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Complimentary Copy

Front Cover Photo : Construction of Headworks of Chameliya Hydroelectric Project in progress

Back Cover Photo: Construction of Syangja 132 kV Substation in progress

NEPAL ELECTRICITY AUTHORITY

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KATHMANDU
NEPAL

The Prime Minister

Message

It gives me great pleasure to congratulate Nepal Electricity Authority (NEA) on its completion of twenty seven years of service to the nation. This occasion, on one hand, is a moment of glory for NEA for what it has achieved so far and on the other, it is an occasion to come with strong commitment to reform the NEA and reduce load shedding in the coming days.

We are in the process of logically concluding the enactment of constitution with political consensus. While the political deliberations are going on, the economic agenda should also get the priority of the government. Without economic development and poverty reduction, achieving only political agenda may not be sustainable. Due to the consistent energy crisis, we have not been able to fully exploit the potentials of the economic development. Therefore, we should be able to meet the growing demand of energy in order to push the high economic growth. In this backdrop, NEA must play a vital role to provide reliable and affordable energy. The government has already initiated reforms in the country's power sector which will continue in the coming days as well. The government is committed to create an investment friendly environment for harnessing country's huge hydro potential.

NEA should explore all options to mitigate the energy crisis which our country is currently facing. I am happy to note that NEA has come up with short term, medium term and long term energy crisis mitigation plans and has started working towards the implementation. The government is committed to provide the necessary support in the implementation of these plans. I hope that NEA will improve its operational efficiency and exhibit greater commitment and dedication to provide better services to its customers in the days to come.

I wish NEA and its staff every success in its endeavor to serve the nation.

(Dr. Baburam Bhattarai)

Message from the Chairman

It is a moment of great pleasure for me to put my thoughts as the Chairman of Nepal Electricity Authority, the country's largest public sector utility, on the occasion of its twenty seventh anniversary. On this occasion, I congratulate NEA and thank its staff for their sincere efforts to provide better service.

The country is currently passing through the severe energy crisis. Each year, load shedding is increasing. In this backdrop, NEA, as a government undertaking utility, must play a bigger role in meeting the energy demand of the country. I am happy to note that NEA has come up with short term, medium term and long term energy crisis mitigation plans to make available reliable and quality electricity at an affordable price for the development of the country.

Despite all possible measures taken, demand for electricity could not be met and NEA had no other option but to resort to long hours of load shedding. It is obvious that load shedding cannot be reduced without addition of significant generation capacity and augmentation of transfer capacity. We have noted that despite the government's effort to increase the participation of private sector in the development of hydropower, not much has happened. Unstable political climate, poor security situation, financing hurdles and lack of adequate returns are some of the reasons cited for the lack of adequate private participation. With the political and security situation improving, and a raise of 20% in the posted power purchase rate, I am hopeful that more private sector investment will be coming in the hydropower sector. However, our experience indicates that the private sector is more interested in undertaking the run-of-river type of hydropower projects. The current load shedding is the outcome of run of river mode of electricity generation. What is needed at this hour is storage hydropower plant of reasonable capacity to reduce and ultimately end the load shedding. Therefore, NEA should focus its efforts in the development of more and more reservoir type hydropower projects. I am pleased to note that NEA is working towards the development of storage hydropower plants. In this respect, NEA has already initiated the development of 140 MW Upper Seti (Tanahun) Storage Hydropower Project. Further, NEA is in the process of undertaking detail designs of 600 MW Budhi Gandaki and 530 MW Dudh Kosi Storge Hydropower Projects in addition to the feasibility studies of many storage hydropower projects.

NEA is working towards augmenting the transmission links with India for greater volume of power import and ensuring completion of Trisuli 3 'A', Chameliya, Kulekhani III, Rahughat, Upper Tamakosi hydropower projects at the earliest possible. NEA has completed rehabilitation of many hydropower plants. The overhauling of multi fuel and Hetauda Diesel plants is nearing completion. This together with commissioning of the hydropower projects under construction will definitely help reduce load shedding to some extent in near future.

Fiscal year 2011/12 proved to be yet another year of despair for NEA. Severe supply demand gap led to the load shedding of 12 hours a day during the dry season of the year. This together with increased import of power had adverse effect in its financial health. Nonetheless, NEA was able to improve its performance in many fronts. It is worthwhile to mention here that NEA was able to reduce the system losses by more than 2%. I hope that NEA will put further efforts in the coming year to bring down the system losses to an acceptable limit. Electricity generation from its hydropower plants registered an impressive growth. NEA has exhibited remarkable improvement in its operational efficiency with implementation of advance techniques and stringent cost measures.
I am sure that the continual improvement will transform NEA into a successful commercial entity in the years to come.

To conclude, I thank all NEA staff for the valuable services they have provided.

HKoirala

(Hari Ram Koirala)
Secretary, Ministry of Energy

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Mr. Hari Ram Koirala
Secretary, Ministry of Energy

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Mr. Krishna Hari Banskota
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Dr. Krishna Prasad Dulal

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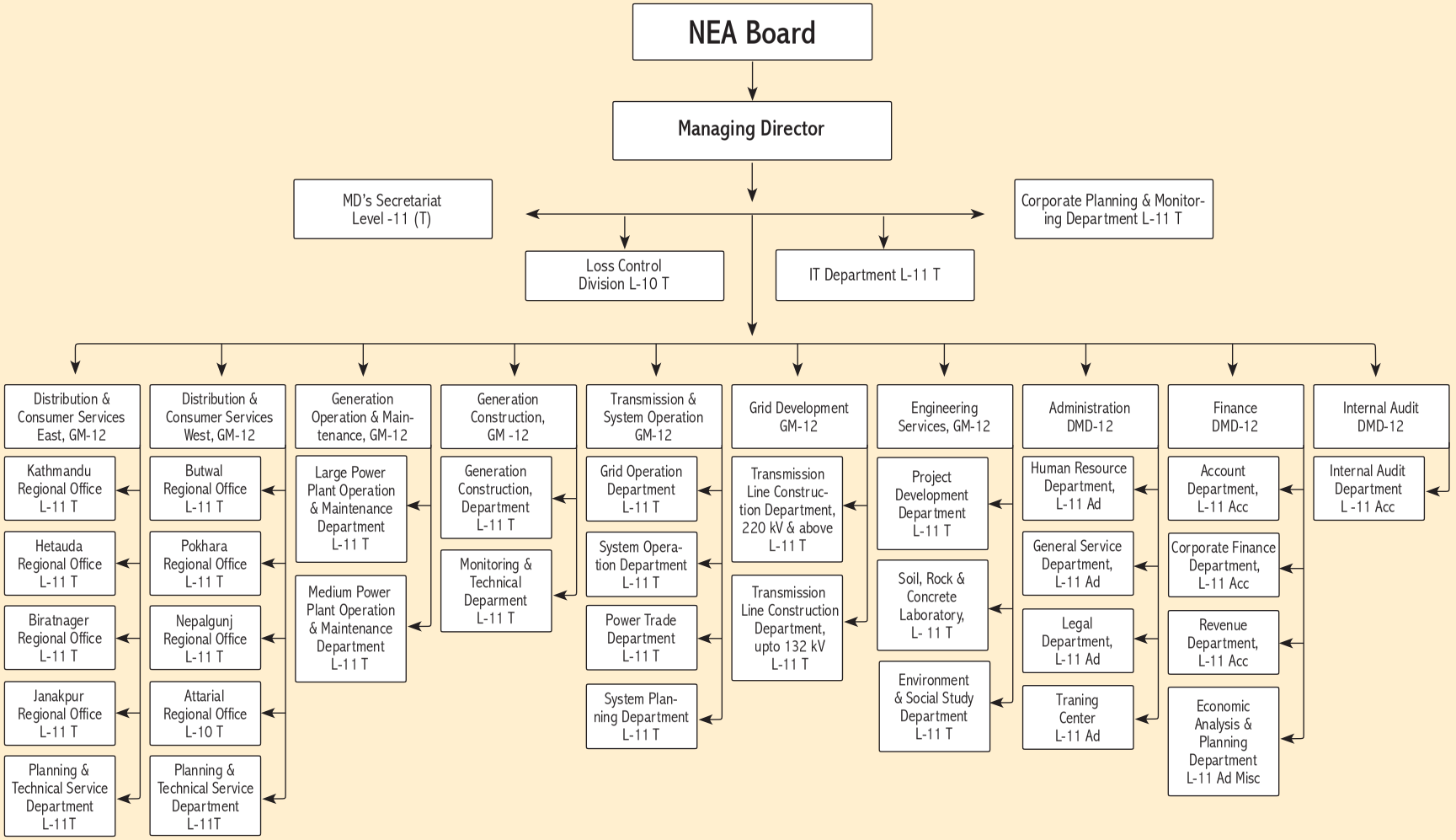
Mr. Tek Nath Acharya

Member Secretary
Mr. Mahendra Lal Shrestha
Act. MD, NEA

Nepal Electricity Authority

Corporate Organization Structure



General Managers and Deputy Managing Directors

MR. TEEKARAM B.C.
Deputy Managing Director
On Deputation to WECS

MR. LAVA BAHADUR GHIMIRE
Deputy Managing Director
Finance

MR. UPENDRA DEV BHATTA
General Manager
DCS West

MR. BIRENDRA KUMAR PATHAK
General Manager
Engineering Services

MR. RAM CHANDRA PANDEY
General Manager
Generation Construction

MR. RAJESWAR MAN SULPYA
General Manager
Transmission & System Operation

MR. GANESH PRASAD RAJ
General Manager
Grid Development

MR. CHIRANJIBI SHARMA PAUDEL
General Manager
DCS East

MR. BADRI NATH ROKA
Acting DMD
Administration

MR. KESHAB RAJ BHATTA
Act. General Manager
Generation Operation & Maintenance

MR. ISHWARI PD. KHATIWADA
Officiating DMD
Internal Audit

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Director
Monitoring & Tech. Department

MR. PUSHPA RAJ KHADKA
Director
Cross Border TL Project

MR. SHER SINGH BHAT
Director
Power Trade Dept.

MR. SUNIL KUMAR DHUNGEL
Director
Project Development Dept.

MR. BUDDHA KRISHNA MANANDHAR
Director
Soil, Rock & Concrete Lab

MR. RISHIKESH SHARMA
Director
Trishuli 3A HEP

MR. RAM E. MANDAL
Director
Planning & Tech. Service Dept.

MR. KANHAIYA K. MANANDHAR
Director
TL Cons. Dept. 220 KV & above

MR. SURENDRA RAJBHANDARI
Director
Corporate Planning & Mon. Dept.

MR. MAHESH PD. ACHARYA
Director
On Deputation to Tanahun Hydro Power Co.

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Human Resource Dept.

MR. GOVINDRA RAJ KHAREL
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Training Center

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Corporate Finance Dept.

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Biratnagar Regional Office

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TL Construction Dept. upto 132 KV

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System Planning Dept.

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Budhi Gandaki HEP

MR. GOPAL BABU BHATTARAI
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Chameliya HEP

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Chief
System Operation Department

MR. BRAJ BHUSHAN CHAUDHARY
Chief
Hetauda Regional Office

Managing Director's Report

We are gathered here to mark the 27th anniversary of Nepal Electricity Authority. As the Acting Managing Director, it is a great honor for me to present before this distinguished gathering a report on the activities and the performance of NEA for fiscal year 2011/12.

I have been associated with this organization from the time of its founding. Twenty-seven years long engagement in this organization has enriched me with a great deal of insight on multitude of issues, challenges, opportunities and possibilities of this organization. It is a significant event in itself that the top management responsibilities have been entrusted on an insider. Therefore, I would like to begin by expressing words of gratitude to the Chairman and NEA Board for giving me the opportunity to serve as the Acting Managing Director. On this occasion, I would like to take this opportunity to once again affirm our commitment to perform better and deliver better results in the days to come. With this note, I now present the Managing Director's report on the activities of past fiscal year 2011/12.

The Year's Significant Events

Two major decisions were witnessed in fiscal year 2011/12 that will have positive impact on NEA's financial health. The Government of Nepal, as part of NEA's financial restructuring plan, decided to write off NEA's accumulated loss of over NRs. 27 billion as of end of fiscal year 2010/11. The other one is Electricity Tariff Fixation Commission finally approved, after a space of over a decade, a tariff raise of 20 % on an average, effective from the beginning of the current fiscal year. However, low income group domestic consumers that consume up to 20 units of electricity in a month will not be affected from this increase in tariff. While granting the tariff raise, the Electricity Tariff Fixation Commission has issued number of directives to NEA for improving its operational and financial efficiencies. The main directives are related to loss reduction, inventory management, account receivables management and institutional reforms. NEA is committed to the timely implementation of those directives. Both the decisions, one on writing off the accumulated loss and the other on the tariff raise, will have favorable impacts on NEA's Balance Sheet and will help in winning investor's confidence.

Though small sized, two hydropower projects came on-stream to NEA's Integrated Nepal Power System during fiscal year 2011/12, both developed in the private sector. One is Hewa Khola of capacity 4,455 kW and the other is Lower Piluwa of capacity 990 kW, thus augmenting our system capacity by 5,445 kW. NEA also commissioned the 400 kW Gamgad Small Hydropower Project for supply in an isolated mode in the remote district of Mugu. The execution of this project was hindered for the past ten years due to remoteness of the site and also due to contractual problems. With this project, NEA's supply of electricity reached to 74 districts of Nepal.

Necessary ground works are now in place for taking off the implementation of the much awaited 400 kV Dhalkebar – Muzaffarpur double circuit transmission line. This cross-border interconnection between Nepal and India will initially be charged at 220 kV and operated in synchronous mode between the two respective grids. Three forms of agreements necessary for the implementation of this cross-border transmission line were concluded during fiscal year 2011/12. One was the Power Sales Agreement (PSA) between NEA and Power Trading Corporation (PTC) India Limited for the bulk purchase of 150 MW power by NEA from India on a long term contract basis. Two other agreements, namely the Implementation and Transmission Service Agreement (ITSA) between NEA and Power Transmission Company Nepal Limited (PTCN), that will own the Nepal portion of the transmission line; and between NEA and Cross Border Power Transmission Company India (CPTC), that will own the India portion of the transmission line, were concluded. Similarly, Share Holder's Agreements between NEA (64%), Power Grid Corporation of India Limited (PGCIL-26%) and IL & FS Energy Development Company (IEDC-10%) for the ownership of PTCN

and between IEDC (38%), PGCIL (26%), Sutluj Jul Vidhyt Nigam Limited (SJVNL-26%) and NEA (10%) for the ownership of CPTC were also concluded. This cross-border transmission line is expected to be in operation by 2014. With the import of 150 MW or more power through this line, the imbalance of supply over the demand is expected to lessen to some extent thereby reducing the amount of load to be shed. There are number of hydropower projects presently under construction both in the public sector as well as in the private sector. Some are planned for implementation. With the commissioning of all those hydropower projects, substantial surplus energy is expected to be available especially during the night hours in the summer months. With the 400 kV Dhalkebar – Muzaffarpur double circuit cross border transmission line in place, this surplus energy could be exported to India. Import at the time of deficit and export at the time of surplus will ultimately lead to low cost of electricity supply for NEA. The successful implementation of the 400 kV Dhalkebar – Muzaffarpur double circuit cross border transmission line will eventually open the doors for the implementation of other cross border transmission lines.

The Chilime Hydropower Company Limited, a subsidiary of NEA, is undertaking the implementation of Rasuwagadhi Hydroelectric Project (111 MW), Middle Bhotekoshi Hydroelectric Project (102 MW), Upper Sanjen Hydroelectric Project (14.8 MW) and Sanjen Hydroelectric Project (42.5 MW) through its subsidiary companies. All the four projects are being developed with 50 % debt and 50 % equity financing mix. Loan agreements between the respective subsidiary company of Chilime Hydropower Company Limited and the Employees' Provident Fund were concluded on 8th December, 2011 for financing the construction of those projects.

NEA and K-Water of South Korea signed the Joint Development Agreement (JDA) for the development of 47 MW Upper Modi - A hydropower project. On completion of Updated Feasibility Study of the project and on securing financing for its development by K-Water, a Special Purpose Vehicle (SPV) with 20 % share ownership of NEA and 80 % share ownership of K-Water will be created for the execution of the project.

The then Honorable Energy Minister, Mr. Post Bahadur Bogoti laid the foundation stones of NEA's two important projects. One is the Upper Trishuli – 3A (60 MW) hydropower project. The other one is the 220 kV Hetauda – Bharatpur transmission line, which on completion will remove some of the bottlenecks and congestion problems in NEA's transmission network.

An agreement for the purchase of additional 9 MW of power from Bhotekoshi hydropower project at a nominal price of NRs. 1.625 per kWh was concluded with the Bhotekoshi Power Company Limited.

Disputes on the claims by the civil contractor, in the Middle Marsyangdi Hydropower Project were recently settled amicably between NEA and the contractor. Regarding the disputes on the claims by the civil contractor, in the Kali Gandaki - A Hydropower Project, a Memorandum of Understanding (MoU) was recently reached at for the full and final amicable settlement of the disputes between NEA and the contractor.

The Organization and Management (O & M) sub-committee formed by the NEA Board to undertake an O & M survey of NEA for recommending necessary organizational restructuring and administrative reforms recently submitted its report.

Operational Performance

The annual peak power demand of the Integrated Nepal Power System (INPS) in fiscal year 2011/12 is estimated to be 1,026.65 MW, with 448 MW power estimated to have been shed. Out of the 578.65 MW of power actually supplied, 349.71 MW was contributed by NEA hydro, 5.3 MW by NEA thermal, 102.2 MW by IPP hydro and the rest 121.44 MW was import. Compared to the preceding fiscal year's figure of 946.1 MW, the annual peak power demand of the INPS registered a growth rate of 8.5 %.

Energy demand of INPS in fiscal year 2011/12 is estimated at 5,194.78 GWh, out of which only 4,178.63 GWh (80.4%) could be supplied. The rest 1,016.15 GWh (19.6%) was resorted to load shedding. Of the total supplied energy volume, 3,432.56 GWh (82.2%) was contributed by domestic generation and 746.07 GWh (17.8%) by import from India. Domestic supply included 1,073.57 GWh (31.3%) from IPPs and the rest 2,358.99 GWh (68.7%) was from NEA owned power stations with a share of 2,357.43 GWh from hydro and 1.56 GWh from thermal.

Considering supply options available, we had predicted resorting to a maximum of 18 hours of load shedding per day per consumer during the driest months of January, February, March and April. However, we succeeded in restricting the load shedding hours to 12 per day per consumer. This was possible due to sound operation of the power system, to ensure filling up of the Kulekhani reservoir at the onset of the dry season, and also comparatively a wet monsoon. Extended load shedding hours for the feeders that reported high percentage of theft was also a contributing factor. NEA resorted to all possible means to minimize load shedding including purchase of all excess energy from the IPPs, operation of costly diesel plants and all possible import under power exchange agreement and power trade with India. Till the supply capability of NEA power system is substantially improved, I regret to say that load shedding is NEA's compulsion.

Total energy sales including sales to India was 3,041.93 GWh in fiscal year 2011/12. This is a growth by 11.5 % in the sales figure of fiscal year 2010/11. Sales to India however declined to 4.1 GWh from 31.1 GWh in fiscal year 2010/11.

Decrease in NEA's system loss in fiscal year 2011/12 is quite encouraging. NEA's system loss decreased by more than 2 percentage points from the audited loss figure of 28.55% in fiscal year 2010/11 to 26.43 % (provisional) in fiscal year 2011/12. This, we believe, is the result of our continued efforts and measures taken on curbing electricity theft. We are committed in continuing to intensify our efforts to bring down the system loss to an acceptable level. For this support from the political parties, civil society and the general public will also be solicited.

The total number of consumers at the end of fiscal year 2010/11 grew by 12.85 % and reached 2.32 million at the end of fiscal year 2011/12. Out of the total number of consumers of 2.32 million; domestic, industrial and the other remaining consumer categories accounted for 94.94%, 1.57% and 3.49% respectively. However, in terms of sales the corresponding shares are 44.05%, 36.95% and 19.0% of total sales.

Financial Performance

In fiscal year 2011/12, net revenue from sales of electricity amounted to NRs. 20,079.13 million, an increment of 11.9% over the preceding fiscal year's sales revenue. Other income such as surcharge, interest income, lease rent, service charge, dividend etc. contributed NRs. 1,349.74 million to the total revenue. NEA's total revenue of NRs. 21,428.87 million in fiscal year 2011/12 recorded a growth rate of 10.9% over the preceding fiscal year's total revenue.

NEA's operating expenses for generation, transmission, distribution and administration were NRs 1,756.61 million, NRs. 459.38 million, NRs. 3,670.68 million and NRs. 1,009.38 million respectively in fiscal year 2011/12. These expenses increased by 88.97%, 32.78%, 22.19% and 16.46% respectively compared with figures in the preceding fiscal year. The substantial increase in the generation operation and maintenance costs was due to the major overhauling works carried out at Duhabi multi fuel and Middle Marsyangdi power plants. Price hike of construction materials and spare parts as well as salary increment (about 30%) for NEA staff were the major reasons behind general increase in NEA's operation and maintenance cost. Power purchase from the IPPs and India is a major cost item in NEA's operating expenses. This cost item alone accounted for 39.13% of NEA's total operating cost. Increased quantity of power purchased from India to minimize load shedding, provision for annual escalation in the power purchase rates and depreciation of NRs vis-a-vis the US$ that effect the US$ denominated PPAs are some of the factors causing increase in power purchase cost in fiscal year 2011/12.

Annual depreciation charge on fixed assets was NRs. 3,105 million in fiscal year 2011/12, an increase by 2.43% over the preceding fiscal year's figure. Interest on borrowing in fiscal year 2011/12 increased to NRs 3,780 million from NRs 3,594.01 million in fiscal year 2010/11. This represents a growth rate of 5.17 %. Street light dues amounting to Rs. 580 million of Village Development Committees' (VDCs) as of end of fiscal year 2010/11 was written off after receiving an equal amount as full settlement from GoN.

As, NEA's total revenue could not keep pace with the total cost, NEA, in fiscal year 2011/12, suffered a net loss of NRs 8,550.76 million.

NEA capitalized some of the distribution system reinforcement and rural electrification projects amounting to NRs. 4,500 million. With this; NEA's property, plant and equipment as of end of fiscal year 2011/12 stood at NRs. 86,120.47 million.

Capital work in progress as of end of fiscal year 2011/12 stood at NRs. 31,924.53 million. Four major hydropower projects namely Chameliya (30 MW), Kulekhani-3 (14 MW), Upper Trishuli 3A (60 MW) and Rahughat (32 MW) and a number of transmission lines at different voltage levels are presently under construction. Most of the projects are being funded through government equity and foreign loans channeled through GoN. In fiscal year 2011/12, NEA invested NRs. 13,592.5 million in capital works and investment projects out of which NRs. 5,392.5 million comprised of government equity, NRs.6,766 million comprised of government loan and NRs. 1,434 million was borne through NEA's internal source. Long term borrowings increased by 13.75 % and stood at NRs. 71,245.74 million as of end of fiscal year 2011/12. The adjusted share capital stood at NRs. 31,087.31 million as of end of fiscal year 2011/12 following the writing off of accumulated loss incurred up to fiscal year 2010/11 amounting to NRs. 27,188.19 million.

Development Activities

NEA's electricity supply position is far from satisfactory to meet the ever increasing demand, thus compelling NEA to resort to heavy load shedding. To overcome this imbalance of supply over demand, as well to keep pace with the annual demand growth presently averaging at 8.5 %, NEA is undertaking the

construction of number of hydropower projects. Quite a few are being developed through NEA's subsidiary and associate companies. The private sector has also a role to contribute. Extension of the transmission grid and the distribution network is also NEA's responsibilities.

Construction of Kulekhani-3 Hydroelectric Project is in progress. The original construction period was 44 months including mobilization, testing and commissioning. Due to various reasons the project period has been extended for another 30 months with the revised completion date set for September 13, 2014; after reaching a settlement on February 18, 2012 with the civil contractor for the continuation of the contract. Construction works at the headworks intake channel and desander is in progress. Out of the 4 adits, the construction of Adit 2 and Adit 3 is going on in full swing. Adit 1A and 4 have already been completed. In the case of the headrace tunnel, excavation problems due to cave-in resulted in many months of delay in the excavation works. However, this problem has been tackled by making a detour of about 82.0 m in the alignment of Adit 3. The excavation work is in full swing, and it is anticipated that the adit will meet the headrace tunnel within a month. Works in the powerhouse area have also been resumed after a break of nearly three years.

Chameliya Hydrolectric Project (30 MW) has achieved 80% of physical progress so far. The major milestone achieved in fiscal year 2011/12 is the tunnel breakthrough which took place on 12th May 2012. Regarding civil works, 76% of the dam construction works has been completed. Similarly, 11% of intake, 97% of connecting tunnel, 62% of desanding basin, 94% of adit tunnel and 90% of the headrace tunnel has been completed. The progress of power house, surge tank, penstock and tail race construction are 87%, 71%, 60% and 63% respectively. The overall progress of civil works is 75%. The embedded parts for powerhouse are installed. Installation of two draft tubes including accessories has been completed. Similarly, installation of turbines has also been completed. Ninety nine percent of tower foundation works and 93% of tower erection works of 132 kV transmission line have been completed.

The construction Upper of Trishuli -3A Project started from 1st June 2011. Most of the land needed for the Project has been acquired including leasing of land for the temporary facilities. Construction of steel bridge and a pedestrian bridge over Trishuli River, construction of temporary camp at headworks, excavation of Adit no. 1, installation of aggregate screening plant, 1st phase river diversion work at headworks area, foundation excavation for Diversion Weir, about 10,000 cu.m. of concreting works in stilling pool and construction of retaining walls of right bank headworks structure have been completed. Upgradation of the 11.5 km long access road, construction of access road to Surge shaft, construction of Employer's Permanent camp, excavation of Headrace tunnel on both upstream and downstream face from Adit-1 and from the headpond and excavation work for Desander, Intake and Headpond are presently being carried out.

The contract agreement for the consultancy services for the supervision of construction of main civil works of Rahughat Project was signed with the selected Consultant on 16 February 2012 and the concurrence from the Export-Import Bank of India is awaited. As per the contract agreement with the main Civil Contractor, only the construction of access road and bridge could be started. Construction of major works of the Project is to commence only after the issuance of Work Order by the Consultant.

To prepare promising hydropower projects for their implementation, study ranging from desk study to feasibility study level has been carried out on number of hydropower projects. Noteworthy among them is the Budhi Gandaki Hydropower Project. To prepare feasibility study and detail design of the project, procurement for the consulting services of the project is presently underway.

The Khimti – Dhalkebar 220 kV double circuit transmission line project, with only one circuit initially strung, is 95 % complete. Yet, the completion of the project is hampered due to obstructions created by local residents regarding the right of way issues. Contract for the stringing of the second circuit has been awarded. Construction of the Hetauda- Bharatpur - Bardghat 220 kV transmission line is under way.

Construction of Syangja 132 kV substation is almost complete and is expected to be commissioned soon. Substantial progress have been achieved in the construction of: Dumre – Damauli – Marsyangdi 132 kV transmission line, Singati - Lamosangu 132 kV transmission line, Kabeli 132 kV transmission corridor, Chapali 132 kV substation, Pathlaiya 132 kV substation, Matatirtha 132 kV substation extension, second circuit stringing of Butwal – Kohalpur- Mahendranagar 132 kV transmission line and second circuit stringing of Hetauda – Kulekhani-II - Siuchatar 132 kV transmission line. To improve the voltage profile, capacitor banks in different grid substations have been installed. In some, they will be installed soon.

The Hetauda – Dhalkebar – Duhabi 400 kV transmission line project is being implemented to enhance cross border power exchange with India and augment the transfer capacity of the

INPS. Seven transmission line/substation projects are also being implemented to facilitate power supply to cement industries. Similarly, a number of other transmission lines are planned for implementation. Most are under project preparatory stage under-going various studies.

Similarly, a number of electrification projects, distribution substation construction and upgrading projects and 33 kV transmission line and substation projects are underway throughout the country to increase the accessibility of electricity to the rural population.

NEA's Subsidiary and Associate Companies and the Private Sector

Quite a few development activities are being carried out through NEA's subsidiary and associate companies.

The Upper Tamakoshi Hydro Power Company Limited (UTKHPL), in which NEA has a stake of 41 %, is undertaking the construction of 456 MW Upper Tamakoshi Hydroelectric Project, a project of **national pride**. The construction works in the project at different front such as Dam, Intake, Headrace Tunnel, Surge shaft, Powerhouse and Tailrace tunnel are ongoing at full swing, following upgrading of the Dolakha Singati road (35 Km) and construction of access road from Singati to Lamabagar (28.6 Km). Around 4 km of excavation of tunnel works has been completed by the end of fiscal year 2011/12

Chilime Hydropower Company Limited (CHPCL), NEA's majority (51%) owned subsidiary company, is undertaking the development of Upper Sanjen (14.6 MW), Sanjen (42.5 MW), Rasuwagadhi (111MW) and Middle Bhotekoshi (102MW) hydropower projects, through CHPCL's subsidiary companies. Project preparatory works such as land acquisition, construction of access roads, selection of consultant and selection of contractors for all the four projects are presently under way. On its own, NEA has a stake of 10 % in Sanjen Hydro Power Company Limited, a stake of 10 % in Middle Bhotekoshi Hydro Power Company Limited and a stake of 18 % in Rasuwagadhi Hydro Power Company Limited. In fiscal year 2011/12, NEA received NRs. 129.74 million (30%) cash dividend and 40 % bonus share (equivalent to NRs. 1,958.40 million) from CHPCL.

NEA has also created Tanahu Hydropower Limited, a Special Purpose Vehicle (SPV) with full NEA ownership for the development of the 140 MW Tanahu Hydropower Project. ADB & JICA are the potential donors for this project. The detailed engineering study of the project is in the final stage of completion. The infrastructure development activity is underway. If financing agreement could be concluded in the year 2012, the construction is planned to begin by mid 2013.

NEA's other subsidiary/associate companies are Trisuli Jalvidut Company Limited (TJCL) developing the Upper Trishuli "3B" Hydroelectric Project with an installed capacity of 37 MW and the Power Transmission Company of Nepal (PTCN) implementing the Nepal portion of 400 kV Dhalkebar – Muzaffarpur double circuit cross border transmission line.

NEA has always considered IPPs as trusted partners in meeting Nepal's growing electricity demand. PPAs for 104 projects have been concluded as of end of fiscal year 2011/12 that would generate 1,574 MW installed capacity on their completion. Twenty five of those projects with total installed capacity of 181.67 MW are already in operation. During the fiscal year under review, 23 new PPAs for a total capacity of 334 MW were signed whereas five PPAs for capacity up gradation totaling 20.72 MW were amended.

The Way Forward

NEA's current huge shortfall of supply over demand cannot be removed outright and is bound to remain for the next 3-4 years. For the intervening period, following measures, among others, will be pursued to restrict number of load shedding hours to 12-14 per day per consumer during the dry season:

- Possibility of importing 30 MW power through the 132 kV Gandak – Ramnagar transmission line, 10 MW power from the 33 kV Birgunj – Raxual line and 10 MW power from the 33 kV Bhairahwa – Sunauli line which have been lying idle for quite some time will be explored with urgency.
- NEA's power system will be operated and managed in such a way, even by utilizing existing thermal and import under exchange as well as trade, so that the Kulekhani Reservoir is full at the onset of dry season.
- Demand side management such as promoting the use of energy efficient lamps and electrical appliances will be implemented.
- Stringent measures shall be taken for the reduction of technical as well as theft part of the losses. For this support from political parties, civil society and the general public will be solicited. Electricity loss including the theft part will be restricted to 23 % by fiscal year 2012/13.
- Refurbishment work in the Hetauda diesel plant and Duhabi multi-fuel plant are nearing completion. They will be operated to the extent possible.

NEA will improve the quality of its services through the use of new technologies to meet the challenges of new environment of utility business. In particular following measures will be pursued:

- The dBase computerized billing system, a 15 year old system based on outdated computer technology is still in use in some of the distribution centers. To bring in uniformity in the billing system, the dBase computerized billing system will be gradually phased out and replaced by the more advanced Oracle based Mpower computerized billing system. In fiscal year 2012/13, the Mpower computerized billing system will be implemented in 20 additional distribution centers.
- Any Branch Payment System within the Kathmandu valley will be introduced very soon. For this, major Distribution Centers within the valley are already connected through fiber cables and the remaining few will be connected within a couple of months.
- Payment of electricity bills through the use of Mobile phone will be implemented on a pilot project basis.
- Automatic Meter Reading (AMR) System for NEA's large customers will be introduced.
- Centralized customer care center will be established to ensure single point of contact for all consumer related activities including prompt grievance handling services.
- Application of Smart Grid and GIS based automated distribution system will be initiated.

Tariff based on the cost plus principle will be applied to the customers availing NEA's power through dedicated feeder. This has in principle been agreed by the Electricity Tariff Fixation Commission.

Safety for the NEA personnel while operating and maintaining the electrical supply lines as well as safety to the consumers will be accorded a high priority.

Integrated Financial Management Information System (IFMIS) based on Enterprise Resource Planning (ERP) will be implemented next year. With such a system in place, NEA will be transformed into an IT enabled organization with prompt and reliable information for facilitating effective and efficient decision-making.

The projects under construction by IPPs and projects for which PPAs have been signed are run-of-river type only. These projects will generate substantial energy during wet season but provide less quantity of energy during dry season. This results in surplus during wet season and deficit during dry season. A comprehensive plan is required to utilize this surplus energy and to manage the deficit in dry season. In this regard, completion of 400 kV Dhalkebar – Muzaffarpur Cross Border transmission line is of utmost importance goal, following which trading of surplus energy to India in large scale could be realized.

Development of storage projects will provide a long term solution to resolve the problem of imbalance between supply and demand during wet and dry seasons. Apart from Budhi Gandaki Storage; Dudh Koshi, Nalsingh Gad, Tamor and Uttar Ganga Storage Hydroelectric Projects have been identified as prospective and viable projects for implementation in near future. NEA will implement these projects on a priority basis.

Acknowledgements

To conclude, I take this opportunity to thank all those contributing to NEA's activities over the past fiscal year. It is only through positive teamwork, I must stress, that a big organization like NEA can function and achieve results to the satisfaction of its stakeholders including customers.

I wish to take this opportunity to thank the Government of Nepal for their continued assistance in our operations and their contributions to our development activities. I express my deep gratitude to the Right Honorable Prime Minister for his interest and guidance in our activities and to the Chairman and members of NEA Board of Directors who have steered the course successfully in all adverse conditions. Thanks are also due to the donor community that has made it possible for NEA to undertake the works for its development.

Despite very adverse working conditions, our staff have shown consistent strive for betterment and dedication throughout the year. I am thankful to the entire staff of NEA and their representative Unions for their support and cooperation to the management.

Most importantly, I wish to thank our valued customers for bearing with us during periods of difficulty and assure them that we are in constant pursuit for providing electrical supply that is reliable and adequate for their needs.

Thank You.

Mahendra Lal Shrestha
Acting Managing Director

Generation Construction Business Group

Generation Construction Business Group is responsible for construction management including detail engineering of new power projects. It is headed by a General Manager. The business group has further division of Generation Construction Department and Monitoring and Technical Support Department both of which are headed by Director. In accordance with NEA Board's decision in line with the new organizational set-up, this Business Group is overseeing the construction of Chameliya Hydroelectric Project (30 MW), Kulekhani III Hydroelectric Project (14 MW), Rahughat Hydroelectric Project (32 MhW), and Upper Trisuli 3 'A' Hydroelectric Project (60 MW). Chameliya Hydroelectric Project, Rahughat Hydroelectric Project and Upper Trisuli 3 'A' Hydroelectric Project report to the General Manager while Kulekhani III Hydroelectric Project reports to the Director,

In order to facilitate and optimize the generation construction of hydropower projects in the near future the Generation Construction Business Group will have to undertake more responsibilities and include in its scope all aspects of hydropower development.

Generation Construction Department

Generation Construction Department headed by a Director is responsible for the construction of new power projects. Currently, this Department is managing the construction of Kulekhani III Hydroelectric Project. The construction activities and project features of the project are as described below:

Kulekhani III Hydroelectric Project

Kulekhani is the only storage Project in Nepal, and it has been providing peak energy to the Integrated National Power System (INPS). The 14 MW Kulekhani III Hydroelectric Project is a cascade project, which utilizes the regulated flow of Kulekhani Reservoir including additional water from Khani Khola. It is expected to generate about 40.85 Gigawatt-hours (GWh) of electric energy per annum. The fund for the construction of the project is being provided by the Government of Nepal and Nepal Electricity Authority (NEA). The initial total estimated cost of the Project is NRs. 2.43 billion. The project is located southwest of Kathmandu in Makawanpur district, Narayani Zone of Central Development Region. The headworks site is located on the left bank of Khani Khola at Bhainse Village Development Committee. The powerhouse site is located at Sanutar of Bhainse VDC. It is located at a distance of about 4 km north of Hetauda and similarly the headworks site is located about 11 km north of Hetauda. The Project site has a good access facility as it is located near the Tribhuwan Highway.

The power generated from the Project will be evacuated to INPS through a 500 m long 132 kV single circuit transmission line. The acquisition of the construction license for the transmission line is in its final stages.

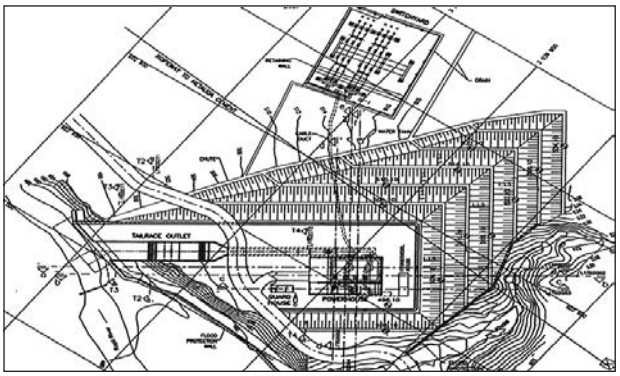
The main construction components of the project are Civil Works Lot C-1 and Electromechanical and Hydromechanical Works Lot-2. The original construction schedule was 44 months including mobilization, testing and commissioning. Due to various reasons the project period has been extended for another 30 months with the revised completion date set for September 13, 2014. The settlement with the Civil Contractor M/S Sinohydro Corporation related to the continuation of the contract was settled on February 18, 2012, leading to the signing of a Memorandum of Agreement. As a result, the contractor has resumed works from March 23, 2012.

The Joint Venture of Water Resources Consult (P.) Ltd. (WRC), SILT Consultants (P.) Ltd. and Hydro Engineering & Development Co. (P.) Ltd. (HEDCO) was appointed as Consultant for the Construction Management and Supervision Work. Due to various reasons, the contract with this Joint Venture was terminated in February 2012 and at present an individual Engineer has been appointed temporarily in lieu for the time being until a permanent arrangement is made.

