the power sector in Nepal. Following this changing trend in the regional power scenario NEA, as the lead player in the power sector of Nepal has initiated bold structural and operational reforms that are envisaged to establish an environment conducive to further private sector participation.

Nature has endowed us with immense hydropower potential that remains strikingly untapped in the absence of a secure market. The approach adopted to export power now needs to be reexamined in view of the emerging possibilities of regional trade in power. Any realistic trade shall be predominantly governed by prices and unless we strive towards becoming competitive our dream to harness our water resources to export power will always remain a dream. NEA therefore needs to explore the reasons for the high development costs of hydropower generation in the country, which is ultimately reflected in our electricity tariff. It must examine adopted development strategies, find practical ways to reduce our costs to make our tariff affordable to the common Nepali and offer competitive prices to solicit regional buyers.

The past year saw another successful year of operation of NEA. It continued to maintain generation sufficiency enabling it to provide better services to its customers despite the damages to its plants and equipment due to the Maoist insurgency. NEA needs to be commended for its exemplary efforts to maintain its supply and services and bring the damaged plants into different levels of operation. The past year also saw the promulgation of the anti-theft regulation following the enactment of the anti-theft Act of 2001. The enforcement of this regulation has enabled NEA to handle the severe problem of pilferage more effectively and the ensuing results in a short period of time are encouraging. Similarly the establishment of eighteen Distribution Centres is another major step taken by NEA towards increasing efficiency, reducing losses and providing better services to its consumers.

Demand for rural electrification still remains a major challenge for NEA. The need to operate on commercial lines for its own sustainability in the face of high cost of energy obtained from private producers and the social responsibility of investing in rural electrification that does not ensure any substantial returns remains a big dilemma. However the initiatives taken by NEA to muster participation of local communities in electrification of their own areas is a step in the right direction.

To conclude, I wish to congratulate all the staff in NEA for their sincere efforts to enhance the performance of NEA and provide better services to its consumers. I wish NEA all the best in its quest for a brighter future.



**Sarvendra Nath Shukla**

Minister for Culture, Tourism and Civil Aviation,  
Land Reforms and Management, Forest and Soil Conservation  
and  
Chairman, Nepal Electricity Authority

## Managing Director's Report

I am extremely pleased to report on the activities of Nepal Electricity Authority (NEA) for the fiscal year 2002/03 corresponding to the year 2059/60 of the Bikram Sambat. This eighteenth year of business operation produced mixed results. It was a year of despair and hope. NEA encountered numerous difficulties in its development activities and in its efforts to maintain its services in an atmosphere of hostility resulting from the continuing insurgency in the first half of the year. The damage to its assets, disturbances in development works, deteriorating industrial performance, the consequent drop in its revenue and the burden of high cost of IPP energy all collectively affected its financial health and the resulting feeling of uncertainty prevailing within NEA was foreboding. This resulted in the reduction of the revenue by 7.88% against the projected one. Despite the difficult times, NEA in its attempt to improve its position continued with undeterred vigor and firm hope and introduced its bold reforms to increase its efficiency and improve its financial health. In this process the introduction of commercially oriented Distribution Centers and its impact in their performance in the last four months has been positive, sending very optimistic signals that they will be successful in reducing losses, increasing the collection rate, maintaining reasonable stock turn-over ratio and providing prompt services to the public.

### **The Reforms Process**

NEA continued executing its reform process with the objective of instilling a sustainable commercial culture, environment and efficiency in its operations following the creation of discrete entities of Generation, Transmission and System Operation, Distribution and Consumer Services and Engineering Services as core business groups in its corporate structure. The progress in the implementation process has been gradual but satisfactory, as it has demanded substantial preparatory works involving complex technical, financial, procedural and legal framework. As a part of preparatory works, definition of technical boundaries, allocation of assets, liabilities and personnel and documentation of performance agreements for application between the different business groups and the Corporate office are however in an advanced stage. Preparation of other requirements such as transfer pricing, dispatch and system operating rules, wheeling arrangements etc are

also in progress.

In its move towards operating as a true business group on commercial lines the Transmission and System Operation business group initiated the development of a financial model for determination of transfer price for application in the transactions between the different business groups within NEA. It has made considerable progress in formulating basic criteria in this direction and fixation and application of a transfer price is expected in the first half of the present fiscal year. Once this transfer price is in place the different business groups of Generation, Transmission and System Operation and Distribution and Consumer Services will commence to function as true commercial entities. Similarly it is also engaged in the preparation of an NEA Grid Code to enhance operational efficiency. In the present absence of an independent regulatory body in the country the application of this Grid Code will however be only confined to the core business groups within NEA and modified and expanded in the future to cover all users of the transmission grid including private generators and distributors and form a basis for interconnection agreements with them. An NEA team is now working in-house in the preparation of the two important prerequisites for the commencement of inter-business transactions between the different core business groups.

Of foremost significance in taking a major step in the reform process by the Distribution and Consumer Services (DCS) in the year was the formal launching of eighteen Distribution Centres (DC), with subsequent addition of two more distribution centres from this fiscal year, with increased independence, authority and account-ability in its operations. This followed the preparation, approval and enforcement of a special Distribution Centre Operation By-law with its unique features that periodically appraises the performance of the DC and its concerned Chief and provides a variety of incentives, rewards and punishments based on specific performance indicators. A performance agreement between the DC Chief and the General manager of DCS sealed a commitment in the year that could undoubtedly produce outstanding results in the arena of efficiency, transparency, financial performance and loss reduction. The establishment of the eighteen DCs also saw the need of a mechanism to supervise, monitor and evaluate their performance on the basis of specific benchmarks on a continuous basis. An independent management team will do the performance appraisal on a six-monthly basis followed by authentication of the financial results by an independent auditor.

The adoption by NEA of a concept to garner community participation in rural electrification schemes in order to accelerate the pace of expansion into the rural areas and to manage such rural distribution systems in a sustainable manner also demanded a separate establishment to pursue this concept. To cater to these new management needs NEA adopted a separate Community Rural Electrification By-laws 2060. Accordingly, the organizational structure of DCS was restructured to include the creation of Distribution Centre Monitoring and Community Rural Electrification departments. Towards providing better services to its consumers, DCS in addition, also took measures such as time bound new connection procedures, prompt attendance to consumer complaint, consumer education through the electronic media on timely bill payment, meter reading, anti-theft regulation and electrical safety to improve its relations with them.

In the absence of a wheeling charge or transfer price in place, the Generation business group was constrained from conducting any planned inter-business transaction with DCS. However in preparation for the transition into a commercial entity and foreseeing the need to have an accurate metering network to make account of the cost of bulk energy sold to DCS, it has initiated testing and replacement of energy meters at its power stations and substations.

The Engineering Services business group, on the other hand, with long experience in the area of design and construction supervision of hydropower projects of a wide range of capacity, commenced commercial operations in the year while, still remaining under the NEA Corporate umbrella. This transition to a sustainable business entity has paved the way towards transforming itself in the near future into a full-fledged commercial subsidiary company of NEA. Guided by a Steering Committee and chaired by its General Manager the Engineering Services business group apart from providing consulting services, at a price, to the different business groups of NEA, is also spreading its operations beyond, to attract clientele both from the private sector within the country as well as from the region. For instance, it is carrying out a feasibility study of Lower Molung Khola Hydroelectric Project for Shivaduti Power Company Pvt.Ltd., undertaken geotechnical investigation works of Middle Marsyangdi Extension Hydroelectric Project for Fichtner JV of Germany, has submitted proposals for consulting services for Lower Indrawati Hydropower Project promoted by Sunkoshi Hydro Power Company Ltd. and has joined hands with GEOCE (P) Ltd., and Germania Associates of India to take part in the bidding for consulting services to update the Detail Project Report of Tiuni Plasu Hydroelectric

Project in the state of Uttaranchal in India.

In order to gear itself up to appreciate and learn from the changing scenario in the power sector beyond the borders of Nepal, NEA continued to actively participate in the USAID sponsored South Asia Regional Initiative in Energy (SARI/E) program. This program seeks to provide energy sector leaders, policy makers and senior executives the knowledge they need and the steps to take to meet the rapid growth in energy demand in the countries of the South Asia region. Over the year NEA participated in thirteen SARI/E programs that involved thirty-eight of its senior officials. Similarly another USAID sponsored Utility Partnership program under its second phase saw a new agreement reached in the year between NEA and Puget Sound Energy, Seattle City Light and Tacoma Power of the USA and a team of five senior NEA executives paid an exchange visit to these utilities in January 2003 to share and exchange ideas focusing on distribution loss and efficiency.

### **Operational Status**

In the past financial year, the system peak of the interconnected system was recorded on November 28, 2002 at the level of 470.33 MW registering a 10.41 percent increase over last winter's figure.

During the past financial year, the electrical energy available for use within the NEA system totaled 2261.13 GWh, which was an increase of 194.8 GWh (9.42 percent) over the previous year's figure of 2066.33 GWh. This comprised of 1478.04 GWh obtained from NEA's hydro generation and 4.40 GWh from NEA's thermal generation. A total of 149.88 GWh was imported from Indian State Electricity Boards in accordance with the Power Exchange agreements and 628.81 GWh purchased from private generators.

Electricity sales totaled 1708.456 GWh an increase of about 168.426 GWh (10.94 percent) over last year's sales figure. Internal sales within Nepal increased to 1522.165 GWh and accounted for 89.09 percent of the total sales and registered an increase of 115.992 GWh (8.25 percent) over the last year's figure. Exports to India increased to 186.291 GWh an increase of 52.434 GWh over last year.

Over the past financial year, the number of customers grew by an estimated 86,076 (or 9.73 percent) over the previous year's figure to reach a total of 970,611. The domestic category accounted for 95.87 percent of the total customer numbers, 36.01 percent of the sales and contributed to 37.03 percent of the revenue. The industrial category formed only 2.0 percent of the total customers, but accounted for 36.64 percent of sales and contributed to 35.49 percent of the revenue. Non-commercial category constituted 1.0 percent of the customers, accounted for 4.99 percent of the sales and 7.42 percent of the revenue. Likewise, the commercial category constituted 0.54 percent of the total customers, accounted for 6.10 percent of the sales and provided 8.98 percent of the revenue.

### **Improving NEA's Financial Health**

NEA's financial position has not been up to the expectation in the FY 2002/03. This discouraging revelation is indicative of slack economic activity, and poor industrial performance in an atmosphere of insecurity prevailing in the country. The tourism sector, which also contributed significantly to its revenue, was also badly hit. NEA's total revenue increased over the figure for the previous year by 18.74 percent to NRs. 11,797.491 million. NEA's net fixed assets increased to reach an estimated NRs. 59.292 billion. Expenditure in operation and maintenance activities increased by 0.97 percent to a figure of NRs. 9533.10 million as compared to NRs. 9441.076 million of the previous year. On the overall, NEA registered a net loss of NRs. 655.7 million as compared to a net loss of NRs. 717.440 million in the previous year.

Despite concerted efforts of NEA over the years to reduce non-technical losses as one of the means to bolster its financial health under a variety of schemes in the form of projects, action plans, disconnection campaigns, mobile inspection teams, incentives for informers and public awareness programs the desired results could not be obtained for the simple reason that pilferage of electricity was not legally accepted as a crime. Following the enactment of the Anti-theft Act 2001 that recognized theft of electricity as a punishable crime, the promulgation and enforcement in this year of an Anti-theft Regulation reinforced NEA's determination to tackle this affliction with more confidence. NEA is also taking necessary steps to reduce technical losses through refurbishment and reinforcement of existing distribution lines in areas that have demonstrated higher levels of such losses. The provision in the IDA financed Power Development Project for rehabilitation and reinforcement of existing distribution systems in urban and semi-urban centers of Lalitpur, Bhaktapur and Kavre districts will also

contribute to NEA's technical loss reduction drive.

Another notable achievement in NEA's initiatives taken in the year to improve on its financial performance was the continued progress in the application of computerised technology in its billing, accounting and inventory practices. Introduction of computerized billing system in two additional budget centers has currently brought a total of seven budget centers under computerized billing. Development of software for application of computerized systems in inventory control, accounting and personnel management system has been completed with local expertise.

### **Status of Major Projects under Execution**

NEA continued to invest in accordance with its corporate development plans based on the resources available from its own internal funds, HMG/N and Multilateral Development Banks and Bilateral Donors to reinforce and expand its generation, transmission and distribution capabilities to reach a larger section of the populace.

The formation of a 132 kV ring main to replace the now redundant 11 kV ring in the Kathmandu Valley will be realized with the construction of a double circuit 26 km 132 kV transmission line from Thankot to Bhaktapur to cover the southern portion of the valley. Once this is connected to the existing 132 kV system serving the northern half, the ring will be complete. This project is being undertaken with loan assistance of ADB and OPEC under the Rural Electrification Distribution and Transmission Project. Local costs are to be borne jointly by HMG/N and NEA. Expected to be completed by 2006/07, this new ring main will cater to the growing demand, help reduce system losses and improve quality and reliability of supply in the Valley.

The establishment of a new Load Dispatch Centre (LDC) with assistance from KfW is now in the final stage of completion. This new LDC inter-linked with 42 substations and generating stations through a Supervisory Control and Data Acquisition (SCADA) system is expected to go into operation by November 2003. This state-of-art computerized system is based on the collection, computation and analysis of real time data for efficient and systematic supervision of system operation. The upgrading of the associated communication system using fiber optic cable and digital communication technology is also almost in place. The operation of this system will see considerable improvement in system security, quick response to disturbances, reduction in transmission network losses and optimization of generation.

The civil construction works of the 70 MW Middle Marsyangdi Hydroelectric Project undertaken with grant assistance of KfW, suffered a setback this year due to security problems arising from the insurgency during the first half of the year. As the progress of the civil works was affected, the project is now expected to come on line only by 2006 with a delay of more than a year. This deviation from our planned generation expansion schedule is indicative of a short period of power shortage in our system before the commissioning of the project. The current progress in the civil works and manufacture of the electromechanical equipment are however proceeding satisfactorily. One of the noteworthy steps that the project has taken under its resettlement and mitigation program is the income generation oriented training and community awareness program it has taken up for the members of the project affected families and the local people around the project area. In addition in its objective of supporting the development activities in the neighbouring VDCs, its Neighbourhood Support Program has selected five key areas of health, education, water supply and sanitation, roads including river crossings and electrification for development support.

The completion of the first NEA/Public sector joint venture project in the area of hydropower generation was another landmark of the year. The 20 MW Chilime Hydropower Plant set up in Rasuwa District by the Chilime Hydropower Company Ltd. is unique in the fact that the project was executed with the mobilization of local financial and technical resources with the objective to produce energy at a comparatively low cost. At an estimated total cost of the project at NRs 2.32 billion the cost per kW equivalent to US\$ 1549 projects this plant as a frontrunner for future cost effective joint venture investment in the hydropower sector. I am happy to inform you that the power station has been synchronized with the Integrated Nepal Power System on July 22, 2003 (Shrawan 6, 2060).

The Rural Electrification, Transmission and Distribution Project aided by the Asian Development Bank has five different components that will in addition to providing transmission and institutional support, develop the distribution system to connect about 123,400 rural households of 277 Village Development Committees in 22 districts of central, eastern and western Nepal. For the RE and Distribution System Reinforcement component,

activities such as land acquisition, field survey, detail design and preparation of final IEE reports for most of the districts were completed in the year. Another distribution and rural electrification project financed through a Danish grant in the districts of Kailali and Kanchanpur and unique in its objective to hand over the operation of the system once complete to local users cooperatives, progressed satisfactorily. The project has a target of connecting about 30,000 new households in 34 Village Development Committees of the two districts by 2005/06.

### **Resource Mobilisation**

With a current coverage area of only about 35 percent, NEA's development activities continue to play an important role in its functions. Its limited investment capability however remains a major impediment and its attempt to undertake even the most modest development poses a formidable challenge. The support from HMG/N, Donors and Lending agencies has therefore contributed immensely to NEA's efforts to meet the aspirations of the people and a number of project financing arrangements were realized in the year.