Construction works at the headworks intake channel, desander and the connection pipe is in progress. Out of the 4 adits, Adit 1, 2, 3 and 4 the construction of Adit 2 and Adit 3 is going on in full swing. Adit 1A and 4 have already been completed. In case of the headrace tunnel excavation problems due to a

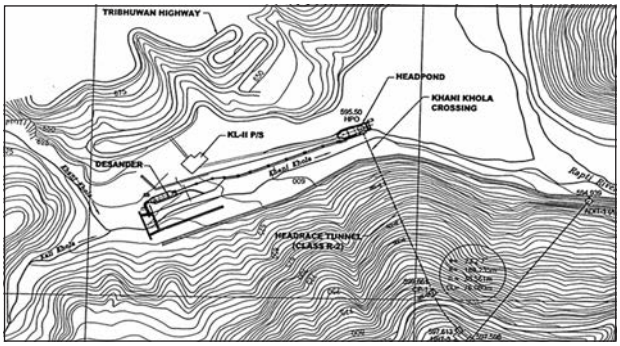
cave-in resulted in many months of delay in the excavation works. However, this problem has been tackled by making a detour of about 82.0 m in the alignment of Adit 3. The excavation work is in full swing and it is anticipated that the adit will meet the headrace tunnel within a months time.

Works in the powerhouse area have been resumed nearly after three years. The work had been stalled after the completion of excavation of the pit. Works have again been initiated and the placement of electrodes for earthing has already been installed by the Electromechanical Contractor M/S Zhejiang Jinlun Electromechanic Co., China. Similarly, the concrete pad has been constructed by the Civil Contractor. Several tests need to be carried out for the confirmation of the foundation works. Soil, Rock and Concrete Laboratory of NEA have already submitted their proposal for the works and it is anticipated that the investigation works will start very soon.



Salient Features of Kulekhani III Hydroelectric Project

Location	:	Headwork near the tailrace of Kulekhani II at Bhaise Dobhan and Powerhouse in Sanutar village (4.5 km north of Hetauda city), Makawanpur district
Type	:	Cascade project of Kulekhani Storage Project
Installed Capacity	:	14 MW
Annual Energy	:	40.85 GWh
Catchment Area	:	143 km2
Design Discharge	:	16.0 m3/s
Gross Head	:	109.8 m
Net Head	:	103.17 m
Headwork	:	Khani Khola Intake Conventional Side Intake on stilling basin downstream of the consolidation check dam
	:	Conveyance length 302 m
Head pond	:	Capacity 2067 m3; Size 30mx10m; Siphon Barrel Size2.7mx2.7mx68.8m
Headrace Tunnel	:	Horseshoe shaped concrete lined; Length 4.3 m; Diameter 3.5 m
Forebay	:	Underground; Horseshoe shaped concrete lined; Length 107 m; width/ height 6 m/9 m
Adit Tunnel	:	4 numbers; Inverted D shaped; 1118.5 m (including branch of Adit 3; Diameter 3.5m)
Tunnel Penstock	:	Horseshoe shaped; Length 370 m; Diameter steel/tunnel 2.3 m/3.8 m
Powerhouse	:	Subsurface, 13.10 m × 21.8 m × 31.1 m
Tailrace	:	44.3 m RCC closed duct and 57.89 m open channel; Size 3 m×3.5 m for closed duct; 10m width of open channel
Turbine	:	2 Vertical Axis Francis Turbine
Generator	:	Two 3 phase, Synchronous AC
Transmission Line	:	132 kV; 0.5 km



Chameliya Hydroelectric Project

Chameliya Hydroelectric Project under joint funding of GoN, NEA and Korean loan was started in 2007 and is scheduled to be completed in 2013. The site is located at Ward No. 4, Balanch of Darchula District. The plant capacity is 30 MW with average annual energy generation of 184.21 GWh. Even with numerous problems, the project has achieved 80% progress so far. The major milestone achieved in 2012 is the tunnel breakthrough which took place on 12th May 2012.

So far 18 km long access road has been completed and local transportation services are in operation. Six bridges and one cause way on the access road have also been completed. Seventeen numbers of buildings which include administration; workshop and guard house have been completed. Likewise,

32.3 km 33 kV transmission line from Gothalapani in Baitadi to Balanch in Darchula is completed and 33/11 kV, 3 MVA sub-station work is at final stage of completion.

Towards civil works, 76% of the dam construction works has been completed. Similarly, 11% of intake, 97% of connecting tunnel, 62% of desanding basin, 94% of adit tunnel and 90% of the headrace tunnel has been completed. The progress of power house, surge tank, penstock and tail race construction stands at 87%, 71%, 60% and 63% respectively. The overall progress of civil works is 75%.

The embedded parts for powerhouse are installed. Installation of two draft tubes with all accessories has been completed. Similarly installation of turbines has also been completed. Most of hydro-mechanical and electro-mechanical equipment are delivered to site. Ninety nine percent of tower foundation works and 93% of tower erection works of 132 kV transmission line works have been completed. Thirty five percent of the tree cutting has been completed. Eighty two percent of total electromechanical/hydro mechanical/transmission line works has been completed.

A total expense of project till now is Rs. 8.8 billion. A month long Far Western strike adversely affected the project progress. The construction materials could not be transported to site and site works stopped completely. Tree cutting works could not be completed and transmission line stringing works could not be started. Heavy flood on July 1, 2012 at Balanch Khola damaged the coffer dam inside box culvert of tailrace and water entered inside turbine. The cofferdam was over-topped by the flood water on July 4, 2012 causing the partial stoppage of concreting activities at dam site. Dewatering and cleaning works is underway. Heavy rain of July 20, 2012 washed away Gokule-Balanch road at many places and disrupted the transportation to power house site.

Transmission line Work in Progress

Construction of Headworks in Progress

Tunneling work in Progress

Construction of power house in progress

Tnneling work in Progress

Salient Features of Chameliya Hydroelectric Project

Type of Project	:	Run-off - river plant with (6 hours daily peaking)
Catchment area	:	835 Km2
Gross head	:	103.7m
Design discharge	:	36 cumecs (38% exceedence flow)
Installed capacity	:	30 MW
Dam	:	Concrete with gated weir

Desanding basin

Type	:	Underground
Number of basin	:	2

Headrace Tunnel

Tunnel Type	:	Horse shoe, Pressure tunnel
Length/diameter	:	4067m/5.2m (4.2 m)
Type of surge tank	:	Restricted orifice

Surge tank

diameter/height	:	8.0m/49.8m

Penstock

length/diameter	:	383.64m/3.7m

Powerhouse

Type	:	Semi-underground
Length/Width/height	:	37.5m/23.5m/27.4m

Turbine

Type of turbine	:	Vertical Shaft Francis
Number of unit	:	2
Tailrace	:	Cut and cover box culvert
Transmission Line	:	132 kV single circuit, 131km long
Access Road	:	18 km
Annual Energy	:	184.21 GWh

Rahughat Hydroelectric Project

Rahughat Hydroelectric Project (32 MW) which is under construction, is located in Galeshwor, near district headquarter Beni of Myagdi district in Dhaulagiri zone of western Nepal. The Project envisages generating 187.66 GWh energy from the Rahughat river.

The Project has been initiated with funds made available from the Government of India through Export-Import Bank of India and is scheduled to be completed in 2016 A.D. The status of various activities in progress is as follows:

Camp Facilities

Construction of camp facilities for the project includes 14 number of buildings (office, guest-house & staff-quarters) along with compound wall and associated works. The concrete works for the buildings are almost completed and remaining civil construction works of the buildings are in progress. The works are scheduled to be completed by 20 December 2012.

Consultant Appointment

The contract agreement for consultancy services for construction of main civil works was signed with WAPCOS Ltd. (A Govt. of India Undertaking) in association with TATA CONSULTING ENGINEERS LIMITED AND LARSON & TOUBRO LIMITED on 16 February 2012 and the concurrence from the Export-Import Bank of India is awaited.

Land Acquisition

About 30 hectare of land required for project needs (camp, road, power-house, etc.) has been acquired. Payment for the cost of acquired land has been distributed from office of Chief District Officer (CDO) of Myagdi District.

Forest Clearance

About 1,442 numbers of trees are required to be cut-down for clearance of construction site for the project works. Tree-cutting order was issued in February 2012 and about 50% trees have been cleared.

Main Civil Works

Contract agreement was signed on 4th November 2010 with IVRCL Limited, India for construction of main civil works. As per contract agreement, only the construction of access road and bridge was started and the rest of the works is to commence only after the issuance of Work Order by the consultant. The construction of the access road has been disturbed due to forest clearance issue and problems from local people. As the consultant for the construction of main civil works has not been approved by the Export-Import Bank of India yet, so letter to proceed has could not be issued to the contractor.

Fund Management Status

The fund requirement for the Project is US$ 68 million out of which US$ 31 million is available from the Export-Import Bank (EXIM Bank) of India under US$ 100 million Dollar Credit Line Agreement dated September 14, 2007. Out of US$ 31 million available from EXIM Bank of India, US$ 28.5 million will be utilized for the construction of "Main Civil Works" and remaining US$ 2.5 million will be utilized for the consultancy services for the construction of "Main Civil Works". The deficit fund of US$ 37 million required for electro-mechanical, hydro-mechanical, transmission line and main civil works & consultancy services has been made available from EXIM Bank of India under US$ 250 million Dollar Credit Line Agreement dated October 21, 2011.

Electro-mechanical and Hydro-mechanical and Transmission Line works

Application for prequalification (PQ) for electro-mechanical works for the project was invited on 4th March 2012. Only one applicant namely Bharat Heavy Electricals Limited, India (BHEL, India) submitted the application for PQ which is under consideration of NEA.

Application for prequalification for hydro-mechanical has been invited on 9th July, 2012 and last date of submission of the application is scheduled on 23rd August, 2012.

Construction of under camp facilities.

Installation of crushing plant for the main civil works.

Construction of temporary quarters.

Salient Features of Rahughat Hydroelectric Project:

Location	:	Myagdi District
Total Catchment Area	:	305 km2
Design Flow	:	13 m3/s
Diversion during Construction Designed for (dry season, 1:10 yrs)	:	27 m3/s
Type of Weir & Undersluice	Gated	
Capacity of Weir & Undersluice (1 in 1,000 years flood)	:	688 m3/s
Number of Desanding Basin	:	2
Size of Desanding Basin (Length x Width x Depth per bay)	:	80.0 x 8.0 x 5.2 (m)
Length of Headrace Tunnel	:	6,151 m
Internal diameter of Headrace Tunnel-Shotcrete lined/ Concrete lined	:	3.5 / 2.9 (m)
Diameter of Surge Tank	:	10 m
Height of Surge Tank	:	47 m
Length of Concrete Lined Pressure Tunnel	:	740.5 m
Internal Diameter of Concrete Lined Pressure Tunnel	:	2.6 m
Length of Steel Lined Penstock	:	352 m
Diameter of Penstock (underground)	:	1.95 m
Size of Power House Length x width	:	52.6 x 16.7 (m2)
Number of generating units (19 MVA each)	:	2
Turbine type	:	Pelton (vertical axis)
Turbine rated capacity	:	2 x 16 MW
Gross Head	:	295.5 m
Rated Net Head	:	284.3 m
Installed Capacity	:	16 x 2 = 32 MW
Transmission Line (Powerhouse site to Modi Sub-station, Double circuit)	:	28 km
Access road (from Powerhouse to headworks)	:	12.9 km
Project Cost	:	67 MUSD
Total Financial Cost	:	90 MUSD
Total Annual Salable Energy Generation	:	187.66 GWh
Firm Energy (90 % Hydrological Firm)	:	98.92 GWh
Secondary Energy	:	88.74 GWh
Benefit / Cost at 10 % discount rate	:	1.135

Adit 1 Portal

Upper Trishuli 3A Hydroelectric Project

Current Status

Construction of this 60 MW Run of River hydropower Project located in Rasuwa and Nuwakot districts was initiated in FY 2010/11. The loan agreement for 640 Million Chinese Yuan (about 93 Million US$) covering the major project works (Civil, Electro-Mechanical, Hydro Mechanical works) and its construction supervision was signed on 28 February 2011 between Nepal Government and China Exim Bank. Estimated cost of the project is 125.775 Million US$ and China Exim Bank has committed to provide concessional loan of 120 Million US$.

The Project structures comprise of a 15 m high, 95 m wide diversion weir, Intake, Desander, 4.1 km long Headrace tunnel, Surge shaft, Inclined shaft, Pressure tunnel, Underground powerhouse, Tailrace, 46 km long 220 kV Transmission line and ancillary structures like camp facilities. The access road to be built consists of 2.5 km long new road to Surge shaft and other Project sites, upgrading of 11.5 km existing road and a steel bridge of 55 m span to be built over Trishuli River. The estimated annual energy generation of the Project is 460 GWh. The construction of this project is being undertaken under Engineering Procurement and Construction (EPC) model and comprises of three packages as follows.

Major construction work (Tender No. UT3A-01-2066/67)

Contract for the major construction work (Civil, electro-mechanical, hydro-mechanical works) was signed on 28 May 2010 with China Gezhouba Group Co. Ltd. (CGGC) at a cost of 89.1779 Million US$. After signing of the Loan Agreement and subsequent Subsidiary Loan Agreement (SLA) between Government of Nepal and NEA the Contract has become effective since 1st June 2011. The construction work has started from 1st June 2011 and shall be completed in 35 months.

Land acquisition for the major Project work has been basically completed including leasing of land for the temporary facilities. CGGC has completed construction of steel bridge and a pedestrian bridge over Trishuli River, temporary camp at headworks, excavation of Adit no. 1, aggregate Screening plant, 1st phase river diversion work at headworks area, foundation excavation for Diversion Weir, about 10,000 cu.m. of concreting works in stilling pool and retaining walls of right bank headworks structure. CGGC has been undertaking upgradation of the 11.5 km long access road, access road to Surge shaft, Employer's Permanent camp, excavation of Headrace tunnel on both upstream and downstream face from Adit-1 and from headpond. Similarly excavation work for Desander, Intake and Headpond is being carried out.

Construction Supervision (Tender No. UT3A-03-2066/67)

Contract for construction supervision of the project has been signed with Northwest Hydro Consulting Engineers on September 2010. The contract amount is 3.923 Million US $ and the supervision work has started since 1 June 2011.

Transmission line work (Tender No. UT 3A-04-2067/68)

The Transmission line comprises of 46 km long 220 kV line from powerhouse switchyard to Matatirtha substation in Kathmandu. In addition to 46 km overhead line about 1 km of 220 kV underground cable route leads to the Matatirtha Substation and two 132 kV line bay extension work will be installed for interconnection with existing Matatirtha substation. The overhead transmission line comprises of about 4 km 132 kV double circuit single Bison conductors from powerhouse to UT3B Hub substation, about 36 km 220 kV double circuit double Bison conductors from UT3B Hub substation to Bandbhanjyang and about 220 kV four circuit having upper two circuits double Bison conductor and lower two circuits double Moose conductors from Bandbhanjyang to Matatirtha. The Contract for Transmission line was signed in 27 March 2011 and was awarded to China International Water & Energy Corporation (CWE) and its cost is 22.6 million US$ excluding VAT. The Contract for the transmission line has become effective from 26 February 2012 after the loan agreement between GoN and China Exim Bank was signed on 17 August 2011.

Till now route alignment survey has been finalized by CWE and Detail survey of the transmission line will be started very soon. Geotechnical investigation works of 20 out of 48 angle points has been completed.

Apart from the works mentioned above, NEA is preparing to impart skill enhancement training to 120 persons from the project site. The Draft Report of Initial Environmental Examination (IEE) for Transmission line work, after incorporation of all the reply to MOE's comments, has been submitted to Ministry of Energy on September, 2011 and is under process of approval.

It is envisaged that this medium sized project under construction through concessional loan will help improve supply in Kathmandu valley.

Steel Bridge over Trishuli River

Diversion Weir construction at right bank of Headworks

Headrace Tunnel Inlet Portal at Headpond

Salient Features of Upper Trishuli 3 A Hydroelectric Project

Type of project : Run of River hydropower

Project location

District/Zone : Rasuwa & Nuwakot of Bagmati zone
Headworks : 1 km downstream of Mailung Trishuli confl uence
Powerhouse : Near Simle village
Nearest Town : Trishuli about 19 km to the south
Nearest Roadhead : Simle near proposed powerhouse site
Length of access road : 2.3 km new and upgrading of 11.3 km between Betrawati & headworks site

Hydrology

Name of River : Trishuli
Reference Hydrology : Betrawati St. no. 447
Catchment area : 4542 sq. km
Design Discharge : 51 cumecs based on 70% exceedance flow

Geology

Regional geology : Lesser Himalyas
Geology of project area : Good rock type, Gneiss, Schist

Project General Description

Gross Head : 144.5 m
Type of headworks : Gated weir with side intake
Design flood : 2424 cumecs based on 1:1000 year fl ood
Full Supply level : El: 870.5 m
Undersluice gate size : 4 nos. 11.6 m x 10 m
Intake type : Side intake
Intake channel length : 148 m
Desander : Twin Berri type
Desander size : 95 m x 30 m x 9.2 m (L x B x H)
Headrace tunnel length : 4095 m
Headrace tunnel Shape : D type (excavated) and circular (finished)
Headrace tunnel Size : 5.4 m for concrete lined and 5.9 m for shotcrete
Shotcrete lined portion : 60% of total length
Surge shaft : Restricted orifice type 17 m dia. 37.7 m high
Inclined shaft : Length 168.27 m, diameter 4 m
Pressure tunnel : Length 86.6 m, diameter 4.0 m to 2.0 m
Powerhouse Type : Underground
Powerhouse Size : 42.6 m x 14 m x 30.2 m
Turbine Type : Vertical Francis
Installed Capacity : 60 MW (2 X 30 MW)
Switchyard Size : 2 nos of 50 m X 15 m
Tailrace Conduit : D type 6.2mx5.0 m size,115 m length And twin conduits 25 m length
Tail water Level : El. 726 m

Power & Energy

Min. power Generation : 43.75 MW
Annual average Energy : 489.76 GWh (gross)

Power Evacuation

Length of Transmission

Line : 48 km
Transmission Voltage : 220 kV initially charged at 132 kV
Interconnection point : Thankot substation at Kathmandu

Project Cost

Estimated cost : 109.224 Million US $

Project Economics

Benefit cost ratio : 2.18
EIRR : 21.6%
Specific energy cost : 3.03 cents/kWh

Monitoring and Technical Support Department

Monitoring and Technical Support Department headed by a Director is responsible for monitoring of power projects that are under construction, provide technical support to the power projects as necessitated by site conditions, supporting the supervision works and monitoring the progress of the construction activities.

Generation Operation and Maintenance Business Group

Generation Operation and Maintenance (GO&M) Business is responsible for the optimum operation and maintenance of the seventeen (17) hydropower stations and two (2) thermal power plants presently owned by NEA. 'Generation of energy by optimally utilizing the resources available while undertaking periodic overhauling, major maintenance works and rehabilitation projects of the generating stations'; that approximately describes the mission of the GO&M Business Group.

One hundred years have passed since Nepal, in 1911, started producing hydro-electricity from Pharping power station. The erstwhile Bijuli Adda has found its continuity in various forms of government agency and is presently the Nepal Electricity Authority. In this way, GO&M business can be called to possess the heritage of a hundred years of operation and maintenance of power stations.

The total installed capacity of hydropower stations and thermal power plants under this business group now has reached a humble 469.29 MW and 53.41 MW respectively. There has not been any capacity addition in this year nor the preceding year. Despite it, the GO&M business has strived to increase total production of energy year on year basis, without accounting for the thermal energy that has been kept minimal due to its high operating cost. The year-on-year increase of total generation of last FY 2010/11 had been a modest increase of 0.6%. This year the same resources have been maximally used to generate 2,351.53 GWh which represents again a 10.99% increase over the previous year. Hydro-energy claims a share of 2,349.97 GWh of the total with a mere 1.56 GWh from thermal.

The generation target set for the year was 2,344.55GWh which has been exceeded. The bars will be further raised this fiscal year with the same power plants in hand, placing more demand on optimum operation and maintenance practice so as to fulfill the targets, while trying to reduce the load-shedding torment of the nation. The run-off river (ROR) generating units operated at only 64.61% plant factor whereas Kulekhani-I and Kulekhani-II, the two storage hydropower stations in cascade, showed the aggregate plant factor of 26.64%. The maximum water-level of the Kulekhani reservoir was recorded at 1530.5 masl on November 24th, 2012. The water extraction from Kulekhani reservoir has been cautiously limited this year to 1497 masl minimum level while expecting to fill the reservoir for the coming winter season.

The Business Group has continued to work on the repair and maintenance activities, periodic overhauling and rehabilitation as well as renovation, modernization and upgradation (RMU) projects in assistance with Government of Nepal and multilateral agencies. After the successful completion of RMU project in Devighat last year, the generation has been satisfactory which has been limited only by the obstacles in generation faced by upstream cascade plant of Trishuli. The Multifuel power plant is undergoing major overhauling. After the overhaul work, one unit has been tested at full capacity. However, the other units are still under repair and expected to be completed by October 2012. The other RMU projects in KGA, Modi and Marsyangdi Power Plant are at various stages of implementation.

Ageing generating stations resulting in increased operation and maintenance costs coupled with inadequate skilled workforce and unavailability of spare parts are some of the challenges faced by this business. Advanced technologies used in the new power plants demand manpower up to the notch. Efforts have been made to upgrade available manpower at floor level and at engineer level. Systemic improvements are called for in this sector to bring the generation to the optimum level. Efforts have been made towards this, but more disciplined continuity is required supported by corporate commitment for the same. The Business Group will continue to work on generation improvement initiatives in a broader framework.
This Business Group is structured into two departments, namely, Large Power Plants and Medium Power Plants Operation & Maintenance Departments.

Lagre Power Plant Opertation & Maintenance Department

The (LPPOM) Department oversees the operation and main-

tenance of five (5) hydropower stations and one (1) thermal power plant above 30 MW owned by NEA, with a total of 414.9 MW of installed capacity. The generations of the power plants have been very satisfactory excluding the Multi-fuel power plant which is hardly operated due to high fuel costs. Overhauling of generating units is a regular practice normally carried out in the lean season avoiding energy loss. This ensures that design capacity is available during wet season.

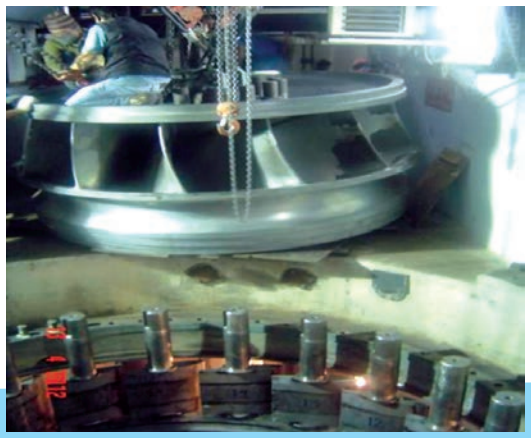
Annual overhauling and repair works were carried out in Kaligandaki A, Middle Marsyangdi and Marsyangdi power plants. Kulekhani 1 and Kulekhani 2 being reservoir type power plants does not experience erosion problems and hence, only regular preventive maintenance exercises are undertaken. Kaligandaki power plant is shutdown for few hours periodically during early monsoon due to overload of floating debris at its intake, which also reduces the desander efficiency. Model studies made have suggested simple modification in the intake that can significantly improve the performance. Works for such modification as well as repair and rehabilitation and spares purchase are being forwarded under World Bank loan. Underwater works to repair the stoplog gate seal beams and concrete were carried out in gate 3. Valuable experience has been gained and such works may be necessary to apply in future installations.

Urgent left bank repair of Middle Marsyangdi dam side was carried out with 2 weeks of plant shutdown. It has revealed need for further structural improvements. Bathymetric survey and model study will be carried out this year to determine the works. Stoplog gates were placed in undersluice of Marsyangdi weir requiring drawdown of water and plant shutdown for nearly 4 days, Further efforts shall be made this year to bring the Undersuice gate to operation and carry out flushing. Technical support from Fichtner GmbH for operation and maintenance of Middle Marsyangdi is being availed under KfW loan program for improving the maintenance practices, imparting training and providing technical advice where found necessary. In Kulekhani 2, one 132 KV power transformer was damaged due to lightning and resulting fire. The transformer is sent to NEA workshop in Hetauda for possible repair while necessary cable and busbar repair was carried out to bring the unit in service within 3 days.

Present power system faces transmission congestion in the Bharatpur-Hetauda line which limits the power production of Kaligandaki A during off-peak hours. Possible solutions were explored to improve voltage profile around this network area so as to reduce congestion during off-peak and produce maximum by Kaligandaki A. Major power plants as Kulekhani 1 and 2, Marsyangdi and Middle Marsyangdi now contribute to their capacity in boosting the Reactive power generation and improving voltage profile in Hetauda and Bharatpur area. Test operation in Synchronous capacitor mode of Kulekhani 1 pushing approximately 38 MVAr to the system was done recently to demonstrate the reactive support possible from this plant during periods when it is not generating. Together with Kulekhani 2, it is in nodal position to support the system voltage and frequency.

The rehabilitation project of Multi-fuel Power Plant was renewed with a contract amendment and additional spare parts have been delivered and repair and machining works are being carried out.

Further to the repair works and operation of power plants, capacity building efforts were initiated in-house from May 2012 in all five hydro-power stations. The dire need to transfer knowledge to the lower level technicians is recognized and the best means for doing that is in-house. Short training courses of one week duration were carried out by the engineers and supervisors of the plant to their own junior colleagues, bolstered with some external resource persons also. Following very encouraging results, this initiative will now be pursued vigorously in the coming year.



1. Kaligandaki 'A' Hydropower Station

Kaligandaki 'A' Hydropower Station, located at Beltari, Syangja is the largest with installed capacity of 144 MW and annual design generation of 842 GWh which was commissioned in 2002. Aided by favorable river discharge and increasing load in the western region, it exceeded the target and design generation this year. This also indicated that with rigorous operation practice in intake area,

timely repair activities and proper operational support, generation can be increased even further. Unit no1 was overhauled this year. Other major works include underwater repair works at radial gates in damside, steel liner replacement of gates, epoxy application in ogee surface, 132kV GIS repair and maintenance works and timely replacement of balancing pipes of Unit 2 which allowed the postponement of Plant shutdown and MIV seal repair.
Rehabilitation project scope under World Bank finance was modified while the PDP project itself is concluded in Decmebr 2012. Bid Documents for the works are prepared and now awaiting bridging of the loan program so that the works can be concluded by December 2014.

2. Middle Marsyangdi Hydropower Station

Middle Marsyangdi Hydropower Station is located at Bhoteodar, Siundibar, Lamjung with the installed capacity of 70 MW and annual design generation of 398 GWh. It was commissioned in 2008. This year it exceeded the generation target as well as the design generation by high margin which was also aided by favorable river discharges. It is apparent that with better repair practices, intake operation, sediment management and operational support, generation can be increased even further without aggravating the turbine health. Apart from the left bank rip-rap protection and sediment removal accumulated in reservoir which was carried out in a short plant period of 13 days from January 29, 2012 to February 11, 2012, major unit repair works was carried out in Unit 2 and Unit 1. New runner was installed in Unit 1. The runners and turbine parts have shown severe erosion indicating annual repair with recovery of runner blades and wicket gates as essential. Repair of steel liners and epoxy coating of ogee surface was also carried out in Headworks. Scares created due to the troubles occurring in the sophisticated control system were overcome avoiding any major generation loss similar to previous years. Urgent capacity building in this area is indicated, and efforts are being undertaken to upgrade our manpower knowhow. The sluice service gate was repaired by VA TECH under contractual obligations.

3. Kulekhani-I Hydropower Station

Kulekhani-I Hydropower Station, located at Dhorsing, Makwanpur is a storage type power station with installed capacity of 60 MW and annual design generation of 211 GWh (165 GWh primary and 46 GWh secondary) which was commissioned in 1982 AD. Civil repair works to protect the reservoir storage capacity was carried out, including excavation and gabion works in Chakhel intake and in the tributaries pouring to Indra sarovar. During the last monsoon season, sandbags were placed in the spillway crest by 50 cm height increase to increase the water storage. The winter of 2011/12 was much helped by this additional energy. Installment of a new 350 KVA D.G. set and replacement of two number of air compressor system was carried out in this fiscal year. Regular check-up of generator and turbine is carried out including cleaning of stator coils of both units. Presently, all of the two units are in normal operation. It works as a backup in INPS.

4. Kulekhani-II Hydropower Station

Kulekhani-II Hydropower Station, located at Nibuwatar, Makwanpur is a cascade of Kulekhani-I with installed ca-

pacity of 32 MW and annual design generation of 104.6 GWh which was commissioned in 1986 AD. The Plant has faithfully followed the generation of Kulekhani I while also boosted with water intake from Mandu and Rapti pumping. Every year Mandu intake is cleaned after the wet season to allow the filtered water to the intake pond. Survey was carried out to explore the addition of Mandu and Rapti more extensively such that one unit can run while Kulekhani 1 is closed preserving water. In April 2012, lightning stroke inflicted heavy damage in the 132 kV Y-phase power transformer, damaging power cable and busbar. However, generation was promptly resumed with necessary repair and replacement within 4 days. Presently, all of its two units are in normal operation.

5. Marsyangdi Hydropower Station

Marsyangdi Hydropower Station is located at Aabookhaireni, Tanahun in the central region with installed capacity of 69 MW and annual design generation of 462.5 GWh. It was commissioned in 1989 AD. The generation was highest since more than a decade, although handicapped with increased tailrace bed. The runner efficiencies after many years of overhauling and repair need to be tested to determine further ways of increasing the generation. The overhauling of turbine runner assembly of Unit No. 1 and replacement of six (6) numbers of line side 132 kV GIS CTs to address the line bottlenecks have been successfully completed and Weir Control modernization and rehabilitation of Excitation System under EAEIP funded by ADB are under different phases of implementation. Presently, all of its three units are in normal operation. Stoplog gate placement in Undersluice, repair of radial gate steel liners, epoxy and magma quartz coating of the ogees surface are some of the works carried out in Headworks.

6. Multi-Fuel Power Plant

Multifuel Power Plant, located at Bansbari, Morang in the eastern region with installed capacity of 39 MW uses furnace oil (F.O.) as a source of energy. There are four units each 7.5 MVA from Leroy Somer France and two units each 8.144 MVA from Alsthom, France. The plant has installed capacity of 39 MW with 26 MW put into service in FY 1990/91 and additional 13 MW put into service in FY 1997/98. The rehabilitation of all the six units under World Bank finance and support from Government of Nepal and NEA own finance, is underway. Unit No. 1, Unit No. 2, Unit No. 5 and Unit No. 6 overhauling is undergoing whereas Unit 3 and 4 are being investigated after it was shutdown in March. The works is expected to be completed by October 2012 and ready for generation in coming winter provided support strategy for high fuel costs are in place.

Medium Power Plant Operation and Maintenance Department

The (MPPOM) is responsible for operation and maintenance of medium & small power stations with installed capacity of below 30 MW. There are 12 Hydropower & 1 Thermal power stations under this department.

In this fiscal year, the old excitation system in the remaining two units of Trishuli Hydropower Station has been replaced with new static digital excitation system. The RMU project for rehabilitation of Devighat Hydropower Station, consisting of design, manufacture, testing, supply of 3 numbers of 5 MW Turbine, completed last year is performing well & its warranty period has completed recently. The intermittent operation of Gandak Hydropower Station in the recent past has been a concern. Government of Nepal and NEA has jointly made budgetary provision to address the problems in its generator and turbine runner assembly. Renovation of excitation and control system

of Seti Hydropower Station is at its final stage. The rehabilitation of Panauti Hydropower Station is underway. Its Unit No. 2 generator is being repaired which is at its final stage and Unit No. 1 & 3 is likely to be completed in coming fiscal year. Rehabilitation & upgrading of electromechanical system of Sundarijal Hydropower Station is proposed for 2012/13 in the second phase of ADB aid program. The penstock alignment of Ilam Hydropower Station due to fragile geology in the vicinity is under close watch and all possible temporary measures with crack filling, repair works with high strength concrete in forebay, head tank, improving penstock support blocks etc. have under taken. The functioning of headworks of Modi Khola Hydropower station has been a concern since its commissioning. Study for the possibility of modification of headworks of this Hydropower Station is underway with formation of Expert Team. Total generation from Medium Hydropower stations is 404.18 GWh in FY 2011/12, which is 3.26% more than that of previous fiscal year, while particular note is made of the record generation by Sunkoshi power station this year. Key challenges for increasing generation from power stations remain the enforcement of maintenance schedule, reducing downtimes, imparting skills and operating prudence.

The following sections provide a concise description of the power stations and highlight major activities carried out under this department during the fiscal year.

1. Trishuli Hydropower Station

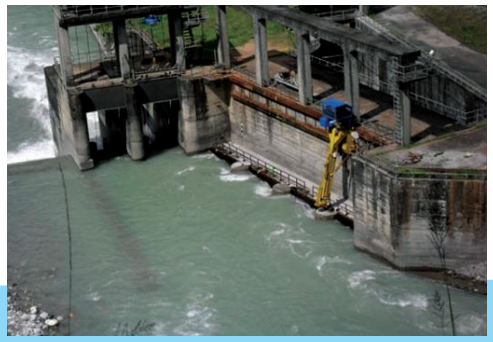
Trishuli Hydropower Station, located at Trishuli, Nuwakot, previously with installed capacity of 21 MW consisting of 7 units each of 3 MW commissioned in 1967 AD was rehabilitated in 1995 AD and upgraded to 24 MW with 6 units each of 3.5 MW and one unit of 3 MW. The replacement of excitation cubicles in remaining two units has been completed and the replacement of existing SF6 breaker carriages with VCB carriages is underway and installation of electrical control cubicles of the governors of Unit No. 1, 2 & 3 has been completed. Leaking gate No. 4 & 5, highly eroded Seal Beam & SS Plate has been repaired & high strength concrete M60 has been applied in eroded concrete areas.

2. Gandak Hydropower Station

Gandak Hydropower Station, located at Surajpura, Nawalparasi with installed capacity of 15 MW and annual design generation of 106.38 GWh was commissioned in 1979 AD. The ongoing repair and maintenance works of the Main Western Canal carried out by Government of India has largely resulted in the intermittent operation of the power station. The overhauling of Unit No. 2 has been completed while Unit No. 1 was down since 2065 B.S. due to burning of Generator Stator Coil. This year 15.4% higher energy was generated compared to previous year. The intake section rehabilitation project financed by ADB under EAEIP is under consideration.

3. Devighat Hydropower Station

Devighat Hydropower Station, located at Devighat, Nuwakot with installed capacity of 14.1 MW and annual design generation of 144 GWh was commissioned in 1984 and rehabilitated recently in and its installed capacity has been upgraded to 15 MW in 2011. The 105.1 GWh generation this year is highest since FY 1999/2000.



4. Modikhola Hydropower Station

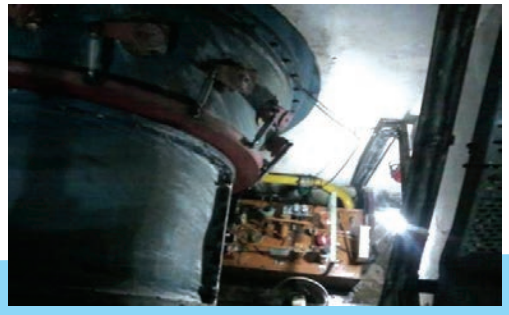
Modikhola Hydropower Station is located at Dimuwa, Parbat with installed capacity of 14.8 MW and annual design generation of 92.5 GWh and which was commissioned in 2000 AD. New AVRs were installed in both the units and combined bearing oil coolers in Unit no. 2 have been replaced. Civil repair works such as high strength concreting on the downstream of under sluice has been completed. Presently, both units are in operation but frequent choking of intake with boulders and high rate of sand inflow from intake frequently disturb normal operation in rainy season. In 2068/69 the power station generated the lowest since its commissioning due to long shut down for maintenance and frequent cooler failures.

5. Sunkoshi Hydropower Station

Sunkoshi Hydropower Station, located at Lamosanghu, Sindhupalchowk with installed capacity of 10.05 MW and annual design generation of 70 GWh was commissioned in 1972 AD. The replacement of turbine, head-cover and wicket gate assembly in Unit No. 2, the installation of overhauled power transformer, the application of RCC high strength concrete in sloping part of the settling basin and head works repairing are the significant maintenance works of this year. The power station has recorded the highest generation of 66.38 GWh with PF of 75.40% this year outperforming the previous best of 66.19 GWh in 1999/00.

6. Ilam (Puwakhola) Hydropower Station

Ilam Hydropower Station is located at Golakharka, Ilam with installed capacity of 6.2 MW and annual design generation of 48 GWh. It was commissioned in 1999 AD. The water leakage due to crack development at the head tank/forebay has been repaired to some extent. The fragile geology in the vicinity poise threat to the penstock alignment especially during rainy season.



7. Chatara Hydropower Station

Chatara Hydropower Station is located at Chatara, Sunsari with installed capacity of 3.2 MW and annual design generation of 6 GWh. It was commissioned in 1996 AD. Overhauling of turbine runner assembly of Unit No. 2 and repair and maintenance of Unit No. 1 are underway to bring both the units into normal operation. The sharing of water inflow with Sunsari-Morang Irrigation Project, Biratnagar for irrigation purposes primarily restrains the normal operation of this plant.

8. Panauti Hydropower Station

Panauti Hydropower Station, located at Khopasi, Panauti with installed capacity of 2.4 MW and annual design generation of 6.97 GWh. It was commissioned in 1965 AD. The rehabilitation of the units has been planned with GON assistance. Presently, unit 1 is running at 400 to 500 Kw . Generator of Unit 2 is being repaired by NHE Butwal. Unit 1 & 3 are scheduled to undergo major repair in 2069/070 under ADB/GON/NEA budget.

9. Seti Hydropower Station

Seti Hydropower Station, located at Nadipur, Pokhara with installed capacity of 1.5 MW was commissioned in 1985 AD. The rehabilitation of excitation system along with switchgear control and protection system are underway and is likely to be completed in 1st quarter of 069/070. This year generation was affected due to heavy flood in the river Seti.

10. Fewa Hydropower Station

Fewa Hydropower Station, located at Pardi, Birauta, Pokhara with installed capacity of 1 MW and annual design generation of 6.5 GWh, was commissioned in 1969 AD. The public encroachment of power canal and consumptive use of water from the canal have always affected the power station. The power canal has been repaired this year.

11. Sundarijal Hydropower Station

Sundarijal Hydropower Station, located at Sundarijal, Kathmandu with installed capacity of 640 kW and design generation of 4.77 GWh was commissioned in 1934 AD. Both of its units are in normal operation. The cracks developed in the number of anchor blocks of the penstock has been repaired. Exciter coil rewinding in unit no. 1 and runner repair on unit no. 2 are the major works of this year. The rehabilitation of electromechanical works is underway with assistance from ADB and GON.

12. Pharping Hydropower Station

The first in Nepal and second in Asia, Pharping Hydropower Station, is a century old hydropower station commissioned in May, 1911 AD with installed capacity of 500 kW. It is located at Setidevi VDC, Pharping, Kathamandu. It was erected with a grant from British Government at a cost of NRs. 0.713 million. It is presently not in normal operation. A master plan has been prepared to develop the site as Live Museum with construction and establishments including model power station of wind, solar and hydro and as a centenary celebration memorial. Now only one unit is running for an hour in a day due to water being utilized for drinking water supply.