The World Bank and HMG/N signed an agreement in July 2003 for an IDA financial assistance of US\$ 75.6 million for the implementation of the Nepal Power Development Project. . Of the total amount US\$ 50.4 million will be in the form of credit and US\$ 25.2 million as grant. The NEA component will cover expansion of transmission lines to strengthen its national grid and reinforcement and extension of the distribution system to enhance the quality of grid-connected supply to about 34,000 consumers including 17,000 new connections. In addition technical assistance will also be provided to strengthen NEA's financial management, audit and accounting systems and to conduct studies to review opportunities for productive use of surplus energy in the system. This NEA component of the Nepal Power Development Project carries total assistance of US\$ 32.6 million, which comprises of US\$ 15.4 million as credit and US\$ 17.2 million as grant. With funds from this NEA component of the Nepal Power Development Project the construction of the countrys first 220 kV transmission line from Khimti to Dhalkebar will improve the reliability of power evacuation from the Khimti Hydropower Plant, improve quality of supply in the eastern regions of the country and provide ample transmission capacity for future generation such as from the proposed Upper Tama Koshi Hydropower Project in the Khimti region. The construction of a 132 kV Dhalkebar to Bhattamod portion of the exchange link to facilitate export of power to India under the Nepal-India power exchange agreement is another significant component to be financed through this IDA assistance. The Government of India will have to construct the 45 km segment of this exchange link within India.

In the area of distribution system expansion to reach a larger percentage of the rural population in the Mid and Far Western regions of the country the Swedish Government has conveyed its commitment to provide a concessionary credit of about US\$ 20 million through the Swedish International Development Authority (SIDA) for the Mid and Far Western Rural Electrification Project. This will electrify 145 VDCs in the eight districts of Surkhet, Dailekh, Achham, Doti, Dadeldhura, Darchula, Baitadi and Bhajahang with a target of 17,200 new connections.

An agreement was also signed between Government of Norway and HMG/N in May 2003 for a grant assistance of Norwegian Kroner 14.8 million for the preparation of a bankable upgraded feasibility study report of the Upper Tama Koshi Hydroelectric Project. This followed the first phase feasibility study prepared by NEA in 2001 that found this 250 MW peaking run-off-river hydropower scheme capable of generating 1570 GWh annually. The financial analysis in this report computed a benefit cost ratio of 2.94 and IRR of 26.41 and an estimated cost of US\$ 277 million. This and the minimal environment effect to the project area have made the project extremely attractive leading it to a prominent position for completion by 2010/11 in NEA's generation expansion plan.

Apart from the committed assistance, requests have been made to the Government of Japan for assistance in the upgrading of a feasibility study of Upper Seti Storage Project, construction of Kulekhani-III Hydropower Project and 220 kV Hetauda Bardghat transmission line. Assistance from HMG/N continues to support NEA's development efforts on an annual basis.

### **Private Sector Participation**

Independent power producers continued to play an important role in the power sector of the country contributing to almost 21 percent of the total installed capacity with the addition in the system of the 7.5 MW

Indrawati III Hydropower Project, which commenced commercial operations from October 2002. The continued interest shown by private investors in the generation sector is encouraging but at present limited to small plants not exceeding 10 MW. A capacity balance study conducted in the year by NEA revealed that in the FY 2004/05 the integrated Nepal power system will begin to experience capacity deficit during four months of the year due to the envisaged delay in the commissioning of the Middle Marsyangdi Hydropower Project. Even with this project on stream in 2005/06 the system will continue to experience this situation. Successful implementation and timely commissioning of a number of albeit small projects that have signed power purchase agreements with NEA earlier will complement NEA's own generation expansion efforts and help mitigate the possibility of capacity and energy shortage in the system envisaged to appear in the near future. During the year another three power purchase agreements were concluded with 4.5 MW Lower Indrawati, 0.5 MW Rairang and 1.4 MW Thoppal Hydropower projects. Similarly price negotiation is in progress for the 10 MW Madi-1 project and the 1.4 MW Kolfu awaits formal signing of a PPA. Ten additional projects promoted by private investors amounting to a capacity sum of 33 MW are undergoing technical review for PPAs.

### **Looking Ahead**

In the coming year NEA will continue to implement various elements of its reform program to establish accountability, maintain transparency, enhance efficiency and improve its financial health. Performance agreements between the Corporate Office and General Managers of the Generation business group, Transmission and System Operation business group and Distribution and Consumer Services business group will be effected and will provide guidelines for their operations as truly commercial entities. Transfer price for wheeling of power between these three business groups will also be determined and applied and a Grid Code covering connection and operation procedures initially applicable within NEA will come into effect. Similarly, steps will be taken to convert the Engineering Services business group into a subsidiary company. Computerised systems will be introduced in all budget centers in the fields of accounting and inventory and the computerized consumer billing system will be replicated in additional twelve budget centers bringing the total to nineteen centers that cover about seventy percent of NEA's consumers. It is also planned to establish a Virtual Private Network (VPN) linking the systems of the different centers to headquarters to facilitate sharing of information and monitor performance.

On the technical side, amongst others, feasibility studies will be taken up in the year for the Upper Tama Koshi Hydropower Project and the 220 kV Khimti-Dhalkebar transmission line. Initial activities for the construction of the Hetauda-Dhalkebar 220 kV transmission line will also commence. Preliminary activities for a storage generation project are also envisaged in the year.

### **Acknowledgements**

In conclusion, I take this opportunity to thank all who have contributed to NEA's activities over the past year. I will like to express my deep gratitude to the NEA Board, which helped NEA to navigate through difficult problems by giving right decisions. I wish to thank His Majesty's Government of Nepal for her continued support in our operations and contributions to our development efforts. Thanks are also due to the Bilateral Donors such as Germany, Japan, Norway, Denmark, Sweden and USA and development banks such as the World Bank, Asian Development Bank, Japan Bank for International Cooperation and Kreditanstalt fur Wiederaufbau (KfW) that have made it possible for NEA to maintain its continuing development process to meet the growing needs of its customers in particular and the nation in general.

My sincere thanks go to the entire staff of NEA at all levels for their continued determination and support over the year. My appreciation goes to all the Trade Unions of NEA for their critical but supportive understanding. My special thanks to my colleagues who helped to realize the concept of team management. I cannot forget those who responded to the call of duty during the difficult times of the insurgency in the country. I wish to express my special thanks to them who have stood by me in those times of trial. From my past affiliation with NEA over thirty years I cannot restrain myself from expressing my appreciation of the spirit of teamwork that is inherent in its culture as a means to achieve results.

I also wish to thank our valued customers for bearing with us during periods of difficulty and assure them that NEA, which has embarked on the implementation of a completely new corporate concept will function in a more competent and accountable way to provide quality supply and services to them.

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**(Dr. Janak Lal Karmacharya)**

Managing Director, Nepal Electricity Authority



The most noteworthy event that has put NEA on the mainstream of power sector reform has been the introduction of a form of internal unbundling in NEAs organizational structure without changes in ownership patterns. Discrete entities of generation, transmission and distribution along with engineering services have been formed as core business groups in NEA and have been organized to undertake semi-autonomous functions with accountability through performance agreements with NEAs corporate offices.

With an objective to bring in significant performance improvement in terms of better service quality, efficiency, cost savings and increased revenue, increased cash flows, effective electricity loss control, NEA management has already started the reform process. Generation, Transmission and System Operation, Engineering Services and Distribution and Consumer Services are internally unbundled as core business groups of NEA. These core businesses will be provided with increased independence, authority and accountability in its operations with built in reward and punishment system in accordance with their performance. Accordingly, the performance contract documents required for effective operations and management of these businesses were drafted and prepared by NEA in the year under review. Considering some technical and administrative difficulties in executing performance contracts, NEA is developing separate by-laws for operation and management of each business unit comprising of the essential features included in performance agreement documents. Accordingly, *Bitaran Kendra Biniyamabli, 2059* has been prepared. After the approval of this *Biniyam* (bylaws) eighteen Distribution Centers are already in operation under this by-laws from February 2003 (Falgun 2059). NEA has also prepared separate bylaws for operation and management of Generation, Transmission and System Operation and Distribution and Consumer Service business groups. Authority as well as responsibility and obligation of businesses are clearly stated and provisioned in these by-laws. Similarly, benchmark for performance indicators, and a reward and punishment system on the basis of performance evaluation for each six monthly performance period are clearly pointed out in the document.

The adoption by NEA of a concept to garner community participation in rural electrification schemes in order to accelerate the pace of expansion into the rural areas and to manage such rural distribution systems in a sustainable manner also demanded a separate establishment to pursue this concept. To cater to these new management needs NEA adopted a separate Community Rural Electrification By-laws 2060. Accordingly, the organizational structure of DCS was restructured to include the creation of Distribution Centre Monitoring and Community Rural Electrification departments. Towards providing better services to its consumers, DCS in addition, also took measures such as time bound new connection procedures, prompt attendance to consumer complaint, consumer education through the electronic media on timely bill payment, meter reading, anti-theft regulation and electrical safety to improve its relations with them.

To cope with the new role, NEA is currently working on a financial model for fixation of transmission price to be charged to the various business units within NEA. Transfer Price will also form the basis for fixation of wheeling charges for those IPPs interested in using the NEA system to sell energy directly to bulk consumers within and outside the country. In the initial phase, the model will not discriminate among users at the same voltage level. In future, mechanism for location pricing will be developed and applied as the market evolves and NEA gains more experience in this field. NEA is also in the process of development of a NEA Grid Code, which will help to enhance operational efficiency and instil professionalism in its dealings with the grid users by creating a level playing field for all users, irrespective of their ownership. In the absence of an independent regulatory commission, the Grid Code, in the present form will be an internal document without any legal validity and as such cannot be enforced upon outside players. Nevertheless, it can still form a basis for power purchase agreements or interconnection agreements with other users of the grid.

## **LOSS REDUCTION INITIATIVE**

Electricity theft in the NEA distribution network is quite high. Despite concerted efforts in the past to control electricity theft, little success has been achieved primarily due to the absence of adequate legal instruments. In view of this fact, HMG/N, to curb and control the unauthorised use of electricity, enforced the Electricity Theft Control Act 2058 and the Electricity Theft Control Regulation 2059 thereof, that treat electricity theft as a criminal offence. The salient features of the Electricity Theft Control Act 2058 and the Electricity Theft Control Regulation 2059 are:

1. It is the duty of the local authorities of HMG/N to come to the aid of NEA in case of help and co-operation being sought by NEA in matters relating to electricity theft.
2. NEA will discontinue the supply of electricity to those found indulging in the act of theft of electricity and may only be restored upon payment of the assessed amount of compensation and the penalty imposed.
3. Anybody dissatisfied with the compensation and penalty amount can plead for the same to the fully empowered Review Committee of NEA constituted for that purpose.
4. Failure to pay the compensation and penalty by those found indulging in the act of theft of electricity enables NEA to take legal action against them in a court of law.
5. The court can impose a penalty of Rs 5,000 or 3 months imprisonment or both to those convicted in the acts of electricity theft.
6. Compensation and penalty amount imposed by NEA are doubled for those found indulging in electricity theft for the second time.

### **JOINT VENTURE INITIATIVE**

Involvement and participation of the private sector in hydropower development is given considerable importance in the Hydropower Development Policy of HMG/N. At the same time generation of hydroelectric energy at low cost is vital for healthy development of the hydro-power potential of the country so as to provide the general public with energy they can afford. In conformity with this policy of HMG/N to encourage private sector participation in Nepal's hydro-power development, NEA in 1995 formed the Chilime Hydropower Company Limited with the aim of developing the 20 MW Chilime Hydro-electric Project comparatively at a lower cost by mobilising indigenous funds and manpower. This was the first attempt by NEA to involve the general public, including the employees of NEA, to participate in its initiatives to develop this project using local resources.

The total cost of the Chilime Hydro-electric Project of Rs.2,32,31,89,000 was funded with a debt/ equity ratio of 60: 40, with the debt portion provided by Nepalese financial institutions with Karmachari Sanchaya Kosh and Nagarik Lagani Kosh as the major financiers. The structure of the equity portion of the investment is as follows:

- 51% - NEA
- 25% - NEA Employees
- 24% - General Public

The major contributions of NEA towards the successful completion of this project may be enumerated as follows:

- Identification, investigation and preparation of Feasibility Study Report.
- Established the Chilime Hydropower Company Limited to develop the project.
- Encouraged the Company to work independently.
- Initiated investment for studies and construction works.
- Deputed its experienced engineers and staffs to work in the project.
- Supported with its plant & equipment for the initiation of the construction of the underground works.
- Completed of the 38 km Chilime-Devighat 66 kV transmission line.
- Provided guarantee to financing institutions for the long term and short term loans.
- Guaranteed the power market through the Power Purchase Agreement.

Encouraged its employees to invest in hydropower projects.

The Chilime Hydropower Project was successfully test synchronised with the Integrated Nepal Power System on July 22, 2003. The successful completion of this project at comparatively lower cost may encourage others to take up similar projects in the future through similar private/public initiatives.

## **HANDLING OF EMERGENCY SITUATION**

A series of damages occurred in various hydropower-generating stations, transmission and distribution system of Nepal Electricity Authority due to the insurgency carried out by the Maoists in the previous years. The approximate value of damages estimated so far amounted to NRs. 276 million causing a great financial loss to Nepal Electricity Authority.

### **Damages in Medium Hydropower Stations**

A number of hydropower stations like Panauti, Modi Khola and Sunkoshi were damaged due to the insurgent movement prevailing in the country. Out of the three generating units of Panauti Hydropower Station two units were destroyed by the insurgents on 2nd of September 2002. Similarly, power transformer, switchyard, powerhouse building, office building and a pick-up were also damaged. The damaged generating units, power transformer, switchyard and powerhouse building have already been repaired and the powerhouse was brought into operation on 16th of June 2003. The total cost incurred in the repair work was around NRs. 2 million. The remaining items like office building and the pick-up is yet to be repaired and is estimated to cost NRs. 1.7 million. In addition, the bridge on Salandu Khola, connecting the power-house with other parts of Kavre district and Khopasi town was also damaged. This is yet to be repaired and is expected to cost around NRs. 500,000. Various items like vehicles, computers and furniture of Modi Khola hydropower station were badly damaged leading to a loss of about NRs. 4.1 million. These damaged items are yet to be repaired. Similarly, a truck and a pick-up belonging to Sunkoshi Hydropower Station were also damaged resulting to a loss worth NRs. 550,000. The repair of the pick-up which will cost around NRs. 350,000 is in progress. The truck is yet to be repaired.

### **Damages in Small Hydropower Stations**

Out of twenty-six Small Hydropower Plants operating in various districts of the Kingdom, nine Plants were damaged due to the Maoists insurgency. Out of the nine damaged plants, seven have been partially repaired and the supply has been resumed and two plants are still to be repaired. Similarly, 33/11 kV substations at Piluwa (Sankhuwasabha District) and Udipur (Lamjung District) have also been damaged due to the insurgency. The total estimated value of loss in small hydropower plants and sub-stations is NRs. 36.2 million. The details of the estimated loss so far in small hydropower plants and substations are as given in the table.

### **Damages in Transmission Lines**

132 kV and 66 kV towers, substations and control rooms were also damaged due to Maoist attacks in different parts of the country. The total value of damages in this sector so far is estimated at NRs. 32.037 million and the damaged towers, substations and equipment are listed below:

- Chanauta Substation, Kapilvastu
- Lamahi Control Room
- 132 kV tower of Attariya-Lamki transmission line
- Attariya Switchyard
- Lamki control room
- 132 kV tower of Kohalpur-Lamahi transmission line
- 132 kV tower of Chanauta-Lamahi transmission line

66 kV tower of Lamosangu-Panchkhal transmission line  
132 kV tower of Bhaktapur-Lamosangu transmission line  
Baneshwor Substation

Out of these, substations like Chanauta and Baneshwor, control room of Lamahi, 132 KV towers of Attariya-Lamki and Kohalpur-Lamahi transmission line and switchyard of Attariya have already been repaired and put into operation. Others are yet to be repaired.

#### **Damages in Different Offices of Distribution and Consumer Services**

Different offices of Distribution and Consumer Services business group were also attacked by the insurgents, destroying various items like transformer, office equipment, meters, vehicles, panel board, office building, conductor, poles, furniture, etc. The total amount of the loss has been estimated at NRs. 171.54 million. Most of the office buildings and the damaged items await repair.

## **Generation Business Group**

In line with the new organizational set-up of NEA, the Generation business group has started taking over the ownership of the power stations and is gearing up to operate independently as a separate commercial entity under the NEA umbrella. Under this new arrangement, it will sell its generated energy, in bulk, to Distribution and Consumer Services (DCS) business group at a mutually agreed price. It has therefore initiated testing and replacement of defective kWh meters at its power stations and substations foreseeing the need to have an accurate metering network to bill the cost of bulk energy to DCS in the very near future when transfer price and wheeling arrangements are finalized by the Transmission and System Operation business group.

Most of the new hydropower stations of NEA have been operating smoothly since their commissioning. However, some of the old ones demanded overhauling and plants like Trishuli, Kulekhani-I and Gandak hydropower stations have been attended to and rehabilitated. Hydropower stations like Sunkoshi and Devighat are also in need of refurbishment and as a step towards rehabilitating these power stations, the Engineering Services business group, on the request of Generation, has taken up the study of these two stations for the necessary rehabilitation works. Due to the Maoist insurgency, the management had to invest on additional infrastructures in the year in the form of barracks and residential quarters for the additional security personnel deputed to augment security in the power stations. The cost incurred for this arrangement was around NRs. 20 Million.

With an average load factor of 54.88 percent and an availability of 97 percent NEA power generation in the FY 2002/03 showed a marked increase by 9.42 percent over the previous years figure. This increase in generation was mainly due to the entrance of Kaligandaki A HEP to the Integrated Nepal Power System (INPS). The total available energy from its hydro and thermal plants in the year was 1482.44 GWh as compared to 1130.14 GWh last year. Of the total generated energy, hydropower contributed 1478.04 GWh. The contribution of generation from plants owned by NEA to the total supply of energy was 65.56 percent. The performances of NEAs major generating stations are as follows:

## HYDRO GENERATION

### Kaligandaki A Hydroelectric Department

The three units of Kaligandaki A Hydropower Station were commissioned on 19th April 2002, 23rd May 2002 and 31st March 2002 respectively. Since the commissioning of these three units, the power station has generated a total of 627.385 GWh including 512.20 GWh that was generated in FY 2002/03. A problem faced in the cooling system of shaft seal was rectified by installing three new automatic strainers with back wash system. The bottom sill beam of spillway radial gate number 3 was replaced by a new seal beam manufactured at site. Furthermore, the damaged portion of the concrete ogee was repaired by applying sika coating.

### Marsyangdi Hydropower Station

Marsyangdi Hydropower Station generated 333.921 GWh in the FY 2002/03 compared to 386.13 GWh of the previous fiscal year, contributing to 22.59 percent of the total hydropower generation of NEA. Overhauling and major repair and maintenance works of unit number 1 was completed as scheduled with the repair and maintenance of the sluice canal. A 160 meter length of the cooling pipeline, that was damaged badly, was replaced by new pipes. A new water tank, with 75000 liters capacity, was constructed near adit number 3 to supply clear water to the shaft seal. The runner of unit number 1 was found to be damaged badly with three of its blades cracked and was repaired successfully by the joint efforts of technicians and engineers of the powerhouse.

### Kulekhani I Hydropower Station

Kulekhani I Hydropower Station generated 170.03 GWh in the fiscal year 2002/03 compared to 145.42 GWh of the previous fiscal year, showing an increase of 16.95 percent. Maintenance and adjustment of runners and displaced jet-break pipe (nozzle) of unit number 1 were carried out. Replacement works of new air circuit breaker of station transformer number 2 and the maintenance of the ACB, controlling air conditioning and ventilation were also carried out. Old lead acid batteries were replaced with new maintenance free lead acid batteries. Besides these, other regular maintenance works were also carried out to keep the equipment in the best possible condition.

### Kulekhani II Hydropower Station

Kulekhani II hydropower station generated 74.12 GWh in the fiscal year 2002/03 compared to 65.69 GWh last year, thus showing an increase of 12.92 percent. In the year, shaft seal of unit number 1 was replaced to stop leakage and both the sump pumps were repaired and maintained. A generator house was constructed to house the emergency diesel generator set. Any damage to the compound wall encircling the powerhouse due to bank erosion was averted by laying big boulders along the riverside. Besides these, routine preventive maintenance works of the different equipment installed in the power station were also carried out.

### Trishuli Hydropower Station

Trishuli Hydropower Station generated 117.646 GWh in the year in review compared to 128.24 GWh of the previous year, with a load factor of 60 percent. During the flooding of the power station in 1996/97(2053/54), most of the electrical and electronic parts were damaged. These parts are being replaced gradually over the years and in this process the digital governor of unit number 3 was replaced by a new one in the year. Similarly, air cooler of unit number 3 was also replaced. Repair and maintenance of various units like bypass valve,

barrage gates, six sets of circuit breakers and one turbine runner were also carried out in the year. Furthermore, adjustment and calibration of relays and meters and regular maintenance, repair and painting works of civil structures were also carried out.

### **Devighat Hydropower Station**

This power station generated 83.195 GWh in the FY 2002/03 against 92.02 GWh of the previous fiscal year. The 6.6/66 kV, 6.3 MVA transformers, which were burnt, were repaired and installed for smooth operation. Repair and maintenance of 66 kV circuit breakers and 11 kV feeders were also completed in the year. Besides these, the regular maintenance works of governor of diesel generating sets and other equipment of the powerhouse were carried out. Similarly, repair and maintenance of leakage in the roof of the powerhouse was also carried out successfully.

### **Sunkoshi Hydropower Station**

This power station generated 52.79GWh against 50.82GWh of the previous fiscal year showing an increase of 4.15 percent. Maintenance, repair and replacement of sliding ring, upper and lower generator bearing and trash racks were carried out. The old 66 kV MOCB breaker was replaced successfully by a new 66 kV SF6 breaker. About 1000 tree saplings were planted around the residential area of the powerhouse with a motive to create a green and healthy environment.

### **Modikhola Hydropower Station**

This power station generated 54.38 GWh of energy against 41.45 GWh in the previous year. Choking of the trash rack at the intake was a major problem faced by the power station in the year. A thorough study to assess the remedial measures to counter this problem has been assigned to the Engineering Services business group.

### **Gandak Hydropower Station**

This powerhouse generated 27.08 GWh of energy in FY 2002/03. Repair and maintenance of power transformers and 6.6 kV circuit breaker were carried out. For this the units had to be shutdown for a few months. Both 6.6/132 kV power transformers were damaged and had to be isolated from the system and the generated energy from the powerhouse was fed to the 33 kV line through a 6.6/33 kV transformer. One of the 6.6/132 kV transformers which had to be isolated from the system was repaired and connected to the system again. However, power export to India was continued through the switchyard of this power station.

### **Puwa Khola Hydropower Station**

This station generated 25.76 GWh of energy in the year in review. As, the problem of sagging of penstock pipe still persisted in this power station, a detail study of the problem has been undertaken by the Engineering Services business group. Meanwhile, a 40mm of pipe was added in the expansion joint at anchor block 3 and 25mm of pipe was deducted from the expansion joint at anchor block 4 to provide sufficient space for expansion and construction of the joint during different seasons.

### **Seti/Phewa Hydropower Stations**

These powerhouses generated 11.14 GWh in the year compared to 8.79 GWh of the previous fiscal year. Replacement of rubber sills was carried out to prevent the leakage at the headwork gates. Steel plates were

placed at the sidewalls of the under sluice to prevent it from further erosion and repair and maintenance works in the downstream of the river gates were also carried out.

### **Panauti Hydropower Station**

On 2nd September 2002 ( 17th Bhadra 2059), this hydropower station was damaged due to the insurgent movement prevailing in the country, leading to a complete stoppage of power generation for a period of ten months. But with relentless efforts of engineers and technicians the powerhouse was rehabilitated successfully and the station started full generation, by all the three units, from 16th June 2003 (2nd Ashad 2060). The power station consequently generated only 1.42 GWh of energy in the year.

### **Chatara Hydropower Station**

Due to the problem faced in the application software controlling the governor, the power station was not in operation, earlier in the year. An expert was invited from VA Tech, Germany and the problem was rectified. However, only one unit of the station has started generation from April/May 2003 (Baisakh 2060) as the other unit requires a spare part which has to be imported from Germany and will be in operation only in the current fiscal year after its procurement and installation. The power station generated only 0.98 GWh of energy in the year in review.

### **Sundarijal Hydropower Station**

This power station has been functioning at full capacity for the last 69 years since its commissioning in the year 1934 A.D (1991 B.S). The overhauling of unit number two was successfully completed in the year. During the overhauling, a runner was replaced, nozzles were repaired and protection and excitation systems were updated. A total of 3.16 GWh of energy was generated in the FY 2002/03.

## **THERMAL GENERATION**

### **Duhabi Multifuel Diesel Plant**

With a total installed capacity of 39 MW, this plant is maintained as a standby and is operated only when the demand exceeds the supply. In the year in review, the plant generated 4.149 GWh. The major maintenance work that was carried out in this plant was 8000-hour overhauling of unit no 3. Similarly, overhauling and maintenance of turbo charger of unit no 1, 5, and 6 were also completed.

### **Hetauda Diesel Plant**

The total installed capacity of this plant is 12.75 MW and is also operated as a standby. In the year, the plant generated 0.247 GWh. Major maintenance works carried out in this plant was overhauling of unit no 4, 6, and 7.

### **Marsyangdi Diesel Plant**

With an installed capacity of 2.25 MW this diesel plant was installed mainly to supply construction power to Marsyangdi Hydroelectric Project. At present, this powerhouse is also maintained in running condition as a

standby. The plant generated only 3.1 MWh in the year 2002/03.

## MAJOR PROJECTS

### Middle Marsyangdi Hydroelectric Project

Middle Marsyangdi Hydroelectric Project (MMHEP) is a daily pondage run-off-river scheme with an installed capacity of 70 MW and an average annual energy generation of 398 GWh. This Project is being funded by KfW (Germany), HMG/N and NEA. The estimated cost of the Project is about US\$ 190 million (NRs. 13.65 billion).

The project was initially planned for completion by 2005, but due to the insurgency and security problems in the past and some major design changes, the revised completion date of the project is estimated to be around 2006. Fichtner Joint Venture is responsible for carrying out the detailed design and construction supervision of the Project whereas environmental consultant TAEC-NESS Joint Venture is responsible for Environmental Impact Assessment (EIA) and monitoring of the Mitigation Plan during construction.

The contractor of the civil works Dywidag-Dracados-CWE JV (DDC JV) started the civil works since June 25, 2001, but the insurgency problem last year has affected the progress of the works. However, rehabilitation of the project-affected families has been completed along with the construction of residential quarters. Besides these, the works on dam, penstock, powerhouse building and tunneling are in progress. Similarly, Voith Siemens Hydropower Generation GmbH & Co., the contractor of mechanical equipment (Lot-M) started the manufacturing of the allocated works and is expected to complete them in time. ALSTOM Energietechnik GmbH, the contractor for 132 kV GIS switchgear equipment and 132 kV substation switchyard (Lot-SSI) has finished the manufacturing of 132 kV, GIS switchgear equipment and is in the process of carrying out detailed design of the 132 kV switchyard. Similarly, ALSTOM power generation AG, the contractor for electrical equipment (Lot-E) has started the manufacturing of the allocated works and is also expected to complete them in time. For hydroelectric steel structure equipment (Lot-HSS) contract negotiation with VA TACH Hydro GmbH Co. of Austria is in process, whereas for transmission line (Lot-TRL) re-tender for international bidding is in process.

The project has already acquired about 53.6 ha (1054 ropanies) of land for various sites. As part of the resettlement and mitigation program, the project has carried out income generation oriented training and community awareness programs focused on public health and traffic safety to the members of the project affected families and the local people of the project area. To fulfill its main objective of supporting the development activities in the nine Village Development Committees (VDCs) neighboring the MMHEP, the Neighborhood Support Program (NSP) has selected five key development areas, namely, health, education, water supply and sanitation, roads (including river crossing) and electrification.

### Chameliya Hydroelectric Project

Chameliya Hydroelectric Project located on the Chameliya River, a tributary of the River Mahakali is a medium sized, 30 MW capacity, 6 hours daily peaking Run-Off-River project. It lies about 950 km west of Kathmandu in Darchula district of Far Western Development Region. The Detailed Design and Tender Documents of the project were completed by December 2001, utilizing a grant assistance from Korea International Co-operation Agency (KOICA) in collaboration with NEA. The project will generate 184.21 GWh of energy annually.

The main features of the projects are 54m high concrete gravity dam with two 13.5m high radial gates, underground desander with 2 basins, 4067m long headrace tunnel, 49.8m high restricted orifice type surge tank, 461m long penstock and semi underground power house with two units of 15 MW vertical shaft Francis turbines. The power will be evacuated through 131 km long 132 kV transmission line to Attariya Substation in Kailali district. The main infrastructures needed to develop the project are 18 km long access road out of which earthwork and structural works of 17 km portion is being completed and local transportation services are



already in operation. Out of seven bridges of the access road two have been completed and the construction of another two are in progress. Out of twenty buildings proposed for camp facility, construction of three have been completed. The Environment Impact Assessment (EIA) study as per Environment Protection Rule 1997 (First Amendment 1999), of the project and 132 kV transmission line route corridor are in progress. The detailed survey of 35 km long 33 kV transmission line for construction power supply (Gothalapani, Baitadi to Balanch, powerhouse site) has been completed. Initial Environment Examination (IEE) study is in progress.

The estimated cost of the project including 132 kV transmission line is US\$ 74.897 million. Project implementation has been envisaged under a co-financing of HMG/N, NEA and other donor Agencies. His Majesty's Government has already made an official request to the Government of Republic of Korea and other donor Agencies for loans and NEA has also proposed for an EDCF loan of US\$ 35 million. The project construction is estimated to be completed within four years. The development of this Chameliya Hydroelectric Project will facilitate the system balance of the national grid, the infrastructure development for rural electrification and an integrated and balanced economic development of the region.

### *Kulekhani III Hydropower Project*

Kulekhani-III Hydropower Project is located 40 km south west of Kathmandu. This project lies on the right bank of Rapti River near Hetauda-Bhaise road at the Bhaise Village Development Committee of Makwanpur district. It will mainly utilize the tailrace water from the Kulekhani-II Hydropower Station. A 50m high dam will be constructed in Yangrang Khola for the storage of around 0.5 million cubic meter of water after connecting it by a 3.5 km tunnel to the tailrace water of Kulekhani -II and Khani Khola. The stored water will be conveyed to an underground powerhouse by a 4.5m diameter and 400m long headrace tunnel to generate 45 MW of peak power.

The impact of the project on the natural environment will be minimal. Similarly, the impact on the social environment will be the resettlement and land acquisition in Sanutar village, Gumaune village, the Yangrang regulating pond area and the tailrace outlet. The Environmental Impact Assessment (EIA) of the project has been approved by Ministry of Population and Environment.

The upgrading of the feasibility study of this project has been undertaken with the technical assistance of Japan International Cooperation Agency (JICA). His Majesty's Government of Nepal has also requested the government of Japan for assistance in the detail design and implementation of the project. The project with an estimated cost of US\$ 77.8 million will be commissioned to meet the peak demand of the dry season by 2007. The annual energy output of the project will be 47.8 GWh.

## **Transmission And System Operation Business Group**

Transmission and System Operation (TSO) is one of the core business groups of NEA headed by a General Manager. Under the internally unbundled structure of the NEA organization, this business group primarily assumes the role of an energy transporter, wheeling power from the NEA generators to distributors and charging them for its transmission services. As the grid owner, TSO bears the responsibility of transmission development and operation and maintenance of the high voltage transmission network and grid substations at 66 kV and above. In the near future, as a wheeler of power, it will be also doing the important role of transporting the power generated by Independent Power Producers (IPP) directly to bulk loads within and outside the country.

To cope with the new role, TSO is currently working on a financial model for fixation of transmission price to be

charged to the various business units within NEA. Transfer Price will also form the basis for fixation of wheeling charges for those IPPs interested in using the NEA system to sell energy directly to bulk consumers within and outside the country. In the initial phase, the model will not discriminate among users at the same voltage level. In future, mechanism for locational pricing will be developed and applied as the market evolves and TSO gains more experience in this field. TSO is also in the process of development of a NEA Grid Code which will help to enhance operational efficiency and instill professionalism in its dealings with the grid users by creating a level playing field for all users, irrespective of their ownership. In the absence of an independent regulatory commission, the Grid Code, in the present form will basically be an internal document without any legal validity and as such cannot be enforced upon outside players. Nevertheless, it can still form a basis for power purchase agreements or interconnection agreements with other users of the grid.

TSO is structured into three departments, namely, Transmission and Substation Construction Department, System Operation Department, and Grid Operation Department. Each of these Departments is headed by a Director.

### **Transmission and Substation Construction Department**

This Department is entrusted with the important task of executing projects related to the expansion and reinforcement of NEA transmission lines and grid substations at 66 kV voltage level and above. With the completion of Kali Gandaki A HEP, the priority now is set on enhancement of transmission capacity so that addition in generation capacity will not experience problems in power evacuation to different load centers.