13. Hetauda Diesel Power Plant

Hetauda Diesel Power Plant, with installed capacity of 14.41 MW, is located at Hetauda, Makawanpur, The first phase with three Units was commissioned in 1963 and the second phase with four Units was commissioned in 1980. The major overhauling of all the seven units and the replacement of MOCBs by VCBs with C&R panels were successfully completed this year. The plant primarily stands up as a system backup. The high fuel prices restrain its normal operation.

Training Activities

Verious training programs in different fields of specialization were conducted for the staff of this Business Group to enhance and upgrade their skill and knowledge. Training program were conducted at Kulekhani I, Marsyangdi, Middle Marsyangdi and Kulekhani II Hydropower Stations to enhance inhouse capacity in maintenance and overhauling works.

Training at Marsyangdi

Training at Mid- Marsyangdi

Training at Kulekhani I

Nepal Electricity Authority

Generation Operation and Maintenance

Actual Generation for the FY 2068/69 (FY 2011/12 A.D.)

S. No.	Power Stations/ Month	Shrawan	Bhadra	Ashwin	Kartik	Mangsir	Poush	Magh	Falgun	Chaitra	Baishakh	Jestha	Ashad	Total
1	Kaligandaki 'A'	97,146.00	95,179.00	89,537.00	86,031.00	76,345.00	53,209.00	41,116.00	38,628.00	46,979.00	52,635.00	93,203.00	90,746.00	860,754.00
2	Mid-Marsyangdi	43,085.60	46,377.90	42,804.70	43,003.00	36,903.30	27,596.30	12,596.80	22,233.67	26,137.00	31,159.25	48,525.43	44,921.25	425,344.20
3	Marsyandi	45,669.20	45,602.40	37,491.70	44,563.40	34,698.00	31,715.70	25,909.20	24,523.90	27,934.20	32,558.20	48,613.00	46,620.50	445,899.40
4	Kulekhani I	7,888.00	7,611.00	13,698.00	8,112.00	6,866.00	8,683.00	13,638.00	25,823.00	25,403.00	17,814.00	3,884.00	3,864.00	143,284.00
5	Kulekhani II	3,770.64	3,531.99	6,577.05	3,765.23	3,763.92	4,488.72	7,047.39	13,195.85	12,473.07	8,913.30	2,026.90	1,894.32	71,448.38
6	Trishuli	12,251.90	11,939.10	11,856.40	13,358.50	12,665.40	11,262.60	8,626.10	8,627.20	10,240.50	11,047.80	12,657.70	10,239.60	134,772.80
7	Gandak	2,119.40	2535.7	2614.6	177.6	-	-	1,455.10	2,856.50	926.40	-	-	392.40	13,077.70
8	Modi	3,021.10	4,081.90	2,257.30	3,313.10	2,976.10	2,564.00	2,165.20	2,269.10	3,300.70	4,491.10	3,313.80	855.00	34,608.40
9	Devighat	9,393.40	9,206.60	9,455.10	10,169.90	9,903.10	7,109.10	7,499.10	7,248.30	8,425.90	9,139.80	9,736.30	7,802.60	105,089.20
10	Sunkoshi	7,213.60	6,965.40	7,160.60	7,348.80	5,852.60	4,391.40	3,224.40	3,298.10	3,700.50	3,744.80	6,335.10	7,147.80	66,383.10
11	Puwa	3,205.89	3,743.02	3,846.84	4,197.49	2,916.64	1,839.38	1,239.85	1,019.31	1,182.94	1,163.55	1,240.52	2,734.57	28,329.99
12	Chatara	804.25	460.75	612.75	364.25	195.00	39.75	-	28.75	187.25	146.75	193.25	-	3,032.75
13	Panauti	-	-	152.64	262.80	249.30	281.34	111.78	-	-	43.74	30.78	147.78	1,280.16
14	Seti	906.03	903.60	603.99	998.64	989.55	1,016.91	974.70	953.46	987.57	737.73	747.18	591.93	10,411.29
15	Fewa	207.86	150.90	159.24	150.18	187.72	247.65	190.22	229.24	219.13	125.96	4.11	-	1,872.21
16	Sundarijal	431.00	425.33	440.00	456.33	426.33	380.00	322.66	306.00	266.00	241.33	252.33	398.33	4,345.62
17	Pharping	2.32	3.56	3.72	4.11	4.30	4.26	3.35	3.12	2.54	1.63	1.05	1.12	35.08
	Total (Hydro)	**237,116.18**	**238,718.15**	**229,271.63**	**226,276.32**	**194,942.26**	**154,829.11**	**126,119.85**	**151,243.49**	**168,365.69**	**173,963.94**	**230,764.45**	**218,357.20**	**2,349,968.27**
18	Multifuel	-	-	-	-	2.46	89.21	223.33	223.20	37.99	-	41.70	5.64	623.53
19	Hetauda Diesel	5.74	2.60	5.75	43.92	9.00	4.80	27.48	24.83	325.72	476.01	6.94	7.74	940.53
	Total (Thermal)	5.74	2.60	5.75	43.92	11.46	94.01	250.81	248.03	363.71	476.01	48.64	13.38	1,564.06
	Grand Total	**237,119.60**	**238,717.19**	**229,273.66**	**226,316.13**	**194,949.42**	**154,918.86**	**126,367.31**	**151,488.40**	**168,726.87**	**174,438.32**	**230,812.03**	**218,369.46**	**2,351,532.33**

*Provisional figures subjected to final audit

Nepal Electricity Authority

Generation Operation and Maintenance

Generation Related Statistics and performance factors for the FY 2068/69

S. No.	Power Stations	Total Installed Capacity (MW)	Total No. of Units In-stalled	Actual Generation (MWh)					Maximum Generation in a year till date / year (MWh)	Design Generation (MWh)	Generation Target (MWh)	Net Transmis-sion to Grid (MWh)	Local Distribution (MWh)	Plant Factor (%)	Current No. of Employ-ees
				FY 2064/65	FY 2065/66	FY 2066/67	FY 2067/68	FY 2 068/69							
1	Kaligandaki 'A'	144.00	3	-	-	-	-	-	860,754.00 (2068/69)	842,000.00	806,277.00	855,629.40	897.59	68.24	165
2	Mid-Marsyangdi	70.00	2	-	169,000.00	390,038.10	377,151.30	425,344.21	425,344.21 (2068/69)	398,000.00	399,306.48	413,937.97	2,438.15	69.36	66
3	Marsyandi	69.00	3	54,752.16	66,188.16	54,281.28	50,820.48	52,795.20	483,928.20 (2052/53)	462,500.00	447,007.33	430,658.20	154.00	73.77	97
4	Kulekhani I	60.00	2	153,016.00	75,114.00	86,996.00	98,886.00	143,284.00	249,680.00 (2056/57)	211,000.00	153,016.00	132,815.97	8,317.30	27.26	112
5	Kulekhani II	32.00	2	51,445.28	36,934.63	43,518.56	50,468.13	71,448.38	122,757.00 (2056/57)	104,600.00	76,508.00	69,918.71	-	25.49	61
6	Trishuli	24.00	6+1	133,391.10	114,938.80	135,302.50	128,247.00	134,772.80	154,423.75 (2053/54)	163,000.00	139,201.15	120,183.69	13,586.00	64.10	94
7	Gandak	15.00	3	20,479.20	20,525.20	15,006.30	11,331.40	13,077.70	52,272.70 (2043/44)	106,380.00	33,949.31	(20,283.25)	2,667.13	9.95	51
8	Modi	14.80	2	4,345.89	4,062.27	4,349.73	4,121.61	4,345.62	67,348.90 (2063/64)	92,500.00	65,368.50	23,467.00	9,798.75	26.69	42
9	Devighat	15.00	3	91,485.70	81,437.80	96,041.35	74,132.63	105,089.20	106,277.70 (2056/57)	114,000.00	99,995.99	86,854.07	4,323.30	79.98	82
10	Sunkoshi	10.05	3	53,084.30	60,593.60	57,385.40	60,355.40	66,383.10	66,383.10 (2068/69)	70,000.00	62,607.00	62,418.50	3,090.71	75.40	57
11	Puwa	6.20	2	3,876.00	7,686.50	9,366.30	18,681.80	24,203.64	34,640.93 (2064/65)	48,000.00	34,360.52	28,172.08	-	52.16	38
12	Chatara	3.20	2	3,839.25	2,638.25	2,424.50	4,097.75	3,032.75	5,219.75 (2063/64)	6,000.00	4,688.72	977.36	1,911.36	10.82	33
13	Panauti	2.40	3	3,077.94	1,879.55	2,879.31	2,729.22	1,280.16	4,654.80 (2058/59)	6,970.00	3,462.28	(1,807.59)	3,218.72	6.09	24
14	Seti	1.50	3	10,822.77	10,870.11	11,197.73	11,616.19	10,411.29	11,616.19 (2067/68)	9,310.00	11,629.87	10,369.07	*	79.23	29
15	Fewa	1.00	4	1,216.11	2,179.81	1,425.18	1,913.49	1,872.21	3,919.47 (2035)	2,200.00	2,714.37	1,838.40	*	23.36	13
16	Sundarijal	0.64	2	4,345.89	4,062.27	4,349.73	4,121.61	4,345.62	4,345.62 (2063/64)	4,770.00	4,452.96	3,932.80	*	77.51	29
	Total (Hydro)	468.79	46	589,177.58	658,110.94	914,561.97	898,674.02	1,061,685.87	2,653,576.80	2,641,230.00	2,344,545.47	2,219,082.37	90,403.01		993
18	Multifuel	39.90	6	7,866.39	5,322.37	9,702.65	2,348.86	623.53	86,215.07 (2055/56)		-	(83.96)	-	0.18	49
19	Hetauda Diesel	14.10	4+3	1,308.72	3,734.37	3,416.85	1,332.97	940.53	24,203.64 (2055/56)		-	936.85	-	0.75	40
	Total (Thermal)	54.00	13	9,175.11	9,056.74	13,119.50	3,681.83	1,564.06	110,418.71			852.90	-	-	89
	Grand Total	522.79		598,352.69	667,167.68	927,681.47	902,355.84	1,063,249.93	2,763,995.51	2,641,230.00	2,344,545.47	2,219,935.27	0,403.01		1082

** Transmission at 11 KV, Local Distribution is Same*
 # Transmission at 11 KV, Local Distribution is same

Grid Development Business Group

Grid Development Business Group is responsible for development and implementation of high voltage transmission system. This Business Group is headed by a General Manager and has four departments, namely, Transmission Line Construction Department (220 kV and above), Transmission Line Construction Department (up to132 kV), Power Development Project, and Cross Border Transmission Line Project, each headed by a Director.

This Business Group builds new transmission lines and substations to evacuate the power generated by both NEA and IPP owned power plants and undertakes reinforcement of the existing transmission system. Nepal's first-ever 220 kV transmission line is nearing completion. This Business Group helps to develop and implement cross border transmission lines which are emerging as important links in the overall development of Nepal and these links will play a pivotal role in the South Asia region in future. The first high voltage cross border link from Dhalkebar (Nepal) to Muzzafarpur (Bihar, India) at 400 kV double circuits is going to be executed very soon.

This Grid Development is moving ahead with short-term as well as long-term transmission system plans as envisaged in Transmission System Master Plan.

Brief summary of projects under different stages of development are presented below:

A. Transmission Line Construction Department up to 132kV

The key transmission lines and substations and the major activities with regard to the development of these lines under the jurisdiction of this Department are as follows:

Projects under Execution

1. Thankot – Chapagaon - Bhaktapur 132kV Transmission Line

The project was started in FY 1998/99 with the objective of enhancing transmission capacity, improving supply reliability in Kathmandu Valley, reducing losses and voltage drops through construction of 132kV ring main and was scheduled to be completed in FY 2011/012. The project is estimated to cost US$ 23 Million and will be jointly financed by loan assistance of ADB and OPEC, GoN and NEA.

The scope of the project includes the construction of 28km Thankot-Chapagaon-Bhaktapur 132kV double circuit transmission line, construction of a 132 / 11kV, 22.5MVA

sub-station at Matatirtha, addition of 132 / 11kV, 45MVA transformer at Bhaktapur, addition of 66/11kV, 45MVA transformer at Balaju substation. Expansion and Upgrading of existing Balaju and Bhaktapur substation has been completed and handed over for operation. The newly constructed Matatirtha Substation has been operated from August 2011.

In case of 132kV transmission line works only 0.5km transmission line in Matatirtha area has been constructed to connect Matatirtha substation to INPS. Rest of transmission line construction work has been stopped because of right of way issues raised by local inhabitants of few VDCs of Lalitpur District.

4 Circuit Tower at Matatirtha Substation for Loop in Loop Out Connection from Siuchatar

2. Syangja 132kV Substation

The objective of this project is to improve the power supply in Syangja and its vicinity and was started in FY 2008/09. Total project cost is estimated at US$6.6 Million which is jointly financed by GoN and NEA.

The main activities of the project are construction of 132/33kV, 30MVA and 33/11kV, 8MVA substation. The existing Kaligandaki-A Lekhnath 132kV transmission line will be looped-in looped-out at Rang Khola of Shyangja District to construct this substation.

As of end of FY 2011/12, Substation construction work is about 95% completed. Substation testing and commissioning work will be completed by Bhadra 2069.

Shyangja 132/33kV, 30MVA Substation under construction

3. Dumre – Damauli – Marsyangdi 132kV Transmission Line

The objective of this project is to evacuate power generated by Middle Marshyangdi power plant, enhance the reliability of Middle Marshyangdi power plant and facilitate the power evacuation from candidate hydro power projects of Marshyangdi Corridor. The objective also includes enhancing the performance of INPS and reduces outage frequencies of Bharatpur-Pokhara 132kV transmission line. Cost of this project is estimated to be US$ 18.62 Million which is jointly being funded by loan assistance from ADB, GoN and NEA. The project started in FY 2008/09 and is scheduled to be completed in FY 2013/014.

The scope of project includes: the construction of 18 km of double circuit transmission line from Dumre to Damauli and 1km of four circuit loop-in loop-out transmission line at Middle Marshyangdi power plant, stringing of 39 km 132 kV second circuit transmission line from Middle Marshyangdi to Dumre and construction of 132/33kV, 30MVA substation at dam site of Lower Marshyangdi power plant.

Construction work for this project has been divided into two packages. As of end of FY 2011/12, for Transmission Line Construction Package, Environmental Study and Survey work has been completed; Tower Design Work has also been completed. Hardware and fittings are about to be delivered to the site. Row clearance is in progress.
Contract for Substation Construction Package has been awarded, L/C has been opened and copy sent to ADB for L/C commitment. Substation staff quarter, boundary wall construction works are in progress.

4. Butwal – Kohalpur-Mahendranagar 132kV Transmission Line Second Circuit

The project is divided into two parts, one is from Butwal to Kohalpur and second part is from Kohalpur to Mahendranagar. First part was started in FY 2008/09 with US$ 13.8 million loan assistance from ADB and NRs. 276.4 million from GoN and NEA and this project is scheduled to be completed in FY 2013/014.

The main objective of this project is to supply increased power to Western Nepal, to meet growing electricity demand in the area, to supply upcoming cement factories and evacuate power from Chameliya Hydropower plant, power to be received from Upper Karnali. It is also targeted to import additional power from Tanakpur via this line. The summary output of the project include: 132kV second circuit stringing on existing double circuit towers between Butwal and Kohalpur (208km), replacement of existing ground wire between Butwal and Kohalpur with Optical ground wire (208km), addition of one 132kV line bay at Butwal substation, addition of two 132kV line bays at Shivapur substations, addition of one 132kV line bay, one 20MVar capacitor bay, one 132/33kV, 30MVA transformer bay at Kohalpur substation. Also included in the project is construction of new 132kV substation at Kusum with five 132kV line bays, one 132/11kV, 30MVA transformer bay, 12kV switchgears and associated lines, one control building and double bus bar.

As of end of FY 2011/12, bids for the project have been invited in two lots one for substation work and another for transmission line work. Construction contract has been signed for both packages, construction license has been acquired, land for Kusum substation has been acquired, L/C for both packages has been opened, Optical Ground Wire, Hardware and Fitting have been received at site for Transmission Line Package and Substation Equipment Power Transformer, 132kV Circuit Breakers, Battery Charger received for Substation Construction Package.
Second part was started in FY 2011/012 with US$26.7 million loan assistance from ADB including funding by NEA and it is scheduled to be completed in FY 2014/015. Estimate for this phase has been approved and draft tender document has been sent to ADB for approval.

5. Capacitor Banks at Grid Substations

The objective of this project is to improve the voltage and reduce the losses through installation of capacitor banks in grid substations. Cost of this project is estimated to be around US$ 2.2 Million and it is being jointly funded by loan assistance of ADB, GoN and NEA. The project is estimated to be completed by FY 2012/013.

The project scope includes installation of 33kV 2X12.5MVar at Bharatpur, 2X12.5MVar at Dhalkebar, 2X20MVar at Butwal and 11kV 3X5MVar at Simra, 2X5MVar at Hetauda, 2X10MVar at Siuchatar, 2X10MVar at Patan, 2X12.5MVar at New-Baneshwor, 2X12.5MVar at Balaju and 2X12.5MVar at Chabel substations.

Construction works at Butwal, New Chabahil and Baneshwor Grid Substation has been completed and already put into operation. Installation, testing and commissioning of works at Balaju substation is nearing completion. Remaining work is expected to be completed soon.

Capacitor Bank Installed at Butwal Substation

6. Chapali 132kV Substation

Project is divided into two parts. Objective of the first part of the project is to cater to the increased residential and commercial demand of Kathmandu North and to improve power supply reliability. The project started in FY 2008/09 and is scheduled to be completed in FY 2013/014. Total cost of the project is US$ 16 Million and it is being jointly financed by loan assistance of ADB, GoN and NEA.

The main output of the project includes 132/11kV, 30MVA substation at Chapali, 66kV GIS bay at Lainchhour substation and Chabahil-Lainchhour 7.7 km long interconnection by 66kV underground cable. In the second phase there is a plan to develop Chapali Substation link with 132kV and 66kV installing 132/66kV, 45MVA Transformer.

As of end of FY 2011/12, land required for the substation has been acquired and construction contract has been signed. L/C opening for the equipment is in progress.

Second part of Chapali Substation Expansion Project was started in FY 2011/012 with US$23.0 million loan assistance from ADB and NEA and it is scheduled to be completed in FY 2014/015. The main output of the project includes 132/66kV, 2X45MVA Transformers at Chapali, 132kV GIS bay at Balaju substation, 132kV Bay at Bhaktapur Substation and 4X 66kV Bays at Chapali Substation to make Double Circuit Connection from Balaju to Bhaktapur and 132/66kV Link to Kathmandu Valley.

Estimate for this phase has been approved and Draft Tender Document has been sent to ADB for approval.

7. Matatirtha Substation Expansion

Objective of the project is to cater to the increasing electricity demand of Kathmandu West as well as to supply United Cement, Naubise and Laxmi Cement, Lalitpur. This substation will also help to relieve overloaded Siuchatar, Teku and New-Patan substations feeding core areas of the Kathmandu Valley. Cost of this project is estimated to be US$ 3.3 million and is being jointly funded by loan assistance of ADB, GoN and NEA. The project was started in FY 2008/09.

Main project activites include: Addition of 132/33kV, 30MVA transformer, 33kV and 11kV switchgears at existing Matatirtha substation and 132/11kV, 22.5MVA transformer at Bharatpur substation.

132kV Equipment Foundation Work at Matatirtha Substation

As of end of FY 2011/12, civil works at Matatirtha and Bharatpur Substations are in progress, some of the equipments have been received at site.

8. Kabeli 132kV Transmission Corridor

Objectives of this project are to facilitate evacuation of power generated from Kabeli-A Hydro Power Project and power produced from Hydro Power Projects in Kabeli, Hewa, Mai and other rivers in the eastern region. Construction of transmission line and associated substations will meet the increasing electricity demand of Damak area, relieve Anarmani substation and improve power supply situation in this part of the country. Cost of this project is estimated at US$ 31 Million and funded by WB, GoN and NEA. Project was started in FY 2008/09 and Damak Substation is estimated to be completed by FY 2012/013; Damak-Kabeli 132kV DC Transmission Line and Illam, Phidim, Kabeli Substationsare estimated to be completed by FY 2013/014.

132/33kV, 30MVA Damak Substation under construction

The scope of the project includes construction of 90 km of double circuit 132kV transmission line from Damak to Kabeli. In addition, the project also includes construction of:

i) 132/33/11kV Damak substation with 132/33, 30MVA and 33/11kV, 8MVA transformers,
ii) 132/33/11kV Illam substation with 132/33kV, 30MVA and 33/11kV, 3MVA transformers,
iii) 132/33kV Phidim substation with 132/33, 20MVA and 33/11kV, 3MVA Transformers and
iv) 132/33/11kV Kabeli substation with 132/33kV, 30MVA, 33/11kV, 3MVA transformers.

Project status as of end of FY 2011/12, includes completion of transmission line survey works, IEE, acquisition of land required for substations, detailed engineering study of the transmission. Control building, equipment foundation of Damak Substation are almost completed, Power and Station Transformers, Capacitor Bank, Control Relay Panel for Damak Substation have been received at the site, contract agreement for construction of Illam, Phidim and Kabeli substation has been signed.

9. Pathlaiya 132kV Substation

Objective of this project is to provide adequate supply to the Birgunj industrial corridor, improve quality of supply and reduce technical losses in the area. The project started in FY 2008/09 and is scheduled to be completed in FY 2012/013. Cost of this project is estimated to be US$ 5.4 Million and is being jointly funded by loan assistance from WB, GoN and NEA.

The Project activities include construction of 132/11kV, 22.5MVA substation at Pathlaiya, 24km of 11kV distribution line and replacement of existing earth wire by OPGW conductor from Pathlaiya to Birgunj and Old Parwanipur to Simra substation.

As of end of FY 2011/12, 85% of substation construction work has been completed including installation and erection of the substation equipments.

10. Singati-Lamosangu 132kV Transmission Corridor

Objective of this project is to evacuate power from different hydroelectric projects to be developed by different IPP's in the Tamakoshi-Singati basin. Total cost of the project is about US$ 13 million. The project was started in FY 2008/09 and is scheduled to be completed in FY 2012/013.

Project will construct Lamosangu-Singati 40 km 132 kV Double Circuit Transmission Line and 132/33 kV, 30 MVA substation at Singati and the Bay extension at Lamosangu Substation will also be carried out.

As of end of FY 2011/12, Route alignment survey, Check Survey and Tower Spotting for transmission line has been completed. IEE study has been completed and the design of the Towers has been approved. Major substation equipments like CT, PT and DS have been received at site. The power transformer and the SF6 CB are under delivery stage. Conductors and Hardware Fittings have been received at the site for the Transmission Line Package and land has been acquired for substation. Civil work for Staff Quarter and Boundary Wall is completed. Construction of approach road, Switch Yard, and Control Building are in progress.

11. Hetauda-Kulekhani-II-Siuchatar 2nd Circuit 132kV Transmission Line

Objective of this project is to increase power evacuation capacity from the different IPP's and reinforcement of INPS. The project is scheduled to be completed in FY 2012/013. Cost of this project is estimated to be US$ 2.5 Million and it is being funded by GoN.

Scope of the project includes stringing of 45 km second circuit on the Hetauda-Kulekhani-II-Siuchatar 132 kV Transmission Line. It also includes the bay extension at substations and reinforcement work on existing 132kV Line.

As of end of FY 2011/12, contract has been signed for Transmission and Substation packages. L/C opening for Substation package is in progress and so is the mobilization payment for Transmission Line Package.

Funding Secured Projects

1. Modi-Lekhnath 132kV Transmission Line

Objective of this project is to increase power evacuation capacity of the IPP's up coming in the Modi-Lekhnath Corridor. Scope of the project includes construction of 132kV Double Circuit Transmission Line from New Modi to Hemja Substation to Lekhnath Substation, Switching Substation at New Modi and 30MVA New Substation at Hemja. Cost of this project is estimated to be US$ 14.8 Million and it is being jointly funded by Exim Bank of India and GoN. The project is scheduled to be completed by FY 2014/15.

As of end of FY 2011/12, detail survey has been completed. The MoU has been signed with Environment and Social Study Department for IEE study and ToR for the work has been received.

2. Solu Corridor (Katari-Okhaldhunga-Solu) 132kV Transmission Line

Objective of this project is to increase power evacuation capacity of the IPP's coming up in the Solu Corridor. It also includes the expansion of INPS. Construction of 90km of Double Circuit Transmission Line with CARDINAL conductor from Tingla (Solu) substation to Mirchaya and 132/33kV New Substation at Tingla is the main output of the project. Cost of this project is estimated to be US$ 26.5 Million and it is being jointly funded by Exim Bank of India and GoN. The project is scheduled to be completed by FY 2015/016.

As of end of FY 2011/12, Detail Survey Work and Environment Study have been completed, Tender Document Preparation work is in progress and an officer has been designated for Land Acquisition work. The land acquisition process has already been started.

Survey/ IEE Study Completed Projects

1. Kohalpur-Surkhet 132kV Transmission Line, 50 km

2. Sunkoshi 132kV Substati on, 15 km
3. Ramechap – Garjyang – Khimti 132kV Transmission Line, 30 km
4. Madi-Lekhnath 132kV Transmission Line , 22 km
5. Gulmi-Arghakhanchi-Chanauta 132kV Transmission Line, 110 km
6. Tadi Corridor (Samundratar-Trishuli 3B) 132kV Transmission Line, 20 km
7. Hapure-Tulsipur 132kV Transmission Line, 18 km
8. Dordi Corridor (Kirtipur-Udipur/Marsyangdi) Transmission Line, 16 km

Feasibility Study Completed Projects

1. Karnali Corridor (Lamki-Upper Karnali) 132kV Transmission Line, 60km
2. Bajhang-Deepayal-Attariya 132kV Transmission Line, 130 km
3. Surkhet-Dailekh-Jumla 132kV Transmission Line, 107 km
4. Kaligandaki-Gulmi (Jhimruk) 132kV Transmission Line, 43 km
5. Dhalkebar-Loharpatti 132kV Transmission Line, 20 km
6. Butwal-Lumbini 132kV Transmission Line, 22 km

Projects under Feasibility Study

1. Baneshwor-Bhaktapur 132kV DC Under Ground Cable Transmission Line, 12 km
2. Budhganga-Umedi-Pahalwanpur 132kV Transmission Line, 75km
3. Balefi-Barhabise 132kV Transmission Line,25km
4. Rupeni 132kV Substation

Projects for Power Supply to Cement Industries

In order to promote cement industries, the GoN has taken a policy of developing transmission line and road networks up to the site of the cement industries. The budget was allocated under the Ministry of Industry. A minute of understanding was signed between Ministry of Industry (MoI) and NEA with regards to development of transmission line. According to the understanding NEA will execute the transmission line project as per the instruction of MoI which in turn will provide required funds. Projects aimed for power supply to cement industries at different stages of implementation are as follows:

1. Kamane, Hetauda 132kV Substation

The main objective of this project is to provide power supply to Shivam Cement located at Hetauda. The project was started in FY 2008/09 with an estimated cost of US$ 3.5 million and is financed by GoN.

The main project output includes construction of a new 132/33kV, 30MVA substation at Kamane and construction of 11 km of 33kV sub transmission line from Kamane to Laxmipur and Phaparbari.

As of end of FY 2011/12, Construction of 11km of 33kV sub transmission line is almost completed. Approval of IEE report and contract agreement for the substation work . Land for Substation Construction has been allocated by Ministry of Forest. Approval of the Equipment Design Drawing has almost been completed. Major equipment like Power Transformer, communication equipment, protection equipment has already arrived at the site. The casting of the slab of the control building under the civil works is completed. Super structure work for staff quarter and store building is in advanced stage. Switchyard foundation work is in progress. Project is expected to be completed by November 2012.

2. Kusum - Hapure 132kV Transmission Line

The main objective of this project is to develop transmission system up to the site of Dang Cement to be established at Hapure of Dang. Further extension of this line will benefit Sonapur and Rolpa cements. The project was started in FY 2008/09 with an estimated cost of NRs. 500 Million and is financed by GoN.

Main activities of the project include: construction of 22km Kusum-Hapure 132kV transmission line and 132/33kV, 30MVA substation at Panchakule of Dang.

Project achievement till date includes: land acquisition for substation, construction of staff quarter, boundary wall, and control building, switchyard and contract agreement for both transmission line and substation construction works. Power Transformer, Fiber Optical Cables have been received at site and the arrival of other equipment is in process.

Hapure 132/33kV, 30MVA Substation under Construction

3. Mirchaiya-Katari 132kV Transmission Line

The objective of this project is to provide power supply to Maruti Cement Industry to be estabilished at Katari. Cost of this project is estimated to be NRs. 675 Million and it

is being funded by GoN. The project is scheduled to be completed by FY 2012/013.

Project components include construction of 25 km 132 kV double circuit transmission line from Mircahaiya to Katari and construction of 132/33 kV, 30 MVA substations at Mirchaiya and Katari. For this purpose one circuit of existing Dhalkebar – Lahan 132kV line will be looped-in and looped-out at Mirchaiya in Siraha district to extend the 132kV transmission line to Katari.

Transmission line route survey has been completed and TOR for IEE study has been submitted for approval.

4. Lamahi-Ghorahi 132kV Transmission Line

The objective of this project is to provide power supply to Ghorahi Cement Industry and Ghorahi Municipality. Cost of this project is estimated to be US$ 6.5 Million and GoN through Ministry of Finance has allocated the budget for this work. The project is scheduled to be completed by FY 2014/015. Project components include construction of 15 km 132 kV double circuit transmission line from existing Lamahi Substation to Laxmipur VDC Goglee and construction of 132/33 kV, 30 MVA substations at Laxmipur VDC Goglee.

As of end of FY 2011/12, substation bids has been approved by the management and construction contract has been signed with M/S CWE-NHE JV. The re-invitation of the Transmission Line Bid is in process (As no Bidders took part in the first Bid invitation).

5. Matatirtha-Naubise 33kV Transmission Line

The objective of this project is to provide power supply to United Cement. GoN through Ministry of Finance has allocated the budget for this work. Cost of this project is estimated to be US$ 3.06 Million. The project is scheduled to be completed by FY 2014/015. Project component includes construction of 10 km of 33 kV Double circuit sub transmission line from Matatirtha to Naubise, 33/11 kV and the construction of a 2X8 MVA Substation at Naubise.

As of end of FY 2011/12, Substation Construction Tender has been called. The preparation of the estimate for the Transmission Line has been completed. Land Acquisition has been finalized with Cement Industry.

6. Matatirtha- Malta 33kV Transmission Line

The objective of this project is to provide power supply to Laxmi Cement. Cost of this project is estimated to be US$ 5.33 Million and GoN through Ministry of Finance has allocated the budget for this work. The project is scheduled to be completed by FY 2014/015. Project component includes construction of 30km of 33kV Double circuit sub transmission line from Matatirtha to Malta, 33/11kV and the construction of a 2X16.5MVA Substation at Malta.

As of end of FY 2011/12, Letter of Intent has been issued for Construction of 33/11kV Substation. Preparation of Tender for 33kV Sub-Transmission Line is in final stage.

7. Tulsipur-Kapurkot 33kV Transmission Line

The objective of this project is to provide power supply to Rolpa Cement P. Ltd. Cost of this project is estimated to be US$ 0.4 Million and GoN through Ministry of Finance has allocated the budget for this work. The project is scheduled to be completed by FY 2014/015.

As of end of FY 2011/12, Tender has been called for construction of 16 km of 33kV transmission line from tapping point at Tulsipur substation (Salyan) up to the proposed substation construction site at Kapurkot.

B. Transmission Line Construction Department 220kV and above

The key transmission lines and substations and the major activities with regard to the development of these lines under the jurisdiction of this Department are as follows:

Projects under Execution

1. Khimti – Dhalkebar 220 kV Transmission Line

The project was started in FY 2002/03 with the objective of enhancing transmission capacity, improving supply reliability, reducing losses and voltage drops through construction of 220kV double circuit line and is scheduled to be completed in FY 2012/13. The project cost is estimated at US$ 22 Million and is jointly funded by World Bank, GoN and NEA.

The scope of the project includes construction of 75 km long Khimti-Dhalkebar 220kV transmission line on double circuit tower with single circuit of twin Bison ACSR conductor (initially charged at 132kV) and two nos. of 132kV line bays at Khimti and Dhalkebar substations in first phase and stringing of second circuit in the second phase.

As of end of FY 2011/12, in the first phase of work, supply of line materials and substation equipment is completed and the construction of transmission line is 95% completed. The rest of the construction work has been interrupted because of right of way issues raised by local inhabitants of Sindhuli District whereas bay extension is in ready position. Contract has been signed for second phase of work and supply work is in progress.

2. Hetauda - Bharatpur 220kV Transmission Line

The objective of the project is to enhance the transmission capacity and reliability of the Integrated Nepal Power System (INPS) and to evacuate the power to be generated by other hydro power plants from western region of Nepal. Cost of this project is estimated to be US$ 24.25 Million and it is being funded jointly by loan assistance of WB, GoN and NEA. The project was started in 2009.

Construction of about 75 km long double circuit Hetauda-Bharatpur transmission line initially to be strung as a single circuit 220kV transmission line and associated 132kV substations are being taken up. The substation components include expansion of existing Hetauda and Bardghat substations and construction of New Hetauda and New Bharatpur substations. New Hetauda substation shall comprise of 132kV line bays and bus coupler bay while New Bharatpur substation shall comprise of 132kV line bays, bus coupler bay, transformer bay and 132/11kV, 22.5MVA power transformer.

As of end of FY 2011/12, Final Route Alignment Survey has been approved. Acquisition of Land for Tower Foundation is in final stage. RoW Clearance work is in progress. Earth Wire and OPGW cable dispatch order has been made. ACSR BISON conductor, Insulators, Hardware Fittings, 99 nos of Tower accessories have been received at the site. 22 Tower Foundations are completed on Transmission Line Construction side.

Civil works for control building, store house, guard house and staff quarter on New Hetauda Substationis is in its final stages. Substation equipments including Power Transformer, SF6 Circuit Breakers, Battery and Battery Chargers has been delivered at site on Substation Construction Part.

3. Bharatpur - Bardghat 220kV Transmission Line

The objective of the project is to enhance the transmission capacity and reliability of the Integrated Nepal Power System (INPS) and to evacuate the power to be generated by other hydro power plants from western region of Nepal. Cost of this project is estimated to be US$ 17 Million and is being funded jointly by loan assistance of WB, GoN and NEA. The project was started in 2009 and it is scheduled to be completed by the beginning of FY 2013/014.

The main output of the project is the construction of 75 km Bharatpur-Bardghat 220kV double circuit transmission line.

As of end of FY 2011/12, alignment and detail survey has been completed. Design and Testing of transmission line materials is in the final stage. Site delivery of line materials has already commenced (about 70% of ACSR Conductors has been delivered to site). Right of Way Clearance (forest and other land) is in progress.

Funding Secured Projects

1. Tamakoshi -Kathmandu 220/400kV Transmission Line

Objective of this project is to increase power evacuation capacity of the IPP's coming up in the Khimti (Tamakoshi)-Kathmandu area and increase cross border transmission capacity enhancement. Project will construct 85km of Double Circuit 400kV Transmission Line but it will initially be charged at 220kV, 220/132/11kV. 100MVA Substations at Barhabise and Mulpani (Kathmandu) will also be constructed. Cost of this project is estimated to be US$ 88 Million and is being jointly funded by ADB and GoN. The project is scheduled to be completed by FY 2015/016.

As of end of FY 2011/12, desk study & field reconnainance survey from Tamakoshi to Mulpani (Kathmandu) 220kV has been completed. Revision of the survey for 400kV Line from New Khimti to Barhabise to Mulpani (Kathmandu) has been started by Project Development Department with a changed scope . The New Khimti to Barhabise reconnaissance survey has been completed within the changed scope. The report has been received. Evaluation on Expression of Interest for Consultant appointment is going on. Land Selection work for Substation Construction has been completed.

2. Koshi 220kV Transmission Corridor

Objective of this project is to increase power evacuation capacity of the IPP's coming up in the Koshi Corridor and expansion of INPS. Main output of the project is construction of 110km of 220kV Double Circuit Transmission Line from Khandbari to Baneshwor to Basantapur to Inaruwa, Construction of 65km of Double Circuit Transmission Line from Lelep to Hangpang to Basantapur, construction of 220/132/33/11kV, 250MVA Substation at Basantapur, construction of 220/132/33/11kV, 2X75MVA Substations at Khadbari, Baneshwor, Hangpang and Lelep. Cost of this project is estimated to be US$ 90.0 Million and it is being jointly funded by Exim Bank of India and GoN. The project ewas started in 2065/066 (2008/09) and it is scheduled to be completed by FY 2014/015.

As of end of FY 2011/12, detail survey from Inaruwa to Basantapur to Khadbari has been completed. MoU for the survey work has been signed for Basantapur to Hagpang to Lelep consisting of 65km. Additional scope and the Desk Study Report has been received for the project from

Project Development Department, Engineering Services . IEE Draft Report of Inaruwa-Basantapur-Khadbari transmission line has been approved by Ministry of Energy. Preparation of ToR is in final stage for Consulting Services. An officer has been designated for Land acquisition.

3. Marsyangdi-Kathmandu 220kV Transmission Line

Objective of this project is to increase power evacuation capacity of the Marsyangdi Corridor and INPS system reinforcement. Main scope of the project is to construct 85km of Double circuit Transmission Line with 2X MOOSE Conductor from New Marsyangdi to Naubise to Matatirtha, 220/132/33/11kV Substation at Naubise. Cost of this project is estimated to be US$ 35.0 Million and it is being jointly funded by Exim Bank of India and GoN. The project was started in FY 2009/10 and it is scheduled to be completed by FY 2014/015.

As of end of FY 2011/12, detail survey and reconnaissance survey work has been completed. EIA report has been submitted to Ministry for approval. Substation Land Acquisition at Marchichwok is completed. Distribution of compensation has been completed. Contract has been signed for the construction of compound wall and Mobilization payment has been released for the work. Land acquisition process at Naubise and Matatirtha has been started.

Survey/ IEE Study Completed Projects

1. Marshyangdi Corridor 220kV Transmission Line, 90 km
2. Kaligandaki (Dana-Kusma-New Butwal) 220kV Transmission Corridor, 110 km
3. Chilime-Trishuli 220kV Transmission Line, 40 km
4. Lekhnath-Damauli 220kV Transmission Line, 45 km

Feasibility Study Completed Projects

1. Trishuli 3B 220kV HUB Substation
2. Hetauda-Butwal 400kV Transmission Line, 168 km
3. Butwal-Lamki 400kV Transmission Line, 300 km
4. Lamki-Mahendranagar 400kV Transmission Line, 102 km
5. Duhabi-Anarmani 400kV Transmission Line, 100 km

Projects under Feasibility Study

1. Marsyangdi-Bharatpur 220kV Transmission Line, 25 km
2. Damauli-Bharatpur 220kV Transmission Line, 40 km

C. Power Development Project – Part C

Power development project (PDP) was originally approved by the World Bank board on May 22, 2003 for SDRs 55.25 million. It had three components, and Power Development Project implemented by Nepal Electricity Authority (NEA) is one of them. Additional finance was provided on May 26, 2009 to further enhance NEA components, taking the total project amount to SDRs 93.81 million. These funds were provided to address the prevailing power crisis in Nepal through rehabilitation of generation capacity, strengthening of the transmission system, and expansion of distribution access.

Original NEA components include construction of Chaandranigahpur sub-station, the Distribution and Rural Electrification Project and the Khimti-Dhalkebar 220 kV transmission line. At the time of restructuring, following activities were started: Distribution System Rehabilitation Project, Rehabilitation of the Hetauda diesel plant, Rehabilitation of Kaligandaki-A plant, multi-fuel power plant and the Pathlaiya substation, implementation of the integrated financial management information system (IFMIS), Hetauda-Bharatpur 220 kV transmission line, Bharatpur-Bardaghar transmission line and conductor procurement for Hetauda-Dhalkebar-Duhabi (HDD) line. The conductor procurement for HDD line was included under the PDP in January 2011 to achieve financial closure of the Nepal-India Electricity Transmission and Trade Project (NIETTP). Chandranigahpur sub-station, the Distribution and Rural Electrification Project are now close to completion. However, Khimti-Dhalkebar transmission line is only 90% complete. Some of the local problems in the area have delayed the progress to be made in Khimti-Dhalkebar 220 kV transmission line. Similarly, the Distribution System Rehabilitation Project, the Rehabilitation of Hetauda diesel plant, rehabilitation of the Duhabi multi-fuel plant and the Pathlaiya substation are proceeding well towards completion by the project closing date (December 31, 2012). However, the Hetauda Bharatpur transmission line has been significantly delayed due to rerouting and delays in forest clearance. The forest clearance has now been received and the contractor is trying to expedite the works. It is likely that a significant proportion of the activity would extend beyond the project closing date. Similarly, the implementation of the Bharatpur-Bardaghat transmission line has witnessed a delay in securing Forest Clearance from the Ministry of Forests.

Additionally, three activities are yet to be procured (1) Conductor for Hetauda-Dhalkebar-Duhabi line, (2) Rehabilitation of Kaligandaki-A plant and (3) Implementation of the Integrated Financial Management Information System (IFMIS) and procurement of System Integrator (SI). Although the project is closing on December 31, 2012, the disbursement ratio currently remains low (58%).

The 144 MW Kaligandaki-A is the largest hydropower plant in Nepal, providing nearly 22% of the electricity supply. Although it is in urgent need for rehabilitation, the identification of a technical solution has taken much longer than originally anticipated.

Transmission and System Operation Business Group

Transmission and System Operation Business Group is entrusted with the key responsibilities of generation and transmission system planning, system operation, operation and maintenance of national grid and trading of power. It is headed by a General Manager. The System Planning Department carry out load forecasting, generation expansion planning and transmission system planning of the power system of Nepal while System Operation Department performs the operation planning and real time system operation. Similarly, Grid Operation Department carries out overall operation and maintenance of national grid and Power Trade Department executes the trading of power with Independent Power Producers and also carries out the business activities of power exchange and trading of power with India.

System Planning Department

In the context of increased private sector participation in electricity generation, and the Government of Nepal's 10,000 MW in 10 years and 25,000 MW in 20 years plans made public in recent years, the role of centralized generation planning by NEA has become minimal.

However, least cost generation expansion plan is vital for any utility to ensure reasonable cost of supply to the consumer. After the entry of private sector in generation; different factors make the deterministic approach to least cost generation expansion planning very complex. In the changed context, a modified approach for generation expansion planning has become inevitable.

Currently, Grid Impact Study (GIS) for new generation projects is the main focus of System Planning Department (SPD). The GIS analyzes the effect of new connection to NEA Grid. To ensure satisfactory operation of the NEA Grid in conformity with the NEA Grid Code; requirement for additional transmission lines, reinforcement in the network, and requirement for the installation of capacitors and reactors are recommended.
SPD also identifies constraints in the grid that could pose operational risk and that reduce efficiency due to outages in the Integrated Nepal Power System (INPS). SPD also develops transmission configurations for evacuating power from planned generation projects. For this, different technical studies such as load flow, short circuit, steady and transient stability are carried out.

SPD also assists other departments of NEA by providing necessary data and give suggestions regarding implementation of planned projects.

In FY 2011/12, System Planning Department carried out number of technical studies at the request of NEA's different departments. Notable among them are:

- Study on compensation requirement in the INPS
- Load flow analysis of Hetauda-Birgunj transmission corridor
- Energy simulation study of West Seti (750 MW) Hydropower Project
- Transmission system study for the NausalGad Storage Hydropower Project (400MW)
- System based analysis for the sizing of Nausalgad Hydropower Project
- Study on compensation requirement at Butwal sub-station
- Load flow analysis for the extension of Chapali sub-station
- Transmission system study for the Upper Modi – A (42 MW) Hydropower Project
- Transmission system study for the Kulekhani - III (14 MW) Hydropower Project
- Transmission system study for the Chamelia (30 MW) Hydropower Project
- Load flow and dynamic stability study of Tanahu (140 MW) Hydropower Project
- Load flow analysis for the bulk load of 5.9 MW of Saakha Steel Industry in the Hetauda-Birgunj transmission corridor

In FY 2011/12, System Planning Department completed Grid Impact Study for the following hydropower projects to be developed in the private sector.

List of GIS conducted projects in FY 2011/12

S. N.	Name of Projects	Capacity (MW)	Connection Substation
1	Ankhu Khola	42.9	Upper Trishuli 3 'B' Hub substation.
2	Lower Khare	8.26	Singati substation.
3	Junbesi Khola Small	5.2	Tingla substation.
4	Madi Bhorletar	10	New Damuali substation.
5	Middle Bhotekoshi	102	Barhabise Hub substation
6	Rasuwagadhi	111	Chilime Hub substation
7	Singati Khola	16	Singati substation
8	Dordi-I	10.3	Udipur Hub substation
9	Bagamati Small	17	Kulekhani-I
10	Mai Cascade	4.5	Mai HPP
11	Idi Khola	0.975	Lekhnath substation
12	Ghalemdi Khola	4	Dana substation
13	Midim	3.4	Damauli substation
14	Upper Seti I	21	Hemja (Banskot) substation
15	Nyadi	30	Khudi (Tadi Kuna) hub substation
16	Mai	22	Godak substation (Ilam Hub, Kabeli Corridor)
17	Kabeli B1	25	Kabeli substation
18	Lower Pheme Khola	3.5	Phidim substation
19	Super Dordi 'Kha'	49.6	Kirtipur (Dordi corridor) hub substation
20	Lower Jogmai Khola	6.3	Ilam substation (Godak hub)
21	Mai Cascade	7	Mai HPP
22	Phalakhu Khola	14.7	Trishuli 3 B hub substation
23	Upper Piluwakhola	9.622	Baneshwor substation
24	Solu	23.5	Tingla Substation
25	Hewa Khola 'A'	14.9	Phidim Substation
26	Lower Hewa Khola	9.5	Phidim Substation
27	Upper Mai 'C'	5.1	Ilam substation (Godak hub)

Grid Impact Study for the bulk load of 5 MW of Hulas Steel Industry and 3.3 MW of Ashok Steel Industry in the Hetauda-Birgunj transmission corridor were also carried out.

System Operation Department

As in the past years, Load Dispatch Centre has been working round the clock to keep the operation of the Integrated Nepal Power System (INPS) on the right track through the use of computer based Supervisory Control and Data Acquisition (SCADA) system.

The availability of real time data and better communication system have improved the overall availability of power stations and transmission lines and has helped to minimize the time required for restoration of the power system in case of black-outs, thereby reducing loss of revenue. The magnitude of load shedding was also reduced considerably.

For the continued smooth functioning of the system, it is necessary that the data acquisition from the power stations and substations be updated according to the latest changes/

modifications in the respective stations. The trained manpower in the LDC has been able to keep the data up-to-date in the SCADA software in the LDC. Besides the regular maintenance works, new bays from upgraded substations and new substation Simara have been integrated into the SCADA software. Around Rs.100 million revenue is being received annually by leasing (to Nepal Telecom and other private companies) the fibers from the fiber optic cable.

Control Center at Siuchatar, Kathmandu

Grid Operation Department

The Grid Operation Department is responsible for transmitting reliable and quality power from distant generators to various load centers. It also provides connection facilities to IPPs and Bulk Consumers at different voltage levels by entering into Connection Agreement as per the NEA Grid Code. Another main function of the Department is to look after the operation of 66 kV & 132 kV substations and transmission lines by carrying out routine and breakdown maintenance such as: up-gradation, extension, replacement and rehabilitation works including installation of necessary reactive compensation equipment. Under this Department there are division offices in Kathmandu, Hetauda and Butwal and branch offices in Duhabi, Pokhara and Attaria.

Major Works performed in F/Y 2068/69 are as follows:

a. **Transformer Upgrading, Reactive Compensation and Substation Reinforcement Works (Completed)**

This department has executed number of transformer reinforcement and upgrading works in various substations. With the increase of power demand and below acceptable voltage level, up-gradation and rehabilitation of power system equipment and installation of shunt capacitor banks in different substations are being carried out. Transformers that are being replaced are installed in other substations after necessary overhauling and maintenance. Relocation of power transformers in different substations is a cost effective way of load management. The department has also completed some of the connection facilities for evacuating power from power plants owned by the Independent Power Producers (IPPs).

Various works executed by this department have supported to reduce forced outage rate caused by inadequate transformation capacity. The department carried out and completed following major up-gradation and reinforcement works in FY 2068/69.

- Installation of new 132/66 kV, 45MVA transformer at Parwanipur S/S.
- Shifting two 33/11 kV, 16.6 MVA transformers from Duhabi S/S to Anarmani S/S.
- Commissioning of 66/11kV, 7.5MVA transformer at Indrawati Power House.
- Rehabilitation work at Amlekhgunj S/S.
- Repair and Commissioning of damaged 33/11 kV, 8 MVA transformer at Butwal S/S.
- Repair and Commissioning of damaged 33/11kV, 5 MVA transformer at Dhalkebar S/S.
- Installation of new Air Compressor for pneumatic breaker charging mechanism at Balaju S/S.

Power Transformer at New Parwanipur S/S

b. Following major up-gradation & reinforcement works for substation are initiated and are currently under progress

- Replacing 7.5 MVA transformer with new 30 MVA transformer at 132/33 kV Lamahi S/S.
- Installation of new 132/33 kV, 30 MVA transformer at Chandranigahpur S/S.
- Installation of new 22.5 MVA and 18 MVA transformers at 66/11 kV Chabel and 66/11 kV Patan S/S respectively.

- Replacing 3 MVA transformer with new 16.6 MVA transformer at 33/11 kV Chanauta S/S.
- Shifting each of the two 33/11 kV, 7.5 MVA transformer from Anarmani S/S to Attaria S/S and Lamki S/S.
- Shifting 33/11 kV, 3 MVA transformer from Attaria S/S to Lamahi S/S.
- Replacing 5 MVA transformer with 10 MVA transformer at 132/33 kV Mahendranager S/S.

c. **Relay Testing and Energy Meter Testing Works**
Testing and calibration of more than 200 relays of different types and more than 450 energy meters have been carried out by the Relay and Meter Testing Group of this Department in various Grid substations including some of the meters owned by the IPPs.

d. **Grid Connection Agreement**
The Department has entered into the Grid Connection Agreements with 21 IPPs (Independent Power Producers) with a total combined capacity of 419.5MW.

e. **Routine & Breakdown Maintenance Works**
Routine Maintenance works were carried out as per schedule for Substations and Transmission Lines.
Recently the Department acquired the capability for the hot spot scanning through Thermal Surveillance Camera provided by Statnett SF, Norway. These Cameras are being used to identify the faulty points & hot spots in transmission lines, equipment and connection points. Problems so identified have been rectified successfully before reaching the breakdown point.

Power Trade Department

Power Trade Department is responsible for trading of electric power both in domestic and cross border market. It is the single window interface of NEA with Independent Power Producers (IPPs) for processing their application for Power Purchase Agreement (PPA). Functions of Power Trade Department may be broadly classified into three categories:

a. **PPA Processing** :
This function covers PPA processing activities up to and including the conclusion of power purchase agreements.

b. **PPA Implementation and Monitoring:**
This function includes PPA administration and monitors the testing and commissioning of IPP projects to commence their commercial operation.

c. **Operational Administration:**
This function includes PPA administration after commercial operation.

Hewa Khola (4,455 kW) and Lower Piluwa (990 kW) were commissioned during fiscal year 2068/69 thus augmenting the system capacity by 5,445 kW. With these two projects the total number of IPPs in operation reaches 25 with their combined installed capacity of 181.67 MW. Similarly 22 projects of IPPs with their combined capacity of 840 MW were noted to be under construction.

During FY 2068/69, 23 new PPAs with combined capacity of 334 MW were concluded whereas PPAs of five projects for upgrading their capacity by 20.72 MW in total were amended. Besides this, PPAs for 90 projects with their combined capacity of 926 MW are in progress.

The total number of PPAs concluded so far till FY 2068/69 stands at 104 with their combined capacity 1,574 MW.

Apart from 50 MW import under the Power Exchange Agreement with India, a short term PPA for the import of 20 MW power from January 1, 2012 to April 30, 2012 was concluded with PTC India Limited.

Distribution and Consumer Services East Business Group

The Distribution and Consumer Services, East (DCSE) Business Group is entrusted with the key responsibility of overall management of electricity distribution network of NEA in Mechi, Kosi, Sagarmatha, Janakpur, Narayani and Bagmati zones of Nepal. The major activities of this Business Group include operation, maintenance, rehabilitation and expansion of the network up to the 33 kV voltage levels and consumer services such as new consumer connections, meter reading, billing, and revenue collection. The operation and maintenance of off grid small hydro power plants in its area, also falls under the jurisdiction of this Business Group. DCS East is the largest business group of NEA in terms of number of employees and business activities. Approximately 18% of the total staffs of NEA are employed in DCS, East. Also, DCS East is on the forefront to earn revenue for sustaining operation and maintenance and development activities of NEA.

DCS, East provides services to 64.65% of total electricity consumers through 50 Distribution Centers spread over 34 districts of the country. This Business Group is headed by a General Manager. The General Manager is supported by one department and four regional offices each headed by a Director.

Performance Highlights

In FY 2011/12, total number of customers under DCS East reached 14,78,557 an increase of 11.67 % over the last fiscal year's figure.

Customer Category	No of consumer (% of total consumers)	Sales %	Revenue %
Domestic	93.63	41.50	41.81
Non-Commercial	0.49	4.19	5.81
Commercial	0.57	8.63	12.23
Industrial	1.69	39.12	35.18
Others	3.62	6.56	4.98

Similarly, in FY 2011/12, a total of 2191.31 GWh of energy was sold earning a gross revenue of Rs. 14727.47 million, an increase of 8.64% and 3.87% over the previous year's energy sales and revenue respectively. Industrial and Commercial consumer categories combined together represent only 2.26% of the total number of consumers but share 47.74% of total sales. Similarly, the domestic consumer category represents 93.63% of total consumers but contributes only 41.5% to the total sale.

Programs and Activities

As part of system reinforcement and expansion of the distribution systems, many activities, programs and the projects were undertaken in FY 2011/12 to expand and improve the service delivery. These programs and activities were executed by the Department and Regional Offices. The main activities undertaken are listed below:

Electrification Program

The program during the year under review focused on extensions of the existing distribution system and on completion of outstanding incomplete electrification works on a priority basis. The activities of the program are spread over all the areas

under the jurisdiction of the DCS, East business group. During FY 2011/12, four 33/11 kV transformers of 6/8 MVA capacity and two 33/11 kV transformers of 10/13.3/16.6 MVA capacity were charged at different substations of NEA.

Loss Reduction Activities

In FY 2011/12, special drives were initiated to reduce the technical and non-technical losses. Feeder-wise loss evaluation was made and extra load shedding hours were set for high loss prone feeders. This practice was found to be effective and losses of the many high loss prone feeders were brought down substantially. At the same time, distribution centers were assigned loss targets to achieve within the prescribed time frame. This was also linked with the performance of concerned distribution center chief and a significant loss reduction was observed in many areas. The special efforts of the employees and the support of the various institutions in controlling non technical losses brought in good results in many areas. The Business Group carried out regular monitoring of the feeders and areas having more than 35% loss. The Loss Reduction Committee was formed in many distribution centers under the chairmanship of Chief District Officer. Loss reduction committee at center level issued directives to the concerned offices to improve the loss situation. During the FY 2011/12, a total of 2955 numbers of direct hooking was caught and Rs 16,701,384.89 was recovered from persons involved in direct hooking. The Business Group also took action against 1103 customers for electricity pilferage and Rs 11,569,953.72 was recovered from them. Similarly, 21.2 million units of electricity was billed that was wrongly read due to CT/PT errors. Regular monitoring, data downloading and analysis of the consumption of large industrial and commercial consumers were augmented. Significant loss reduction was observed in many high non technical loss prone areas by the use of Ariel Bundle Conductor, ABC. Upgrading of overloaded conductors and transformers was also carried out to reduce the non technical losses. As per NEA decision, the electromechanical meters of the consumers of 25-50 kVA range are also being replaced with electronic meters. Despite the adverse local work environment especially in terai and some hilly areas, continued efforts and measures taken to control losses brought fruitful results by bringing down the distribution system losses to 21.72 % in this period.

Demand Side Management

With grant assistance from Asian Development Bank, DCS East has initiated program to distribute 750,000 CFL lamps to improve the power factor and voltage level in some selected areas of the country. Besides, installation of capacitor banks was completed in Nepalgunj, Jaleshwor, Rajbiraj and Tanki-Sinuwari substations and substantial voltage improvement has been observed. Similarly, LV capacitor installation program is underway to improve voltages of the distribution networks. The goods have already been received and the program is expected to complete in few months.

Project Highlights

Energy Access and Efficiency Improvement Project
Project for Energy Efficiency through Loss Reduction

This project has been started with the objective of reducing technical losses in the distribution networks of Kathmandu valley and Birgunj corridor. This project is jointly financed by Asian Development Bank (ADB) and GoN. The project has identified 27 distribution feeders with unacceptable level of loss in Kathmandu valley and Birgunj where rehabilitation is required. The project is scheduled to be completed in 2013 AD.

Distribution System Augmentation Project

This project is jointly financed by Asian Development Bank (ADB), GoN and NEA. The scope of the project includes: (i) Construction of new 33/11 kV, 6/8 MVA substation at Baniyani, Mirchaiya, Dhanusadham, Parual, Barathawa, Baskot, Kusma, Mainapokhar and 11 kV switching station in Mirmi, Swoyambhu & Mulpani and (ii) Construction of 95 km of 33 kV and 156 km of 11 kV lines in the vicinity of substation area.
The construction of substations and interconnection feeders is expected to complete in 2013.

33/11 kV substation construction at Baniyani, Jhapa

Distribution System Rehabilitation Project

The scope of the Project includes upgradation of distribution substations at 10 locations viz Khanar and Inaruwa of Sunsari district, Rupani of Saptari district, Janakpur of Dhanusha district, Haripur of Sarlahi district, Chanauli of Chitawan district, Bhairahawa of Rupandehi district, Ghorahi of Dang district, Gulariya of Bardiya district and Tikapur of Kailali district. It also includes construction of 68 km 11 kV line, rehabilitation of

131 km of existing 11 kV distribution network, construction of 49 km 0.4 kV line using ABC Cable and rehabilitation of 155 km of existing 0.4 kV distribution network in above mentioned districts. To ease the implementation, the Project has been split into two Lots. Lot-1 covers all the works in Sunsari, Saptari, Dhanusa and Sarlahi districts while Lot-2 covers the remaining districts.

Upgradation work of distribution substations of both lots have been completed adding 82 MVA capacity of 33/11kV power transformers. The construction of new distribution network and rehabilitation of existing distribution network will be completed during first trimester of F/Y 2069/070.

Project for Solar Powered Street Lighting and Grid-tied PV Solar System

The ADB funded project aims to install solar powered street lighting systems in some parts of five municipalities of the Kathmandu valley. This project also aims at installing 100 KW and 60 KW Grid-tied PV solar power systems in NEA Training Centre, Kharipati and Bir Hospital, Kathmandu respectively. Solar street light project will facilitate the promotion of solar powered street lighting in historically important places of Kathmandu valley. For the successful implementation of this project, an advisory committee comprising of representatives from Ministry of Local Development and members from other stake holders has been set up. The project includes purchase of solar powered street- lighting system, replacement/installation and setting up a system to ensure a smooth maintenance. Around 1000 existing street lamps will be replaced by solar energy which will reduce peak demand by 0.2 MW and save about 700 MWh per year.

Energy Efficiency in lighting (CFL) Project

The success of the pilot CFL program which was launched in 21 locations of the country has encouraged NEA to design and implement CFL distribution program in other part of country. Under this program, around one million high quality CFLs with a capacity of 12 W - 15 W will be distributed. The implementation of the project is expected to begin from December 2012 and the objective of this program is to reduce annual energy consumption by 23 GWhr. About 500,000 residential customers are expected to be benefited from this program. The project is financed by ADB & GoN.

Pilot Project for Public Private Partnership in Distribution System

This project is jointly financed by ADB and GoN. The project aims at enhancing the quality of service delivery and overall efficiency through Public Private Partnership program in the sector of electricity distribution. The scope of the project includes procurement of the consulting services for the implementation of Public Private Partnership in three distribution centers of NEA. The consultants have submitted draft bidding document and franchisee agreement which will be used in implementing PPP in distribution.

Kathmandu Valley Distribution System Rehabilitation Project

This project has been started with the objective of improving the quality and reliability of the power supply and reducing technical losses in Kathmandu valley. The project will also enhance the capacity of the distribution networks to meet the growing energy demand in the Kathmandu valley. The project is jointly financed by World Bank (WB), GoN and NEA. The scope of the project includes addition & up gradation of distribution transformers (735 nos.), extension & upgradation of 11 kV and 0.4/0.23 kV line using covered conductors and ABC Cables (650 km), installation of Switches and replacement of poles. The contracts for procurement of line materials are complete and construction work is in progress. The project is scheduled to be completed in 2013 A.D.

Energy and Customer Accountability Enhancement Project

This Project focuses on NEA's efforts (a) to enhance accountability to its customers through (i) the improvement of services to customers; (ii) the improvement of customer interface and responsiveness by establishing easy and quick systems and processes for new service registration to enhance customer satisfaction, and through easy and convenient any-time access to customer information over the internet; (b) to build an energy accountability framework (metering and billing, verification) and revenue collection system for large customers receiving high voltage supply.

Consultant was appointed for this project which conducted few workshops including inception workshop, bid process management workshop, customer feedback and communication strategy workshop and improving customer billing workshop. The consultant has also submitted the draft bid document for pilot implementation of remote meter reading. It has also submitted the report on Customer Billing Enhancement in NEA and Consumer Asset Codification Methodology. Field data collection has almost been completed. The consultant is doing analysis of these data to prepare the report. This assignment is also expected to be completed during first trimester of F/Y 2069/070.

Computerized Billing Project

The objective of the this Computerized Billing Project (CBP) is to implement a common billing system in all the revenue col-

lection centers of NEA for improved billing and revenue collection processes in a modern, efficient and cost effective manner. The system (Mpower) is in operation in 68 collection centers. Computerized Billing Project has also implemented Handheld Meter Reading Device (HHD) which is in operation in 27 different collection centers. This has helped to reduce human error during meter reading. The project has implemented computer assisted interactive voice response service (IVR) in major collection centers.

Bank through Payment System (Online Banking) has already started for Ratnapark Distribution Center through Prime Commercial Bank. This system will help customers pay their bills without standing in queues. The use of IVR in this sector has helped the customers to have information on payment dues and other service.

The introduction of Any Branch Payment System (ABPS) currently implemented in 4 revenue collection centers (Ratnapark DC, Baneshwor DC, Lagankhel DC and Pulchowk DC) will help the customers to pay their bills easily on time. This system will also help NEA to collect revenue and get analytical reports on time.

The project targets to centralize the billing system of the collection centers inside the Kathmandu valley within this Fiscal Year. For this purpose a Billing Data Center shall be set up. Bank through Payment System (Online banking) shall also be extended to other banks. Billing information of the customer shall be put on the internet such that customers can know their respective billing history. Further Computerized Billing Project plans to implement Mpower billing system and Handheld Meter Reading Device in additional 20 collection centers within this Fiscal Year.

Inauguration of Any Branch Payment System at Ratnapark by Acting MD, NEA

33/11 kV, 6/8 MVA Substation at Dhulabari (Jhapa)

This project was started in FY 2009/10 to meet the growing demand of Dhulabari and its vicinity. The project will help to improve the quality of supply and reduce the technical loses of the area. The scope of the project includes the construction of 33/11 kV, 6/8 MVA substation at Dhulabari. The project is funded by GoN and is scheduled to complete in 2012.

Ilam-Phidim-Taplejung 33 kV Transmission Line Project

The project includes the construction of 90 km of 33 kV, transmission line in Fidim and Taplejung district. Construction of 33/11 kV 1.5 MVA Substation and 33 kV Bay at Ilam Substation has been completed. Pole erection for 80 km line is complete out of which conductor stringing in 60 km line is completed. For supply, delivery, installation and commissioning of 3 MVA substation at Taplejung and 33 kV Bay at Phidim Substation is scheduled to be completed by FY 2012/13. Tender for material supply and construction of remaining work of line has been made.

Buipa-Okhaldhunga33 kV Transmission Line Project (Khotang and Okhaldhunga Districts)

The scope of this project includes the construction of 32.5 km of 33 kV transmission line, 35 km of 11 kV and 30 km of LV distribution line and two 33/11 kV, 1.5 MVA substations one each at Okhaldhunga and Khotang districts. Construction of substation at Buipa (Khotang district) has been completed and construction work at Okhaldhunga is in progress. Construction of 32.5 km of 33 kV line, 35 km of 11 kV line and 18 km of LV distribution line has been completed and construction of remaining LV line is in progress.

Since, 33 KV line from Jaljale to Buipa is charged at 11 kV, parallel 11 kV line is being constructed to free the existing 33 kV line to feed the Buipa substation. About 28 Km of 11 KV line has been constructed so far and works for remaining 7 Km of line is in progress. The project is expected to complete in FY069/70.

Rasuwaghat-Khotang S/S and RE Project

Major works to be performed under this Project include the construction of 14 km of 33 kV transmission line, one 33/11 kV, 1.5 MVA capacity substation at Rasuwaghat of Khotang district, 90 km of 11 kV and 90 km of LV distribution lines in Khotang district. Out of these, 6 km of 33 kV transmission line, 16 km of 11 kV line and 29 km of LV distribution line construction have been completed. 33 KV Bay extension at Jaljale substation has been completed.

Bharatpur-Madi 33 KV Sub-transmission Line & R.E. Project

This project is financed by the Govt. of Nepal (GoN) and is being implemented for the electrification of Madi area and its vicinity in Chitwan district. The scope of the project includes construction of a 3 MVA 33/11 kV substation, 22 km of 33 kV overhead line, 8 km of 33 kV underground line, 30 km of 11 kV line and 50 km of 0.4 kV line and installation of 30 distribution transformers. The project will provide electricity to about 11,000 households of the area. The construction of substation and U/G cable is under progress. Construction of 22 Km of 33 KV overhead line has been almost complete. The project is scheduled to be completed in 2013.

Dhankuta-Hile-Leguwa-Bhojpur 33 kV Transmission Line Project

The project includes the construction of 35 km of 33 kV transmission line, 52 km of 11 kV line, 50 km of LV distribution line and one 33/11 kV substation in Bhojpur district. Construction of 33 kV transmission line and 33 kV Bay/Switching Substation have been completed and are in operation. Construction of 33/11 kV, Substation at Bhojpur and 11 kV line is in progress and is scheduled to be completed by FY 2012/13.

Tumlingtar-Dingla-Bhojpur 11 kV Transmission Line Project

The project includes the construction of 30 km of 11 kV and 25 km of LV distribution line in Sankhuwasabha and Bhojpur districts. Pole erection for entire 11 kV line and 20 km of conductor stringing have been completed. Similarly, 18 km of LV distribution line has also been completed. Tender for material supply for remaining work is under progress.

Sangutar-Okhaldhunga 33 kV Transmission line project.

Major components of the project include the construction of 40 km 33 kV line, 40 km 11 kV line, one 33 kV bay at Sanghutar and 40 km LV distribution line. Pole erection in half of the of 33 kV line has been completed. Procurement of 315 nos. of poles and 120 km of conductor with hardware has been made for construction of 33 KV line and work is in progress.

Okhaldhunga-Salleri 33 kV Transmission line project

The major component of this project are construction of 40 km 33 KV line, 40 km 11 kV line, one 33 KV bay construction at Okhaldhunga substation and 1.5 MVA Substation & 40 km of LT line at Salleri of Solukhumbu district. Procurement of 315 nos. of poles and 120 km of conductor with hardware has been made for construction of 33 KV line and work is in progress.

Khurkot-Nepalthok 33 kV Transmission Line Project

Major components of the project include the construction of 25 km of 33 KV line, 25 km of 11 kV line, 40 kM of LV distribution line at Sindhuli District & 33/11 kV, 1.5 MVA Substation at Nepalthok. The procurement of poles & conductor for 12 KM of 33 KV Transmission line has been completed and construction of line is in progress.

Hatia-Kamane 33 kV line Project

The project scope includes construction 10 km, 33 kV double circuit line from Kamane in Hetauda to Hatia. This project aims to meet the load demand of the industries in Hatia and eastern part of the Makawanpur district.

A section of Kamane-Hatia 33 kV line

Almost 90% of the project work is complete except about 2 km of line in the forest area for which IEE is required. IEE report has been approved and it is in process complete and the project is expected to complete soon.

Aathrai VDC-Sankranti Bazaar 33/11 kV Substation Project

Major components of the project includes the construction of 25 km of 33 kV line, 25 km of 11 kV line, 40 km of LV distribution line in Tehrathum district and a 33/11 kV Substation at Sankarnti Bazaar. Construction of 23 km of 33 kV line has been completed. Tender for line material and construction has been made. The construction is in progress. The land for Substation construction has been selected and its acquisition is in process.

Bokhim Lekharka (Bhojpur) Electrification Project

The project includes construction of 70 km of 11 kV line and 100 km of LV line in Bokhim, Khawa, Sideshwor, Gupteswor, Nagi, Lekharka, Gogane, Timma, Kot, Chinamakhu and Annapurna VDC of Bhojpur district. Erection of poles for 11 kV line is in progress and tender for ACSR Conductor has been made.

Dhankuta-Hile-Ranibas-Bhojpur 33 kV Transmission Line Project

The project includes construction of 27 km of 33 kV line, 50 km of 11 kV line and 50 km of LV line in different V.D.C. of Bhojpur district. Erection of poles for 33 kV transmission line has been completed. Tender for other material supply and construction of line has been made. Procurement of land for substation construction is being made.

Piluwa 33/11 kV Substation Upgrading

The scope of works includes upgrading of 1.5 MVA, 33/11 kV transformer by 6/8 MVA, 33/11 kV power transformer and replacement of 33 kV Switchgear and Panels. Contract for supply, delivery, installation and commissioning of 6/8 MVA transformer was made and works is in progress and scheduled to be completed by FY 2012/13. Tender for replacement of Switchgear and Panels has been made and completion of works is scheduled to be finished by FY 2012/13.

Ranibas-Balardaha-Bhojpur 33 kV Transmission Line

The project started in FY 2010/11. Scope of works includes 33 kV line survey and construction apart from construction of 33/11 Substation / 33 kV Bay at Balardaha. Tender for Detailed Survey has been completed in FY 2011/12. Similarly, tender for procurement of poles has also been invited.

Muga-Ghodetar-Bhojpur 11 kV Transmission Line Project

The project started in FY 2010/11. Scope of works includes 10 km of 11 kV line and 10 km of LV distribution line in different VDCs of Bhojpur district. Tender for Hardware, Insulators, ACSR Conductor has been made and remaining portion of works is in progress.

Rake-Rabi-Chisapani 33 kV Transmission Line Project

The project includes the construction of 25 km of 33 kV line, 40 km of 11 kV line, 40 km of LV distribution line, construction of 33/11 kV substation and 33 kV bay. Out of which, 23 km of 33 kV line and 10 km of 11 kV line has been constructed. The procurement of material has been done. Tender for construction of line has been made. Land for Switching Station at Chamaite has been already acquired while acquisition for Substation is still in process.

Bhadratar Talakhu Electrification Project, Nuwakot

This project is financed by GoN to electrify Mahakali, Likhu, Talakhu, and Chhap VDC of Nuwakot district. The scope of the project includes construction of 12 km of 11 kV line, 16 km of 0.4/0.23 kV line and installation of 5 nos of distribution transformers. Construction is in progress and is scheduled to be completed by the end of 2012.

Belkot Kumari Chauthe Electrification Project, Nuwakot

This project is financed by GoN to electrify Belkot, Kumari, Chauthe VDC of Nuwakot district. The scope of the project includes construction of 9 km of 11 kV line, 10 km of 0.4/0.23 kV line and installation of 4 number of distribution transformers. Construction is in progress and is scheduled to be completed by the end of 2012.

Line Re-alignment Due to Road Expansion in Kathmandu

Extensive line re-alignment work is being implemented in Kathmandu valley in the areas where road expansion is taking place. Concerned distribution centers are executing this work in co-operation with road department and other concerned agencies.

Dismanting and realigement of pole

Community Electrification

As part of the government policy to promote community participation in rural electrification, the Business Group carried out community based electrification in various parts of the country and handed over the facilities to the community for operation. The government provided 90% of the capital cost of electrification, and the remaining 10% of the capital cost was borne by the Community. NEA is responsible for maintenance of HT line where as Community/ Users' Group is responsible for maintenance of LV distribution system. The public response to this initiative of NEA has been overwhelming. Altogether, about 73,000 households have been provided with electricity by the end of FY 2011/12 through 94 community groups in the jurisdiction of the business group.

Planning and Technical Services Department

The Planning and Technical Services Department is responsible for planning and preparation of distribution system expansion programs and supporting DCS, East Business group in the technical and commercial matters. At present, major works under this department include identification of potential rural electrification and substation rehabilitation projects and planning for implementation. The department is also responsible for management of TOD energy meters & metering equipment and identify and implement programs for loss reduction in distribution systems. In addition, the Department also carries out impact studies for evacuation of power from IPPs to distribution substation.

The department aims to include distribution planning, demand side management and loss reduction as an integral part of the planning process in future. Besides, this business group is eagerly trying to meet consumer aspirations by providing modern facilities to the electricity consumers. Sixty eight distribution centers have computerized billing system till date and plans are to extend it to all distribution centers with modern facilities in the coming years. The Computerized Billing Project under this department has plans to cover entire distribution centers within Kathmandu valley with 'Any Branch Payment System'. Four distribution centers, Ratnapark, Baneswar, Lagankhel and Pulchowk were selected for implementation in the first phase. This system is already implemented between Ratnapark and Baneswar DCs and will be operable soon between Lagankhel and Pulchowk DCs.

Future Plans and Programs

NEA has taken the high system loss as a major challenge and shall make every effort to bring down the system loss to 23% in the coming fiscal year. It is also planning to improve the quality of the services through the use of new technologies and capacity building to meet the challenges of new environment in utility business. Consumer complaints shall be addressed without delay and the procedure for new connection related works shall be made simple and user friendly. Centralized customer care center shall be established to ensure single point of contact for all consumer related activities, timely service, less processing time for new connection and centralized control and monitoring over the entire customer care process. NEA is planning to implement Automatic Meter Reading, AMR system a large industrial and commercial customers. Payment and billing information shall be made available in internet so that consumer can access information on line. A system will be implemented for consumers to pay the electricity bill either through bank or in NEA's revenue collection center. Payment KIOSK shall be installed in major branches to facilitate bill payment outside office hours.

Regional Offices

There are four regional offices under DCS East, located at Biratnagar, Janakpur, Hetauda and Kathmandu. The functions of operation, maintenance, and expansion of the network up to the 33 kV voltage levels and consumer services such as new consumer connections, meter reading, billing, and revenue collection are carried out by Regional Offices. In addition, the regional Offices are also responsible for managing community based rural electrification and operation and maintenance of off grid small hydro power plants within their jurisdiction. Each regional office is headed by a director and reports to the General Manager. Technical division headed by a Manager looks after all the technical matters, rural electrification activities and management of small hydro power plants.

Apart from the regular consumer services, the Regional Offices focused on the following activities in FY 2011/12:

Loss Reduction Program

The distribution networks comprise of technical and non- technical losses, in which proportion of non-technical losses is quite high. During the year under review, various measures taken in the preceding years were continued to reduce the non-technical losses. Massive awareness campaigns as MICing, rallies and workshops were implemented in various distribution centers.

Besides, strict measures for electricity theft control as confiscation of electric equipments and taking legal action against culprits were also conducted in various distribution centers with the help of local administration and security agencies.
Extensive programs were implemented to avoid electricity theft manipulating meter and metering units, mainly consisting of:

Awareness rally against electricity theft in Birgunj

Loss reduction workshop in Hetauda

- Installation of tamper proof meter enclosures and refurbishment of metering facilities
- Implementation of meter enclosure seal management system.
- Replacement of electro-mechanical meters by programmable poly phase electronic meters and replacement of unmatched current transformers to eliminate possible errors in multi plying factor.
- Investigations on illicit tapings and meter tempering
- Meter testing: Bulk/ Ordinary supplies
- Rehabilitation of meter cubicles
- Implementation of meter seal management system to secure energy meters from tempering
- Replacement of bare conductor with ABC cables in loss prone areas

NEA management made various decisions as 'Immediate Action Plans' to improve its functioning. Among many, this plan included regular inspection of Time-of-Day (TOD) meters, data download and analysis to curb any connection fault or manipulation. All regional offices and distribution centers actively participated in this drive which was found to be much effective.

Direct hooking objects confiscated at Kalaiya

TVs, Fridges and electric motors confiscated at Malangawa

Energy Monitoring and Auditing of Distribution Substations

Under the program, static energy meters were installed at distribution substations to measure the amount of energy delivered by the substations. The Planning and Technical Services Department co-operated with Grid Operation Department to install ToD meters in various grid substations. The static meters installed at different substations were downloaded to check and verify the data. The program for installation of Bulk Supply Meters and the Metering Unit was also continued in FY 2011/12. The energy monitoring and audit was also augmented verifying the data with concerned transmission grid and generation units.

Customer Care

Distribution centers work as interfaces between NEA and its consumers. So, special efforts were taken to improve the quality of service at the consumer interface points. The employees took special efforts to serve our valued consumers in more effective way. With the Queue Management System at some of the cash collection centers, difficulties encountered by the consumers in queuing for making payments were minimized. Round the clock no-light services have been implemented in most of the urban no-light centers. These functions and activities were carried out by all four regional offices.