With funds secured from the IDA, the construction of the first 220 kV line in the country from Khimti to Dhalkebar is ready to take off. This will improve the reliability of power withdrawal from Khimti-1 HEP thereby minimizing any potential contractual problem with the IPP. It will also provide ample capacity for transmission of any future generation in the Khimti region such as the 250 MW Upper Tamakosi power, a severe constraint faced in earlier transmission plans. A second 220 kV line from Bardghat to Hetauda is also being planned as the first step towards a 220 kV national grid stretching from east to west, reinforcing the existing 132 kV network. A 66 kV substation is also being constructed in the heart of Kathmandu and another 132 kV substation at Parwanipur to improve the supply situation in these regions. The power supply situation in the eastern region will also improve once the stringing of the second 132 kV circuit from Hetauda is completed. Similar stringing of the second circuit in the western region will be taken up as and when necessary. The Department is also constructing three power exchange links at the 132 kV level to enhance the transfer capability of the Nepal-India cross-border interconnections. As with the existing system, these new lines will operate in isolated modes. As per the understanding between the two countries, each country will be responsible for the construction of the facilities within their territory. Major projects being implemented under this Department are briefly described below.

#### **K-3 Substation Project**

Under this Project, a new 66/11 kV substation of 36 MVA capacity will be constructed within the Singh Durbar premises and will be connected to the existing Teku Substation through 3.5 km long 66 kV double circuit underground cable. Under the same Project, several 11 kV feeders will be drawn out from this substation to link with the existing overhead distribution network. The proposed 66 kV substation will not only relieve the stresses on the existing distribution feeders but also help reduce system loss and improve reliability and quality of supply in the area. The Project commenced from FY 2002/03 and is expected to be completed by FY 2004/05. Undertaken with grant assistance from Government of Japan and funding from HMG/N and NEA, the Project is estimated to cost US\$ 13 million.

#### **Birgunj Corridor Transmission Line Project**

The heavily industrialized corridor between Simra and Birgunj presently receives its power supply from Hetauda through a 66 kV double circuit transmission line. The increasing demand for power in this corridor is, however, constrained by the overloading of the 66 kV lines giving rise to serious voltage problems and frequent interruptions. To improve the supply situation in this region, one 132 kV substation with 36 MVA transformer capacity is being constructed at Parwanipur along with a 20 km long transmission line. Expected to be completed within two years, the Project will not only cure the existing transmission problem in the corridor, but will also facilitate exchange of power between Nepal and India through the planned Parwanipur-Birgunj transmission line. The Project, estimated to cost US\$ 4.75 million is being funded jointly by HMG/N and NEA.

### **KhimtiDhalkebar 220 kV Transmission Line Project**

This will be the first 220 kV transmission line Project in the country. Its immediate objective is to improve the reliability of power withdrawal from Khimti-1 HEP, provide a direct route for export via Dhalkebar Substation and improve the voltage problem in the eastern region. In future, the line will also be used to evacuate power from the 250 MW Upper Tamakoshi HEP that is being planned for construction. It can also accommodate generation from other power plants that have been identified in the Khimti region.

The Project comprises of a 75 km long 220 kV transmission line on double circuit towers from Khimti HEP to Dhalkebar along with a 132 kV line bay extension at each end. Till Upper Tamakoshi or a similar large generating station is connected to this line, only one circuit with ACSR BISON duplex conductor will be strung under the present scheme and charged at 132 kV level. The cost of the Project is estimated at US\$ 22 million and it is funded jointly by IDA, HMG/N and NEA. A loan agreement was recently signed between HMG/N and IDA to finance this Project as a part of the Nepal Power Development Project. The project is estimated to be completed in fiscal year 2006/07.

### **Banepa-Panchkhal Substation Project**

Constructed at a cost of NRs. 80 million, the 66 kV Banepa Substation with a transformer capacity of 10/12.5 MVA has been in service since October 2001. It has vastly improved the quality and reliability of electricity supply to Banepa, Dhulikhel, Panauti and the surrounding areas. The construction of another 66 kV substation with a 5 MVA transformer to reinforce the old substation at Panchkhal is in full swing. Reinforcement of this old 66 kV substation was undertaken to evacuate power from Indrawati HEP. The total project cost of NRs. 70 million is being borne jointly by HMG/N and NEA and the project is scheduled to be completed by September 2003.

### **Thankot-Chapagaon-Bhaktapur 132 kV Transmission Line Project**

Under this Project, a double circuit 26 km long 132 kV transmission line, initially with only one circuit, will be constructed from Thankot to Bhaktapur in the southern side of Kathmandu Valley to connect with the existing 132 kV line serving the northern half, thus forming a 132 kV ring main in the Kathmandu Valley. The Project also includes one 132 kV switching station at Thankot, one new 132 kV substation at Harisiddhi and upgrading of Balaju and Bhaktapur substations. The Project will not only cater to the growing demand in the Valley but also reduce system losses and improve quality and reliability of the supply in the region. The project has already acquired necessary land for substation construction at Matatirtha and Harisiddhi and has recruited Nippon Koei Co. Ltd. of Japan as the project consultant. The estimated project cost of US\$ 15 million is jointly funded by ADB, OPEC, HMG/N and NEA. The project is expected to be completed by fiscal year 2006/07.

### **HetaudaDhalkebar & Butwal-Bardaghat 132 kV Second Circuit Transmission Line Project**

Financed jointly by HMG/N and NEA, the Project was designed to increase the transmission capacity of the existing transmission line connecting Hetauda with the eastern part of the country by stringing the remaining 174 km long second circuit on the empty side of the double circuit transmission towers from Hetauda to Dhalkebar using the hot-line erection method. This will facilitate power flow from the west, where the present generations are concentrated, to the east and improve the quality and reliability of the supply in the eastern region. At present, extension of associated line bays at four substations is in progress and project commissioning is expected in January 2004. The Project is estimated to cost US\$ 3.8 million.

### **Modikhola Substation Expansion Project**

The present supply to Kusma and Baglung region comes all the way from Pokhara through a 33 kV line. Because of the long line and limited transformer capacity, the present supply is far from being satisfactory. The Project aims at augmenting the supply capacity to this region as well as improving its quality and reliability. Under this project, a 132/33 kV substation with 5 MVA transformer capacity is being constructed at Modikhola Power Station at a cost of NRs. 25 million, which is being met jointly by HMG/N and NEA. The Project is scheduled to come on line in the first quarter of fiscal year 2003/04.

### **Butwal-Sunauli 132 kV Transmission Line Project**

The Project comprises of a 23 km long double circuit transmission line and the extension of two 132 kV line bays at Butwal Substation. The contract for the construction of this Project was awarded in the last fiscal year but progress has been hampered because of the problem of right of way for the transmission line. To complete the exchange link, another 45 km of transmission line needs to be constructed from the border to Anandnagar in India. The Project, financed jointly by HMG/N and NEA, is estimated to cost US\$ 1.8 million and it is scheduled for completion in fiscal year 2004/05.

### **ParwanipurBirgunj 132 kV Transmission Line Project**

The scope of this Project covers the construction of a 15 km long double circuit 132 kV transmission line from the 132 kV Parwanipur Substation, that is under construction, to Birgunj on the border with India. The construction of the line along with the extension of two associated 132 kV line bays at Parwanipur Substation is estimated to cost US\$ 1.85 million, which is to be borne by ADB, OPEC, HMG/N and NEA. The Project consultant has been selected and at present EIA studies is in progress with detailed route survey completed. The Project is expected to be completed in fiscal year 2004/05. On the other side of the border, another 45 km stretch of transmission line needs to be constructed from the border to Motihari in India in order to complete the link.

### **Dhalkebar-Bhittamod 132 kV Transmission Line Project**

The construction of this power exchange link will be very beneficial for power export because of the proximity of Dhalkebar Substation to the Khimti region, where a number of potential hydropower projects have been identified and among these Upper Tamakoshi is already being proposed for development. Under this Project, a 45 km long double circuit 132 kV transmission line along with the extension of two 132 kV bays at Dhalkebar Substation will be constructed at an estimated cost of US\$ 6.18 million. The segment of the link within India from the Indo-Nepal border to Sitamarhi Substation in India is about 45 km. To be financed by IDA under the Nepal Power Development Project along with HMG/N and NEA, the Project is scheduled for completion in fiscal year 2004/05.

### **System Operation Department**

System Operation Department has the principal responsibility of real time supervision and monitoring of the operation of Integrated Nepal Power System (INPS) including the grid connected generating stations owned by Independent Power Producers (IPP). The Departments routine works include formulation and implementation of operating plans to manage demand and supply of electricity in a way to minimize outages and losses, and maximize quality and reliability of electricity supply. Load Dispatch Center (LDC), which operates round the clock, is the central wing of this Department that operates and supervises the INPS. The Department is also executing the LDC and Balaju Substation Extension Project. Besides, the upkeep of power line communication network is also undertaken by this Department.

## **Load Dispatch Center**

As in the past years, the Load Dispatch Center has been working round the clock to keep the operation of the Integrated Nepal Power System on the right track. With the commissioning of Indrawati-3 and Kali Ggandaki A hydropower projects, energy availability has surpassed the demand during the wet months thus giving rise to unutilized energy during the period. Because of overloading of transmission lines at several sectors, the available generation capacity could not be utilized even during the peak hours during the wet months. The damage caused by miscreants on several transmission sectors further aggravated the situation. Nevertheless, LDC was able to limit its ill-effects on system operation and at the same time curtail power import and augment export to India.

## **LDC and Balaju Substation Extension Project**

A new state of the art Load Dispatch Center being built at Syuchatar, is expected to be commissioned in the first quarter of the current fiscal year. Once commissioned, this new LDC is expected to improve system security, enable quick response to disturbances, optimize dispatching and reduce system losses through acquisition of real time data at each busbar, generator, line, transformer, capacitor and reactor. The new Master Station constructed in Syuchatar is being interlinked with 42 power stations/substations through Supervisory Control and Data Acquisition (SCADA) system enabling efficient and systematic supervision of system operation. Required adaptation works along with the installation of Remote Terminal Units at these outstations have been completed.

Once the project is commissioned, a number of system supervisory and control software will be added to LDC tools. These software include (i) Report Generation Software (ii) RTU Database and Downloading Software (iii) Economic Load Dispatch Software (iv) Reserve Monitoring Software (v) Automatic Generation Control Software (vi) Contingency Analysis Software (vii) On-line short Short Circuit Calculation Software, and (viii) Historical Data Generation software. As part of the Project, the communication system is also being upgraded with the use of digital technology. Fiber Optic cable has been laid within Kathmandu Valley and in the sectors SyuchatarKulekhaniHetauda, SyuchatarMarsyangdiDamouliLekhnath-Pokhara and BardghatButwal. In the sector LekhnathKaligandaki AiButwal, fiber optic cable has already been laid by the Kaligandaki A project. It is planned to lease several fibers of these fiber optic cable to Nepal Telecommunication Corporation. Similarly, Power Line Carrier Communication (PLCC) has been upgraded in other sectors either by installing digital PLCC or by repairing the existing ones.

## **Grid Operation Department**

Grid Operation Department is another key wing under Transmission and System Operation business group. The principal responsibility of this Department is to keep NEA owned trans-mission lines and substations available for operation round the clock by undertaking appropriate maintenance, reinforcement and rehabilitation works in a timely manner and by judicious management of available resources. The Department also mobilizes skilled and experienced manpower to man the substation facilities so that the trans-mission and substation network are available for unhindered operation round the clock as per the instructions of LDC. In fiscal year 2002/03, the activities of the Department were focused mainly on upgradation, reinforcement and

rehabilitation of transmission lines and substations.

### **Transformer Up gradation and Voltage Improvement Works**

At Butwal, Anarmani, Kohalpur and Lamahi substations, 132/33 kV transformer capacities were uprated, the net increase being 35 MVA. Similarly, 132/11 kV transformer capacities of Bharatpur and Pokhara substations were up-rated with a net increase of 17.7 MVA. Contracts have been signed for supply, delivery and installation of 63 MVA, 132/33 kV Power Transformer at Duhabi Substation and 30 MVA, 132/33 kV Transformer at Dhalkebar Substation which are expected to be completed in fiscal year 2003/04. Contracts have also been signed for constructing additional 33/11 kV transformer bays with 7.5 MVA and 3 MVA transformers at Kohalpur and Lamahi substations respectively and shall be completed in the current fiscal year 2003/04. Similarly, contracts have been awarded for the supply, delivery and installation of 10 MVAR and 30 MVAR Capacitor Banks at Birgunj and Duhabi substations respectively. Once completed, these measures will bring to an end the prevailing transmission and voltage problems at these substations.

### **Other Reinforcement Works**

At Bharatpur and Duhabi substations, one set of old faulty 132 kV Circuit Breaker (CB) with control and relay panels was replaced. Current Transformers (CT) have been procured to replace the existing low capacity CT in Bardaghat, Bharatpur, Butwal, Pokhara, Hetauda and Dhalkebar substations to increase the power transmission capacity of the line. At Lahan Substation, the old 11 kV switch-gears were replaced by new Vacuum Circuit Breakers (VCB). New control room building has been built at Thimi Substation, and new 11 kV switchgears have been procured for installation in this substation. Retrofitting of 11 kV VCB has been completed at Patan Substation. One unit of new mobile Transformer Oil Regeneration Plant has been acquired and successfully operated. This will be helpful in increasing the life of transformer oil and thus the transformer itself. Contract has been awarded for construction of outdoor 33 kV bays at Attariya Substation. Contract has been signed for supply and installation of 132 kV CB at Bardghat and Surajpura Substation, 66 kV CB at Hetauda and Syuchatar substations and control room equipment at Lamki and Chanauta substations. All these works shall be completed by the end of FY 2003/04. Likewise, conversion of Main and Transfer Bus into Double Busbar arrangement is in progress at Kohalpur Substation.

### **Substation Maintenance Works**

During the last fiscal year, the Department undertook various maintenance works that include the following:

Overhauling of 3 x 6 MVA, 66/11 kV transformer at Patan Substation;

Repair and commissioning of one single phase 132/11 kV, 6 MVA transformer at Syuchatar Substation;

Overhauling of one single phase 132/11 kV, 3.3 MVA transformer at Bharatpur Substation;

Replacement of damaged 66/11kV 6.3MVA transformer at Simara Substation by the transformer relieved from Bharatpur Substation;

Replacement of damaged 132kV GCB poles at Hetauda and Duhabi substations;

Replacement of damaged LAs, CVTs and CTs at various substations.

## **Transmission Line Maintenance Works**

Two 132 kV and one 66kV transmission line towers damaged by miscreants in the Lamosangu-Bhaktapur section were repaired. Similarly transmission line towers damaged by miscreants at Lamahi-Chanauta Section (1) Kohalpur-Lamahi(1) and Attariya-Lamki Section (1) were replaced. Three towers of Attariya-Dadeldhura 66kV line that collapsed due to heavy snowfall and wind were also replaced. Necessary re-routing of transmission line of Marsyangdi-Syuchatar section at Gajuri due to progressive landslide will be completed by mid August 2003. In addition to the above, the Department also carried out routine tower protection works, replacement of stolen tower members and right of way clearance at various sections of the transmission lines.

## **Database Management**

The Department was able to register a major stride in its efforts to upgrade data acquisition and management capabilities. During the past FY, the Department successfully completed the task of acquiring, consolidating and analyzing Outage and Energy transaction data of all substations and transmission line sections covering the past three years. To strengthen its database management capability, the Department also acquired database management software which will be very useful in analyzing transmission performance variables like Voltage, Energy, Peak Load, Loading Status and Outages, personnel data and other performance variables. This software will be installed at all Divisions under this Department where the primary data shall be entered. The entered data will be transferred through electronic mail to the Department where consolidation and analysis will be performed automatically by the software. The software is also capable of generating monthly and annual reports. This software will facilitate the task of detecting the overloading of components of the network, and enhance the efficiency and the effectiveness of the Departments activities.

## **Distribution and Consumer Services Business Group**

The Distribution and Consumer Services (DCS) business group is responsible for the operation and maintenance of distribution network up to 33 kV voltage level and its further development and expansion including rural electrification. It will purchase power in bulk from Generation business group paying wheeling charges to the Transmission and System Operation business group and sell it to all the segments of consumers at a price approved by the Electricity Tariff Fixation Commission (ETFC). The major functions of this business group are to :

- 1) Plan, design and construct distribution network up to 33 kV voltage level.
- 2) Operate and maintain the distribution network.
  