NEA employees and APF personnel Departing for loss control activities at Tandi

Features of these four regional offices are given in the following table:

Description	Kathmandu Regional Office	Biratnagar Regional Office	Hetauda Regional Office	Janakpur Regional Office
Zonal Coverage	**Bagmati**	**Mechi & Koshi**	**Narayani**	**Janakpur & Sagarmatha**
No. of municipalities fully electrified	11	6	7	8
No. of municipalities partially electrified	0	3	0	1
No. of VDC's fully electrified	133	30	232	389
No. of VDC's partially electrified	337	278	114	204
No. of VDC's having no access to electricity	47	117	19	128
No. of community electrified VDC's	38	38	23	16
No. of distribution centres	17	14	8	11
Units sold during the year under review (GWh)	896.274	467.20	591.231	236.598
Revenue earned from the units sold (NRs in Millions)				
- Billing Amount	6779.44	3026.284	3675.848	1245.89
- Collection Amount	6552.14	2848.325	3534.823	1261.42
Total no. of consumers at the end of the year	511523	389936	254948	325355
No. of new connections provided during the year	26667	40934	27068	55330
Length of 33 KV line (Km)	200.2	595.3	259.2	856
Length of HT Distribution (11 KV) Line (KM)	3357.4	3709.5	3284.1	3918
Length of LV Distribution (0.4/0.23 KV) Line (Km)	19707.65	11440.4	6912.3	6646
No. of 33/11 KV primary S/S	10	18	8	16
Total installed capacity of 33/11 KV substations (MVA)		184	82.1	234.5
No. of distribution transformers	4709	2450	2563	2377
Total installed capacity of distribution transformers (MVA)	527.98	176.11	245.3	176.76

Distribution and Consumer Services West Business Group

The Distribution and Consumer Services, West (DCSW) Business Group is entrusted with the key responsibility of overall management of electricity distribution network of NEA lying on western territory of Nepal from Narayani River. The responsibilities of DCS West include construction, operation, maintenance, rehabilitation and expansion of the network up to the 33 kV voltage levels and consumer services such as new consumer connections, meter reading, billing, and revenue collection. It is also entrusted with the work of Operation & Maintenance of western region Small Hydro power plants and Rural Electrification projects. It is one of the main interfaces with the consumers. It is the second largest among the business groups of NEA in terms of number of employees and business activities. about 12% of the total staffs of NEA are employed in DCS West. Also DCS West is on the forefront to earn revenue for sustaining operation and maintenance and development activities of NEA.

This Business Group provides service to consumers through 40 Distribution Centers spread over 35 districts of the country. This Business Group is headed by a General Manager and organized into Department at central level and four regional offices.

Performance Highlights:

In FY 2011/12, total number of customers under DCS West reached 8,35,441 an increase of 10.61% over the last fiscal year's figure.

Customer Category	No of consumer (% of total consumers)	Sales %	Revenue %
Domestic	94.21	45.56	44.96
Non-Commercial	0.26	3.01	4.53
Commercial	0.57	5.71	8.60
Industrial	1.95	33.37	33.61
Others	3.01	12.35	8.3

Similarly in FY 2011/12, a total of 838.9 GWh of energy was sold earning gross revenue of Rs. 538.58 million, an increase of 15.38 % and 14.36% over the previous year's energy sales and revenue respectively. Sales and revenue contributions of different customer groups under DCS, West in FY 2011/12 are depicted above: Industrial and Commercial consumer categories combined together represent only 2.52% of the total number of consumers but share 42.21% of total sale. Similarly, the domestic consumer category represents 94.21 % of total consumers but contribute only 44.96% to the total sale.

As part of system reinforcement and expansion of distribution system program, many activities were undertaken in FY 2011/12 to improve the service delivery. The main activities undertaken are listed below:

Electrification Program

Electrification program focuses on extensions of the existing distribution network and on completion of outstanding incomplete electrification works on a priority basis. The activities of the program are spread over all the areas under the jurisdiction of the DCS West business group. During the FY year construction on three 33/11 kV substation was added. These are 6/8 MVA substation at Arghakhachi, 8 MVA substation at Nepalgunj and 3 MVA substation at Baitadi. Similarly 36 km of 33 kV line and 221 km of 11 kV line was constructed. In addition 446 km of LT Line was added to the distribution network and 295 numbers of distribution transformers having total capacity of 20.745 MVA was added.

Planning and Technical Services Department

The Planning and Technical Services Department is responsible for planning, preparation of distribution system expansion programs and supporting DCS West Business group in the technical and commercial matters. The Department identifies potential RE projects and substation rehabilitation projects for implementation in phase wise manner. The Department also

carries out management of TOD energy meter & metering equipment and develops and implements programs for reduction of distribution system losses. In addition, the Department carries out impact studies for evacuation of power from IPPs to distribution substation.

Loss Reduction Activities in DCS, West

In FY 2011/12 special efforts were taken to reduce the Technical and Non-Technical Losses. Distribution and Consumer services, West have started regular monitoring of the feeders and areas having more than 40% loss. The Loss Reduction Committee was formed in many distribution centers. The Committee is headed by the concerned Chief District Officer. Loss reduction committee at center level have regularly collected loss related information from the distribution centers and regional offices, analyzed the collected information and directed the concerned offices to improve the loss situation. During the FY 2011/12, 7522 numbers of direct hooking was caught and Rs 10,33,818.90 was recovered from it Similarly, 343 customers were penalized for electricity pilferage and Rs 27,89,425.79 was recovered from it.

Monitoring, data downloading and analysis of the consumption of large industrial and commercial consumers have been increased. Use of Arial Bundle Conductor, ABC has been encouraged in high non technical loss prone areas. Upgrading of overloaded conductors and transformers has been carried out to reduce the non technical losses. Despite continued efforts and measures taken to control non technical losses, the desired result could not be achieved. This is mainly due to the adverse local work environment especially in terai and some hilly areas.

Queue Management System (QMS)

As a continuous effort to provide better service and comfort to our valued consumers, QMS has been implemented in different branches and improvement in physical infrastructure at these locations has also been made to provide comfort to consumers.

E-bidding system

DCS continues to explore various modes to utilize technological developments for operational efficiency. This F.Y. DCS has introduced e-bidding with co-ordination from MIS Department of NEA. This has helped a lot in ensuring fair, transparent and more competitive bidding procedure.

Human Resource Development

In FY 2011/12, about 68 technical and non-technical staffs participated in various training program and seminars organized by NEA in Training Center and other agencies to enhance the technical and managerial skill of employees.

Small Hydro Power and Rural Electrification Projects:

After the structural intervention in FY 2011/12, Distribution and Consumer Services, West is also responsible for Operation and Maintenance of Small Hydro Plants located in western part of the country which was previously under Small Hydro and Rural Electrification Department of Electrification Business group. Besides rural electrification, the Business Group also oversees distribution and consumer service functions of 22 small/micro hydro plants located at different districts. Out of 21 small hydropower plants 18 are in operation. These centers serve 20187 consumers in total. Apart from these, 9 more small/micro hydro plants located at various districts have been leased to private companies or communities. These leased small hydropower plants serve around 10977 consumers.

Small Hydro Plants under DCS West

S.N.	Name of the Center	Installed Capacity kW	No of Consumers
1	Aachham	400	2660
2	Arughat	150	855
3	Dolpa	200	1039
4	Kalikot	500	1518
5	Heldung (Simikot)	500	781
6	Tatopani	2000	997
7	Gamgad	400	1090
8	Rupalgad	50	270
9	Surnayagad	200	
	Total	4400	9210

Rupalgad Small Hydro plant and Surnayagad Small Hydro Plant are operated by Dadeldhura Distribution Center and Baitadi Distribution Center respectively.

Small Hydro Plants Leased to Private Communities and Monitored by DCS West

S.N.	Name of Center	Installed Capacity kW	No of Consumers
1	Bajhang	200	1300
2	Bajura	200	923
3	Chame	45	376
4	Chaurjahari	150	702
5	Darchula	300	1518
6	Jomsom	240	2050
7	Jumla	200	1350
8	Manang	80	631
9	Syarpudaha	200	2127
	Total	1615	10977

Baitadi Small Hydro Plant

Small Hydro Plants under DCS West not in operation:

S.N.	Name of Center	District	Capacity kW
1	Setibeni	Syanja	80
2	Jhupra	Surkhet	345
3	Doti	Doti	200
4	Baglung	Baglung	200
		Total	825

For Rural Electrification, a number of 33 kV transmission lines and 33/11 kV substation projects are under construction. The status of projects carried out by then SHPRED in FY 2010/11 which is now managed by DCS, West is summarized below.

Gamgad Small Hydropower Project (Mugu District)

The construction of Gamgad Small Hydro Project (400 kW) was started in FY 2001/02. NEA Board deputed special taskforce to complete this project within 6 months and the construction of project has been completed at Sept-15-2011.

Sitalpati -Musikot 33 kV Transmission Line Project (Salyan and Rukum Districts)

The project includes the construction of 50 km of 33 kV transmission line, 50 km of 11 kV line, 40 km of LV distribution line and two 33/11 kV substations of 1.5 MVA capacity one each at Sitalpati and Musikot. Out of 50 km long 33 kV transmission line, stringing of 34 km line & pole erection has been completed. Construction of 33/11 kV, 1.5 MVA substation at Sitalpati and 33 kV bay extension at Tulsipur are in progress and expected to be completed in this current F.Y. Land acquisition for Musikot Substation has been completed.

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

The scope of the project consists of the construction of 70 km of 33 kV transmission line, 100 km of 11 kV, 100 km of LV distribution line and two 33/11 kV substations at Surkhet and Jajarkot districts. Out of 70 km long 33 kV transmission line, pole erection and stringing of conductor for 45 km and 11 km of 11 kV line has been completed. Construction of 33/11 kV, 750 kVA substation at Rakam is completed. Contract for 33kV and 11kV Protection Scheme of Rakam Substation has been awarded and work is in progress and expected to be completed by FY 2012/13.

33KV Bay at Ghorahi Underconstruction

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

Scope of this project consists of the construction of 45 km of 33 kV transmission line, 50 km of 11 kV, 50 km of LV distribution line and two 33/11 kV substations at Holleri & Ghorahi. Construction of 45 km 33 kV transmission line up to Holleri has been completed.Construction of 33/11 kV, 750 kVA sub-station at Holleri and 33 kV bay extension at Ghorahi are near completion. Substation Building at Holleri has been completed.

Construction of 10 km 11 kV Transmission and Distribution line and installation of two (2) 50 kVA distribution transformer has been completed. Procurement of Poles, Conductor of 33 kV transmission line has been completed. The project is scheduled to be complete in F/Y 2012/13.

33KV Bay at Ghorahi under construction

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

The project includes the construction of 90 km of 33 kV transmission line, 53 km of 11 kV, 53 km of LV distribution line and one 33/11 kV, 1.5 MVA substation in Manang and 33 kV bay extension in the existing Udipur substation. Out of 90 km long 33 kV transmission line, pole erection for 70 km up to Danaque of Manang district and stringing of conductor for 15 km up to Bulbule has been completed. Land acquisition for Manang Substation has been completed. Procurement of line materials (Insulator & Hardwares) for 15 km of 33 kV transmission line has been awarded. Tendering has been done for construction of 8 km line stringing of 33 kV transmission Line from Khudi up to Thakanbesi (Lamjung) and the work is completed in last F/Y. Dadeldhura-Baitadi 33 kV Transmission Line Project.

The scope of the project includes the construction of 14 km of 33 kV transmission line, 15 km of 11 kV & LV distribution line, one 33/11 kV 3 MVA substation at Baitadi and 33 kV bay extension in the existing Dadeldhura substation. Construction of 33/11 kV, 3 MVA substation and its testing & commissioning at Baitadi has been completed in FY 2010/11 and electricity to local consumer is supplied by Baitadi S/S.

Dipayal-Sanfebagar-Manma-Jumla 33kV Transmission Line Project:

Major components of the project include the construction of 155 km of 33 kV, 15 km of 11 kV & 3 nos. of 33/11 kV substations at Sanfebagar, Manma and Jumla. -Out of 155 km long 33 kV transmission line, pole erection for 22 km up to Saphebagar has been completed. Process has been initiated for land acquisition at Saphebagar (Achham). Procurement of line materials (Insulator & Hardwares) has been completed.

Dailekh Substation Project:

The project includes the construction of 25 km of 33 kV, 15 km of 11 kV, 10 km of LV distribution line & one 33/11 kV, 1.5 MVA substation at Dailekh and 33 kV Bay extension at Surkhet. Construction of 33/11 kV, 1.5MVA sub-station at Dailekh and 33 kV bay extension at Surkhet substation is under construction. Power transformer and other major electrical equipments has been transported to the construction site.

33-11 KV Substation at Dailekh under construction

Galkot Substation Project

This project is being implemented to provide electric supply to Galkot area in Baglung district. 33 KV Bay extension at Baglung substation has been completed. Land Acquisition for Sub-station construction at Galkot has been completed. Tendering for construction civil work for land protection has been done and is now in evaluation process.

Kapurkot-Koilachaur 33 kV Transmission Line Project:

The project includes the construction of 15 km of 33 kV, 25 km of 11 kV, 25 km of LV distribution line in Salyan & Rolpa districts

& 6/8 MVA 33/11 kV substation at Koilachaur & a switching substation at Kapurkot. Construction of 12 km, 33 kV transmission line from Kapurkot to Kalachaur has been completed. Land acquisition for substation construction has been completed. Tendering for construction of 6/8 MVA 33/11kV substation has been done and is now in evaluation process.

Saphebagar(Achham)-Martadi (Bajura)33 kV Transmission Line Project:

The project includes the construction of 48 km of 33 kV, 40 km of 11 kV, 40 km of distribution line in Achham and Bajura district , 33/11 kV substations at Martadi and 33 kV Bay extension at Saphebagar. construction Of 12 kV transmission in progress. Procurement of conductors and insulator hardware for 33 kV transmission line has been completed. Process of land acquisition has been initiated.

Martadi (Bajura)-Gamgadi (Mugu) 33 kV Transmission Line Project:

The project includes the construction of 90 km of 33 kV, 40 km of 11 kV, 40 km of LV distribution line in Bajura and Mugu district , 33/11 kV substations at Martadi and 33 kV Bay extension at Saphebagar. construction of 10 km of line has been completed. Procurement of conductor hardware for construction of additional 10 km 33 kV has been completed. Land Acquisition process for Sub-station construction has been initiated.

Khorpe (Baitadi) Chainpur (Bhajang) 33 kV Transmission Line Project:

The scope of this Project includes the construction of 90 km of 33 kV, 40 km of 11 kV, 40 km of LV distribution line in Baitadi and Bajura district , 33/11 kV substations at Chainpur and 33 kV bay extension at Baitadi Substation. construction of 10 km of 33 kV Transmission line was completed. Tendering has been done for poles for construction of additional 10 km 33kV line. Land Acquisition process for Sub-station construction has been initiated.

Udipur Substation Upgrading Project:

The project has been started from FY 067/068 to upgrade the existing Udipur substation. Contract has been signed for the upgradation of Udipur substation in Lamjung to 8 MVA capacity and the work is to be completed by Kartik of this F/Y.

Rajapur 33 kV Substation Project:

The project has been started from FY 067/068 to construct 15 km 33 kV line, 10 km 11 kV line, 10 km of distribution line and construction 33/11 kV substation at Bardiya. Process has been initiated for land acquisition for the construction of Rajapur Substation.

Bojhapokhari Nawalparasi 33 kV Transmission Line Project:

The project has been started from FY 067/068 to construct 15 km 33 kV line, 10 km 11 kV line, 10 km of distribution line and construction 33/11 kV substation at Nawalparasi. Process has been initiated for land acquisition and tender document preparation.

Dang Bhalubang 33 kV Transmission Line Project:

The project has been started from FY 067/068 to construct 25 km 33 kV line, 10 km 11 kV line and construction 33/11 kV substation at Dang. Process has been initiated for land acquisition.

Surkhet Bijaura 33 kV Substation Project:

The project has been started from FY 067/068 to construct 30 km 33 kV line, 20 km 11 kV line and construction 33/11 kV substation at Bijaura Surkhet. Land acquisition work has been completed. Construction of compound wall is in progress.

Khairenitar 33 kV Substation Project:

The project has been started from FY 067/068 to construct 12 km 33 kV line. Process has been initiated for land acquisition for the construction of Khairenitar Substation.

Thada 33 kV Substation Project:

The project has been started from FY 067/068 to construct 22 km 33 kV line and construction of 33/11 kV substation at Thada, Arghakhachi. Purchasing of land has been completed for the construction of Thada Substation.

Regional Offices

Under Distribution and Consumer Services, West four Regional Offices namely Butwal Regional Office (BRO), Nepalgunj Regional Office (NRO), Attaria Regional Office (ARO) and Pokhara Regional Office (PRO) are in operation. The main function of the Regional Offices is to co-ordinate the activities of distribution centers within its region.

Key objectives of the Regional Offices are:

- Provision of reliable electricity supply to the consumers within the region at statutory levels of voltage
- Sell electricity and achieve planned surpluses of revenue over the total expenditure
- Provide new connections to prospective consumers
- Ensure rational development of the electricity distribution system within the region
- Operation and maintenance of Small Hydropower Plants within the region

- Management of community based rural electrification projects

Main Activities of Regional Offices

1. Loss Reduction Program
   The problem of "Distribution Losses" was addressed by two separate ways: Reduction of non-technical (commercial) losses and reduction of technical losses. During the year under review following steps which were taken in previous years were continued to reduce the non-technical losses especially at the bulk supply installations
- Installation of tamper proof meter enclosures and refurbishment of metering facilities
- Implementation of meter enclosure seal management system.
- Replacement of electro-mechanical meters with programmable poly phase meters and replacement of unmatched current transformers to eliminate possible errors in multiplying factor.

During the year following steps were also taken as in previous years to reduce non technical losses in different distribution centers

- Investigations on illicit tapings and meter tempering
- Fixing meter enclosures for bulk supplies and 5-30A supplies
- Meter testing: Bulk/ Ordinary supplies
- Rehabilitation of meter cubicles
- Implementation of meter seal management system to secure energy meters from tempering
- Replacement of bare conductor with ABC cables in loss prone areas

During the FY 2011/12 stern measures were also taken to reduce the electricity losses: mainly non-technical. The name of the feeders having more than 50% loss was made public in the first stage and public notice was given mentioning that load shedding for feeders having such loss will be more than less loss feeders. In the second stage name of the feeders having more than 40% loss was made public. In many distribution centers employees actively participated in the national campaign of reducing the electricity loss and this drive brought good results in many areas.

2. Energy Monitoring and Auditing of Distribution Substations
   Under this program energy meters were fixed at distribution substations to measure the amount of energy distributed by the substation. TOD meters installed at different substations were downloaded to check and verify the data. The program for installation of Bulk Supply Meters and the Metering Unit was also continued in FY 2011/12.
3. Customer Care:
   Special efforts were taken to improve the service at the customer interface points. The staffs took special efforts to serve our valued customers effectively in the current year. With the Queue Management System at some of the cash collection centers, difficulties encountered by the customers in queuing for making payments were minimized.

Butwal Regional Office

Introduction

Butwal Regional Office (BRO) is one among the four Regional offices of Distribution and Consumer Services, West (DCS West). The office is headed by a director who is directly responsible to the General Manager. Area of operation of this regional office covers the districts of Lumbini zone.

Operational Structure

There are 9 Distribution Centers within the regional office for effective administration. In addition, there is technical division headed by a Manager who looks after all the technical matters. Rural Electrification activities within the region and management of Small Hydro Plants within the region are also coordinated by the technical division. The finance and revenue functions of the Region are carried out by Accountants and Controlled and supervised by the Asst. Director of the region. The Regional Office is provided with a separate administrative officer to attend human resource function.

Highights of the year

- Units sold within the region during the year: 409.56 GWh
- Revenue earned from Units sold: Rs 2651 Million
- Total no. of consumers within the region at the end of the fiscal year: 304457
- No of new connections provided during the year: 29793
- Average revenue per consumer per month: Rs 725.75
- Average energy per consumer per month: 112.08 kWh

Distribution Infrastructures

- 33 kV Distribution Lines: 500km
- 11 kV Distribution Lines: 2500 km
- 33/11 kV Primary Substations: 14Nos
- LV Distribution Lines: 7653 km
- LV Distribution Substations (Distribution Transformers): 4086 Nos
- Distribution Transformers total installed capacity: 285460 kVA

Sales

BRO reported 48.82% of electricity sales within the DCS West. In the year 2011-12, 409.56 GWh of electricity was sold in the region.

Revenue

The revenue from electricity sales during the year was Rs 2651.69 million. The reasons for increased revenue than the previous year are growth of energy sales and recovery of old dues from consumers. BRO accounts for 49.23% of the total revenue of the DCS West.

Electricity Consumer Accounts and New Service Connections

BRO recorded 304457 consumer accounts by the end of the year 2011-12. The majority of the consumer accounts were in the domestic category. During the year under review, a total of 29793 new connections were provided.

33 kV Transmission Line and Substation Projects under Butwal Regional Office:

1. Chanauta-Maharajung (kapilbastu) 33 kV transmission line project:
   - Land has been purchased for construction of S/S and other works has been remaining.
2. Gulmi-Majuwa 33/11 kV S/S Project:
   - Purchasing of land for S/S is in process.
3. Ramnagar (Nawalparasi) 33/11 S/S Project:
   - Land has been selected for construction of substation but purchasing has been left.
4. Hanspur (Arghakhachi) 33/11 kV S/S Project:
   - Purchasing of land for S/S is in process.
5. Amrai-Dohali-Wagla-Aglung (Gulmi) Electrification Project:
   - 75% work has been completed and remaining work will be completed in this FY.

Nepalgunj Regional Office

Introduction

Nepalgunj Regional Office (NRO) is one among the four Regional offices of Distribution and Consumer Services, West (DCS, West). The office is headed by a director who is directly responsible to the General Manager. Area of operation of this regional office covers the districts of Rapti & Bheri zone. Total population within the region is 2.388 million (Census 2001). Out of 6 municipalities and 370 VDCs under NRO, 5 municipalities are fully electrified, 1 municipality and 204 VDCs are partially electrified and 166 VDC have no access to electricity.

Operational Structure

There are 13 Distribution Centers within the regional office for effective administration. In addition, there is technical division headed by a Manager who looks after all the technical matters. Rural Electrification activities within the region and management of Small Hydro Plants within the region are also coordinated by the technical division. The finance and revenue functions of the Region are carried out by Accountants and Controlled and supervised by the Asst. Director of the region. The Regional Office is provided with a separate administrative officer to attend human resource function.

Highlights of the year

- Units sold within the region during the year: 145.37 GWh
- Revenue earned from Units sold: Rs 9594 Million
- Total no. of consumers within the region at the end of the fiscal year: 200169
- No of new connections provided during the year: 26182
- Average revenue per consumer per month: Rs 399.00
- Average energy per consumer per month: 60.51 kWh

Distribution Infrastructures

- 33 kV Distribution Lines: 461 km
- 11 kV Distribution Lines: 1468 km
- 33/11 kV Primary Substations: 9 Nos
- LV Distribution Lines: 5381 km
- LV Distribution Substations (Distribution Transformers): 1469 Nos
- Distribution Transformers total installed capacity: 100000 kVA

Sales

NRO reported 17.303% of electricity sales within the DCS West. In the year 2011-12, 145.37 GWh of electricity was sold in the region.

Revenue

The revenue from electricity sales during the year was Rs 9594.43 million. NRO accounts for 17.81% of the total revenue of the DCS. Higher revenue is due to the recovery of old dues.

Electricity Consumer Accounts and New Service Connections

NRO recorded 196517 consumer accounts by the end of the year 2011-12. The majority of the consumer accounts were in the domestic category. During the year under review, a total of 27806 new connections were provided.

33 kV Transmission Line and Substation Projects under Nepalgunj Regional Office:

1. Rolpa-Sulichaur 33 kV Transmission Line Project:
- Process of land purchasing is in initial phase.
2. Surkhet-Gagate-Matela-Jajarkot 33 kV Transmission Line Project:
- Process of land purchasing is in initial phase.

Attaria Regional Office

Introduction

Attaria Regional Office (ARO) is one among the four Regional offices of Distribution and Consumer Services, West (DCS West). The office is headed by a director who is directly responsible to the General Manager. Area of operation of this regional office covers the districts of Seti & Mahakali zone. Total population within the region is 1.12 million (Census 2001). Out of 6

Office of Attariya Regional Office

municipalities and 257 VDCs under ARO, all the municipalities and 37 VDCs are fully electrified, 96 VDCs are partially electrified and 124 VDC have no access to electricity. Previously this Regional office has not their own building but form this FY 2069/70 it has been shifted to their own new building.

Operational Structure

There are 8 Distribution Centers within the regional office for effective administration. In addition, there is technical division headed by a Manager who looks after all the technical matters. Rural Electrification activities within the region and management of Small Hydro Plants within the region are also coordinated by the technical division. The finance and revenue functions of the Region are carried out by Accountants and Controlled and supervised by the Asst. Director of the region. The Regional Office is provided with a separate administrative officer to attend human resource function.

Highlights of the year

- Units sold within the region during the year: 109.854 GWh
- Revenue earned from Units sold: Rs 619.84 Million
- Total no. of consumers within the region at the end of the fiscal year: 124950
- No of new connections provided during the year: 14205
- Average revenue per consumer per month: Rs 413.39
- Average energy per consumer per month: 73.00 kWh
- Surnayagad SHP under Baitadi DC that was previously not in operation. After major maintenance both of the units (2 x 100 kW) are connected to 11 kV grid line with the initiation of ARO.

Distribution Infrastructures

- 33 kV Distribution Lines: 315.71 km
- 11 kV Distribution Lines: 2888.15 km
- 33/11 kV Primary Substations: 13 Nos
- LV Distribution Lines: 7946.66 km
- LV Distribution Substations (Distribution Transformers): 1248 Nos
- Distribution Transformers total installed capacity: 68156 kVA

Sales

ARO reported 17.32% of electricity sales within the DCS West. In the year 2011-12, 109.854 GWh of electricity was sold in the region.

Revenue

The revenue from electricity sales during the year was Rs 619.84 million. ARO accounts for 11.50 % of the total revenue of the DCS, West.

Electricity Consumer Accounts and New Service Connections

ARO recorded 109453 consumer accounts by the end of the year 2011-12. The majority of the consumer accounts were in the domestic category. During the year under review, a total of 14205 new connections were provided.

33 kV Transmission Line and Substation Projects under Attaria Regional Office:

1. Pahalmanpur 33/11 kV Transmission Line Project:
- Survey work has been completed,
- Land has been received from related VDC for S/S
- Polling is 33 kV transmission line is in progress.
2. Budar-Jogbudha-Bagarkot 33 kV Transmission Line Project:
- Survey work completed, site is located for construction S/S and Tender is awarded for polling of 33 kV transmission line.
3. Khalanga Darchula 33 kV Transmission Line Project:

- Tende is awarded for survey and polling work and land has been received for S/S from related VDC but remains to handover for transfer to NEA from their owners.

4. Doti-Mauwa-Nagardaha 33 kV S/S construction Project:

- Survey work has been completed, site is located for S/S and Tender is awarded for polling of 33 kV transmission line.

5. Safebagar-Chamra Chautara 33 kV Transmission Line Project:

- Surver work has been completed, Land is received from related VDC for S/S but remains for transfer to NEA. Tender is awarded for polling of 33 kV transmission line.

Pokhara Regional Office

Introduction

Pokhara Regional Office (PRO) is one among the four Regional offices of Distribution and Consumer Services, West (DCS, West). The office is headed by a director who is directly responsible to the General Manager. Area of operation of this regional office covers the districts of Gandaki & Dhaulagiri zone.

Operational Structure

There are 10 Distribution Centers within the regional office for effective administration. In addition, there is technical division headed by a Manager who looks after all the technical matters. Rural Electrification activities within the region and management of Small Hydro Plants within the region are also coordinated by the technical division. The finance and revenue functions of the Region are carried out by Accountants and Controlled and supervised by the Asst. Director of the region. The Regional Office is provided with a separate administrative officer to attend human resource function.

Highlights of the year

- Units sold within the region during the year: 174.12 GWh
- Revenue earned from Units sold: Rs 4031.08 Million
- Total no. of consumers within the region at the end of the fiscal year: 205865
- No of new connections provided during the year: 11981
- Average revenue per consumer per month: Rs 743.46
- Average energy per consumer per month: 64.65 kWh

Distribution Infrastructures

- 33 kV Distribution Lines: 500km
- 11 kV Distribution Lines: 1200 km
- 33/11 kV Primary Substations: 8 Nos
- LV Distribution Lines: 7643 km
- LV Distribution Substations (Distribution Transformers): 4026 Nos
- Distribution Transformers total installed capacity: 282460 kVA

Sales

PRO reported 20.75% of electricity sales within the DCS, West. In the year 2011-12, 174.12 GWh of electricity was sold in the region.

Revenue

The revenue from electricity sales during the year was Rs. 1154.88 million. The reasons for increased revenue than the previous year are growth of energy sales and recovery of old dues from consumers. PRO accounts for 21.44% of the total revenue of the DCS.

Electricity Consumer Accounts and New service connections

PRO recorded 205865 consumer accounts by the end of the year 2011-12. The majority of the consumer accounts were in the domestic category. During the year under review, a total of 11981 new connections were provided.

33 kV Transmission Line and Substation Projects under Pokhara Regional Office:

1. Jomsom Lomatham Upallo Mustang 33 kV Transmission Line Project:
   - Process of land purchasing is in initial phase.
2. Beni Darbang Myagdi 33 kV Transmission Line Project:
   - Process of land purchasing is in initial phase.
3. Sindhubeshi-Lamjung-Lekhnath Kaligandaki 33 kV Trans mission Line Project:
   - Process of land purchasing is in initial phase.
4. Righa Kharwang (Baglung) 33 kV Transmission Line Project:
   - Process of land purchasing is in initial phase.

Engineering Services Business Group

Engineering Services is entrusted with the responsibility to carry out engineering studies beginning from identification to detailed engineering design, environmental studies, geological and geotechnical studies. It is headed by a General Manager. The Business Group has rendered its service to NEA and private sector particularly for the study of hydropower and transmission line projects. The Project Development Department, Soil Rock and Concrete Laboratory and Environmental and Social Studies Department provide these services to the various departments within NEA and to the private parties.

Project Development Department (PDD)

Project Development Department (PDD) looks after the study of hydropower projects at different levels. It is headed by a Director. There are six divisions under the department each headed by a Manager. The Department mainly focuses on the preparation of hydropower projects for development by NEA. This includes identification of projects, their screening and ranking, carrying out their feasibility studies and finally preparing tender documents and detailed drawings through a detailed design study. The department has also been providing construction supervision services for the projects under construction as per the agreements with the concerned project. In addition, PDD has also been providing consulting services for the detailed survey of a number of transmission line projects being carried out by Grid Development Business Group Brief descriptions of the projects being carried out from this department is outlined in the following sections.

Nalsyau Gad Storage Project

Nalsyagu Gad Storage Hydropower Project was conceived as one of the most attractive storage projects among the 93 storage projects screened and ranked during the "Identification and Feasibility Study of Storage Projects- 2001". This project is located in Jajarkot District in Mid We stern Development Region of Nepal. Nalsyaugad is a small tributary of Bheri River in Karnali River Basin.

The present study has established the dam site location just downstream of Udheri Khola at approximately 9.25 km upstream from the confluence of Nalsyaugad and Bheri River towards Nalsyaugad River. The power house is located on the left bank of Nalsyaugad River near the confluence with Bheri River. Chinchu Jajarkot road will serve as main access for the project. At present the access road has been constructed up to the other side of powerhouse at Dali. The road starts from Kholapur Surkhet highway at Chhinchu and passes through Rimna. A bridge over Bheri River Rimna has not been constructed yet. Another bridge either over Bheri River or over Nalsyagu Gad river will be required to connect the project site at powerhouse. Apart from this approximately 40 km of project road is required to provide access to the major structures of the project before the construction of this project. An alternative access, a seasonal motorable road, from the Rukum airport to the powerhouse site is also available at the site.

The topographical survey, reservoir mapping, hydrological study and geological study inclusive of surface geological mapping, seismic refraction survey (8050 m), drilling (605 m) have been completed. Detail transmission line survey to evacuate the power from power house to national grid has been carried out. Environmental studies of the hydropower and transmission line have been initiated.

The project has been designed to produce 410 MW of power. Full supply level has been fixed to 1570 masl. About 200 meter high rock fill dam, 8.2 km long headrace tunnel and 1100 meter long drop shaft have been proposed with an underground power house housing four units of pelton turbines. The reser-

voir has live storage of 296.37 million cubic meter. The design discharge of 75.0 cumecs will utilize 635.80 meter of net head to produced 1406.06 GWh of annual energy. Total useable energy in the system is estimated to be 794.17 GWh where as the spill energy is estimated to be 611.89 GWh. The power is proposed to be evacuated to the national grid through 112 km 400kV transmission line with substation at Kohalpur.

Kaligandaki Storage Project

Kaligandaki Storage Project lies in Nawalparashi district of Western Development Region of Nepal. The project site is located in Kaligandaki River, about 25km upstream from Devghat where the Kaligandaki joins the Trishuli river Basin. The prefeasibility of Project was completed in 1985. The project site of this project lies approximately 20 km from Gaindakot, Nawalparasi via earthen road.

The Project is in its initial stage of feasibility study with site reconnaissance and hydrological study perfomed in the fiscal year 2011/2012.The application for the survey license for the study of the project is submitted to the Department of Electricity Development (DoED) in the year 2011/2012.The prefeasibility study has recommended a 177 m high rockfill dam on Kaligandaki river, at Khalte and the powerhouse located at the toe of dam. The dam will create a reservoir of 106.5 sq.km with full supply level at 375 masl with gross capacity of 5200 M m3. The study proposed the project with installed capacity of 660 MW with annual firm energy of 3470 GWhr.

The hydrological study of the project has been updated. A gauging station has been established just upstream of the proposed dam site of the project. The further study of the project is planned to be carried out in fiscal year 2012/13.

Dam site area (Kaligandaki 2)

Nisti Panah Storage object

Nisti Panah Storage Project lies in Gulmi district of Western Development Region of Nepal. The project is located at Chhaldi khola which is one of the main tributary of Badigad Khola. The project site is accessible via earthen road of approximately 15 km from Tamghas, district headquarter of Gulmi district.

The Project is in its stage of pre-feasibility study on going in the fiscal year 2011/2012.The application for the survey license for the study of the project is submitted to the Department of Electricity Development (DoED) in the year 2011/2012. The ongoing study has recommended a 200 m high rockfill dam on Chhaldi Khola which lies approximately 2.5 km downstream of the confluence of Nisti Khola and Chhaldi Khola and the powerhouse is located on the right bank of Badigad Khola about 31 km from Riddi bazaar, Gulmi District and about 7 km downstream of confluence of Chhaldi and Badigad Khola. The dam will create a reservoir of 9.90 sq.km with full supply level at 891 masl with gross capacity of 430.80 M m3. The study proposed the project with installed capacity of 189.60 MW with annual energy generation of 389.50 GWhr with 6 hrs operation daily.

The topographical survey, preliminary geological and hydrological study of the project has been completed .A gauging station has been established at damsite and powerhouse site of the project. The further study of the project is planned to be carried out in fiscal year 2012/13.

Dam Site Area (Nisti Panah)

Tamor Storage Hydropower Project

Tamor Storage Hydropower Project lies in Terhathum and Panchthar districts of Eastern Development Region. The Project was identified during the Koshi River Basin Master Plan Study during 1985. Further studies on the project started only in 2009, after about 25 years of its identification. The Project is in its initial stage of study. As per the study conducted so far, the Project will have an installed capacity of 530MW and an annual energy generation capacity of about 2406GWh. The Project site can be accessed via Biratnagar – Dhankuta- Myanglung black topped road. An earthen tract of about 25 Km

Dam Site Area (Tamor Storage Project)

connects Myanglung to Lambhughat which is located at about 1.5 Km upstream of the proposed dam site. Being a reservoir project with seasonal storage capacity and suitably located to cater the energy hungry industries of Eastern Development Region; this is one of the promising storage projects being studied by Project Development Department.

The topographical survey, preliminary geological and hydrological study of Tamor Storage project has been completed with the assistance from JICA. A gauging station has been established at Lambhughat on Tamor River. The PDD completed the site reconnaissance study and Power Evacuation Study identified and confirmed the new license for generation for this Project at DoED.

Upper Modi "A" Hydroelectric Project

Upper Modi "A" HEP was identified during 1997 and the Feasibility study of this project was completed in 2000. The Environmental Impact Assessment (EIA) of the project was approved in 2004. Presently this project is conceptualized to be developed as a 42 MW run of the river scheme.

Upper Modi A Headworks Site

This project is located approximately 250 km west of Kathmandu in Kaski District of Gandaki Zone in the Western Development Region of Nepal. Both the headwork and powerhouse site of the project is located in Ghandruk VDC. The nearest road head to the project site is at Nayapul, about 38 Km west of Pokhara on Pokhara Banglung highway. Approximately 8 km of gravel road and a steel truss bridge over Modi Khola has already been constructed by the local VDC. This bridge connects Nayapul to the powerhouse site at Sauli Bazar. Therefore, approximately 10 Km of access road need to be constructed from powerhouse to the headwork site at Himalku. Around 7.5 Km long 132 KV single circuit transmission line will be required to evacuate 214.87 GWh of generated energy to the INPS system at New Modi Khola substation.

This project is conceptualized to develop in Public Private Partnership (PPP) model. Hence, a Joint Development Agreement (JDA) was signed between Nepal Electricity Authority (NEA) and Korean Water Resources Corporation (K-Water) on 27th March 2012. By the end of this year K water will complete the project review followed by the formation of Special Purpose Company (SPC) with 20% NEA's share and 80% K- Water's shares. Among the 80% K- Water's share, up to 10% share should be provided to the local people.

Tamakoshi-V HEP

Tamakoshi-V Hydroelectric Project is located just downstream of the Upper Tamakoshi Hydroelectric Project, being implemented by Upper Tamakoshi Hydroelectric Company. This project is conceptualized to operate in tandem operation with Upper Tamakoshi HEP taking the design discharge from the tailrace of Upper Tamakoshi HEP.

This project is located approximately 170 km north east of Kathmandu and approximately 42 km away from Charikot Bazar. Topographical survey, hydro-

Proposed Headworks Site

logical study and surface geological study were completed in the previous fiscal year. In this fiscal year, a high flood level measuring gauging station has been installed, construction material survey, seismic refraction study of 2000m and 90 m of core drilling has been completed as a part of feasibility study. Feasibility design of this project for the 87 MW of installed capacity is expected to be completed by this fiscal year 2011/2012.

Indra Sarovar - Reservoir of Kulekhani Powerhouse

Bagmati Kulekhani Pharping Study Project

Under this study project every possible options have been studied and the Bagmati Indrasarovar Water Pumping Project is finally selected.

The Bagmati Indra Sarovar Water Pumping Project is located in the Kathmandu, Lalitpur and Makawanpur Districts. The headworks of the project lie in the Bagmati River about 3 km southeast of Pharping Bazar at Katuwal Daha in Simpani Mukha Basti village. The project lifts the water 350 m up from Bagmati River to feed the Indra Sarovar, reservoir of Kulekhani – I. The main objective of this study is to augment firm energy from the three power plants of Kulekhani KL-1, KL-2 and KL-3 diverting water from the Bagmati river and feeding in to the Indra Sarovar in case of if it is not filled completely from the present source, during wet months.

The total power generating from the three powerhouses is 106 MW and the operation power required is 74 MW. The main benefit of this proposed project is to generate power from higher head than the smaller lifting head.

Gaudi Khola Headworks Site

The water from tailrace of KL-3 flows to the Rapti river system. Therefore, this water will have impacts on the downstream project such as Bagmati Multi Purpose Storage Projects.

Gaudi Khola (Khadgakot) Storage Project

Gaudi Khola (Khadgakot) Storage Project is a small reservoir type Project, for which the preliminary study was proposed in the fiscal year 2011/12 under the program of "Identification and Selection of Storage Project" being carried out by PDD.

Uttar Ganga Headworks Site

The proposed project is located in Gulmi district of Lumbini Zone in Western Development Region. An earthen road from Ridi-Purtughat via Shantipur provides access to the project area. The study so far has shown that the installed capacity of the project will be 17 MW with an average annual generation of 34.6 GWh.

The proposed project will have a rock fill dam of 135 m height, 2,900 m long headrace tunnel, surge shaft, 750 m long supported steel penstock pipe and a surface powerhouse on the right bank of Gaudi Khola. The tentative project cost is estimated to be US$ 152.96 Millions. With the project economic indicators like IRR of 3.98% and B/C Ratio of 0.49, the project is far from economic viability. Hence, it was recommended not to apply for survey license for further study.

Uttar Ganga Storage Project

Uttar Ganga Storage Project is one of potential storage projects, for which NEA has proposed to initiate the feasibility study in the FY 2011/12 under the program of "Identification and Selection of Storage Project" being carried out by PDD. The project was identified by NEA during "Identification and Feasibility Study of Storage Projects" and after selection as one of the prominent projects during coarse screening and ranking study, the pre-feasibility Study of the project was carried out in the FY 2003/2004. The proposed project is located in Baglung District of Dhaulagiri Zone in the Western Development Region. The dam site lies nearby Gaba of Nisi VDC and the reservoir area lies in Boban VDC of the district within Dhorpatan Hunting Reserve. About 30 km of access road from Boban, the nearest roadhead to the dam site is required.

Uttar Ganga Headworks Site

As per the pre-feasibility study, the project will have the installed capacity of 300 MW with average annual energy generation of 1,518 GWh in operation of 24 hours during November-May. The major components of the project are 190 m high rock fill dam, sloping type intake, 9,800 m long headrace tunnel, circular restricted orifice surge shaft, 3,900 m long inclined pressure shaft and horizontal tunnel and a powerhouse on the right bank of Nisi Khola. The tentative project cost is estimated to be 650 millions US$ at the price level of 2004. With the economic indicators like IRR of 18.2% and B/C Ratio of 2.04 using LRMC, the project is very attractive from the economic point of view.

PDD completed the site reconnaissance study of the project in the FY 2011/12. The application for the survey license for the study of the project has been submitted to DoEd. As the permission from the Ministry of Forest & Land Conservation has not been received, the field investigation works could not progress as proposed in the current fiscal year 2011/2012. An inception report based on the site reconnaissance visit and review of pre-feasibility study is being prepared.

Indrawati Storage Hydroelectric Project

Indrawati Storage Hydroelectric project is located in Indrawati River in Sindhupalchowk district of Central Development Region of Nepal. The Indrawati river is a major tributary of Sun Koshi river. The dam site is located at Indrawati river about 2 km upstream from the bridge over Sun Koshi river at Dolalghat on Araniko highway. As the project has been planned to be developed as a toe development, the powerhouse will be located just downstream of the dam. About 1km long access road which takes off from the existing Araniko highway is required to be constructed to reach the dam site.

NEA identified 102 medium sized storage projects with capacities ranging from 10 MW to 300 MW and carried out coarse screening and ranking in Phase I. During Phase II, a Fine Screening and Ranking Study was caof 10 projects including Indrawati storage was carried in 2000. The study conducted option study of Rockfill and concrete dam and concluded that rockfill dam option is better and recommended accordingly. The height of the Dam is 111m. Its installed capacity is 91.2 MW. It can generate 384 GWh of annual energy including dry season energy of 116 GWh. The capital cost of the project is estimated at 198.72 million US$ at 2000 price level. The B/C ratio and IRR of the project are 0.76 and 7.4% respectively based on the project economic analysis. The study concludes that the project is good from the point of access and location. The project lies at fair geological condition. The main impacts associated with the project will be relocation of 460 households and inundation of about 810 ha of fertile agricultural land. Thus the project is technically feasible but possesses significant environmental impacts. The project is not economically feasible as the B/C ratio is less than unity and the IRR is less than the discount rate considered at 10%.

In the current FY 2011/12, review study of the Indrawati storage project is in progress. A multi desciplinary team of professionals of NEA including the director of Project Development Department (PDD), NEA and Mr. Ozaki, JICA Expert to NEA visited the site on August 26, 2011 to review and reexamine specially the dam site. A separate site visit report was prepared and submitted by the JICA expert to PDD, NEA. The team assigned for the project prepared a Project Review Report. The main features of the report are summarized in the following paragraphs.

- Survey license are either issued to IPPs or IPPs has applied for survey license for several hydropower projects in Indrawati River and its tributaries. Among them, Indrawati-Sunkoshi Project (46 MW) having coordinates of 27035'45"- 27041'20" to 85040'00"- 85041'00" applied by Koshi Hydropower Co. Ltd. for survey license will affect the Indrawati Storage Project.

- A roock fill dam is suitable from the topographical conditions which is relatively gentle and the geological conditions consist of fragile phyllite. Waterway and powerhouse will be aligned on the left bank and the spillway will be located on the right bank in consideration to topography and geology at the dam site.

The height of the Dam is 109m. Its installed capacity is 78 MW. It can generate 334 GWh of annual energy including firm energy of 1172.9 GWh. The capital cost of the project is estimated at 459.32 million US$ at 2011 price level. The B/C ratio of the project is 0.88 based on the project economic analysis. The study concludes that the project is good from the point of access and location. The dam site conditions are not so appropriate topographically and geologically. Some amount of river discharge will be diverted by the ongoing Melamchi water supply project and inflow volume will be decreased. The main impacts associated with the project will be relocation of 460 households and inundation of about 810 ha of fertile agricultural land as of 2000, the both are derived from "Identification and Feasibility Study of Storage Projects in 2000 by NEA". Thus the project is not economically feasible as the B/C ratio of 0.88 is less than unity.

Master Plan Study on Storage-type Hydroelectric Power Development in Nepal

The Nationwide Master Plan Study on Storage Hydroelectric Power Development in Nepal is being conducted on the basis of the Scope of Work agreed between Japan International Coperation Agency and the Ministry of Energy of Nepal with Nepal Electricity Authority as the counterpart agency. The study aims to prepare a master plan for storage type hydroelectric power developments for domestic demand in Nepal for the coming 20 years from the year 2013 by selecting promising candidate projects in the range from 100 MW to 300 MW from a list of 65 potential projects as listed by NEA.

The study started off in Japan from the end of December 2011. The first work period in Nepal began from January 2012 up to the end of February 2012. The first stake holder's meeting was held in February 2012 in Kathmandu. The second work period for the JICA team in Kathmandu was from the beginning of May up to the end of June 2012. The end of the second work period concluded with the selection of four storage projects. Reconnaissance site visits were also conducted for these four projects.

Andhi Khola Storage Hydroelectric Project

Andhi Khola Storage Hydropower Project lies in Syangja district of Western Development Region to fulfill the peaking demand of the country. The feasibility study of this project was completed in 1998 by NEA. As per this study, the project will generate about 693 GWH of energy annually with installed capacity of 180 MW. NEA has applied for survey license of this project in the fiscal year 2010/11. In fiscal year 2011/12, the project Development Department (PDD) has completed a new topographical survey of dam site and powerhouse site, installed the gauging stations at the dam site, carried out the sediment sampling at the dam site as the part of the upgraded feasibility study of the project. PDD plans to begin environmental impact study (EIA of this project in 2012/13 provided that the survey license is issued to NEA by DOED. Apart from this, PDD shall carryout the geotechnical investigation and design works in this fiscal year.

Andhi Khola Headworks Site

Kali Gandaki 'A' Model Test Project

Kali Gandaki 'A' Hydropower Project (KGA) was commissioned in August 2002. It has an installed capacity of 144 MW and is the largest hydropower project in operation in Nepal till date. From the very beginning year of its operation, the power station has been facing problems related to floating debris and sediment at its headworks. The hydraulic performance of the headworks and desander has also been below par leading to unexpected damage to turbines and other hydromechanical parts resulting in frequent shutdowns for repair and this has caused a loss in the overall generation from the project. To identify the cause behind these problems and to propose

Kaligandaki A Model Testing

appropriate remedial measures, the World Bank has provided financial assistance to conduct a physical hydraulic model study of the KGA headworks. Hydro Lab Pvt. Ltd. has been appointed to carry out the physical model study.

The consultant has collected necessary data, reports and field measurements required for the model study. Then, the consultant constructed the model of the Kaligandaki A headworks at 1:40 scale and simulated various flow scenarios at the premises of Hydrolab Pvt. Ltd. at Pulchowk, Lalitpur. The consultant has submitted the draft final report. The consultant has simulated various possible modifications and recommended the possible modifications for improvement of sediment and debris handling at headworks and desander of KGA.

Upper Arun Hydroelectric Project

The Arun River is bestowed with high firm flow and steep river gradient making very favorable for the hydropower development. The Upper Arun Hydroelectric Project, which lies on the upper reach of the Arun River, is one of the most attractive projects in the Eastern Development Region of Nepal. Based on the feasibility study carried out on 1991, the installed capacity of Peaking Run-of –River type Upper Arun HEP is 335 MW. The design discharge of the project is 78.8 m3/sec and generates the firm energy of 2050 GWh per annum. The project has design head of 492 m. The total cost of the project is US$ 479 Million. Similarly, this project has an economic internal rate of return of 14.52 and specific energy cost of the project is 1.90 cents/kWh.

Recently the Review Study of this project is carried out by NEA. The project cost is revised based on the today's unit rate, prevailing road facilities which is already built up to Num, near the dam site of Arun 3 HEP and transmission line. The total project cost at present cost is calculated to be 445.54 M US$. The review study also shows the increment in the annul generation to 2734.2 GWh. This makes the project more attractive than presented in the feasibility study.

The review study shows that the project is very attractive in both the cases either the project is constructed by NEA with the loan taken from Nepal Government or the project is develop by NEA by taking loan from commercial bank. The estimated energy cost of Rs. 2.10 per kWh as of today is far below the prevailing rate offered in power purchase agreement (PPA), if the project is developed by NEA with finance from international donor agencies. The cut off energy rate is Rs. 2.74 per kWh from the year 2020 on ward.

Burhi Gandaki Hydropower Projects

Burhi Gandaki Hydroelectric Project is a storage type of project located between boundary of Gorkha and Dhading district on the Burhi Gandaki River in Central/ Western Development region of Nepal. After identification during the Gandaki Basin Study in 1978, the prefeasibility study was completed by Department of Electricity in 1984. The prefeasibility study found that the project with the option of 600 MW will be the most promising and recommended option for the project development. The major components of the project will be as follows:

- Rock fill dam of height 225 m with full supply level at 520 masl incorporating an ogee type gated spillway;
- Reservoir having the area of 50 km2 and the live capacity of 3,320 million cubic meter;
- Shaft type intake having three gates of size 4.25 m x 10.0 m;
- Headrace tunnel of length 276 m having finished diameter of 12.0 m;
- Steel penstock of the length 3,900 m and diameter 4.0 m;
- Underground powerhouse accommodating 4 units of electro-mechanical equipment;
- Tailrace tunnel of length 1.1 km having the size of 13 m x 13 m.
- The proposed Storage Project has been envisaged to generate annual energy of 2,500 GWh with the estimated cost of US$774 millions.

Though the prefeasibility study has recommended the project to be implemented immediately, the project remained in hibernation for about 26 years. With the onset of the acute energy crisis during dry season, studies have been reinitiated by NEA since the fiscal year 2010/11 realizing the attractiveness of the project due to the ability to generate dry season energy and proximity to Kathmandu, the major load center of the country. The additional studies carried out additional studies in that year includes hydrological investigation and studies, household counting in the reservoir area establishing 62 survey monuments and identification of alternate powerhouse and tailrace location near Fisling around 10 km downstream of the Benighat in Trisuli river with the possibility of additional gen-

eration of about 700 GWh. Ministry of Energy has also issued the survey license of BGSHEP to Nepal electricity Authority.

The GoN has given a high priority for the development of the project citing it as one of the projects of national pride. NEA has received the fund from GoN toward the cost of consulting services for feasibility study and detail design of the project. Procurement of consulting services to prepare the project for implementation from the current status of pre-feasibility study is in progress. The overall objective of the planned further study is to carryout necessary field investigation and upgrade the existing pre-feasibility study of Budhi Gandaki Hydropower Project to a feasibility level, prepare a detailed design and tender documents and tender drawings, and prepare Environmental Impact Assessment, Social Impact Assessment, Environmental Management Plan. In accordance with the QCBS selection method, the selection of the consultant is being carried out in two phases. In the first phase six (6) firms were short listed from a long list of 24 firms who submitted their Expressions of Interest. All six (6) short listed firms submitted their proposals within the stipulated due date for submission. The technical proposal of three firms is accepted and the financial document is scheduled to open on July 25, 2012. The process of selection of the Consultant and Award of Contract for is scheduled to be completed by the end of august 2012. Feasibility study and detail engineering design of the project is aimed to be completed within two and half years in February 2015. It is also envisaged to complete financial closure by mid 2015 and tendering and contracting by the end of 2015. After this the construction of project can be completed within the 6 years.

Dudhkoshi Storage Hydropower Project

Dudhkoshi Storage Hydropower Project is another reservoir type project identified during the Koshi basin study in 1985. it lies in Khotang and Okhaldhunga districts of Eastern Development Region. The Project was studied further in 1995 by Medium Hydropower Study Project. The studies done so far have shown that the installed capacity of the project will be 300 MW with an annual energy generation capacity of 1806 GWH. A seasonal road from Khurkot of the Banepa – Bardibas National Highway via Harkapur and Halesi to the proposed dam site exists at present.

PDD completed the site reconnaissance study of this project in the fiscal year 2067/68. The application for the survey licence for the study of the project be submitted to DOED in the fiscal year 2068/69 and an interim study of the project is currently being carried out by Project Development Department.

Other Activities

In addition to the regular work consisting of carrying out studies at different levels for different projects, PDD has been carrying out various other activities which have been instrumental in developing the institutional strength of Nepal Electricity Authority in the field of consulting services. The following are the few of the activities of PDD carried out during the fiscal year 2010/11:

- Continuation of the construction supervision of Chameliya Hydroelectric Project in association with the Joint Venture of three local consulting firms (Shah SILT and ICON JV).
- The conduction of the annual sediment survey at Kulekhani Reservoir.
- Construction Supervision of Bridge construction at Devighat Hydropower Station
- Construction Supervision of Slope Stabilisation works near Powerhouse of Puwa Khola Hydropower Station
- Preliminary Engineering Study of Slope Stability of Kulekhani Valve house area and Puwa Khola Penstock alignment
- Initiation for the design of three new NEA Office Complexes based on the new master plan within the premises in RatnaPark.
- Construction supervision of the following substation buildings
  - Unichaur substati on building in Lalitpur District (11kV-33kV)
  - Salyantartar substati on building in Dhading District (33kV-66kV)
  - Chaughada substati on building in Nuwakot District (33kV-66kV)
- Detailed survey and design of Access Road of Upper Trishuli 3 A HEP for upgrading of road from Trishuli Colony to Upper Trishuli 3 B hub site at Champani.
- Detailed survey and design of Access Road of Upper Seti Storage HEP.

Air Sampling at Balanch, Powerhouse site of Chameliya HEP

Air Sampling at Balanch, Powerhouse site of Chameliya HEP

Environment and Social Studies Department

The Environment and Social Studies Department (ESSD) of Nepal Electricity Authority is one of the integral Departments of Engineering Services, which executes activities related to all aspects of environmental studies of hydropower and transmission line projects being planned, designed, constructed or operated by NEA. This Department located in Kharipati, Bhaktapur is a commercial unit of NEA with its technical expertise in conducting

Environmental Impact Assessment (EIA), Initial Environmental Examination (IEE), Social Impact Assessment (SIA), Resettlement Action Plan (RAP), Vulnerable Community Development Plan (VCDP) studies and Environment Management Action Plan (EMAP) of hydropower and transmission line projects. This department is also responsible for the implementation of environmental and social mitigation measures, enhancement measures, community support programs and environmental and social monitoring during construction and operation phases of the project. Active public involvement in all phases of the projects is another major responsibility of the department.

Local People Participating in the Public Hearing of Upper Karnali HEP

During this fiscal year 2010/2011, ESSD 27 projects were undertaken by ESSD which includes 7 are hydropower and 20 transmission line projects. The Department successfully conducted several environmental studies out of which Scoping Document and ToR for EIA of Kohalpur – Surkhet 132 kV Transmission Line Project has already been approved by MoEST. Similarly, Terms of References for IEE of Koshi Corridor 220 kV Transmission Line project and Solu Corridor 132 kV Transmission Line Project has been approved by the Ministry of Energy. The IEE report of Upper Trishuli 3 "A" - Matatirtha 220 kV T/L Project and Scoping Document and ToR for EIA of Tamakoshi 'V' Hydroelectric Project are at the stage of final approval.

Typical landuse of Rahughat-Modi T/I Project

Environmental Monitoring of Khimti-Dhalkebar 220 kV T/L Project has been completed and site offices at Sindhuli and Ramechhap has been closed. The compensatory plantation sites have been handed over to the the concerned District Forest Offices and Community Forest User's Groups. At present, additional Mitigation works for Khimti-Dhalkebar 220 kV T/L Project is being carried out.

Three new site offices for Environmental Monitoring Units (EMU) of Upper Trishuli 3 "A" HEP, Kabeli-Damak 132 kV T/L Project and Hetauda - Bharatpur 220 kV T/L Project has been established in this fiscal year. The EMU of Chameliya HEP is continuing construction phase Environmental Monitoring and the implementation of mitigation programmes like Vegetable and Livestock Training and Assistance Support, Social and environmental Awareness and Library Support and Extra Educational Activity have been implemented this year.

ESSD also participated in the Public Hearing of 900 MW Upper Karnali Project which is being promoted by GMR- India in collaboration with NEA. NEA possess 27% of equity share in the project.

Draft EIA Report of Upper Trishuli 3 "B" HEP has been pre-

pared and preparations for PublicHearing is being done. Similarly, Draft IEE Reports of Rahughat- Modi 132 kV T/L Project and Solu Corridor 132 kV T/L Project is being prepared. The department has successfully completed SIA,RAP and VCDP documents for Hetauda-Bharatpur 220 kV T/L and Bharatpur-Bardaghat 220 kV T/L projects as per the requirement of the World bank and obtained approval form the concerned agencies. The Inception report for Hot Spot Study (Large mammal, Monkey, Birds and Elephant) of Hetauda - Duhabi 400 kV T/L Project has been submitted and approved from World Bank and the field work is in progress.

Beside the above mentioned projects the following assignments are at hand:

1. EIA of Tamor Storage HEP
2. EIA of Nausalgad Storage HEP
3. EIA of Upper Arun HEP
4. EIA of Modi - Lekhnath 132 kV T/L Project
5. EIA of Ramechhap - Garjyang 132 kV T/L Project
6. EIA of Manang Marsyangdi 220 kV T/L Project
7. EIA of Kali Gandaki Corridor 132 T/L Project
8. EIA of Kohalpur - Nausalgad 400 kV T/L Project
9. IEE of Sunkoshi 132 kV T/L Corridor.
10. IEE of Gulmi - Arghakhanchi 132 kV T/L.
11. IEE Upper Dordi A 132 kV T/L Project
12. IEE of Lamahi-Ghorahi 132 kV T/L Project
13. Environmental Mitigation Monitoring and Management of Balach–Attariya 132 kV T/L Project

Soil, Rock and Concrete Laboratory

Soil, Rock and Concrete Laboratory (SRCL) established and developing as Geotechnical Department under the Engineering Services of Nepal Electricity Authority. It provides services in material testing, geological and geotechnical investigations for the different phases of a hydroelectric project development. It provides services like geological mapping, various types of geophysical surveys, core drilling and construction material investigation at different levels to the different departments of NEA and the private sector. In the field of soil and rock engineering, it also provides services of carrying out in-situ tests and laboratory tests viz. determination of index properties, tri-axial tests, consolidation tests, point load tests, direct shear tests, uniaxial compressive strength tests etc. on a regular basis for clients inside and outside NEA.

Following are the major works executed by SRCL in fiscal year 2011/12

1) Geological and geotechnical investigation works of Nalsuau Gad Storage Project :
   Geological and geotechnical investigation works including 602 m core drilling, construction material survey and Laboratory tests have been completed.
2) Karnali-7 HEP :
   Drilling work of 710 meters has been completed in this project under taken by Lanco Infratech, India. Laboratory tests and final report preparation is in concluding stage.

3) Tanahu Hydropower Project (formerly; Upper Seti Storage HEP) :
   This project is under taken by NEA. The consultant responsible for design work is J-Power of Japan.

Photo: Core drillin g work at Karnali-7 HEP

A total of 835 m of core drilling (680m of the first stage, and 155m of the second stage has been completed. Different laboratory tests of the core samples are also going on simultaneously. Further core drilling works of about 1300m has been planned for this year and proposal for the work has been submitted to Tanahu Hydropower Company.

4) Bheri-Babai Multipurpose Project :-
   This project is under taken by Ministry of Irrigation. A total of 270 m of core drilling out of 300 m has been completed. Different laboratory tests of the core samples are also going on simultaneously.
5) Upper Modi-A HEP :-
   This project is under taken by NEA. A total of 116 m of core drilling out of 155 m has been completed. Detail

engineering geological mapping of tunnel alignment and geophysical investigations including different laboratory tests of the core samples are also going on simultaneously.

6) Nisti-Panah Storage HEP :-
This project is under taken by NEA. Detail geological mapping and 2-D ERT survey is in progress.

5) Rasuwagadi HEP:-
This is under taken by Chilime hydro power company. A total of 106 meters of drilling works has been completed including laboratory test of core samples.

6) Rasuwa-Bhotekoshi HEP:-
This is also under taken by Langtang Bhotekoshi hydro power company. A total of 130 meters of drilling works has been completed including laboratory test of core samples.

7) Middle-Bhotekoshi HEP:-
This is also under taken by Chilime Hydro Power Company. A total of 60 meters of drilling works has been completed including laboratory test of core samples.

8) Solu-Katari-Mirchaiya 132kv Transmission line Project:-
Detail geological Mapping and geotechnical investigation work of 90 km long transmission line from Lamane (Solukhumbu to Mirchaiya) has been completed.

Laboratory works:

SRCL provides laboratory services of carrying out in-situ tests and laboratory tests including construction material survey and quarry site investigations. Following major works has been carried out in this fiscal year.

- Construction material survey and laboratory test of Karnali-7 HEP, Rasuwagadhi HEP and Sisa Khola HEP has been completed
- Sediment Test, Construction material survey and laboratory test of Nalsyau Gad Storage Project and Tanahu Hydropower company (Upper Seti Storage Project) has been completed.
- Construction material survey and laboratory test of Mugu HEP and Bheri-Babai HEP.has been completed.
- Test pit excavation, sampling and laboratory test of Solu-Katari-Mirchaiya Transmission line corridor has been completed.

In addition to these major project works, SRCL has carried out various laboratory tests of rock and soil samples from private sector hydropower projects.

For this fiscal year, SRCL expecting and planning of Exploratory core drilling along with geological and geotechnical investigations of Saptakoshi High Dam project, Budhi Gandaki Storage Project, Super Trishuli HEP, and some more projects from IPP. Photo: Standard Penetration Test at Solu-Katari-Mirchaiya Transmission line corridor

In the fiscal year 2012/13, SRCL is planning to extend its scope of works towards Adit Tunnel excavation, Geophysical Exploration with latest equipments, Petrographic study of rock and entire facilities on rock tests viz.

- Triaxial test of rock
- Petrographical study of rocks
- Slake durability test
- Plate load test
- Hydrofracture test
- Dilatometer test
- Rock sonic test

For this, a separate detail proposal for establishment of above mentioned tests including cost have been forwarded to NEA management.

Electromechanical Design Division

This division handles all of the electromechanical issues arising within Engineering Services. These issues range from the design of electromechanical equipments of projects that are under various stages of study. Apart from design of the electromechanical equipment, this division also runs and maintains Central Workshop in Hetauda and manufacturers of concrete poles from it's two Concrete Pole manufacturing Plants, one in Kotre and the other in Amlekhgunj. During the last fiscal year 068/069, a total of 13324 concrete poles were manufactured at the concrete pole plant in Amlekhgunj. Similarly, a total of 2124 concrete poles were produced from Kotre pole plant in Tanahu, Pokhara.

Bird eye view of the Amlekhgunj Pole Plant

Manufacturing of PSC Pole under process

NEA's Subsidiary and Associate Companies

Figure: Fitting of Repaired Pelton Runner on Unit-2 in Progress

Chilime Hydropower Company Limited

Chilime Hydropower Company Limited (CHPCL), a subsidiary of Nepal Electricity Authority (NEA), is the first public limited company in hydropower sector in Nepal. The company was incorporated in 1995 with an objective of hydropower generation through optimal utilization of resources within the country. The majority of Company's ownership with 51% share belongs to NEA. The remaining 49% shareholding belongs to general public which includes 10% shares from local people.

CHPCL owns and operates 22.1 MW power plant located in Rasuwa district, 133 km North of capital city Kathmandu. The Company is undertaking the development of four hydropower projects with total capacity of 270.3 MW through following three subsidiaries:

1. Rasuwagadhi Hydropwer Company Limited
2. Madhya Bhotekoshi Jalavidhyut Company Limited
3. Sanjen Jalavidhyut Company Limited

Chilime Hydropower Plant (CHPP)

The Chilime Hydro Power Plant, a peaking runoff river (PROR) type plant with installed capacity of 22.10 MW, is delivering energy to the National Grid through 38.5 km long 66 kV single circuit transmission line at Trishuli Power Plant, Trishuli, Nuwakot. During fiscal year 2011/12, the plant delivered a total of 156.083 GWh of Energy against the annual deemed energy of 132.795 GWh. Tunnel draining was carried out in the month of March for the replacement of Valves as leakages were observed. New Auma matic Drain) valves were fitted on both units and mmanual Valves (Drain, Bypass, brake Nozzle) were replaced by new ones. Also, Brake Nozzle Hydraulic Valve in Unit-2 was replaced by new one while that of Bypass was replaced by a repaired one. Replacement of old pelton runner of unit-2 by the repaired one was successfully done in the month of July. The unit has been operating at its full potential since then.

Madhya Bhotekoshi Jalavidyut Company Limited

Madhya Bhotekoshi Jalavidyut Company Limited (MBJCL), a subsidiary company of Chilime Hydropower Company Limited is undertaking the development of Middle Bhotekoshi Hydroelectric Project with an installed capacity of 102 MW in Sindhupalchowk district. MBJCL has already completed financial closure with debt: equity ratio of 50:50. Promoter equity structure of MBJCL to develop the project consists of 38% of CHPCL, 10% of Nepal Electricity Authority (NEA), 1% of Nepal Araniko Hydropower Co. Pvt. Ltd., 1% of Sindhu Investment Company Pvt. Ltd. and 1% of Sindhupalchowk Hydropower Company Limited. Similarly, general public share participation consists of 3.5% of employees of promoting institutions, 1% of employees of EPF, 19.5% of contributors in EPF, 15% of general public and 10% of local public of Sindhupalchowk district. The major activities completed till the end of FY 2011/12 are as given below:

- PPA has been made with NEA on 14th November 2011 with the commercial operation date on December 2016.
- Loan agreement has been signed on 8th December 2011 between MBJCL, CHPCL and EPF for debt portion. MBJCL has planned to start the construction of MBKHEP by 2013 and targeted to complete the project by December 2016.

- Evaluation of Request for Proposal (RFP) for the appointment of Consultant is in final stage.
- Pre-qualification for the selection of construction companies is in progress.
- Geological investigation including drilling in headworks, surge tank and powerhouse as well as sub-surface exploration with ERT has been carried out to determine the geological condition in the key structure locations.
- A 250m long and 5m diameter test adit tunnel excavation is in progress in the location of construction Adit-1.
- A Draft Environmental Impact Assessment Report of the project has been submitted.
- Land acquisition process is in progress to acquire land required for this project.

Test Adit of Middle Bhotekoshi HEP

Sanjen Jalavidhyut Company Limited (SJCL)

Sanjen Jalavidhyut Company Limited (SJCL), a company promoted by Chilime Hydropower Company Limited (Chilime) was established on 1st February, 2010 AD with the objective of harnessing hydropower potential of the county with maximum participation of local people in the projects' ownership and mobilization of local resources for the successful implementation of various hydroelectric projects. As the first initiative the SJCL has planned to develop two hydroelectric projects, namely, Sanjen (Upper) Hydroelectric Project (14.8 MW) and Sanjen Hydroelectric Project (42.5 MW) in cascade, with its own equity and loan from financial institutions of Nepal. Both the projects' financing mechanism will be 50:50 Debt: Equity ratio. 51% of the equity part will be invested by the promoters of the company, which is composed of Chilime (38%), Nepal Electricity Authority (10%) and District Development Committee (DDC) and all 18 Village Development Committees (VDCs) of Rasuwa (3%). For financing the remaining 49% of the equity investment, SJCL will raise through share participation of the public, which is composed of Depositors of Employees' Provident Fund (EPF-19.5%), Employees of EPF (1%), Employees of Promoters (3.5%), General Public (15%) and Project Affected Local People (10%). The Company has concluded loan agreement with Employees' Provident Fund on 8th December, 2011 for financing 100% of the loan part in the two projects.

The Company has obtained Generation License from Ministry of Energy for Sanjen HEP. Other preliminary works like land acquisition, registration in the Department of Industry and Environment Impact Assessment (EIA) have been completed for these projects. Main Access Road (Chilime – Tiloche), access road to Surge Tank and buildings construction works for Camps and Offices is in progress. The Company has completed the prequalification of contractors for Lot-2 Civil works, Lot-3 Electromechanical Works and Lot-4 Hydromechanical Works and short listing of Consultants for Final Design and Construction Supervision Works. Bids for Lot-2 Civil Works are under evaluation, notice for Invitation for Bids for Lot-3 Electromechanical Works has been published and Lot-4 Hydromechanical Works has been published. The Company has scheduled the construction of both simultaneously from September 2012. The commercial operation dates for Sanjen (Upper) HEP and Sanjen HEP are July 2015 and December 2015 respectively. A total of 324.31 GWh of electricity will be added into NEA Grid within 2015 AD. The total cost of the two projects is NRs. 7.24 billion excluding interest during construction.

Rasuwagadhi Hydropower Company Limited

Rasuwagadhi Hydropower Company Limited (RGHPCL), a subsidiary company of Chilime Hydropower Company Limited (Chilime), has been established in 17th Shrawan, 2068, for the implementation of Rasuwagadhi Hydroelectric Project (RGHEP) in Rasuwa district which is a run-of-river type project with installed capacity of 111MW.

Chilime – Tiloche Access Road Construction

RGHPCL has planned to manage its capital requirement from debt and equity under the debt equity ratio of 50:50. The com-

Figure 1: Construction of Test Adit Tunnel

pany will manage the debt requirement of the project from the Employees Provident Fund (EPF) under the term loan arrangement and equity investment will be made from 51% promoter share (Chilime - 33.0% and NEA - 18%) and 49% public share including 10% to the local people.

RGHEP utilizes a gross head of 167.90 m by diverting the flow of Bhotekoshi river through a 4.203 km long tunnel to an underground powerhouse. The design discharge of the project is 80 cumecs and installed capacity is 111 MW. The net head of the project is about 158.48 m. RGHPCL has planned to start the construction of RGHEP by January 2013 and targeted to complete the project by the end of December 2016. The status of the Project at the end of fiscal year 2011/12 is as follows:

- Detailed project report of the project has been accomplished.
- The EIA report has been approved from the Ministry of Environment.
- PPA has been signed with NEA on November 14, 2011.
- The tri-partite loan agreement for the construction of project has been signed on 8 December, 2011 between RGHPCL, Chilime and EPF.
- The evaluation of pre-qualification document is in progress.
- Detail design and tender document preparation for camp facilities is in progress.
- PQ document for Electro-Mechanical works is in final stage.
- Construction of 260m Test Adit tunnel (Figure 2) to investigate the geological condition of the underground powerhouse is in progress
- Land acquisition process is in progress.
- Selection of Consultant for the project is in final stage.

Upper Tamakoshi Hydropower Limited

Upper Tamakoshi Hydropower Limited(UTKHPL) was formed as a subsidiary company of NEA on March 9, 2007 with the primary objective of developing and managing 456 MW Upper Tamakoshi Hydroelectric Project (UTKHEP) utilizing the financial and the technical resources from within the country. NEA is the major shareholder of the Company with 41% stake. Contributors of Employees Provident Fund (EPF) will contribute 17.28%, Nepal Telecom (NT) 6%, Citizen Investment Trust (CIT) 2% and Rastriya Beema Sanathan (RBS) 2% of the share equity. The rest of the equity capital will be raised from general public (15%), natives of Dolakha District (10%), NEA and Company staff (3.84%), and staff of financial institutions providing the debt for the Project (2.88%). A Seven-member Board of Directors representing four from NEA, one each from EPF and NTC and one free lancer (to be nominated) for the Company has been constituted after shareholder agreement between UTKHPL and NEA, NT, CIT and RBS which was signed on 26 July, 2010 (Sravan 10, 2067). One member each from CIT and RBS will represent the UTKHPL Board as invitee. A tripatriate loan agreement between NEA, EPF and UTKHPL was signed on 30 July, 2010 (Shravan 14, 2067) for NRs 10 Billion loan and NRs 2 Billion Debenture. A loan agreement for Rs. 2 Billion each from CIT and RBS was signed on December 7, 2010 (Mangsir 21, 2067) and for Rs. 6 Billion from NTC was signed on May 12, 2011(Baisakh 29,2068). The Government of Nepal has also decided to provide loan up to NRs. 11.8 Billion during construction period in case of shortfall. With this, the financial arrangement for the project has been completed.

Project Features

Upper Tamakoshi Hydroelectric Project (UTKHEP) is located in Lamabagar Village Development Committee of Dolakha District and is a peaking run-of-river type of project with 822 m gross head, design discharge of 66 m3/s and Installed capacity of 456 MW. The Project will be generating about 2,281.2 GWh of

energy annually. The major components of this Project are: an intake, a 22.0 m high concrete dam, twin desanding basins, 7.86 km long headrace tunnel, 360 m high surge shaft, 495 m long penstock pipe, underground powerhouse with six units of pelton turbines, 2.9 km long tailrace tunnel and 47 km long 220 kV transmission line to Khimti substation.

Financial Management of the Project

The total cost of the project is estimated at 441.17 MUSD without interest during construction (IDC). Out of the total estimated cost of 441.17 MUSD, Project Costs amount to 376.26 MUSD and Price Contingencies amount to 29.81 MUSD. Similarly, VAT is estimated at 24.89 MUSD and while Taxes and Duties are estimated 10.21 MUSD. The project funding comprises of NRs 10.59 Billion (30%) of equity and NRs 24.70 Billion (70 %) of debt.

Project Status

Power Purchase Agreement (PPA) with NEA was signed on December 29, 2010 (Poush 14, 2067). The PPA rate agreed stands at NRs 3.5 average per KWh for the base year (2010/11) and NRs 4.06 average per KWh at required commercial operation date (RCOD).

JV Norconsult AS –Lahmeyer International GmbH (JVNL) is the Engineer for consultancy services for construction supervision and the Ms. Sinohydro Corporation, China is the Contractor for the main civil works (LOT-1). Texmaco India Limited has been awarded the contract for Hydromechanical works (Lot-2) while Andritz Hydro GmbH, Austria has been awarded contract for Electromechanical works (Lot-3). The tendering process is underway from the prequalified contractors for Transmission and Substation works (Lot-4). Similarly, procurement process for "Management Team" including Chief Executive Officer (CEO) of UTKHPL is underway.

Honorable Prime Minister Dr. Baburam Bhattrai inspected the project construction works on June 11, 2012 (Jestha 29, 2069). Honorable the then Prime Minister Mr. Jhala Nath Khanal laid foundation stone at underground powerhouse site , Gongar on May 18, 2011 (Jestha 4, 2068) signaling the construction of main civil works. Upgrading of Dolakha Singati raod (35 Km) and the construction of access road from Singati to Lamabagar (28.6 Km) has been completed. The construction works in the project at different front such as Dam, Intake, Headrace Tunnel, Surge shaft, Powerhouse and Tailrace tunnel are ongoing at full swing. Around 4 km of excavation of tunnel works has been completed by the end of fiscal year 2011/12.

Power Transmission Company Nepal Limited (PTCN)

In Mid 2006 IL&FS, NEA and Power Trading Company of India (PTC India) with support from the then MOWR/MOF Nepal and Embassy of India in Nepal took initiative to facilitate the development of transmission interconnection between India and Nepal for the mutual interest and benefit of both the countries. Following three cross border interconnections were identified by Power Exchange Committee.

- Dhalkebar-Mujaffarpur 400kV Transmission Interconnection
- Duhabi-Purnia 400kV Transmission Interconnection
- Butwal-Gorkhapur 400kV Transmission Interconnection

Among above Dhalkebar-Mujaffarpur 400 kV Transmission Line (D-M line) was prioritized in the first phase and decided to realize in commercial modality. According to this modality, the transmission line would be developed by two Companies, one each in India and Nepal and NEA would buy the whole Transmission Capacity from the Companies. Furthermore, NEA would enter into a long term Power Purchase Agreement with PTC India. Consequently, JVC-Nepal called Power Transmission Company Nepal Limited (PTCN) was established in Nepal in 2007 with NEA and IL&FS as 50:50 equity partners. Likewise JVC- India called Cross Border Power Transmission Company India (CPTC) was established in India with a sole ownership of IL&FS, India. Later, it was decided to induct Power Grid Company of India Limited (PGCIL) in PTCN as a new partner, resulting in new equity structure of PTCN. The new equity structure comprises of 64% shares of NEA, 10% of IL& FS Energy Development Company (IEDC) and 26% of PGCIL. Out of the 64% share of NEA, 14% will be divested to Nepalese Financial Institutions. Similarly NEA, PGCIL and Sutluj Jul Vidhyut Nigam Limited (SJVNL) were inducted in CPTC, resulting in new equity structure as IEDC: 38%, PGCIL: 26%, SJVNL: 26% and NEA: 10%. To this effect a Share Holder's Agreement (SHA) was signed on 9th July, 2012 in Kathmandu. The responsibilities of these companies include development, construction, operation and maintenance of the Dhalkebar-Mujaffarpur 400 kV Transmission Interconnection (D-M Line).