- 3) Read meters, bill and collect revenue and
  
- 4) Reduce distribution losses including pilferage of electricity.

In line with the reforms being carried out in NEA, the DCS business group has accordingly been re-organised so as to enable it to execute its functions with increased efficiency. Eighteen of its branch offices were designated as distribution centers from 15 February, 2003 to run in accordance with the principles of responsibility accounting as profit centers to establish commercial operations, provide better consumer services, enhance efficiency, reduce costs, increase revenue and curb electricity loss. For this, the Distribution Center Operation By-law that was effected from 13 February, 2003 (2059/11/1) allows for periodically appraising the performance of these distribution centers and the concerned chief and for incentives, rewards

and punishments based on specific quantified benchmarks.

A Distribution Center Monitoring Department has also been formed within the DCS business group to supervise and closely monitor the actual performance of these distribution centers with regard to its specific performance targets. These distribution centers have shown improved performance in the collection of revenue, reduction of losses and improvement in consumer services during the period of February-June, 2003. Similarly, a Community Rural Electrification Department was also created with the intent to accelerate the pace of growth and to manage sustainable rural electrification with active community participation.

DCS is striving to provide better and quality services to its consumers. Consumer satisfaction has always remained a valuable and motivating factor while consumer grievances have provided opportunities to improve upon its weaknesses. To impart better and prompt services to the consumers and to maintain consumer friendly relations, DCS has taken several specific measures such as time bound new connection procedures, prompt attendance to consumer complaint and consumer awareness through dissemination of information through print and electronic media relating to issues like timely payment of bills, meter reading, loss reduction and safety. Distribution and Consumer Service business group now carries out its functions through four departments, four regional offices, 63 branch offices out of which 18 are declared as distribution centers, 26 small hydro power plants of which 11 are leased and 2 are solar power plants.

During the FY 2002/03, the total internal energy sales was 1522.165 GWh which accounted for 89.09% of the total sales. This is an increase of 115.992GWh over the last fiscal years figure. The revenue for FY 2002/03 is Rs. 11797.491 million which is about 18.74% more than that of last fiscal year.

The number of consumers at the end of FY 2002/03 was 970,611, an increase of 9.73% over the previous year. The domestic consumer category accounted for about 95.87% of the total number of consumers, 36.01% of sales and 37.03% of revenue. The industrial consumer category accounted for only 2.0% of the total number of consumers but its contribution to sales and revenue are 36.64%, 35.49% respectively. The commercial consumer category accounted for only 0.54% of the total number of consumers but contributed 6.10% of the total sales and 8.98% total revenue respectively. Likewise non-commercial consumers constitute 1.0% of the total number of consumers and contributed 4.99% of the total sales and 7.42% to the revenue.

Despite concerted efforts to curb losses, it still remains a burning issue. NEA however continued to make strenuous efforts to tackle this problem and took a series of actions during the year on various fronts like detection of thefts, replacement of defective/ stopped meters, resealing of meters, replacement of electro-mechanical meter by time of day static meters for high consuming HT and LT consumers, strengthening of distribution network to improve system performance and launching of public awareness programs. Yet, it still requires a continued and committed support and effort from all sections of society to control the electricity losses. In order to curb the unauthorized use of electricity, the Electricity Theft Control Act 2058 and its Regulation have been enforced and is envisioned that it will help NEA to bring the system loss down to 19 % by 2006/07.

Similarly, the strengthening and upgrading of electrical network which was long overdue has been taken up to facilitate the transfer of reliable and increased power flow to increase the domestic consumption in view of the existing surplus power available with NEA. The upgrading and rehabilitation of sixteen 33/11 kV distribution sub-stations are being carried out by NEA through its own resources and is scheduled for completion by FY 2004/05.

Electricity coverage has now been extended to all the 75 district headquarters. The Integrated Nepal Power System (INPS) supplies 57 districts, 16 districts have been fed with electricity from isolated small hydro power plants and the remaining two districts are supplied from solar power plants; 22.0% of the population has direct access to the electricity but the potential population coverage of the existing network



is 35.0%.

### **Small Hydro and Rural Electrification Department**

Construction, operation and maintenance of isolated small hydropower plants, rural electrification in the surrounding areas and the extension of the national grid to the remote and difficult hilly regions along with the distribution works are the responsibility of this department. The operation and maintenance works of this department are limited to 27 districts (12 zones) of the Kingdom and are carried out by 5 branch offices and 26 offices of small hydropower plants of which 11 have been leased out to private operators and 2 are solar power generating plants. This department is actively engaged in providing electricity to the remaining parts of these districts.

In the fiscal year 2002/03, the normal activities of this department were partially affected due to the adverse security situation prevailing in most of the hilly and remote areas of the country. Construction works of 33 kV transmission and 0.4 kV distribution lines in most of the districts also remained suspended.

### **Community Rural Electrification Department**

The Board of Directors of NEA approved the Community Rural Electrification By-law on 21 May, 2003 (2060/2/7) to promote and accelerate the community based rural electrification works. Accordingly, a Community Rural Electrification Department was created under Distribution and Consumer Services business group to execute its operations for the development of sustainable rural electrification based on community participation. The salient features of community based rural electrification are:

The community-based organization with legal status can buy electricity in bulk from NEA and sell power within its area utilizing the existing distribution network.

The community-based organization will conduct meter reading, billing and collection from its consumers and in turn pay for the bulk electricity to NEA.

The rate for the bulk purchase of electricity will be settled through negotiation between NEA and the community based organization. The retail tariff rate will be as fixed by the ETFC. The community based organization will take measures to reduce losses to generate more income.

NEA will undertake the rehabilitation works of the distribution system leased out to the community based organization.

The community-based organization will be responsible for the operation, maintenance and construction of the distribution system.

Staffs of the community based organization dealing in electricity will have free access to the training facility of NEA for one year.

### ***Distribution Centers***

In order to run the distribution branch offices on commercial principles with improved efficiency and accountability through various measures like cost reduction in its operation and provision of better services to the consumers, the Board of Directors of NEA approved the Distribution Center By-law on 10 February, 2003 (059/10/27) which became effective from 13 February, 2003 (059/11/1). Its salient features are as follows:

The distribution branch offices operating under this By-law will be known as Distribution Centers (DC). So far,

out of a total 63 DCS branch offices, 18 have been designated as Distribution Centers. These Distribution Centers will execute its operation with increased independence, accountability and authority as stipulated in the By-law.

Distribution Centers will have to reduce at least 50% of their distribution losses as set out in the By-law during one performance audit period (PAP).

They have to meet other performance benchmarks also. These are stock turn over ratio, average revenue collection, new service connection, load approval periods etc.

Punitive action will be taken against Distribution Center Managers not meeting the specified performance benchmarks.

On achieving the specified performance benchmarks, staffs of the Distribution Centers will receive cash incentives not exceeding three times their salary.

The performance appraisal of the 18 Distribution Centers (declared so far) for the five month period 13 February, 2003 to 16 July, 2003 (Falgun, 2059 to Ashad, 2060) has indicated a marked improvement in loss reduction as well as other performance indicators.

## MAJOR PROJECTS

### **Distribution Network Development Project**

Under this project, techno-feasibility studies for Rural Electrification and Distribution System Reinforcement (RE/DSR) in 26 districts of Far Western, Mid Western, Western and Central Development Regions have been completed so far since its inception in 1996, utilizing funds available from NEA and HMG/N. The project has completed the Initial Environmental Examination (IEE) of Lalitpur and Kavrepalanchok districts, and detailed engineering design for RE/DSR of Lalitpur, Bhaktapur, Kavrepalanchok, Dhading and Nuwakot districts. The rural electrification and distribution system reinforcement in these districts will be implemented with funding from International Development Association (IDA) of the World Bank under the Nepal Power Development Project.

### **Kailali Kanchanpur Rural Electrification Project**

This project which started in FY 2000/01 with a US\$ 9.1 million grant assistance from the Danish Government and US\$ 9.7 million from HMG/N and NEA, includes construction of 681 km of 11 kV lines, 1650 km of 400/230 V lines, installation of 490 distribution transformers, construction of three new 33/11 kV substations with a total capacity of 6 MVA, reinforcement of one 33/11 sub-station and connection of around 30,000 households with electricity in 34 VDCs and 1 Municipality of Kailali and Kanchanpur districts. So far 90 km of 11 kV lines, 284 km of 400/230 V lines and 72 distribution transformers have been erected. The Danish contractor, who has been appointed for the erection is also carrying out the distribution line survey works. The construction works of the project is being done on a turnkey contract basis. The project is scheduled to be completed by FY 2005/06 and on completion of the project, the operation of the distribution system will be handed over to local users co-operatives.

### **Mid and Far western Rural Electrification Project**

The Mid and Far Western Rural Electrification Project is proposed for implementation with a concessionary credit of about US \$ 20 million from the Swedish Government through the Swedish International Development Agency (SIDA). An agreement to this effect between the governments of Sweden and Nepal is expected soon.

The project is scheduled to commence from FY 2003/04 and is slated for completion by FY 2005/06. It will electrify 145 VDCs of eight districts (Surkhet, Dailekh, Achham, Doti, Dadeldhura, Darchula, Baitadi and Bajhang ) of Mid and Far Western Region in three phases. The project will also construct and rehabilitate related works to charge the Attaria-Dadeldhura 66 kV transmission line which at present is being charged at 33 kV. It will further construct 29 km of 33 kV sub transmission line along the high way from Chhinchu to Birendranagar of Surkhet in order to enhance the reliability of power supply to Surkhet and Dailekh districts. On completion of the project, the operation and management of distribution system of the area will be handled by Users Groups. The scope of work of the project includes the following:

17,200 new consumer connections

132/66 kV, 10 MVA transformer at 132 kV Attaria Substation, Kailali

66/33 kV, 3 MVA transformer at Budar, Doti and 6 MVA transformer at Syaule, Dadeldhura

225 km of 33 kV, 665 of 11 kV and 835 km of 0.4 kV lines.

7 nos. 33/11 kV and 370 nos. 11/0.4 kV transformers.

### **Rural Electrification, Distribution and Transmission Project**

This project is being implemented with a loan from ADB and OPEC for the foreign component and the local component is borne by NEA and HMG/N. The main objectives of the project are: to develop distribution and transmission systems of NEA to evacuate power from the existing and upcoming hydro power plants; to extend the NEA distribution system in rural areas to provide service to more rural communities and improve living standards and local economic conditions; to accommodate increased loads and new consumers within existing service areas; to reduce losses and improve the overall efficiency of NEAs operations; and to develop the transmission system in the Kathmandu Valley as well as an inter-connection with India. The project which will cover the eastern, central, and most of the western regions of the country, consists of the following five components:

#### *a. Rural Electrification and Distribution System Reinforcement (RE/DSR)*

This component will carry out electrification of around 123,382 rural households of 277 Village Development Committees (VDCs) in twenty-two districts of eastern, central and western regions of Nepal to enhance economic development in the rural areas. RE will encourage the substitution of imported kerosene and diesel fuel in rural areas with electricity. RE in some districts will also support irrigation tube well pumps for agricultural development. The DSR program will raise the quality of the distribution system and hence reduce losses, improve reliability and serve the expected load growth for next four to five years in 27 districts of the country including the proposed districts for rural electrification.

At present the project has completed the following works:

- Land acquisition for 11 places out of 14 places for the 33 kV substations
- Planning, economic analyses, and detail engineering survey works for previously proposed 30 districts
- Final IEE reports for 37 districts
- Field survey works for 11/0.4 kV distribution lines were carried out in eight districts i.e. Jhapa,

Morang, Chitwan, Gorkha, Lamjung, Palpa, Gulmi and Arghakhanchi.

*b. Transmission Line*

The scope of work for this component includes:

- Construction of 26 km of 132 kV lines around the southern side of Kathmandu Valley from Matatirtha to Bhaktapur, to complete the 132 kV Ring around Kathmandu Valley.
- Expansion of existing substations at Bhaktapur and Balaju.
- Construction of new 132 kV switching station at Matatirtha and a new 132 kV substation at Harisiddhi.
- Construction of 15 km 132 kV Double Circuit lines from Parwanipur to Birganj to increase interconnection capacity for power exports to India.

Nippon Koei Company was appointed as the consultant for this project in May 2003. The Consultant has completed collection of required data and documents. Report preparation is in final stage. Land acquisition for Matatirtha switching station has been completed and that for Harisiddhi Substation is in progress.

*c. Computerized Billing*

The Computerized Billing Project will facilitate DCS to maintain accurate records of consumers, meters and revenue accounting, reduce losses and accounts receivable, expedite reporting works, reduce operational expenses and improve relationship with NEAs consumers. The project completed the technical evaluation report for the selection of consultants in the year in review and is awaiting the concurrence of ADB to proceed with financial negotiations.

*d. Distribution Profit Center*

Under this component, consulting services will be provided to assist DCS in its efforts to operate its distribution branch offices on a truly commercial basis as profit centers. The consulting services will complement the steps taken by NEA in the establishment of commercially oriented Distribution Centers to reduce losses, increase revenue and maximize profits.

Financial negotiation is in progress with COWI Consulting Engineers & Planners of Denmark for this consulting services.

*e. Fixed Assets Revaluation*

Under the Fixed Assets Revaluation component, consulting services will be provided to establish a computer based fixed assets register, improve accounting procedures to resolve issues raised by NEAs external auditors relating to revaluation of fixed assets and inventories and design an appropriate formula for annual revaluation of fixed assets on an interim basis. Financial negotiation with Ernst & Young, India is in progress for this consulting services.

*Projects of Small Hydro and Rural Electrification Department*

The following projects have been carried out by Small Hydro and Rural Electrification Department during the year.

#### Small Hydropower Projects

##### **Heldung Small Hydropower Project (Humla) :**

The actual work of this 500 kW project started in FY 2001/02 and Letter of Credit for the electromechanical works has already been opened. The tender for engineering, procurement and construction on turnkey basis has been awarded to M/s RPP Enterprises. The work of the project is in progress and is expected to be completed by FY 2004/05 at a total cost of about Rs. 129 million.

##### **Gamgad Small Hydropower Project (Mugu) :**

The actual work of this 400 kW project started in FY 2001/02 and Letter of Credit for the electromechanical works has already been opened. The tender for engineering, procurement and construction on turnkey basis has been awarded to Global Construction Company, Chitwan. The project is expected to be completed by FY 2004/05 at a cost of about Rs. 161 million.

#### 33 kV Transmission Line Projects

##### **Sindhuwa-Khandbari 33 kV Transmission Line Project (Sankhuwasabha )**

This project was started in FY 1997/98. The major works of the project include the construction of 45 km of 33 kV transmission line, 25 km of 11 & 0.4 kV composite distribution line and a 1.5 MVA 33/11 kV sub-station at Piluwa. Presently, the testing and commissioning of the sub-station is underway. The project is estimated to cost Rs. 70.4 million.

##### **Buipa-Okhaldhunga 33 kV Transmission Line Project (Khotang and Okhaldhunga)**

The major works of the project are the construction of 29 km of 33 kV transmission line, 25 km of 11 kV and 20 km of 0.4 kV distribution line and two 33/11 kV sub-stations of 1.5 MVA capacity. Of the two sub-stations, evaluation of the tender for the supply and construction of sub-station on a turnkey basis is presently underway. A total of 519 poles for the transmission line have been erected and stringing of conductor for a distance of 10 km has been completed. This project was started in FY 1999/00 and is expected to be completed by FY 2005/06 at an estimated cost of Rs. 132.7 million.

##### **Ilam-Phidim-Taplejung 33 kV Transmission Line Project**

(Panchthar and Taplejung)

The major works of the Project include the construction of 90 km of 33 kV transmission line and 33/11 kV sub-stations of 1.5 MVA capacity in Phidim and Taplejung Districts. The tender for the supply and construction of transmission line on a turnkey basis was finalized in FY 2001/02. Out of the 90 km long 33 kV transmission line, 40 km transmission line work has been completed. This project which started in FY 1999/00 is expected to be completed by 2004/05 at an estimated cost of Rs. 144.5 million.

#### **Sheetalpati-Mushikot 33kV Transmission Line Project (Salyan and Rukum)**

The major works of the project are the construction of 50 km of 33 kV transmission line and two 33/11 kV sub-stations of 1.5 MVA capacity at Sheetalpati and Mushikot. The tender for the supply and construction of transmission line on a turnkey basis was finalized in FY 2001/02. Out of the 50 km long 33 kV transmission line, pole erection work for a distance of 30 km was completed in the FY 2002/03. This project was started in FY 2001/02 and is expected to be completed by 2005/06 at an estimated cost of Rs. 142.5 million.