The PTCN will construct, operate and maintain an approximately 40 km of transmission line from Dhalkebar to Bitthamod near Indo-Nepal border in the Nepalese territory and around 100 km of line in India will be constructed, operated and maintained by CPTC. NEA will pay Transmission Service Charge to Both the Companies for the booking and usage of the whole Capacity of the Transmission Line. The two separates Agreements namely Implementation and Transmission Service Agreement (ITSA) that governs the legal provision for the construction, operation, maintenance of the line and payment mechanism by NEA has been signed between two Companies and NEA on December 13, 2011.

This transmission interconnection is envisaged to be initially charged at 220kV and would be operated in synchronous mode between two grids. The Nepalese portion of the project cost is estimated at NRs 1.28 billion (USD 20.0 million) out

of which USD 13.2 million is to be funded by Government of India as a line of credit to GoN through Exim Bank of India and remaining portion of the costs would be funded through shareholder's equity.

NEA has also signed Power Sale Agreement (PSA) with PTC India for purchase of 150 MW of power for long term. The signing of ITSAs and PSA will lead to the financial closure of the project. The construction of the Dhalkebar-Mujaffarpur D-M line is expected to be complete in December 2014.

Trisuli Jalvidyut Company Limited

Trisuli Jalvidut Company Limited (TJCL) is a joint venture Company of NEA and Nepal Telecom established on Baisakh 29, 2068. The main objective of this company is to develop the Upper Trisuli "3B" Hydroelectric Project with installed capacity of 37 MW located in Nuwakot District. The Project is expected to generate 296 GWh of energy annually. The estimated cost of the Project is 68.0 MUSD. The equity structure of the company is as follows: Nepal Electricity Authority: 30%, Nepal Telecom: 30 %, Village Development Committees and District Development Committees of Rasuwa and Nuwakot districts (DDC and VDCs): 5 %, financial institutions formed by the natives of Rasuwa and Nuwakot: 5 %, natives of project affected district (Rasuwa and Nuwakot:10 %, general public:15 % and employees of NEA and Nepal Telecom in proportion to employees ratio: 5 %. The company has six Board Members, three each from NEA and Nepal Telecom.

The Project has completed its feasibility study, scoping document and terms of reference for environmental impact assessment study. The detail engineering is expected to be complete by the end of year 2012. The Project is targeted to be commissioned by the end of 2016 AD.

Signing of Shareholder's aggreement of PTCN

Tanahun Hydropower Limited

The Upper Seti Hydropower Project is a 140 MW reservoir project planned to be constructed on the Seti River in Tanahu district.

The Detailed Engineering Study (DES) is being carried out since August 2011 with the financial assistance of Asian Development Bank (ADB), for which J-POWER has been engaged. In addition, ADB has also engaged Price Waterhouse Coopers (PwC), India for safeguard related studies, project structuring, and other studies under a Project Preparation Technical Assistance (PPTA). Both the DES and PPTA consulting activities are in the advanced stage of completion.

The physical project consists of a 140 m high RCC dam about 1 km upstream of the confluence of Seti and Madi river in Damauli, and about 1500 m long tunnel, and an underground power house. The dam will create a 25 km long reservoir with surface area at FSL (EL.415) of about 6.5km2. One of the key features of the project is flushing of the sediments in the reservoir.

The project is being planned to be developed through a Special Purpose Vehicle (SPV) as a subsidiary company of NEA. The Tanahu Hydropower Limited (THL) has been registered for this purpose. For the provision of the project management and engineering services a Project Management Consultant (PMC) is being hired. The procurement of PMC is being carried out by the Asian Development Bank.

Asian Development Bank and JICA have shown keen interest in the financing of the project construction. Discussions with the above donors have been held on several occasions over the past one year on various aspects of the project, including the project structuring. PMC is also expected to invest in the project.

Land acquisition for the road and the camp facilities is in the advance stage, with acquisition of land planned to be completed in the current fiscal year.

Development of infrastructure such as access road and bridge is being planned in the FY 2069/70. The project has floated tender for the construction of a RCC bridge over the Seti River. The bidding for the construction of access road will begin soon. If all go well including the lining up of the financing of the project, the bidding process for the procurement of project construction works is expected to begin in the second quarter of 2013.

Central Activities

Information Technology Department

Information Technology Department is responsible for all IT related activities within NEA and is headed by a Director. The Department has completed a fruitful year with the introduction of new innovative IT services such as IP telephony, Biometric attendance system apart from continuous Information and communication Technology (ICT) development, maintenance and support. The Department made further enhancements and extensions to the network infrastructure and server systems to provide reliable and transparent e-bidding services and continued its support as a service provider to Chillime Hydropower Company Ltd. for providing email, e-bidding and computer server / network based services.

During the year under review, more than 254 tenders were fed into the system for e-bidding service. Out of this total, 37 tenders were for Building and Construction, 38 tenders were for Consultancy & Others and 173 bids were for Electricity and Equipment. Similarly, three tenders each were also fed into the system for Road Construction and Maintenance and Vehicle and Spare Parts. A total 43 tender award notice was also fed into the system. The introduction of the e-bidding has transformed the procurement process of NEA into a transparent, trustworthy and up-to-date system.

The Department also continued laying fiber cables within the Kathmandu valley. Almost all the major Distribution Centers within the valley are now connected and the Department is geared up to connect the remaining few locations within a couple of months. This has rendered a possibility for introducing any branch payment system within the valley very soon.

During this fiscal year, customized accounting and inventory (CAIS) of NEA was introduced to very remote locations such as Helambu, Ghamgad, Doti, Dolpa, Bajhang, Khadbari, Diktel, Baitadi, and Darchula distribution centers and branches. The implementation of CAIS and payroll system now remains to be introduced in very few branches within NEA.

The Department also made a contributing role towards the implementation of computerized billing systems. A team of engineers was assigned this year to take up the task of implementing the billing system at several billing locations.

The Department introduced Biometrics attendance system in more than 18 locations of NEA this fiscal year. The Department further revamped NEA website this year with attractive design and improved services.

Corporate Planning and Monitoring Department

Corporate Planning and Monitoring Department is responsible for developing corporate development plans and programs, for carrying out periodical monitoring and evaluation of projects implemented by NEA and for assisting the National Planning Commission, Ministry of Energy and Ministry of Finance in the preparation of national budget by providing data related to projects undertaken by NEA.

In addition, the Department also provides necessary support to NEA management and data input for studies undertaken by various organizations on topics related to NEA. This Department also assists in obtaining new licenses and any extension there of as required for development of power projects. During the year under review, NEA obtained one survey license each for transmission line and hydropower project. Similarly, the validity of survey licenses was extended for three transmission lines.

The Department also plays coordinating role in the development of hydropower projects under different financing mode. During the hear under review, a Joint Development Agreement was signed with K-Water of Korea for the development of 47 MW Upper Modi 'A' Hydropower Project located in Myagdi District.

During fiscal year 2011/12, the Department collected, evaluated and reviewed monthly, quarterly and annual progress of 177 the projects being implemented under various Business Groups of NEA. The Department also furnished various data and reports to Ministry of Energy (MoEn), National Planning Commission (NPC) and other concerned authorities of Nepal Government.

Loss Control Division

Loss Control Division was created as a special task force in August 2011 with the objective of monitoring and controlling technical as well as non technical electricity losses of NEA. It is headed by a Manager and reports its activities directly to the Managing Director. This Division is responsible for monitoring, carrying out surprise check and testing the energy meters and associated equipments installed in the consumer premises. It is also responsible for patrolling distribution lines to monitor the unauthorized uses such as tapping and hooking. The Division carried out surprise checks of many industrial, commercial and domestic consumer premises to test the energy meters. The Division has completed a fruitful year by finding out net recoverable 21,806,964.53 kWh (units) of electricity which is equivalent to worth Rs. 112,827,079.30 from the various distribution centers of NEA.

NEA Board Matters

Mr. Hariram Koirala, Secretary, Minister of Energy was appointed Chairman of Board of Directors of NEA. Mr. Krishna Hari Banskota, Secretary, Ministry of Finance continued as Board Member. Similarly, Mr. Biswa Prakash Gautam, Mr. Mohan Raj Panta and Dr. Krishna Prasad Dulal were appointed Board Members by the decision of Government of Nepal effective from Aswin 13, 2068 BS. Mr. Tek Nath Acharya was appointed Board Member by the decision of Government of Nepal effective from Marga 12, 2068 BS. Mr. Mahendra Lal Shrestha, took over as Membeer Secretary of the Board with his appointment as Acting Managing Director of NEA.

During the year under review, altogether forty six Board meetings were convened to deliberate and decide on various agenda. Scores of important and far reaching decisions were made. Among them, approval of the Shareholders Agreement of Power Transmission Company Nepal, decisions on dispute settlement of Kaligandaki 'A' Hydropower Station, full and final settlement of Middle Marsyangdi Hydropower Project, shortlisting of consultants for the detail design of Budhigandaki Storage Hydropower Project and amendment of Financial Administration Regulation taken by the Board would definitely contribute to the successful growth of NEA. Furthermore, various decisions and action plans relating to personnel, financial and consumer management were taken to impart greater degree of efficiency and effectiveness on the functioning of NEA.

Administration

Administration wing of NEA is responsible for the management of human resources, logistic support, legal advice and arbitration, property management and promotion of public relation functions. Timely amendment of personnel administration regulation and financial administration regulation also falls under the jurisdiction of this wing. This wing is led by a Deputy Managing Director and supported by four departments, namely, Human Resources Department, General Services Department, Legal Department and Training Center, each led by a Director.

Human Resource Department

Human resource department is responsible for executing manpower planning, recruitment, training and capacity development, disciplinary actions, implementation of staff welfare activities and other human resources related functions.

By the end of FY 2011/12, the total number of staff stood at 9,013 while the approved positions remained at 10,325. During the year under review, 252 employees were retired while 18 employees took voluntary retirement and services of 11 employees were terminated on charge of long absence. Similarly, 35 employees resigned and 46 employees passed away. During the year under review, 450 employees of different levels were promoted to higher levels based on their performance evaluation and internal competition and 22 employees were promoted to higher level under special promotion scheme.

During fiscal year 2011/12, the Department filled 588 vacant posts of which 66 were officer and 522 were non officer levels. Meanwhile, one employee was cautioned and 9 employees were suspended under disciplinary action. Similarly, yearly increment in the salary of 4 staffs was decreased.

As a part of staff welfare activities, financial support was provided to 17 employees for different causes. Similarly, under the staff welfare loan facility, a total sum of NRs. 130,263,370.00 was disbursed as loan to employees for purchase, construction and maintenance of house/land, for carrying out social event/rituals and so forth. Similarly, a sum of NRs. 15,150,000.00 was disbursed to various employees under accidental insurance and medical facility scheme and NRs. 215,072,712.42 was disbursed under life insurance scheme.

Level	Service	Approved Position				Existing situation			
		Regular	Project	Pool	Total	Permanent	Periodical	Daily wages/ contract	Total
Managing Director		1	0	0	1	0	0	0	0
GM/DMD (Level-12)		10	0	0	10	9	0	0	9
Officer Level (Level 6-11)	Technical	1001	68	1	1070	869	3	1	873
	Non-tech	469	21	0	490	430	1	1	432
	Total	1470	89	1	1560	1299	4	2	1305
Assistant Level (Level 1-5)	Technical	5295	0	172	5467	4495	509	40	5044
	Non-tech	2996	0	291	3287	2481	163	11	2655
	Total	8291	0	463	8754	6976	672	51	7699
	Grand Total	9772	89	464	10325	8284	676	53	9013

The statistics of employed personnel till the end of fiscal year 2011/12 is given in the table below.

General Service Department

General Service Department (GSD) is an auxiliary unit responsible for vehicle management, logistics management, maintenance of vehicles and corporate office buildings, property management and security management of NEA's corporate offices. The Department is also responsible for dealing with media, organizing press conferences and releasing ceremonial activities.

The Department also publishes 'Vidhyut', a half yearly magazine which covers the wide spectrum of technical, managerial, administrative and other activities of NEA. It also appoints the advertising agency for the publication of various notices of NEA. The Department also registers the complaints from stakeholders regarding service delivery and forwards them to the concerned units for necessary action. During the year under review, 442 such complaints were registered and forwarded to concerned units for the necessary actions.

During the year under review, the Department updated the records of land owned by NEA and their utilization. The Department also succeeded in receiving new Land Registration Certificate for 70-5-2-3 Ropanis of land. In addition, the Department was also entrusted with the responsibility of organizing sports activities for staffs. The Department established NEA Sports Club in FY 2011/12 to encourage participation of staffs in the various sports competition. NEA was successful in securing second position in the inter-corporation sports tournament organized by Public Enterprises Sports Development Association, Nepal (PESDAN) in 2011.

Legal Department

The Legal Department is responsible for dealing with all legal matters of NEA. It provides legal advice to the management as well as to the different departments of NEA. The department is also involved during negotiations for power purchase and contract agreements. Another area of its participation is to defend cases of NEA through NEA's legal advisors in different courts of the country and abroad for dispute resolution. Generally, cases to be resolved are related to the misuse of electricity, electricity theft and unauthorized use of electricity, land acquisition, employees' service termination, staff promotion and contracts/tenders disputes. The Department also provides assistance to the various committees formed for formulating rules and regulations of the organization.

During the fiscal year under review, the Department provided 165 numbers of legal advices to the NEA Management & other departments. The Department also organized legal workshop in Attariya Regional Office of Distribution & Consumer Services West. Out of 143 cases registered in different courts during the fiscal year 2011/12, NEA won 44 cases, lost 12 and the other cases remained sub-judice. Some disputes related to contracts of construction projects are presently being resolved through arbitration and some others are under consideration.

Training Center Department

NEA Training Center (NEATC) is responsible for providing need based short term training ranging from 2-15 days to NEA employees to upgrade and enhance their skill, knowledge and attitude. As human resource is one of the most important and critical ingredients of any organization, its development is indispensable for survival and advancement of the organization. During the year under review, NEATC conducted 32 training programs including Induction Training for the staffs of NEA in different fields of specialization. The training programs conducted covered computer software, finance, administration, sanitation and plumbing, mechanical engineering in addition to the induction training. The training programs involved induction, in-services or refreshers course as well as custom designed courses as per the request and the requirement. A total of 640 participants participated in those training programs. Out of 640 participants, 256 were of officer level and 384 were of assistant level.

In addition to the training programs, NEATC also provided seminar halls, class room, hostel and ground space on rental facilities to different users, groups/organizations etc. upon their request. Engineering colleges, scout, political parties and various organizations used the facilities available in the training center for various purposes on the rental basis. The total income generated from these services amounted to Rs. 2,484,460.00.

Internal Audit

Internal Audit, led by Deputy Managing Director is responsible for reviewing the internal control system, economy, efficiency and effectiveness of operation, risk issues and compliance to applicable rules and regulations. The Deputy Managing Director is assisted by a Director and four regional units responsible for the audit of regional offices of their jurisdiction.
The Internal Audit functions are structured into financial audit, technical /energy audit and management audit. Division wise summaries of the performance/non-performance and associated reasons for non-performance during the period are given in the following paragraphs in brief.

Financial Audit

During FY 2011/12, Financial Audit was carried out in 149 budget centers out of 191 budget centers of NEA. The audit findings, suggestions and recommendation thereon to be included in the annual report for the FY 2011/12 are in progress. The transactions of 99 offices have been audited up to the end of second trimester of fiscal year 2011/12. The audit of the transactions of the third trimester has already started. The status of progress on clearance of audit observations is in improvement.

Technical / Energy Audit

Non-availability of adequate technical audit staffs constrained the coverage of technical audit. It also audits management activities, energy balance and technical aspects carried out by various business groups.

Management Audit

Although, no management audit as such was carried out sue to non-availability of capable audit staff, some aspects of management audit were covered under the financial audit. The findings under this activity were covered under the financial audit report. Beginning from this fiscal year internal audit is planning to carry out management audit separately.

Reporting and Progress Monitoring

For the preparation of annual audit report, all the regional offices must submit their annual report to the Deputy Managing Director, Internal Audit. Then all the reports are consolidated and sent to the Managing Director. The annual audit report for FY 2010/11 was submitted to the Managing Director in May 2012.

Capacity Building

A customized training program was conducted for a group of 10 officers in the Institute of Cost and Works Accountants of India, Delhi in June 2012 to enhance professional knowledge on various issues of internal audits.

Audit Committee

The Board of Directors of NEA formed "Audit Committee" in the last quarter of FY 2011/12, with the objective of enhancing the effectiveness of internal audit functions and ensuring transparency, integrity and accountability within NEA. The Committee comprising of three members lead by a Board Member as Director has started discussion with NEA management on internal control, financial management and internal and external auditors' audit qualifications.

Finance

The Finance wing of NEA is responsible for overall financial management and accounting functions and is headed by a Deputy Managing Director. Apart from the conventional role of financial management, accounting, budgeting, treasury operations, the wing is also responsible for financial analysis & planning, financial administration, supervision & control. Finance wing is divided into four functional departments, namely, Corporate Finance Department, Accounts Department, Revenue Department and Economic Analysis and Planning Department. Each Department is headed by a Director who is accountable to the Deputy Managing Director and is independently responsible for its functional areas of operation.

During fiscal year 2011/12, energy generation from NEA's hydropower plants registered an impressive growth of 11.09% over previous year's figure of 2,122.08 GWh to reach 2,357.43 GWh. The import of energy from India grew by 7.50% over previous year's figure to reach 746.07 GWh. The power purchase from IPPs stood at 1,073.57 GWh registering a marginal increment of 3.34% over previous year's figure of 1038.84 GWh.

During the year under review, the total electricity available in the system stood at 4,178.63 GWh which is 8.30 % higher than the previous year's figure. Out of the total electricity available in the system, consumption accounted for 3,074.10 GWh and system losses accounted for the rest. The special measures and programs undertaken by NEA helped reduce system losses from 28.55% to 26.43 %.

During the year under review, total energy sales including external supply increased by 11.52 % to reach 3,041.93 GWh. Export sales to India decreased by 86.76% over previous year's figure of 31.10 GWh to reach 4.12 GWh. Despite the decline in export sales, internal sales reached 3,037.81 GWh registering an increase of 12.66% over the previous year's figure.

During fiscal year 2011/12, the total number of consumer grew by 12.85 % to reach 2.32 million. Of the total consumers, domestic consumers accounted for 94.94% and industrial consumers accounted for 1.57%. The domestic and industrial consumers contributed 44.05% and 36.95% to the total revenue respectively. Rest of the consumers accounted for 3.49% of the total consumers but contributed only 19 % to the total revenue.

In FY 2011/12, net revenue from sales of electricity amounted to NRs.20,079.13 million, an increase of 11.88% over the previous year's figure. Other income in the form of surcharge, interest, lease rent, service charge and dividend amounted to NRs. 1,349.74 million. NEA's total income reached NRs. 21,428.87 million, which is higher than last fiscal year's total income by 10.86%.

NEA's operating expenses on generation, transmission, distribution, and administration in the FY 2011/12 stood at NRs1,756.61 million, NRs. 459.38 million, NRs. 3,670.68 million and NRs.1,009.38 million respectively. As compared to previous year's figures, the expenses on the above headings increased by 88.97%, 32.78%, 22.19% and 16.46% respectively. The high growth in the operating expenses on generation was primarily due to major overhauling works of multi fuel power plant and Middle Marsyangdi power station. Power purchase costs accounted for 39.13% of the total cost and 58.42 % of the total net sales revenue. The additional power import from India to minimize the load shedding basically contributed to the increase in power purchase costs. In addition, annual escalation in power purchase rate and devaluation of NRs against USD in respect of some PPA made in USD also helped to increase the power purchase costs.

During the year under review, interests on borrowing increased by 5.17% over the previous year's figure to reach NRs 3,780 million. Similarly, annual depreciation charge on fixed assets increased by 2.43% to reach NRs. 3,105 million. During the year, street light dues of Village Development Committees'(VDCs) amounting to NRs. 580 million was written off after receiving an equal amount as full settlement from Government of Nepal (GoN). NEA incurred a foreign exchange translation loss of NRs 897.24 million in FY 2011/12 due to depreciation of Nepalese Rupees vis-a-vis the Japanese Yen loan for Kulekhani Disaster Prevention Project. Based on previous actuarial valuation report, a provision of NRs 2,053.40 million was made to cover up expenses for future liabilities and retirement benefits to the employees on account of gratuity, pension, medical facilities and accumulated leave for the FY 2011/12. The total expenses exceeded total revenue in fiscal year 2011/12 and ultimately, NEA suffered a net loss of NRs 8,550.76 million.

During FY 2011/12, revenue collection remained satisfactory with collection rate of more than 95% of the total sales. The high collection rate helped in the management of fund to some extent. However, the street light dues of municipalities amounting to NRs. 1,070 million still remains a serious problem in revenue collection. NEA also collected NRs.210 million from GoN treasury against government offices' electricity dues up to FY 2010/11. The total receivables at the end of FY 2011/12 stood at NRs 6,672.13 million, which is equivalent to sales revenue of 119 days.

During the year under review, NEA capitalized NRs. 4,500 million in property, plant and equipment. The net carrying amount of NEA's property, plant and equipment reached NRs. 86,120.47 million which is 70.04 % of total noncurrent assets. This addition was mainly due to the capitalization of projects related to distribution system reinforcement and rural area electrification.

The second largest component of noncurrent assets is capital work in progress (CWIP). The total expenditure on capital works and projects stood at NRs. 31,924.53 million at the end of FY 2011/12. The ongoing major hydroelectric projects, namely Chameliyagadh (30 MW), Kulekhani III (14 MW), Upper Trishuli 3A (60 MW) and Rahughat (32 MW) and many transmission lines of different voltage levels contributed to increase in CWIP. In FY 2011/12, NEA invested NRs. 13,592.50 million in capital works and projects. Out of this total, NRs.5,392.50 million was received as government equity, NRs.6,766 million was received as government loan and NRs. 1,434 million was born from NEA's internal source. The long term borrowings increased by 13.75 % to reach NRs.71,245.74 million at the end of FY 2011/12. Accumulated loss up to FY 2010/11 amounting to NRs. 27,188.19 million was adjusted in the books of accounts for the same period as per the decision of 2 Jan, 2012 of council of ministers. Following the decision of the council of ministers, the adjusted share capital reached NRs. 31,087.31 million at the end of FY 2011/12.

NEA borrowed NRs.2,000 million as short term loan from local banks to meet the working capital requirements for FY 2011/12. In addition to this, NEA also received NRs.1,000 million as long term loan from GoN for project financing.

NEA's investment in subsidiaries, associates, joint ventures and others reached NRs. 5,008.07 millions at the end of FY 2011/12. In FY 2011/12, NEA invested NRs.530 million in Sanjen Hydro Power Company Limited and Middle Bhotekoshi Hydro Power Company, both promoted by Chilime Hydro Power Company Limited, a subsidiary company of NEA. By the end of FY 2011/12, NEA's equity investment in Upper Tamakoshi Hydro Power Company Limited (UTKHPL) reached NRs.3,690 millions, constituting 73.68% of the total investment. NEA holds 41% of the total equity in UTKHPL. Likewise, NEA's equity in Chilime Hydro Power Company Limited (CHPCL) remained at NRs. 489.60. In FY 2011/12, NEA received NRs. 129.74 million (30%) cash dividend and 40 % bonus share (Equivalent to NRs. 1,958.40 million) from CHPCL. It is expected that CHPCL will yield better results in future as it is undertaking the development of Upper Sanjen HEP (14.6 MW), Sanjen HEP (42.5), Middle Bhotekoshi (100MW) and Rasuwagadhi (112 MW) through three subsidiary companies. NEA has 10% equity each in Sanjen Hydro Power Company Limited and Middle Bhotekoshi Hydro Power Company Limited and has 18 % equity in Rasuwagadhi Hydro Power Company Limited. Other investment of NEA includes equity investment in Khumbu Bijuli Co (NRs. 20.65 million), Salleri Chaylsa Hydro Electric Co. (NRs. 11.63 milion), Nepal Engineering Consultancy Service Center Ltd (2.28 Million), Nepal Hydro Lab (NRs.1 million), Power Transmission Company Limited (NRs.2.50 million) and Butwal Power Company (NRS.8.8 million). NEA is not receiving any dividend from these subsidiary and associate companies except CHPCL and Butwal Power Company Limited (BPCL). NEA received NRs 2.54 million (25%) cash dividend from BPCL in the FY 2011/12. In addition to the above investment, NEA deposited NRs. 100 million in Citizen Investment Trust (CIT) towards gratuity and pension liabilities. Total amount invested in CIT reached NRs.716.43 million at the end of FY 2011/12.

During FY 2011/12, NEA paid NRs. 2,400.12 million as royalties and NRs 650 million as interests to the GoN.

NEA's petition for upward adjustment in electricity tariff was finally rewarded. The Electricity Tariff Fixation Commission (ETFC) approved this fiscal year to increase tariff by 20 percent in average. The new tariff will be effective on consumption of electricity from Shrawan 1, 2069. While revising the tariff, ETFC has instructed NEA to comply with certain conditions with regard to loss reduction, inventory management, receivables management and administrative reform. This tariff adjustment will definitely support to improve the financial health of NEA but this will not be adequate to meet the challenges lying ahead.

The financial audit of NEA for FY 2010/11 was carried out and completed within nine months following the financial year by the joint auditor Mr. Jagadish Bhattarai and Mr. Mahesh Guragain, Chartered Accountants, appointed by the Office of the Auditor General. Same auditors have been appointed to carry out financial audit for FY 2011/12. The audit for FY 2011/12 is expected to be completed by December 2012. Verified In-

come Tax Returns for FY 2010/11 was filed with the Large Tax payer's Office in second week of May 2012. In FY 2011/12, the Large Tax Payer's Office completed income tax assessment of NEA up to FY 2007/08. NEA has filed petition to Review Tribunal for review against tax assessment order for FY 2005/06.

Series of discussion on audit qualification for period from 2003/04 to 2008/09 were held in Parliamentary Public Accounts Committee in FY 2011/12. Most of these audit qualifications have been settled by NEA. During FY 2011/12, out of the total outstanding audit remarks of NRs. 9.58 million for the period from FY 1973/74 to FY 1993/94, NRs. 0.57 million was settled and remaining qualifications could not be settled due to non existence of Parliamentary Public Account Committee after the dissolution of Constituency Assembly.

NEA is required to achieve a number of covenants in respect of borrowing from the donor agencies. Major covenants related to financial performance are Rate of Return (RoR) (6%) ,Self Financing Ratio (SFR) (23%), Debt Service Coverage Ratio (DSCR) (1.2 times), Average Collection Period (ACP) (<3month) and Average Payment Period(APP) (<3month). NEA could not achieve any of the above loan covenants due to the deteriorating financial health. Considering the weakening financial health of NEA, the World Bank dropped covenants other than ACP and APP. Accordingly, NEA has to comply with only ACP and APP towards World Bank funded projects. NEA could achieve ACP of 4.04 (months) and APP of 5.35 (months) in FY 2011/12.

NEA has perceived the need to improve its current financial management system in order to meet the requirement of national and international accounting standards in preparation and presentation of financial statements. For strengthening financial accounting and financial management decision support system, NEA is planning to put in place a modern IT based Integrated Financial Management Information System (IFMIS). Accordingly, Institutional Strengthening Project is under implementation with the assistance from World Bank to strengthen financial management and accounting system under Institutional Strengthening of NEA Project. MS Deloitte Touch Tohmatsu India Pvt. Ltd. (DTT) in association with Raj MS, Kathmandu Nepal has been appointed the Consultant for this Project. The major scope of the consultancy service includes Accounting Framework Reform, Design and Support for Implementation of new IFMIS & capacity building. During the year under review, the Consultant prepared and submitted new accounting policy manual and internal audit manual and also provided a preliminary in house training on the use of these manuals.

Nepal Electricity Authority

Highlights of FY 2011/12

Description	FY 2012*	FY 2011	Increase (Decrease)	
			Amount	%
Revenue				
Net Sale of Electricity (M.NRs.)	20,079.13	17,946.82	2,132.31	11.88%
Income form other Services (M.NRs.)	1,349.74	1,382.94	-33.20	-2.40%
Total Renenue (M. NRs.)	**21,428.87**	**19,329.76**	**2099.11**	**10.86%**
Operating Expenses:				
Genertion Expenses (M. NRs.)	1,756.61	929.56	827.05	88.97%
Power Purchase (M. NRs.)	11,731.64	10,493.74	1,237.90	11.80%
Royalty (M. NRs.)	936.30	854.76	81.54	9.54%
Transmission Expenses (M. NRs.)	459.38	345.96	113.42	32.78%
Distribution Expenses (M. NRs.)	3,670.68	3,004.18	666.50	22.19%
Administration Expenses (M. NRs.)	1,009.38	866.74	142.64	16.46%
Depreciation Expenses (M. NRs.)	3,105.00	3,031.33	73.67	2.43%
Deferred Revenue Expenditure (M. NRs.)	-	323.68	-323.68	-
Total Operating Expenses (M. NRs.)	**22,668.99**	**19,849.95**	**2819.04**	**14.20%**
Operating Surplus (M. NRs.)	**-1,240.12**	**-520.19**	**-719.93**	**138.40%**
Interest on Long-Term Loans (M. NRs.)	3,780.00	3,594.01	185.99	5.17%
Foreign exhcnage tranlation losses	897.24	85.01	812.23	955.45%
Provision for Employee benefits	2,053.40	1,890.01	163.39	8.64%
Street light dues written off	580.00	-	580.00	-
Net Income (Loss) (M. NRs.)	**-8,550.76**	**-6,089.22**	**-2,461.54**	**40.42%**
Long-Term Loans (M. NRs.)	71,245.74	62,631.85	8,613.89	13.75%
Net Property, Plant & Equipment (M. NRs.)	86,120.47	84,725.47	1,395.00	1.65%
Number of Consumers	**2,320,409**	**2,056,155.00**	**264,254.00**	**12.85%**
Total Sales of Electricity (GWh)	**3,041.93**	**2,727.62**	**314.31**	**11.52%**
Internal Sold/Utilised (GWh)	3,037.81	2,696.52	341.29	12.66%
Annual Average Consumer's Consumption (kWh)+	1310.95	1,326.56	-15.62	-1.18%
Average Price of Electricity (NRs./kWh)	6.73	6.62	0.10	1.59%
Peak Load Interconnected System (GWh)	1,026.65	946.10	80.55	8.51%
Toal Available Electric Energy (GWh)	**4,178.63**	**3,858.37**	**320.26**	**8.30%**
NEA Hydro Generation (GWh)	2,357.43	2,122.08	235.35	11.09%
Termal Generation (GWh)	1.56	3.40	-1.84	-54.12%
Purchased Energy (GWh)- India	746.07	694.05	52.02	7.50%
- Nepal (Internal)	1,073.57	1,038.84	34.73	3.34%
Average Power Purchase Rate (NRs./kWh)++	6.45	6.06	0.39	6.47%
Exported Energy (GWh)	4.12	31.10	-26.98	-86.75%
Self Consumption (GWh)	32.17	29.30	2.87	9.80%
Net System Losses (Percentage)	26.43	28.55	-2.11	-7.41%

Note:- **Provisional figures* *+on internal sales* *++on total purchase*

Nepal Electricity Authority

Balance Sheet as of July 15, 2012

(NRs. in million)

Particulars	2012*	2011	2010	2009	2008	2007	2006	2005	2004	2003
ASSETS										
Non Current Assets										
Property, Plant & Equipment	86,120.47	84,725.47	83,105.63	81,238.50	52,030.28	51,781.76	51,743.38	52,166.56	51,415.14	50,094.75t
Capital Work in Progress	31,924.53	22,832.03	17,040.47	13,550.46	35,699.71	29,145.19	21,991.50	16,060.40	10,619.55	8,655.48
Investments	5,008.07	4,855.07	3,122.06	2,139.92	1,620.19	882.05	819.90	777.00	713.01	613.01
Deferred Expenditure to be Written Off	-	-	323.68	361.22	423.33	130.94	32.40	126.70	250.01	506.82
Total Non-Current Assets	**123,053.07**	**112,412.57**	**103,591.84**	**97,290.10**	**89,773.51**	**81,939.94**	**74,587.18**	**69,130.66**	**62,997.71**	**59,870.06**
Current Assets :-										
Inventories	2,544.14	2,502.93	2,431.99	2,159.12	1,800.13	1,498.45	1,354.80	1,372.70	1,048.01	1,017.22
Trade and other Receivables	6,672.13	6,871.19	6,097.74	4,854.02	5,721.08	5,151.41	4,415.40	3,947.00	3,735.71	3,380.20
Cash and Cash Equivalents	1,636.65	2,016.58	1,244.65	1,724.76	1,337.15	1,447.58	1,258.60	1,322.60	1,036.42	1,076.15
Prepaid, Advances, Loans and Deposits	3,025.83	2,976.82	4,585.60	2,495.13	2,319.72	2,225.53	2,293.90	2,098.60	2,063.27	2,216.91
Total Current Assets	**13,878.75**	**14,367.52**	**14,359.98**	**11,233.03**	**11,178.08**	**10,322.97**	**9,322.70**	**8,740.90**	**7,883.41**	**7,690.48**
Total Assets	**136,931.82**	**126,780.09**	**117,951.82**	**108,523.13**	**100,951.59**	**92,262.91**	**83,909.88**	**77,871.56**	**70,881.12**	**67,560.54**
EQUITY AND LIABILITIES										
Capital and Reserves										
Share Capital	31,087.31	25,694.81	38,651.77	33,659.46	28,609.97	26,382.18	23,113.10	20,161.80	18,215.85	16,976.87
Reserves and Accumulated Profits:										
Reserve	1,677.55	1,677.55	1,631.30	1,497.85	1,407.83	998.92	550.49	513.87	477.51	425.03
Accumulated Profits (Loss)	(8,550.76)	-	(21,022.36)	(14,098.83)	(8,985.61)	(6,650.04)	(6,095.81)	(4,808.01)	(3,475.20)	(1,694.90)
Total Equity	**24,214.10**	**27,372.36**	**19,260.71**	**21,058.48**	**21,032.19**	**20,731.06**	**17,567.78**	**15,867.66**	**15,218.16**	**15,707.00**
Non-Current Liabilities										
Borrowings	71,245.74	62,631.85	58,231.66	53,788.45	51,368.84	47,616.15	46,487.91	44,537.51	41,103.14	39,637.11
Deferred Tax	693.20	693.20	693.20	693.20	791.01	848.40	-	-	-	-
Total Non-Current Liabilities	**71,938.94**	**63,325.05**	**58,924.86**	**54,481.65**	**52,159.85**	**48,464.55**	**46,487.91**	**44,537.51**	**41,103.14**	**39,637.11**
Current Liabilities										
Borrowings	2,000.00	790.00	1,280.00	250.00	1,140.00	0.00	700.00	600.00	600.00	400.00
Sundry Creditors and Other Payables	29,258.65	27,825.95	32,909.45	29,402.22	24,534.17	22,374.17	18,444.39	16,168.69	13,278.34	11,063.12
Provisions	9,520.13	7,466.73	5,576.80	3,330.78	2,085.38	693.13	709.80	697.70	681.48	753.31
Total Current Liabilities	**40,778.78**	**36,082.68**	**39,766.25**	**32,983.00**	**27,759.55**	**23,067.30**	**19,854.19**	**17,466.39**	**14,559.82**	**12,216.43**
Total Liabilities	**112,717.72**	**99,407.73**	**98,691.11**	**87,464.65**	**79,919.40**	**71,531.85**	**66,342.10**	**62,003.90**	**55,662.96**	**51,853.54**
Total Equity and Liabilities	**136,931.82**	**126,780.09**	**117,951.82**	**108,523.13**	**100,951.59**	**92,262.91**	**83,909.88**	**77,871.56**	**70,881.12**	**67,560.54**
Contingent liabilities	**2,038.54**	**1,635.62**	**8,405.92**	**10,953.23**	**10,210.43**	**9,661.33**	**7,206.07**	**4,183.07**	**7,161.14**	**1,859.18**

Note:- **Provisional figures*

Nepal Electricity Authority

Income Statement for the fiscal year ending July 15, 2012

(NRs. in million)

Particulars	2012*	2011	2010	2009	2008	2007	2006	2005	2004	2003
Sales	20,079.13	17,946.82	17,164.60	14,405.93	15,041.39	14,449.73	13,331.90	12,605.20	11,874.70	11,012.60
Cost of Sales :										
Generation	1,756.61	929.56	1,541.27	1,119.71	979.76	855.64	811.12	642.06	544.18	422.17
Power Purchase	11,731.64	10,493.74	9,746.57	7,691.28	7,437.04	6,967.58	6,391.95	5,760.31	5,415.62	4,087.01
Royalty	936.30	854.76	849.77	796.12	839.18	970.47	897.50	844.11	606.10	660.22
Transmission	459.38	345.96	337.73	328.16	274.85	240.88	232.13	215.93	199.50	178.60
Gross profit	5,195.20	5,322.80	4,689.26	4,470.66	5,510.56	5,415.16	4,999.20	5,142.79	5,109.30	5,664.60
Other Income	1,349.74	1,382.94	1,188.27	1,601.67	934.66	1,016.61	639.90	617.50	671.40	512.50
Distribution Expenses	3,670.68	3,004.18	3,091.21	2,575.09	2,110.01	1,834.39	1,703.70	1,484.20	1,376.10	1,308.60
Administrative Expenses	1,009.38	866.74	789.52	651.69	683.98	479.60	419.50	622.40	489.10	536.10
Interest Expenses	3,780.00	3,594.01	3,668.65	2,492.55	2,274.37	2,385.41	3,050.90	3,079.80	2,991.50	2,973.40
Depreciation	3,105.00	3,031.33	2,902.92	2,361.20	1,895.17	1,856.47	1,816.90	1,733.50	1,686.00	1,656.70
Loss (Gain) on Foreign Exchange	897.24	85.01	28.67	813.96	484.10	(493.39)	42.70	(230.00)	59.10	-
Provision for losses on property, plant & equipment	-	-	-	-	60.00	60.00	65.00	40.00	-	191.50
Provision under Employees' Benefits Plan	2,053.40	1,890.01	2,246.02	1,246.00	1,354.00	-	-	-	-	-
Street light dues written off	580.00	-	-	863.00	-	-	-	-	-	-
Deferred Expenditure Written Off	-	323.68	112.36	96.68	108.51	42.56	105.40	123.30	320.10	411.10
Net Profit/(Loss) before Tax	(8,550.76)	(6,089.22)	(6,961.82)	(5,027.84)	(2,524.92)	266.73	(1,565.00)	(1,092.91)	(1,141.20)	(900.30)
Provision for Income Tax	-	-	-	-	-	-	-	-	274.20	1,497.90
Deferred Tax Expense (Income) recognised	-	-	-	97.80	57.39	73.47	-	-	-	-
Net Profit (Loss) after Tax	(8,550.76)	(6,089.22)	(6,961.82)	(4,930.04)	(2,467.53)	193.26	(1,565.00)	(1,092.91)	(1,415.40)	(2,398.20)
Net Profit (Loss) as per Last Account		(21,022.36)	(14,098.83)	(8,985.61)	(6,650.04)	(6,095.81)	(4,808.01)	(3,475.20)	(1,694.90)	278.90
Prior years Income(Income) Expenses		76.61	(38.29)	163.18	(151.96)	727.49	(297.20)	219.90	344.90	(444.40)
Total Profit Available for Appropriation	(8,550.76)	(27,188.19)	(21,022.36)	(14,078.83)	(8,965.61)	(6,630.04)	(6,075.81)	(4,788.01)	(3,455.20)	(1,674.90)
Appropriation for Insurance Fund	-	-	-	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Accumulated Loss Adjusted	-	27,188.19	-	-	-	-	-	-	-	-
Profit (Loss) transferred to Statement of Financial Position	(8,550.76)	-	(21,022.36)	(14,098.83)	(8,985.61)	(6,650.04)	(6,095.81)	(4,808.01)	(3,475.20)	(1,694.90)

Note:- **Provisional figures*

Accounting Policies

1. Basis of preparation of Financial Statements

The financial statements have been prepared in accordance with Nepal Accounting Standards (NAS) and Generally Accepted Accounting Principles and practices following historical cost conventions.