#### **Chhinchu-Rakam-Jajarkot 33 kV Transmission Line Project**

(Surkhet and Jajarkot)

The major works of the project are the construction of 70 km of 33 kV transmission line, 45 km of 11 & 0.4 kV composite distribution line and a 1.5 MVA 33/11 kV sub-station. The tender for the supply and construction of transmission line on a turnkey basis was finalized in FY 2001/02. Out of the 70 km long 33 kV transmission line, 20 km transmission line work was completed in fiscal year 2002/03. The project was started in FY 2001/02 and is expected to be completed by FY 2005/06 at an estimated cost of Rs.142.5 million.

#### **Ghorahi-Holeri 33 kV Transmission Line Project (Rolpa)**

The major works of the project are the construction of 45 km of 33 kV transmission line, 50 km of 11kV & 50 km of 0.4 kV distribution line and a 1.5 MVA 33/11 kV sub-station. The tender for the supply and construction of transmission line on a turnkey basis was finalized in FY 2001/02. In FY 2002/03, pole erection work for a distance of 10 km was completed. The project was started in FY 2001/02 and is expected to be completed by FY 2005/06 at an estimated cost of Rs. 120.5 million.

#### **Tatopani-Larjung-Muktinath 33 kV Transmission Line Project (Mustang)**

This project is expected to be complete by the current fiscal year 2003/04 at an estimated cost of Rs. 7.5 million. In FY 2002/03, construction of one km of 11 kV and one km of 400 volts distribution line works were completed.

#### **Udipur-Beshishahar-Manang 33 kV Transmission Line Project**

(Lamjung and Manang)

The major works of the project are the construction of 90 km of 33 KV transmission line, 53 km of 11/0.4

kV distribution line and a 1.5 MVA 33/11 kV sub-station. Out of the 90 km long 33 kV transmission line, pole erection work for a distance of 10 km was completed in FY 2002/03. This project was started in FY 2001/02 and is expected to be completed by FY 2005/06 at an estimated cost of Rs. 80 million.

#### **Dadeldhura-Baitadi 33 kV Transmission Line Project**

The major works of the project include the construction of 14 km of 33 kV transmission line, 15 km of 11/0.4 kV distribution line and a 1.5 MVA 33/11 kV sub-station. Out of the 14 km long 33 kV transmission line, pole erection work for a distance of 10 km and stringing work for 1 km was completed in FY 2002/03. This project was started in FY 2001/02 and is expected to be completed by FY 2004/05 at an estimated cost of Rs. 33.1 million.

#### **Sub-station Projects**

##### **Rasuwaghat-Khotang 33/11 kV Substation Project**

This project started in FY 2001/02 and is expected to be completed by FY 2005/06 at an estimated cost of Rs. 106 million. It includes the construction of a 33/11 kV substation of 1.5 MVA capacity at Rasuaghat of Khotang district and 90 km of 11 kV and 0.4 kV composite distribution line. Out of 90 km distribution line, 3.7 percent of works has been completed in fiscal year 2002/03. Tenders have been floated for the supply and construction of the sub-station on a turnkey basis and the evaluation of tender is presently underway.

##### **Budar 33/11 kV Substation Project (Doti)**

The construction of this 33/11 kV, 1.5 MVA substation started in FY 2000/01 and was completed and charged in the FY 2002/03. The cost of the project is about Rs. 20.7 million.

##### **Jiri-Khimti 33/11 kV Substation Project (Terhathum)**

This project started in FY 2001/02 and is expected to be completed by FY 2003/04. Tenders have been floated for the supply and construction of a 33/11 kV sub-station of 1.5 MVA capacity on a turnkey basis and the evaluation of tender is underway. This project is estimated to cost about Rs. 25 million.

#### **Small Hydropower Master plan**

To assess the potentiality of small hydropower projects, the Small Hydropower Master Plan (SHMP) Project was initiated in 1990. Following are the major works carried out under this project in the fiscal year 2002/03.

- a) Inventory Study of Thopal Khola (1200 kW) and Ghar Khola (720 kW) were completed.

- b) Feasibility Study of Sarada Khola (2200 kW) is underway.
- c) Detail Design of Inwa Khola (2500 kW) is underway.

## Electrification Group

The Electrification Group is responsible for the operation and maintenance of small hydropower plants, isolated distribution networks and rural electrification. The major functions of this group is to:

- plan, design and construct distribution networks up to 33 kV voltage level
- operate and maintain off-grid distribution networks and small hydropower plants
- read meters, bill and collect revenue and
- implement all electrification projects up to 33 kV.

Under the Electrification Group there are Small Hydro and Rural Electrification Department and Community Rural Electrification Department. The major projects under these departments are as follows:

- Kailali Kanchanpur Rural Electrification Project
- Rural Electrification, Distribution and Transmission Project
- Rural Electrification and Distribution System Reinforcement Project
- Sindhu- Dolkha Distribution line extension Project
- Mid and Far Western Rural Electrification Project
- Distribution and Rural Electrification Project

### **Small Hydro Project (SHP) and Rural Electrification Department (RED)**

The SHP and RED are responsible for the construction, operation and maintenance of isolated small hydropower plants, execution of rural electrification and extension of the national grid to remote and difficult hilly regions along with the establishment of distribution systems to provide electricity to the rural population.

The operation and maintenance works of the department cover 27 districts in 12 zones of the kingdom and are carried out by 26 small hydropower plant branches, 2 solar plant branches and 5 distribution branch offices. Out of 26 small hydropower plants, 8 have been leased out to private firms and 3 have



been leased out to the consumer communities, which operate under the guidelines set forth by NEA. In the fiscal year 2003/04 the normal activities of this department were partially affected due to the adverse security situation in most of the hilly and remote areas of the country. The progress in construction works of small hydropower projects and transmission and distribution lines were also affected.

SHP and RED have carried out the following projects during the fiscal year 2003/04.



### **Heldung Small Hydropower Project (Humla District)**

The actual work of this 500 kW project commenced in fiscal year 2001/02. The tender for engineering, procurement and construction on turnkey basis has been awarded and letter of credit for electromechanical works has been opened. The work of the project is in progress and is expected to be completed by fiscal year 2004/05 at a total cost of about Rs.129 million. The following civil structures have been completed:

Intake structure  
Gravel Trap  
Headrace Canal  
Fore bay

### **Gamgad Small Hydro Power Project (Mugu District)**

The actual work of this 400 kW project began in fiscal year 2001/02. The tender for engineering, procurement and construction on turnkey basis was awarded to the contractor. The project is scheduled to be completed by fiscal year 2004/05 at a cost of about Rs.161 million.

### **Buipa -Okhaldhunga 33 kV Transmission line Project (Khotang and Okhaldunga Districts)**

The major works of the project consist of the construction of 29 km of 33 kV transmission line, 25 km of 11 kV and 20 km of 0.4 kV distribution line and two 33/11 kV substations of 1.5 MVA capacity. Out of the two substations the tender for engineering, procurement and construction for one substation at Okhaldhunga was awarded to the contractor. A total of 600 poles for the transmission line have been erected and stringing of conductor for a length of 10 km was completed. This project was started in fiscal year 1999/00 and is scheduled to be completed by 2005/06 at an estimated cost of Rs 132.7 million.

### **Ilam -Phidim -Taplejung 33 kV Transmission Line Project (Panchthar and Taplejung Districts)**

The major works of the project include the construction of 90 km of 33 kV transmission line and 33/11 kV substations of 1.5 MVA capacity each in Phidim and in Taplejung districts. Out of the 90 km long 33 kV transmission line, 44 km transmission line works has been completed. This project was started in fiscal year 1999/00 and is expected to be completed by 2004/05 at an estimated cost of Rs. 144.5 million.

### **Sheetalpati-Musikot 33 kV Transmission Line Project (Salyan and Rukum Districts)**

The major works of this project are the construction of 50 km of 33 kV transmission line and two 33/11kV substations of 1.5 MVA capacity each at Sheetalpati and Musikot. Out of the 50 km long transmission line, pole erection for a distance of 30 km and stringing of conductor for 15 km was completed in fiscal year 2003/04. The project was started in fiscal year 2001/02 and is scheduled for completion by 2005/06 at an estimated cost of Rs. 142.5 million.

### **Chhinchu-Rakam-Jajarkot 33 kV Transmission Line Project (Surkhet and Jajarkot Districts)**

The major works of this project are the construction of 70 km of 33 kV transmission line, 45 km of 11 kV and 45 km of 0.4 kV distribution line and one 1.5 MVA, 33/11kV substation. Out of the 70 km long 33 kV transmission line, the construction of 30 km transmission line was completed in the year. The project was started in fiscal year

2001/02 and is expected to be completed by 2005/06 at an estimated cost of Rs. 142.5 million.

#### **Ghorahi-Holeri 33kV Transmission Line Project (Rolpa District)**

The major works of this project are the construction of 45 km of 33 kV transmission line, 50 km of 11 kV and 50 km of 0.4 kV distribution line and a 1.5 MVA, 33/11 kV substation. The pole erection and conductor stringing work for a distance of 10 km was completed in the year. The project was started in fiscal year 2001/02 and is scheduled for completion by 2005/06 at an estimated cost of Rs. 120.5 million.

#### **Udipur- Besisahar-Manang 33 kV Transmission Line Project (Lamjung and Manang Districts)**

The major works of the project are the construction of 90 km of 33 kV transmission line, 53 km of 0.4 kV distribution line and a 1.5 MVA, 33/11 kV substation. Out of the 90 km long transmission line, pole erection work for a distance of 24 km was completed in the year. This project was started in fiscal year 2001/02 and is expected to be completed by 2005/06 at an estimated cost of Rs.80 million.

#### **Dadeldhura -Baitadi 33 kV Transmission Line Project**

The major works of the project include the construction of 14 km of 33 kV transmission line, 15 km of 0.4 kV distribution line and a 1.5 MVA capacity sub station. Out of the 14 km of 33 kV transmission line, pole erection work for a distance of 10 km and stringing work for 1 km was completed in the fiscal year 2003/04. This project was started in fiscal year 2001/02 and is expected to be completed by 2004/05 at an estimated cost of Rs 33.1 million.

#### **Rasuaghat -Khotang 33 kV Transmission Line Project**

The major works of the project include the construction of a 33/11kV, 1.5 MVA substation at Rasuaghat of Khotang district and 90 km of 0.4 kV distribution lines. The tender for the supply and construction of 1.5 MVA capacity substation on a turnkey basis has been awarded to the contractor. This project was started in fiscal year 2001/02 and is expected to be completed by 2005/06 at an estimated cost of Rs. 106 million.

#### **Jiri -Khimti 33/11 kV Substation Project (Terhathum District)**

This project was started in fiscal year 2001/02 and is expected to be completed by 2003/04. The tender for the supply and construction of a 33/11 kV, 1.5 MVA substation has been awarded to the contractor on a turnkey basis. This project is estimated to cost about Rs.25 million.

#### **Small Hydropower Master Plan Project**

To assess the potentiality of Small Hydropower Projects, the Small Hydro Power Master Plan Project was initiated in 1990. Followings are the major works carried out under this project in the fiscal year 2003/04:

- a) Feasibility study of 3000 kW Sharda Khola SHP in Salyan district
- b) Detail Engineering Design of 2500 kW Inwa Khola SHP in Panchathar district
- c) Inventory Study of 400 kW Julu Khola SHP in Manang district
- d) Inventory Study of 1000 kW Salakhu Khola SHP in Nuwakot district
- e) Inventory Study of 800 kW Liping Khola SHP in Sindhupalchowk district

#### **Damages In Small Hydropower Stations**

Out of 26 Small Hydropower Plants that have been operating in various districts of the kingdom, several plants were damaged so far due to the Maoist insurgency. A number

of them have been partially repaired and some of them are still to be repaired. The operational status of the Small Hydropower plants and substation damaged earlier are as given below:

- Only one unit in operation of Phidim SHP (240 kW)
- Repairing of Taplejung SHP (125 kW) completed
- Only one unit in operation of Bajhang SHP (200 kW)
- Only one unit in operation of Jumla SHP (240 kW)
- Only one unit in operation of Achham SHP (400 kW)
- Only one unit in operation of Darchula SHP (300 kW)
- Repairing of Piluwa 33/11 kV substation completed
- Repairing of Udipur 33/11 kV substation completed
- Only one unit in operation of Bajura SHP (200 kW)

#### **Major Maintenance Works carried out in Small Hydropower Stations and Substations:**

- a. Rehabilitation of Manang Small Hydro power Plant (80 kW). Rehabilitation works include replacement of old generating set and installation of electronic load controller.
- b. Installation of Electronic Load Controller in Chame Small HydroPower Plant.
- c. Repairing of three 250 kW Generating Units of Tatopani Small Hydro Power Plant, Myagdi.
- d. Upgrading of Baglung Substation from 1.26 MVA to 2.13 MVA (630 kVA+1500 kVA).
- e. Installation of 33/11 kV, 630 kVA Transformer at Baaisjaangar, Lamjung 10 km away from Udipur Substation.
- f. Relocation of 33/11 kV, 630 kVA (2X315 kVA) Transformer from Larjung Substation to Kobang, Mustang.

#### **Mid and Far Western Rural Electrification Project**

This project will carry out rural electrification in Surkhet, Dailekh, Achham, Doti, Dadeldhura, Baitadi and Bajhang districts. The project is scheduled to commence in FY 2004/05. The National Planning Commission and the Ministry of Water Resources have already given consent letter for the project and the Ministry of Finance has decided to seek support from Swedish International Development Agency (SIDA) for the implementation of the project. SIDA appointed a consultant and a more detailed project report has been prepared. An agreement between HMG/N and SIDA for financing the project is expected soon. On completion of the project, Users' Groups will be responsible for the operation and maintenance of the distribution system in the project area. The scope of the work of the project includes the following:

- 17,200 new consumer connections
- installation of a 132/66 kV, 10 MVA transformer at 132 kV Ataraia substation, Kailali.
- installation of a 66/33 kV, 3 MVA transformer at Syaule, Dadeldhura
- construction of 225 km of 33 kV, 665 km of 11 kV and 835 km of 0.4 kV lines.
- installation of seven number of 33/11 kV and 370 number of 11/0.4 kV transformers.

#### **Kailali Kanchanpur Rural Electrification Project**

The project was started in 1999 with DKK 66.3 million grant assistance of the Danish Government and NRs 669 million of HMG/N and NEA. The project will supply electricity to thirty three VDCs and two municipalities of Kailali and Kanchanpur districts. Around 64,000 households will benefit from this project, which is expected to be completed in 2006. So far construction of three number of 3 MVA, 33/11 kV substations at Lamki, Attariya and Lalpur, 173 km of 11 kV line and 456 km of 400/230 V lines in one hundred and nineteen load centers have been completed. Poling work is in progress in

other areas. After completion of the project, load center based users' cooperatives will take over the responsibility of operation and maintenance of low voltage lines and distribution transformers.

### **Rural Electrification, Distribution and Transmission Project**

Rural Electrification, Distribution and Transmission Project is being implemented with a loan assistance of US\$50 million from ADB and US\$ 10 million from OPEC fund. NEA and HMG/N are funding the local component of US\$ 34.5 million.

The main objectives of the project are:

- to enhance NEA 's distribution and transmission system capacity to evacuate power from the existing and upcoming hydro power plants
- to extend the distribution system in rural areas to supply electricity to rural communities and improve economic conditions and living standards
- to meet the increased load growth and supply new consumers within existing service areas
- to develop the transmission system in the Kathmandu Valley and an inter-connection line with India.
- to reduce losses and improve the overall efficiency of the system
- to help distribution centers run commercially and maintain their consumer records and revenue accounting accurately
- to update fixed assets record scientifically

The project, which covers the Eastern, Central, and the Western regions of the country, consists of the following five components:

#### **i) Rural Electrification and Distribution System Reinforcement (RE/DSR)**

The scope of the project includes electrification of around 123,382 rural households of 277 Village Development Committees (VDCs) in twenty-two districts of Eastern, Central and Western regions of Nepal to enhance economic development in the rural areas. Rural Electrification (RE) will encourage the substitution of imported kerosene and diesel fuel by electricity. RE in some districts will also support irrigation tube well pumps for agricultural development. The Distribution System Reinforcement (DSR) program will improve the distribution systems and hence reduce losses, enhance reliability and serve the expected load growth for next four to five years in twenty-three districts of the country.

The project status is as follows:

- Land acquisition for thirteen out of fourteen (except Gorkha district) new 33 kV substations construction sites are completed.
- Planning, economic analysis and detail engineering survey works for previously proposed thirty districts have been completed.
- Final IEE reports for thirty seven districts are in the process of approval from the concerned ministry.
- Scooping and TOR of EIA studies for nine VDCs of Kaski districts under Annapurna Conservation Area Project have been completed.
- Construction of boundary walls at new substation sites of Rangeli of Morang district and Fattepur of Saptari district were completed in the FY 2003/04. The construction of boundary walls and other miscellaneous structures will be completed at nine other new substation sites of Ilam, Birat Chowk, Yadukuha, Aurahi, Bhiman, Simranghad, Mukundapur, Jitpur and Milanchowk in the year. Boundary walls and other miscellaneous structures at substation site of Devdaha of Rupandehi district and additional store construction in a building at Butwal are in progress.
- The materials required for RE and DSR are divided into 11 lots/ 21 packages,

out of which

- Contract Agreement has been executed for 7 Packages amounting 7.42 Million US\$.
- Notification of Award has been issued to execute the contract for a Package of ABC Cables and Hardware amounting 4.94 Million US\$.
- Three Packages namely Substation, MCCB and Panel Boards and Concentric Cables amounting 9.88 Million US\$ are under different stages of evaluation.
- The bids under ICB have already been invited for a package of PSC Poles and Energy meters & MCBs (3 Packages) amounting 3.24 Million US\$.
- The tender for ACSR Conductor (1Package), Meter boxes (1 Package), Tools and Equipment (1 Package) and Vehicles (3 Packages) amounting 7.54 Million US\$ are yet to be invited.
- Contract has been executed with Amalekhgunj Pole Plant, NEA to supply 8 & 9 m PSC Poles amounting NRs. 5,78,87,833.74.

#### ii) Transmission Line

The scope of work for this component includes:

- Construction of 26 km of 132 kV lines around the southern side of Kathmandu Valley from Matatirtha to Bhaktapur to complete the 132 kV Ring around Kathmandu Valley.
- Expansion of existing substation at Bhaktapur and Balaju.
- Construction of new 132 kV switching station at Matatirtha and a new 132 kV substation at Harisiddhi.
- Construction of 15 km 132 kV double circuit lines from Parwanipur to Birganj for power export to India by increasing capacity of interconnected schemes.

The project completed the following works in the year:

- Nippon Koei Company was appointed as the consultant for this project in May 2003.
- Invitations for Tender for the supply and construction of 132 kV transmission line (Thankot-Chapagaon-Bhaktapur) and for 66 and 132 kV substations was published.
- Land acquisition for Matatirtha switching station and Harisiddhi Substation was completed.

#### iii) Computerized Billing Project

The Computerized Billing Project has been described under the Distribution and Consumer Services Business Group.

#### iv) Distribution Profit Center Project

The details about this project has been mentioned under the Distribution and Consumer Services Business Group.

#### v) Fixed Assets Revaluation Project

Under the Fixed Assets Revaluation component, consulting services will be provided to establish a computer based fixed assets register, improve accounting procedures to resolve issues raised by NEA's external auditors relating to revaluation of fixed assets

and inventories and design an appropriate formula for annual revaluation of fixed assets on an interim basis.

The project completed the selection of consultant as per ADB guidelines. The successful consultant Ernst & Young of India has already started the physical verification of fixed assets of 11 generating power stations, 21 HV substations and a pole production plant. Currently the consultant is working on the development of an appropriate valuation methodology.

### **Community Rural Electrification Department**

With the restructuring of NEA in 2003, a community based generation and distribution model was envisaged. This is grouped as individual, joint and collectives and are named as 'community based generation', 'community based rural electrification' and 'community based operation and maintenance' models.

In each model the primary condition to be fulfilled by a community is that, it should be a registered institution as provided by the laws and must be constituted from among the local electricity consumers. In all the models the community is responsible for the operation and maintenance of leased distribution system and should also be responsible for the payment of electricity consumed including both the technical and non-technical losses of the system.

The delivery mechanism is based on a participatory demand driven policy, where the rural community form an electricity distributing organization. The community establishes its own load centers wise organization. Subsidy is provided to rural electrification and the community has to buy electricity at a bulk rate from NEA. This allows the communities themselves to define the quality of service they require under their own financial responsibility.

NEA on the other hand has to supply power with a high degree of reliability and accountability. Establishment of productive end-use is critical for financial viability of the communities (in order to increase the load factor) with regular supply. The individual communities are served by supporting organizations providing managerial, administrative and technical assistance. Members on voluntary basis with minimum overhead cost operate it.

Rural Electric Communities shall finally takeover leased ownership of the LV distribution system. They will be accountable to the society under which it operates. The organizations also take the decision-making responsibility and will be accountable for its performance. The community will also be accountable for the extension of rural electrification.

The salient features of community based on-grid rural electrification are as follows:

1. To develop a coherent framework and suitable concept for cost effective, technically and socially appropriate rural electrification, which is well managed by established user co-operatives in the rural areas to be electrified
2. To develop and establish user co-operatives to be able to maintain the low voltage distribution system from the load centres.
3. To support sustainable means for development of productive-end-use applications in electrified rural areas.
4. To construct cost-effective distribution infrastructure in rural areas, with the aim of connecting as many customers as possible within the framework of the budget available either provided from HMG/N and or other various donors.

The salient features of community based rural electrification are as follows:



1. Considering the expansion and operation of rural electrification under the concept of population's ownership, the government has made a provision of capital grant at the rate of NRs 75,000 per kW to the community which develops a hydro power project to generate up to 500 kW of electricity.
2. With the objective of ushering the policy further by encouraging the involvement of the population in the extension of rural electrification, HMGN has announced to provide 80 per cent of the capital cost of the rural electrification to the community.
3. To promote further activity by encouraging the involvement of the population in the operation and maintenance of distribution system, NEA has formulated "Community Electricity Distribution Regulation, 2060 to lease out the extended RE distribution system to the community.
4. The community based-organization can buy electricity in bulk from NEA and sell within its area utilizing the existing distribution network.
5. The rate of bulk purchase of electricity by community is settled through negotiation between NEA and community based organization and the retail tariff rate for end consumer is fixed by the "Electricity Tariff Fixation Commission" (ETFC).
6. Bulk meter is placed on transformer secondary side and constitutes the demarcation boundary to undertake the extension, rehabilitation, operation and maintenance work of the distribution system.

## Central Activities

### NEA BOARD MATTERS

The change in the political scenario and the cabinet, under the Prime Minister Mr. Lokendra Bahadur Chand on November 18, 2002 (2060/8/2), prompted major changes in the NEA Board. The Board bore a new look under the chairman-ship of Minister of Water Resources Mr. Deepak Gyawali. New ex-officio members joined the Board when the Secretaries from Ministry of Water Resources (MOWR) and Ministry of Finance (MOF) were changed. Similarly, members representing industry, commerce, finance, non-governmental power sector experts and consumers were also changed.

This new NEA Board included Mr. Deepak Gyawali, Minister for Water Resources, as the Chairman; Mr. Bhanu Prasad Acharya as the ex-officio member representing Ministry of Finance; Mr. N.N. Vaidya as the ex-officio member representing Ministry of Water Resources (who after a short period was replaced by Mr. K.B. Chand, the new acting secretary in the Ministry of Water Resources); Mr. Ratna Sansar Shrestha representing industry, commerce and finance; Dr. M.R. Tuladhar and Mr. Arun Dhoj Adhikary representing non-governmental experts from the power sector; Mrs. Ambica Shrestha representing consumers and Dr. Janak Lal Karmacharya as Member Secretary and Managing Director of NEA

This Board was unique in the fact that the Chairman and four other members were engineers with long working experience in the power sector. The Board took policy initiatives by approving two major regulations, in the year in review, related to the functions of the Distribution Centers and community rural electrification. The Distribution Centers were launched under the regulations with clearly defined responsibility and accountability with the intent to provide better consumer services, curb losses and increase revenue along with provisions for reward and punishment based on specific quantified benchmarks. Similarly, the regulation on community rural electrification intends to enhance and mobilize public investment in rural electrification schemes through various entities dedicated to rural electrification. Commensurate to these policy initiatives, the internal structure of Distribution and Consumer Services business group was reorganized with the inclusion of Distribution Center

Monitoring Department and Community Rural Electrification Department on February 10, 2003 (059/10/27).

However, with a major reshuffling of the cabinet under the present Prime Minister Mr. Surya Bahadur Thapa, the NEA Board underwent yet another change with Mr. Sarvendra Nath Shukla, Minister of Culture, Tourism and Civil Aviation, Land Reforms and Management, Forest and Soil Conservation, as the new Chairman and Dr. K.B. Aryal, as the new ex-officio member representing Ministry of Water Resources. Mr. Ratneshwor Lal Kayastha has been appointed Board Member on resignation of Mr. Arun Dhoj Adhikary effective from August 6, 2003.

## **Planning and Monitoring**

Planning and Monitoring has a crucial role in making NEAs investment decisions. It prepares short and long term generation, transmission and distribution plans so as to meet the growing load as well as to provide greater number of people with access to electricity. It periodically monitors development projects executed by NEA for their timely as well as successful completion. It facilitates import and export of power with India for the mutual benefit of both Nepal and India. It also facilitates bulk power purchase from the IPPs for promoting private sector participation in Nepals hydropower development. To support the various functions of Planning and Monitoring, four departments namely System Planning, Corporate Planning, Power Trade and Monitoring are presently functioning.

## **System Planning Department**

The System Planning Department, during the year under review, prepared load forecast and expansion plans of generation, transmission and distribution for the Corporate Development Plan 2002. The department in association with the Soil, Rock and Concrete Laboratory / Engineering Services Business Group brought out two reports namely: Distribution System Expansion Study and Distribution Sub-station Reinforcement Study and carried out the feasibility study of North-South 132 kV transmission line. Both the reports have proved helpful in identifying high priority electrification and reinforcement schemes. With the transfer of GIS related activities from Corporate Planning Department to System Planning Department, this department in FY 2002/03 compiled and prepared GIS database of the electrical network and the consumers falling under Kathmandu East Distribution Centre through the consultant NEPECON. The department in conjunction with NEAs other departments was also actively involved in a number of other important activities. Notable among them are the Study on Utilisation of Surplus Energy, the Tenth Plan, Medium Term Expenditure Framework (MTEF), Indo-Nepal Power Exchange, feasibility studies of Kankai and Kulekhani-3 hydropower projects and feasibility study of 220 kV Khimti-Dhalkebar transmission line project. It is to be noted here that the load flow study and economic analysis of the 220 kV Khimti-Dhalkebar transmission line carried out by this department have been instrumental in securing finance for the project under the recently concluded loan agreement for the Nepal Power Development Project between HMG/N and the World Bank. The department also played an active role in furnishing information sought by visiting missions of various donor agencies.

## **Corporate Planning Department**

The year 2002/03 marked an eventful year for Corporate Planning Department. Subsequent to the change in the Corporate Structure of NEA, the departments scope of activities was streamlined to cover only the relevant activities while others were transferred from its regular plan of action. As this move ensures better functioning of this department as a whole, it also provides ambient conditions for these transferred activities to be implemented more efficiently. Most noteworthy are the transfer of GIS related activities to System Planning Department and PPA along with Nepal-India Power Exchange related activities to the newly formed Power Trade Department.

Regular activities implemented by the Corporate Planning Department were the preparation of Corporate Development Plan 2002, Annual Development Budget and proposals for foreign assistance. It is worthwhile to mention that the department was instrumental in obtaining licenses for NEA from HMG/N for the survey and construction of a number of generation, transmission and distribution projects. Altogether, one survey license for generation, six survey licenses and one construction license for transmission and one survey license for distribution were issued to NEA in the year. It has also developed a database of licenses, with the motive of improving monitoring and reporting on the issues related with these licenses. Furthermore, a special activity undertaken was the preparation of Nepals Tenth Five Year Plan related to the Electricity Sector along with a forerunner plan entitled Mid Term Expenditure Framework (MTEF) focusing on the objective of poverty alleviation of the Tenth Plan.

Another important activity under-taken by the Corporate Planning Department over the years has been the



capacity building of its staffs through various training, workshops, seminars and partnership programmes. This has been further intensified in the year 2002/03 as a new agreement for the second phase of USEA Partnership Programme was reached between NEA and Puget Sound Energy (PSE), Seattle City Light and Tacoma Power (TP) of USA. Accordingly, an Exchange Visit by five NEA executives to USA, focusing on Distribution Loss and Efficiency, was held in January 2003. The aim of this visit was to foster development and exchange of ideas and to explore areas where further assistance could be provided. Similarly, there was an active participation of NEA executives in the USAID sponsored SARI/E Energy Programme. This programme seeks to provide energy sector leaders, policy makers and senior staff with the knowledge they need and the steps to take to achieve the rapid growth in energy that is required to support regional economic growth in the most efficient, sustainable and environmentally acceptable manner. Over the year, NEA participated in thirteen SARI/E training, trilateral exchange, seminars and executive/peer exchange programs which involved thirty-eight senior officials of NEA.

## **Power Trade Department**

Since its formation as one of the departments under Planning and Monitoring about a year ago, the Power Trade Department has taken over the responsibility of dealing with Independent Power Producers (IPPs) as regards to Power Purchase Agreements (PPA) between NEA and the IPPs for bulk purchase/sale of power with a view to encourage private sector investments in the hydropower development of the country. Once a PPA is concluded, the department in coordination with other departments of NEA ensures that the provisions as set out in the PPA are fully complied with. The PPA process comprises of review of technical, legal and financial reports as submitted by the IPP while the coordination of activities upon signing of the PPA basically encompasses dealing with various provisions of the PPA including milestones to be achieved during and after project construction. The role of this department is also crucial towards finalizing the Operating Procedures necessary for smooth operation of the power projects under the provisions of the PPA.

During FY 2002-03, PPA for three projects viz. Lower Indrawati (4.5 MW), Rairang (0.5 MW) and Thoppal (1.4 MW) were concluded. Presently, Madi-1 (10 MW) is under energy price negotiation, and Kolfu (1.4 MW) is being awaited for signing the PPA. Ten other projects with a total capacity of approximately 33 MW are being technically reviewed in the process of PPA.

Apart from dealing with matters related to the PPA, this department is also responsible for power trade with India. In this respect, the seventh meeting of the Indo-Nepal Power Exchange Committee was held in New Delhi from 9th to 11th March 2003. Various issues of mutual interest were discussed and agreed upon. The quantum of power available for immediate export from Nepal was also discussed. The progress of Transmission Links to facilitate power exchange in bulk was reviewed and a technical committee was constituted to look into the technical aspects of the power trade such as system studies, type of switching arrangements and other operational issues.

## **Monitoring Department**

The Monitoring Department carried out monitoring and evaluation of projects being executed by NEA. The department is also responsible for the appraisal of financial, administrative and operational activities of NEA. It co-ordinates with various Government Agencies such as the Ministry of Water Resources, National Planning Commission etc. as regards to the progress of NEA executed projects and their data and reports.

## **Finance and administration**

Finance and Administration is responsible for financial management, accounting, auditing and administration of NEA. It prepares yearly budget and disburses funds to various NEA offices for capital as well as operation and maintenance expenditure. It performs staff recruitment, selection, placement, promotion and training &

development. To support the various functions of Finance and Administration, four departments namely Corporate Finance, Finance and Accounts, Human Resources and General Services are presently functioning.

## Corporate Finance Department

During the financial year 2002/03 the actual generation available in system totaled 2261.13 GWh an increase of 194.8 GWh and 9.42 percent increase over the previous year. Out of total generation, 1478.04 GWh obtained from NEAs hydro generation, 4.40 GWh from NEAs thermal generation, 149.88 GWh imported from India and 628.81 GWh from Independent Power Producers (internal). The system peak was recorded 470.33 MW on November 28, 2002 which was increased by 10.41% over the last winters figure.

Electricity sales during the year totaled 1708.456 GWh an increase of 10.94 percent over last years sales figure. Internal sales within Nepal increased to 1522.165 GWh, which is 89.09 percentage of the total sales. This is an increase of 8.25% in comparison of last year. Similarly, exports to India increased to 186.291 GWh, which is 39.17% increase over last year. However, only 94.0% in respect of GWh sales and 92.12% in respect of revenues was achieved against annual target. Insurgency situation in the country was the contributing factor in the set back in sales and revenue.

In the financial year 2002/03 the number of consumers increased by 9.73% over the previous year & reached a total of 970611. In the composition of total consumers 95.87% constitutes domestic category, 2.0% constitutes industrial, 1% non commercial and 0.54% constitutes commercial. The revenue contribution of domestic, industrial, non commercial and commercial are 36.01%, 36.64%, 4.99% and 6.10% respectively.

In fiscal year 2002/03, total budget of NRs.7658.477 Millions was allocated in capital works & Project. The capital budget is represented by HMG equity contribution of NRS. 511.831 millions, NRs. 5710.435 millions from borrowing and NRS 1436.211 million from NEAs own resources. As the rehabilitation works of Distribution and Transmission Substations could not be completed during he fiscal year due to non-disbursement of ADB loan for Distribution and Transmission Project, only 75.06% progress against the target was achieved on capital investment. Similarly, NRs 10552.68 million was allocated for total operational cash expenses budget (including interest) for the year and NRs 10741.57 million was expended during the year, which is 1.79% higher than the budget.

During the year the budget for FY 2003/04 was also prepared and submitted to the NEA Board before the close of financial year for approval. The budget is prepared with the assumption of an increase in the revenue by 13.31% whereas operational cash expense is assumed to be increase by 12.62%. The capital expenditure is increased by 28% by emphasizing the need for rehabilitation of distribution & transmission substations to ensure the reliability of supply and increase in the sales.

Notwithstanding notable achievement in terms of business and market growth, expansion of geographical coverage, capacity addition, increased no of customers and assets base in comparison to the time of its establishment, financial situation of NEA in recent years are not at all gratifying one. NEA established in 1985, incurred losses till the FY 1991/92. From there onwards there was steady improvements in financial position and started generating profit till FY 1999/2000. In recent years, NEA once again started incurring losses primarily due to increase in power purchase expenses, royalty interest on loan and depreciation. As these expenses are uncontrollable constituting about 80 % of total expenditure, NEA is adopting effective cost control measure to economize expenses in administration cost and other controllable expenses. However, it must be noted that desired enhancement in financial performance would be very difficult without properly addressing the issues related to uncontrollable expenses.

In this context, NEA is facing a daunting challenge to improve the deteriorating financial health. On the one hand there is a set back in achieving the forecasted revenue as a result of low sales growth, particularly in

industrial and commercial customers, caused by insurgency situation in the country. On the other hand the expenditures, such as power purchase and interest, have increased significantly. As a result the operating ratio and cash flow situation has been adversely affected. For an entity, which has to function as a commercially viable and financially sound entity, current financial situation dictates for significant improvement in financial performance. In this context, it is imperative that current state of affairs has to be reversed by concrete and focused efforts resulting into betterment in financial condition of NEA. Current initiative of internal reforms which endowed the core business of NEA with more independent authority, accountability and responsibility along with inbuilt reward and punishment system in accordance with their performance is intended to initiate and prompt commercial orientation in the business and to bring in significant performance improvement in terms of better service quality, cost savings increase revenue, increased cash flows and effective electricity loss control. In order to ensure independent operations and to prevent transfer of inefficiencies between the business units, separate by laws for operation and management of each business are being drafted with active involvement of this department. Eighteen Distribution Centers are already functioning under separate by laws and the operation and management of NEA three core business shall also be adhered to respective separate by laws. These are crucial steps towards improvement in overall financial performance of NEA.

Beside the reform process that NEA has taken, it has also realized that it should focus on better revenue management and look upon the alternatives to increase its revenue without which NEA would have to face serious problem in meeting different financial obligation and to generate required cash flows for financing of future capital investments and smooth functioning of NEA. In this context, Surplus energy available in NEA system is considered as an available alternative for increasing revenue base for NEA. Nepalese electric power system is predominantly based on hydropower with mainly run-off-river type hydro power plant. It is natural therefore to have seasonal variation and surpluses of energy during wet season and off peak periods. With these considerations, a study on utilization of surplus energy has been completed. Based on the recommendation, NEA has opted for a strategy to increase its revenue by encouraging sales of surplus energy in domestic market.

In addition, a new provision included in recent change made in the Electricity Tariff Fixation regulation endowed a basis for making the tariff revision process more transparent and less cumbersome. According to new provision, prevailing tariff could be increased by up to 5 % once a year based on a formula approved by the Electricity Tariff Fixation Commission (ETFC) - a procedure mark as Semi-automatic Tariff adjustment

The strategic as well as operational issues and perspectives in change industry environment of electricity business also call for continued and firm effort to bring in significant improvement in financial management, accounting and auditing practices of NEA. NEA is continuously striving towards this direction. In this connection, an institutional strengthening sub component is included in recently signed Nepal Power Development Project with International Development Association (IDA). This component will focus on various programs that will strengthen NEA capability in financial management, accounting and auditing.

### **Finance and Accounts Department**

NEAs re-valued assets at the end of FY 2002/03 increased to NRs. 59,292.4 million as compared to NRs. 58,538.225 million at the end of FY 2001/02. Total revenue in FY 2002/03 was NRs. 11,797.41 million as compared to NRs. 9,935.7 million in the previous year. This is an increase of 18.74 percent. Expenditure in operation and maintenance activities increased by 0.97 percent to a figure of NRs. 9533.10 million as compared to NRs. 9441.076 million of the previous year. On the overall, NEA registered a net loss of NRs. 655.7 million as compared to a net loss of NRs. 717.440 million in the previous year. NEAs financial performance has not been encouraging, suffering a loss for the third year in a row.

In FY 2002/03, NEA invested NRs. 5,749.06 million in capital works and projects. Funding for this comprised of NRs. 511.83 as HMG/N equity; NRs. 4,272.8 million as HMG/N loan and the rest NRs. 964.43 million as NEAs

own internal resources. NEAs total borrowing stood at NRs.45,011.0 million at the end of FY 2002/03.

The financial audit for FY 2001/02, carried out by M/s T.R. Upadhyay & Co., was completed in FY 2002/03 audit for FY 2002/03 will also be undertaken by the same company. Audit debriefing regarding the audit of FY 2001/02 was conducted on a regional office basis. Training related to accounts and income tax was also conducted during the year under review. Similarly, computer training related to inventory management and accounting was conducted in the year in preparation for the introduction of computerized accounting system from the current fiscal year.

Tax assessment of FY 1994/95 and FY 1995/96 has been completed. Tax returns for FY 1996/97 have been filed with the Inland Revenue Office and tax returns for the period from FY 1997/98 to FY 1999/00 were submitted in July, 2003 (Shrawan, 2060). Tax audits for FY 2000/01 and FY 2001/02 are in process.

### **Human Resources Department**

The Human Resources Department has been entrusted with the following functions under NEAs Corporate Structure:

1. Manpower Planning
2. Staffing
3. Training and Development
4. Employees Record Keeping
5. Staff Welfare
6. Disciplinary Actions
7. Administrative Management

The total approved positions at the end of FY 2002/03 is 10,072 of which a total of 9,860 staffs are presently employed. During the year under review 90 computer operators were appointed, 130 employees retired, 40 resigned and 39 died. Under disciplinary actions, 20 staffs have been cautioned and 10 have been dismissed.

The recruitment process is on-going for appointing 941 new staffs in different positions. Written examinations for all technical and non-technical positions and interview for candidates qualifying the practical examination of levels 5,4 and 3 were conducted in the year. Similarly, 80 percent of the practical examinations for lower technical positions conducted by the NEA regional offices is also complete. During the year under review 47 officers and 214 assistant level staff were promoted on the basis of twelve-year-automatic promotion provision. Similarly, based on performance evaluations 19 Managers were promoted to Directors. Promotion process for the other levels is on-going. A revised Personnel Services Regulation, 2050 has been drafted and submitted to the NEA Board for adoption. The Board has formed a sub-committee to study the draft.

A new personnel management software is being developed for efficient record keeping of employees and enhancing the existing Personnel Data Bank (PDB).

Based on new organization structure job description for the levels up to 10 have been revised. A total of 78 staffs participated in training, seminar/workshop, higher studies and inspection abroad whereas 145 staffs participated in training, seminar/workshop and higher studies conducted by different organizations in Nepal. The NEA Training Center impart-ed training to 251 officer level and 291 assistant level staffs.

Under the Staff Welfare Program, 6 employees received additional financial support for the treatment of serious diseases. Similarly, under the Staff Welfare loan, 245 staffs received house/land purchase-and-construction loan, 444 staffs received house-maintenance loan, 413 staffs received social-activities loan, 371 staffs received three-months loan and 111 staffs received natural-disaster loan.

### **General Services Department**

The General Services Department performs the functions of public relations, general administration, legal and arbitration, property management and procurement. It is responsible for providing all administrative support to the central office as well as ensure the security of its property.

As regards to NEAs legal aspects, being looked after by the Departments Legal and Arbitration division, there were altogether seventy cases in FY 2002/03. Out of this, NEA won six cases, lost five and the remaining fifty nine cases are sub judice. Some of the disputes related to contracts of projects that are under construction are being resolved through arbitration.

In the fiscal year, the Legal and Arbitration division was also involved in the drafting of Community Electricity Distribution By-laws and the Performance Agreement that was concluded between the NEA management and the Distribution Center Managers. It also interacted with the NEA regional offices and conducted orientation programs regarding the Electricity Theft Control Act 2058 and its Regulation.

### **INFORMATION TECHNOLOGY**

In order to enhance NEAs organizational efficiency, computer software for the computerized accounting and inventory systems as well as personnel data bank were developed in FY 2002/03. Computerized accounting and inventory systems will be introduced in all NEA budget centres from FY 2003/04 and for this staff of 30 budget centres were provided with the necessary orientation training in FY 2002/03 and the remaining budget centres will be provided training in the current fiscal year. For the personnel data bank computer program has been developed and relevant data of more than 7,400 NEA personnel have been collected.

In addition, computerized billing was introduced in Janakpur and Nepalgunj distribution centers in the year. With this the number of budget centers with a computerized billing system so far stands at seven. In FY 2003/04 computerized billing will be introduced in another twelve budget centers. With the help of these computerization, NEA will be able to manage its finance, accounts, inventory, billing and personnel functions in a more efficient manner.

A plan is also in the offing to establish virtual private network (VPN) that will link computers of 80 budget centers to allow flow of information from budget centers to NEA central office and vice versa. This will help to expand the coverage of the intranet system of NEA. The VPN and other efforts undertaken in the IT sector will enable NEA to share information, monitor performance, establish accountability, maintain transparency, improve efficiency and above all build up a better organizational image.

### **INTERNAL AUDIT**

In FY 2002/03, the Internal Audit Department (IAD) carried out internal audit in 63 branch offices as compared to 38 branches in the previous year. Besides this, technical audit in 31 budget centres was also conducted. With a view to strengthen NEAs internal audit functions, IAD launched various programs during the year under review. A workshop for top level management of NEA was organized in Kathmandu. Likewise, a team of officers of IAD visited India to take part in a program related to internal audit organized by the Institute of Cost and Works Accountants of India.

## Highlights of FY 2002/03

Description	2003*	2002	Increased/Decreased
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			<b>Amount</b>	<b>Percent</b>
Total Revenue Net (M. NRs)	11797.491	9935.7	1861.791	18.74
Net Sale of Electricity (M. NRs)	11276.062	9476.2	1799.862	18.99
Income from Other Services (M. NRs)	521.429	459.5	61.929	13.48
Operating Expenses,				
Including Depreciation (M. NRs)	9533.10	9441.076	92.024	0.97
Depreciation (M. NRs) ++	1830.6	1420.120	410.48	28.90
Net Income, after interest before tax (M. NRs)	(655.7)	(717.44)	61.74	(-) 8.6
Interest on Long-Term Loans (M. NRs)	3410.154	1395.548	2014.606	144.36
Long-Term Loans (M. NRs)	45011.0	41474.494	3536.506	8.53
Net Fixed Assets (M. NRs)	59292.4	58538.225	754.175	1.29
Number of Customers	970,611	884,535	86,076	9.73
Total Sales Of Electricity (GWh)	1708.456	1540.030	168.426	10.94
Internal Sale (GWh)	1522.165	1406.173	115.992	8.25
Average Consumers Consumption (KWh)+	1568.3	1589.740	(-)21.44	(-)1.35
Average Price Of Electricity (NRs/KWh)+	7.02	6.52	0.5	7.67
Peak Load Interconnected System (MW)	470.33	426.00	44.33	10.41
Total Available Electric Energy (GWh)	2261.13	2066.33	194.8	9.42
Hydro Generation (GWh)	1478.04	1113.13	364.91	32.78
Purchased Energy (GWh) India	149.88	238.17	(-)88.29	(-)37.10
Nepal	628.81	698.02	(-)69.21	(-)9.92
Exported Energy (GWh)	186.291	133.857	52.434	39.17
Thermal Generation (GWh)	4.40	17.01	(-)12.61	(-)74.13
Self consumption (Gwh)	17.61	18.88	(-)1.27	(-)6.73
Net System Losses (Percentage)	23.66	24.56	(-)0.9	(-)3.66

Note:

\* Provisional figures; subject to final audit

+ Internal

++ On revalued assets

## Balance Sheet as of July 15 (in million NRs)

Particulars	2003*	2002	2001	2000	1999	1998	1997	1996	1995
<b>Capital Liabilities</b>									
<b>Capital and Reserves</b>									
Share Capital	17113.1	16601.3	15360.3	14634.0	13365.8	12324.3	10952.6	9231.6	8122.9
Reserve and Accumulated Profit	6699.3	8153.8	10492.7	11689.6	12040.3	13464.5	14746.7	15416.9	14194.5
Secured Long Term Loan	45011.0	41474.5	36707.5	30155.7	23824.3	20848.4	17403.2	14900.4	13367.2
<b>Grand Total</b>	<b>68823.4</b>	<b>66229.6</b>	<b>62560.5</b>	<b>56479.3</b>	<b>49230.4</b>	<b>46637.2</b>	<b>43103.5</b>	<b>39548.9</b>	<b>35684.6</b>
<b>Assets</b>									
Fixed Assets	59292.4	58538.2	37103.7	35195.7	31222.8	29891.3	28633.4	29438.3	28413.6
Capital Work in Progress	5205.2	4837.8	23640.4	18947.1	16542.7	14179.0	11974.6	7362.7	5229.1
Investment	553.0	553.0	517.1	521.1	326.1	247.7	150.6	54.0	30.5
<b>Current Assets</b>									
Inventories	998.1	1058.1	960.9	982.3	740.0	914.9	804.0	617.9	429.1
Sundry Debtors & other Receivables	3257.3	2284.9	1678.5	1525.5	1530.9	1435.4	1209.1	1040.0	682.6
Cash and Bank Balances	741.8	664.6	1039.3	1321.3	1148.1	1632.3	1526.5	1244.8	1349.2
Prepaid, Advance, Loan & Deposits	3993.9	3314.4	2634.9	1932.0	1634.2	1709.6	1329.0	848.4	471.7
<b>Total Current Assets</b>	<b>8991.1</b>	<b>7322.0</b>	<b>6313.6</b>	<b>5761.1</b>	<b>5053.2</b>	<b>5692.2</b>	<b>4868.6</b>	<b>3751.1</b>	<b>2932.6</b>
<b>Less: Current Liabilities and Provisions</b>									
Sundry Creditors and Other Payables	4435.8	4703.9	5070.9	4488.5	4349.5	3555.7	2512.1	1475.5	1414.3

Provisions	1300.1	1244.2	1042.9	988.7	436.8	449.3	413.1	328.2	239.9
<b>Total Current Liabilities &amp; Provisions</b>	<b>5735.9</b>	<b>5948.1</b>	<b>6113.8</b>	<b>5477.2</b>	<b>4786.3</b>	<b>4005</b>	<b>2925.2</b>	<b>1803.7</b>	<b>1654.2</b>
<b>Net Current Assets</b>	<b>3255.2</b>	<b>1373.9</b>	<b>199.8</b>	<b>283.9</b>	<b>266.9</b>	<b>1687.2</b>	<b>1943.4</b>	<b>1947.4</b>	<b>1278.4</b>
<b>Deferred Expenditure (to be written off)</b>	505.7	916.5	978.6	1302.8	615	443.3	267.3	410.8	588.5
<b>Inter unit Balance (Net)</b>	11.9	10.2	120.9	228.7	256.9	188.7	133.2	335.7	144.5
<b>Grant Total</b>	<b>68823.4</b>	<b>66229.6</b>	<b>62560.5</b>	<b>56479.3</b>	<b>49230.4</b>	<b>46637.2</b>	<b>43103.5</b>	<b>39548.9</b>	<b>35684.6</b>

\* Provisional figures, subject to final audit.