The preparation of financial statements requires NEA's management to make estimates and assumptions that affect the reported balance of assets and liabilities, revenues and expenses and disclosures relating to the contingent liabilities. The management believes that the estimates used in preparation of the financial statements are prudent and reasonable. Future results could differ from these estimates. Any revision to accounting estimates is recognized prospectively in the current and future periods. Examples of such estimates include provision for employee benefits, provision for obsolescence in value of inventory, diminution in value of long-term investments, provision for doubtful debts/advances, etc.

2. Property, Plant and Equipment

Property, plant and equipment are stated at cost of acquisition and/or cost of construction less accumulated depreciation. The cost of property, plant and equipment includes cost of acquisition or construction/erection together with other incidental costs and charges attributable to bringing the asset to its working condition for its intended use and also include borrowing costs directly attributable to the acquisition, construction/ erection of qualifying asset.

The incidental costs include proportionate overheads relating to the following offices at the rates given below:

(a)	Planning	50%
(b)	Distribution and Consumer	10%
(c)	Engineering	50%
(d)	Finance and Administration	10%

3. Depreciation

Depreciation is provided on Property, Plant and Equipment, except land, on straight-line basis, which reflects the estimated useful lives of those assets. The rates of depreciation on property, plant and equipment are as follows:

Assets Category		Depreciation Rate (per annum)
(a)	Land	-
(b)	Buildings	2%
(c)	Hydro Electric Structures	2%-3%
(d)	Hydro Electric Plant & Machinery	3%
(e)	Internal Combustion on plant & machinery	2%
(f)	Transmission lines (66 KV, 132 KV and above)	3%
(g)	Transmission lines (33 KV)	3%
(h)	Transmission Substations	3%
(i)	Distribution system (including < 11 KV Transmission lines)	3%-4%
(j)	Solar Power	3%
(k)	Meter & metering equipment	10%
(l)	Consumer Services	7%
(m)	Public lighting	3%
(n)	Vehicles, tools and instruments, furniture and fixtures.	20%
(o)	Office Equipment	15%
(p)	Miscellaneous properties	50%
(q)	Additions during the year	50% of applicable rates

4. Capital Work in Progress (CWIP)

All expenditures in developing property, plants, and equipments not yet completed or ready to use are categorized as CWIP.

5. Investments in Shares

All investments are carried at cost. Provisions are made for impairment, if any, in the value of such investments.

6. Deferred Revenue Expenditure

Certain expenditures incurred on training, investigation, survey, software development, feasibility studies of infrastructure projects and major overhauling etc. which expected to generate benefits over a period of time, were being treated as deferred expenditures and were written off over a period of five years, including the year in which the said expenditures are incurred.

However considering the requirement of NAS all outstanding deferred expenditures have been charged to the income statement from the previous FY2010/11.

7. Inventories

Inventories are valued at lower of cost or net realisable value, using the weighted average method. Management estimates provision for decrease in value of inventory due to obsolesce or otherwise.

8. Trade Receivables

Trade receivables are stated at book values, less provision for doubt on recovery as may be considered appropriate by the management.

9. Foreign Currency Loans

Liabilities on foreign currency loans as at the year ended are converted into Nepali Rupees by applying prevailing year-end exchange rates. The gain /loss arising there from such transaction is recognized as income or expenses in the Income Statement.

10. Grant – in- Aid, Contribution from Customer / Local Authority

Grants-in-Aid received from the GoN or other Authorities towards capital expenditure as well as consumers' contribution to capital work are treated initially as Capital Reserve and subsequently adjusted as income in the same proportion as depreciation is charged on such assets.

11. Revenue from Sale of Electricity

(i) Revenue from sale of electricity is recognised at the time of raising bills to the customers as per the billing cycle Revenue from the billing cycle date up to 31 Ashad (15 July) has been recognised on estimated basis. Revenue from sale of electricity is shown net of rebate.

(ii) Rebate on payment before the due date and surcharge for delayed payments are accounted for on cash basis.

12. Income from Other Services

(i) Interest on investments and rental income are recognised on accrual basis.

(ii) Dividend on investment in shares is recognized when right to receive has been established.

(iii) Revenue from other services, including services provided by Engineering Services, are recognized on cash basis.

13. Employee Benefits

a. Employee benefits, other than retirement benefits, are accounted for in the period during which the services have been rendered on accrual basis.

b. For Retirement Benefits Plans

c. Defined Contribution Plans (such as Provident Fund and Insurance Schemes) expenses are charged to income statement on the basis of the liability recognised for the period.

d. Defined Benefit Plans (such as Gratuity, Pension, Leave Encashment and Medical Benefits) expenses are charged to the income statement on the basis of actuarial valuation.

e. Liability of actuarial valuation done during the year 2007/08 is being charged over the period of five beginning for the year.

14. Insurance Fund

Insurance fund is created by setting aside a sum of Rs 20 million every year, in case of profit for the year, to cover any loss of property, plant and equipment, for any eventuality.

15. Taxes

Current tax is determined as the amount of tax payable in respect of taxable income for the year.

Deferred tax is recognized on temporary difference, being the difference between tax base of assets and liability and carrying amount thereto. Where there is carry forward losses, deferred tax asset are recognized only if there is virtual certainty of realization of such assets. Other deferred tax assets are recognized only to the extent there is reasonable certainty of realization in future.

16. Provisions

Recognition of Provisions involves substantial degree of estimation in measurement and are recognized when there is a present obligation as a result of past events and it is probable that there will be an outflow of resources to settle such obligations. These are reviewed at each yearend date and adjusted to reflect the best current estimate.

17. Contingent Liabilities

Contingent liabilities are disclosed in respect of possible present obligations that have arose from past events but their existence can only be confirmed on occurrence or non occurrence of one or more uncertain future events not wholly within the control of NEA and possibility of outflow of resources is not determinable.

18. Prior year's figures/ regrouping

Previous year's figures have been reclassified/regrouped, where ever necessary, to make them comparable with current year's figures.

Tariff Rates

(Billing Effective from August 17, 2012)

1	DOMESTIC CONSUMERS			
	1.1. Low Voltage (400/230 V)			
	A. Minimum Monthly Charge:			
		METER CAPACITY	Minimum Charge (NRs.)	Exempt (kWH)
		5 Ampere	80.00	20
		15 Ampere	365.00	50
		30 Ampere	795.00	100
		60 Ampere	1765.00	200
		Three phase supply		
		Up to 10 KVA	4400.00	400
		Above 10 KVA to 25 KVA	6900.00	600
	B. Energy Charge: (Single Phase)			
		Energy Consumption Block	Rate NRs. (Per Unit)	Billing Method
	1	Up to 20 Units	4.00	Minimum Charge
	2	21- 50 Units	7.30	Up to 20 units Rs. 4.00/unit, for 21-30 units Rs.7.30/unit. But, for energy consumption above 30 units, consumption from 1 unit itself shall be charged at Rs. 7.30/unit.
	3	51-150 Units	8.60	Rs. 7.30/unit for 0-50 Units and Rs. 8.60/unit for 51-150 Units .
	4	151-250 Units	9.50	Rs. 8.60/unit for 0-150 Units and Rs. 9.50/unit for 151-250 Units .
	5	Above 250 Units	11.00	Rs. 9.50/unit for 0-250 Units and Rs. 11.00/unit above 250 Units.
	C. Energy Charge: (Three Phase)			
	1	Up to 10 KVA	12.00	Minimum charge Rs.4400.00 for Consumption up to 400 Units and Rs.12.00/unit above 400 Units.
	2	Above 10 KVA up to 25 KVA	12.50	Minimum charge Rs.6900.00 for Consumption up to 600 Units and Rs.12.50/unit above 600 Units.
	1.2. Medium Voltage (33/11 K.V.)			
	A. Minimum Monthly Charge:			
		METER CAPACITY	Minimum Charge (NRs.)	Minimum Unit kWH
		Above 25 KVA	31250.00	2500
	B. Energy Charge			
		Energy Consumption Block	Rate NRs. (Per Unit)	Billing Method
		Above 25 KVA	12.90	Minimum Charge Rs. 31,250.00 for consumption up to 2500 Units and Rs. 12.90/unit above 2500 Units.

2	OTHER CONSUMERS			
	2.1 Low Voltage (400/230 Volt)		Rate (NRs.)	
	S.N.	Consumer Category	Demand Charge Rs./KVA/month	Energy Charge (Rs./Unit)
	1	Industrial		
		a) Rural and domestic	55.00	6.50
		b) Small Industry	100.00	8.00

	2	Commercial	295.00	9.35
	3	Non-Commercial	195.00	10.00
	4	Irrigation		3.60
	5	**Water Supply**		
		a) Community Water Supply	140.00	4.30
		b) Other Water Supply	210.00	6.00
	6	Temple		5.10
	7	**Street Light**		
		a) Metered		6.10
		b) Non Metered	2250.00	
	8	Temporary Supply		16.50
	2.2 High Voltage			
	a) 66 kV or above			
	1	Industrial	220.00	6.25
	b) Medium Voltage (33 kV)			
	1	Industrial	230.00	7.00
	2	Commercial	285.00	9.00
	3	Non-Commercial	220.00	9.50
	4	Irrigation	50.00	4.00
	5	**Water Supply**		
		a) Community Water Supply	200.00	5.00
		b) Other Water Supply	200.00	5.50
	6	**Transportation**		
		a) Trolleybus	230.00	5.30
		b) Other Transportation	230.00	7.20
	c) Medium Voltage (11 kV)			
	1	Industrial	230.00	7.20
	2	Commercial	285.00	9.25
	3	Non-Commercial	220.00	9.60
	4	Irrigation	50.00	4.10
	5	**Water Supply**		
		a) Community Water Supply	200.00	5.20
		b) Other Water Supply	200.00	5.70
	6	**Transportation**		
		a) Trolleybus	230.00	5.30
		b) Other Transportation	230.00	7.30
	7	Temple	200.00	8.25
	8	Temporary Supply	300.00	10.00

3 TIME OF DAY (TOD) TARIFF RATES

	S.N.	Consumer Category	Monthly Demand Charge (Rs. /KVA)	Energy Charge (Rs./Unit)		
				Peak Time	Off-Peak	Normal
				17:00-23:00	23:00-5:00	5:00-17:00
	a) 66 kV or above					
	1	Industrial	220.00	7.75	3.30	6.25

	b) Medium Voltage (33 kV)					
	1	Industrial	230.00	8.50	4.20	7.00
	2	Commercial	285.00	10.25	5.40	9.00
	3	Non-Commercial	220.00	11.00	5.60	10.00
	4	Irrigation	50.00	5.25	2.50	3.90
	5	**Water Supply**				
		a) Community Water Supply	200.00	6.10	2.90	4.90
		b) Other Water Supply	200.00	8.50	4.20	7.00
	6	**Transportation**				
		a) Trolleybus	230.00	6.35	3.10	5.20
		b) Other Transportation	230.00	8.50	3.10	7.00
	7	Street Light	70.00	7.00	2.80	3.50
	c) Medium Voltage (11 kV)					
	1	Industrial	230.00	8.75	4.30	7.10
	2	Commercial	285.00	10.50	5.50	9.25
	3	Non-Commercial	220.00	11.25	5.70	10.20
	4	Irrigation	50.00	5.30	2.80	3.95
	5	**Water Supply**				
		a) Community Water Supply	200.00	6.20	3.50	5.10
		b) Other Water Supply	200.00	8.75	4.30	7.10
	6	**Transportation**				
		a) Trolleybus	230.00	6.50	3.50	5.30
		b) Other Transportation	230.00	8.75	3.50	7.10
	7	Street Light	70.00	7.35	3.00	3.65
	8	Temple	200.00	9.40	4.10	7.60
	9	Temporary Supply	300.00	12.00	5.25	9.80
4	**COMMUNITY WHOLESALE CONSUMER**					
	Voltage Level			**Energy Charge (Rs./Unit)**		
	a) Medium Voltage (33 kV/11 kV)					
	Up to (N X 30) Units			3.50		
	Above (N x 30) Units			5.00		
	b) Low Voltage (400/230 Volt)					
	Up to (N X 30) Units			3.50		
	Above (N x 30) Units			5.25		

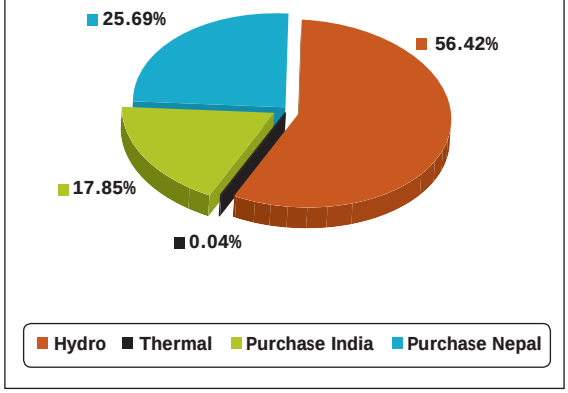
N = Total number of consumers of a community group.

Note:

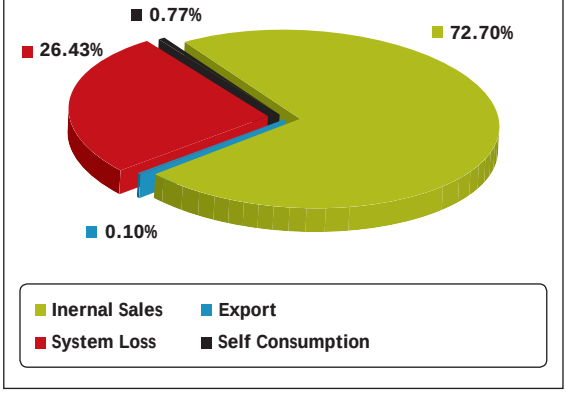
1. *Low voltage refers to 230/400 V, Medium voltage refers to 11 kV / 33 kV and High voltage refers to 66 kV and above.*
2. *If Demand Meter of any consumer reads kilowatts (kW), then kVA=kW/0.8. Consumers having kW demand meter shall mandatorily install Capacitors within the given time. Otherwise their kVA demand shall be calculated as kVA=kW/0.7.*
3. *10% Discount in the total bill amount will be given to the GoN approved Industrial Districts, if the bill is paid within 21 days of billing date.*
4. *20% Discount in the total bill amount will be given to the Nepal Government Hospitals and Health Centres (except residential complex), if the bill is paid within 21 days of billing date.*
5. *Consumers supplied at High Voltage (66 kV and above) and Medium Voltage (33 kV and 11 kV) should compulsorily install TOD Meters.*
6. *If new additional consumers applying for 11 kV supply are to be supplied at 33 kV, they will be charged as per 11 kV tariff structure.*

Statistics & Schematics

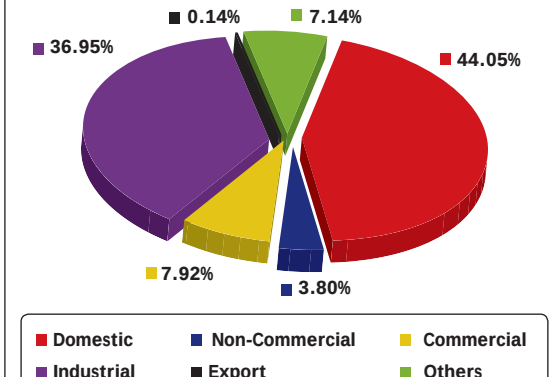
AVAILABILITY OF ENERGY FY 2011/12



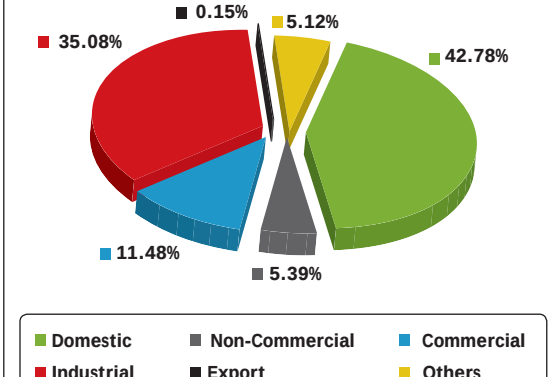
UTILIZATION FY 2011/12



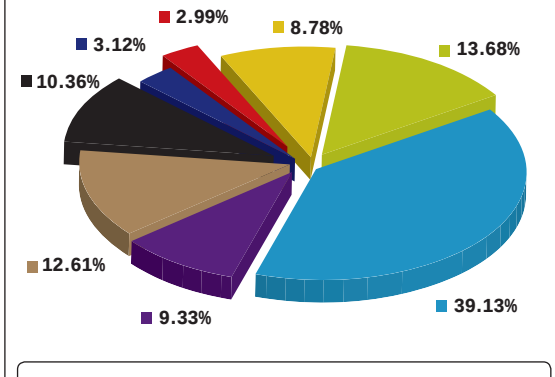
SALES FY 2011/12



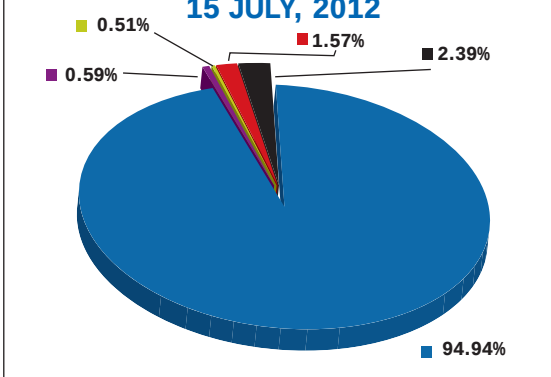
REVENUE FY 2011/12



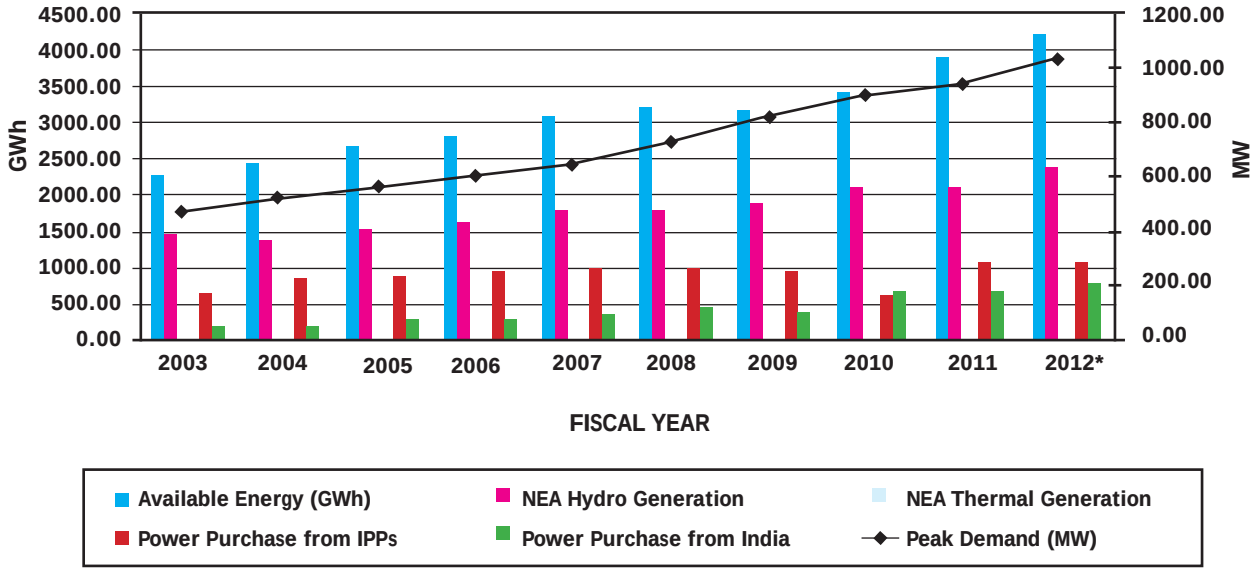
EXPENDITURE FY 2011/12



NO. OF CONSUMERS AS OF 15 JULY, 2012



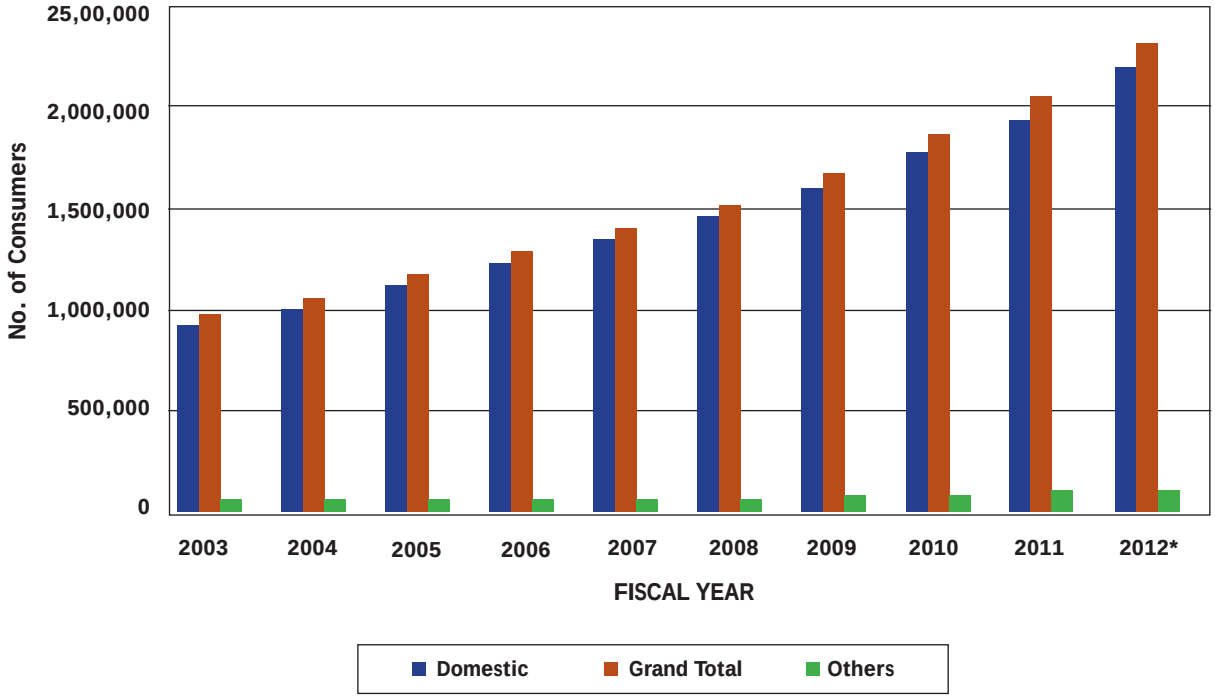
Total Energy Available & Peak Demand



Particulars	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012*
Peak Demand (MW)	470.33	515.24	557.53	603.28	648.39	721.73	812.50	885.28	946.10	1026.65
NEA Hydor Generation	1478.04	1345.46	1522.90	1568.55	1747.42	1793.14	1839.53	2108.65	2122.08	2357.43
NEA Thermal Generation	4.40	9.92	13.67	16.10	13.31	9.17	9.06	13.01	3.40	1.56
NEA Generation Total (GWh)	1482.44	1355.38	1536.57	1584.65	1760.73	1802.31	1848.59	2121.66	2125.48	2358.99
Power Purchase from India	149.88	186.68	241.39	266.23	328.83	425.22	356.46	638.68	694.05	746.07
Power Purchase from IPPs	628.81	838.84	864.80	930.04	962.26	958.42	925.74	591.43	1038.84	1073.57
Power Purchase Total (GWh)	778.69	1025.52	1106.18	1196.27	1291.09	1383.64	1282.20	1230.11	1732.89	1819.64
Available Energy (GWh)	2261.13	2380.90	2642.75	2780.92	3051.82	3185.95	3130.79	3351.77	3858.37	4178.63

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

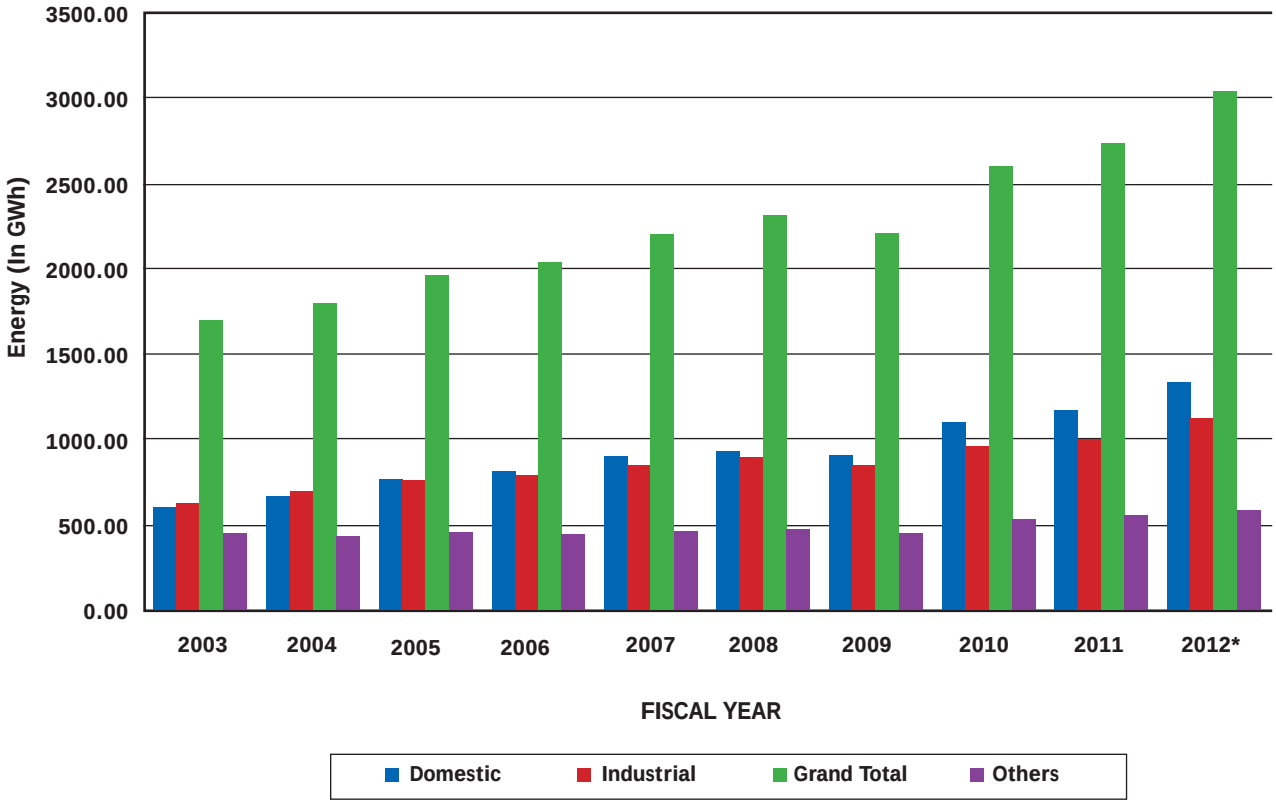
Growth of Consumers



Particulars	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012*
Domestic	930,554	1,010,719	1,113,740	1,227,295	1,339,253	1,450,254	1,595,015	1,775,571	1,949,530	2,202,969
Non-Commercial	9,722	9,865	9,950	10,010	10,215	10,556	10,518	10,952	12,520	13,772
Commercial	5,317	5,454	6,000	6,170	6,000	6,052	7,305	8,919	10,802	11,882
Industrial	19,833	21,374	22,500	23,020	24,089	25,548	28,559	29,410	33,030	36,333
Water Supply	305	352	370	380	414	434	584	609	688	757
Irrigation	1,721	2,557	3,400	6,450	13,183	18,614	22,335	32,089	42,494	46,743
Street Light	1,229	1,437	1,500	1,550	1,608	1,961	2,339	2,214	2,374	2,611
Temporary Supply	138	150	155	165	210	300	403	522	634	697
Transport	48	48	50	54	39	38	42	41	42	46
Temple	1,738	1,959	2,150	2,290	2,628	2,746	2,911	2,941	3,181	3,499
Community Sales	1	15	35	58	169	375	594	795	995	1,095
Total (Internal Sales)	970,606	1,053,930	1,159,850	1,277,442	1,397,808	1,516,878	1,670,605	1,864,063	2,056,290	2,320,404
Bulk Supply (India)	5	5	5	5	5	5	5	4	2	5
Grand Total	970,611	1,053,935	1,159,855	1,277,447	1,397,813	1,516,883	1,670,610	1,864,067	2,056,292	2,320,409

Note : ** Provisional figures*

Electricity Sales

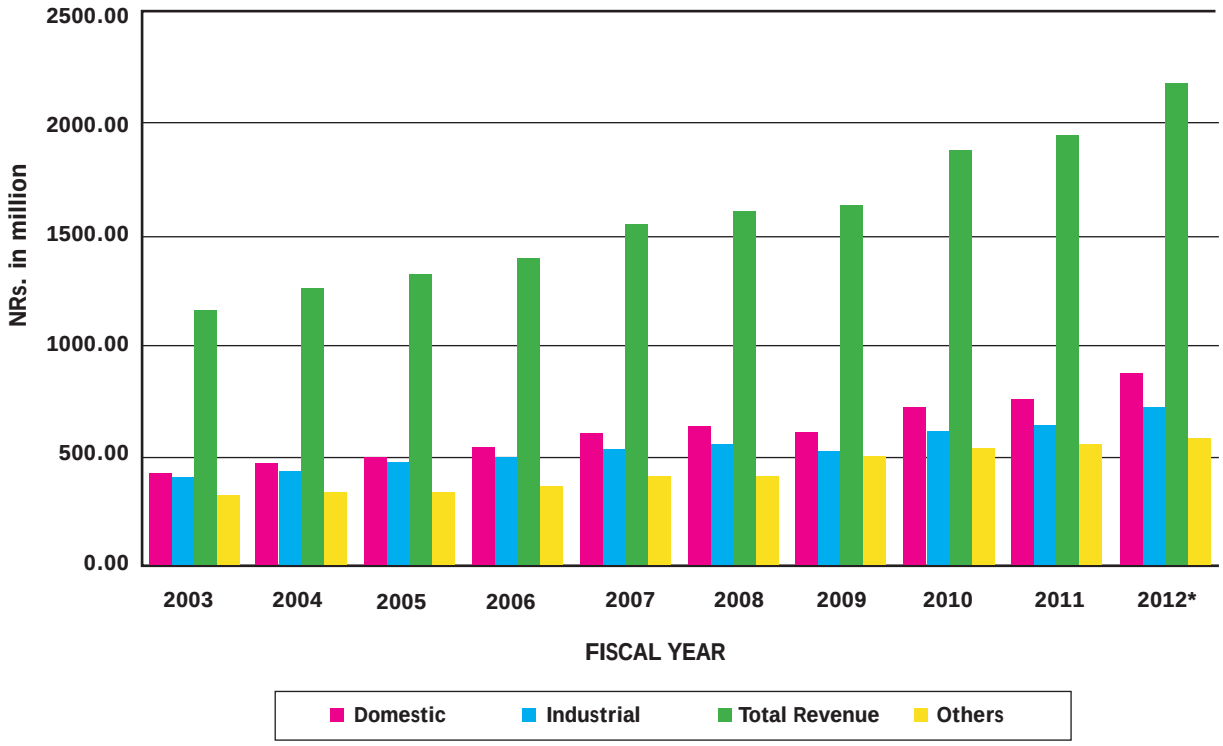


(in GWh)

Particulars	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012*
Domestic	612.37	670.78	758.19	805.72	893.27	931.35	908.67	1,108.87	1,169.31	1,339.93
Non-Commercial	80.74	83.01	100.54	95.29	100.52	109.93	98.89	103.47	109.49	115.68
Commercial	92.74	108.12	109.31	120.30	141.69	154.38	146.29	187.12	204.03	240.97
Industrial	629.51	689.80	764.00	785.55	849.13	901.09	845.68	960.43	1,001.73	1,123.92
Water Supply & Irrigation	29.98	31.67	49.98	45.50	47.96	46.86	48.14	55.98	82.80	64.58
Street Light	45.80	55.20	54.86	63.24	66.90	70.26	67.51	65.58	67.21	72.04
Temporary Supply	0.35	0.25	0.39	0.87	1.26	0.70	1.04	1.00	1.00	1.21
Transport	5.53	5.47	5.80	5.65	6.31	5.88	5.22	5.42	5.54	6.49
Temple	2.81	4.11	4.58	4.77	4.78	5.12	4.76	3.64	3.46	3.96
Community Sales	4.74	5.58	6.03	9.18	15.51	24.65	32.01	34.95	51.95	69.03
Total (Internal Sales)	1,504.57	1,653.99	1,853.68	1,936.07	2,127.33	2,250.22	2,158.21	2,526.46	2,696.52	3,037.81
Bulk Supply (India)	192.25	141.23	110.70	96.55	76.87	60.10	46.38	75.07	31.10	4.12
Grand Total	1,696.82	1,795.22	1,964.38	2,032.62	2,204.20	2,310.32	2,204.59	2,601.53	2,727.62	3,041.93

Note : ** Provisional figures*

Revenue

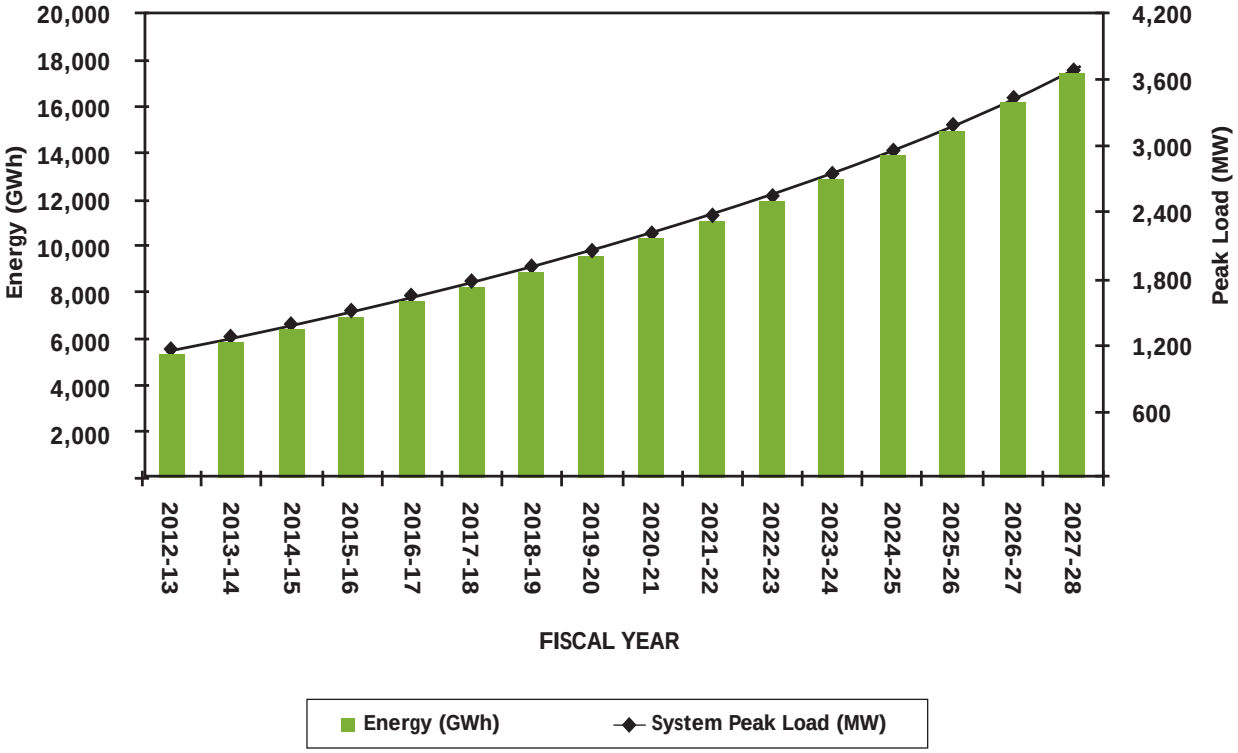


(NRs. in million)

Particulars	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012*
Domestic	4,249.81	4,701.07	4,987.04	5,405.12	6,021.40	6,297.65	6,100.65	7,252.06	7,602.34	8,754.55
Non-Commercial	783.99	816.03	862.37	881.73	940.20	982.08	900.75	983.63	1,020.51	1,103.60
Commercial	894.91	986.32	1,012.66	1,081.26	1,288.05	1,399.51	1,384.67	1,719.35	1,910.28	2,348.54
Industrial	4,039.65	4,380.89	4,799.74	4,978.69	5,300.91	5,544.80	5,264.33	6,060.20	6,378.25	7,177.63
Water Supply & Irrigation	148.53	154.91	171.57	197.96	214.18	204.67	215.62	353.14	250.60	279.23
Street Light	246.79	329.31	354.10	422.35	454.85	467.31	445.96	333.90	433.42	458.68
Temporary Supply	4.74	3.46	5.06	11.18	17.36	10.51	12.20	13.58	13.98	16.46
Transport	29.29	28.92	30.72	29.78	31.65	33.70	26.95	27.58	27.78	31.93
Temple	14.24	26.38	29.17	24.42	26.03	26.38	24.41	28.16	26.51	20.03
Community Sales	16.59	20.09	24.03	23.94	53.70	64.22	70.10	170.90	189.28	240.77
Total (Internal Sales)	10,428.54	11,447.38	12,276.46	13,056.43	14,348.33	15,030.83	14,445.64	16,942.50	17,852.95	20,431.42
Bulk Supply (India)	808.96	673.93	609.51	579.33	428.93	361.14	295.49	604.85	215.42	31.25
Gross Revenue	11,237.50	12,121.31	12,885.97	13,635.76	14,777.26	15,391.97	14,741.13	17,547.35	18,068.37	20,462.67
Net Income from Other Services	287.64	424.75	336.70	336.09	689.08	584.18	1,601.66	1,188.27	1,382.94	1,349.74
Total Revenue	11,525.14	12,546.06	13,222.67	13,971.85	15,466.34	15,976.15	16,342.79	18,735.62	19,451.31	21,812.41

Note : ** Provisional figures*

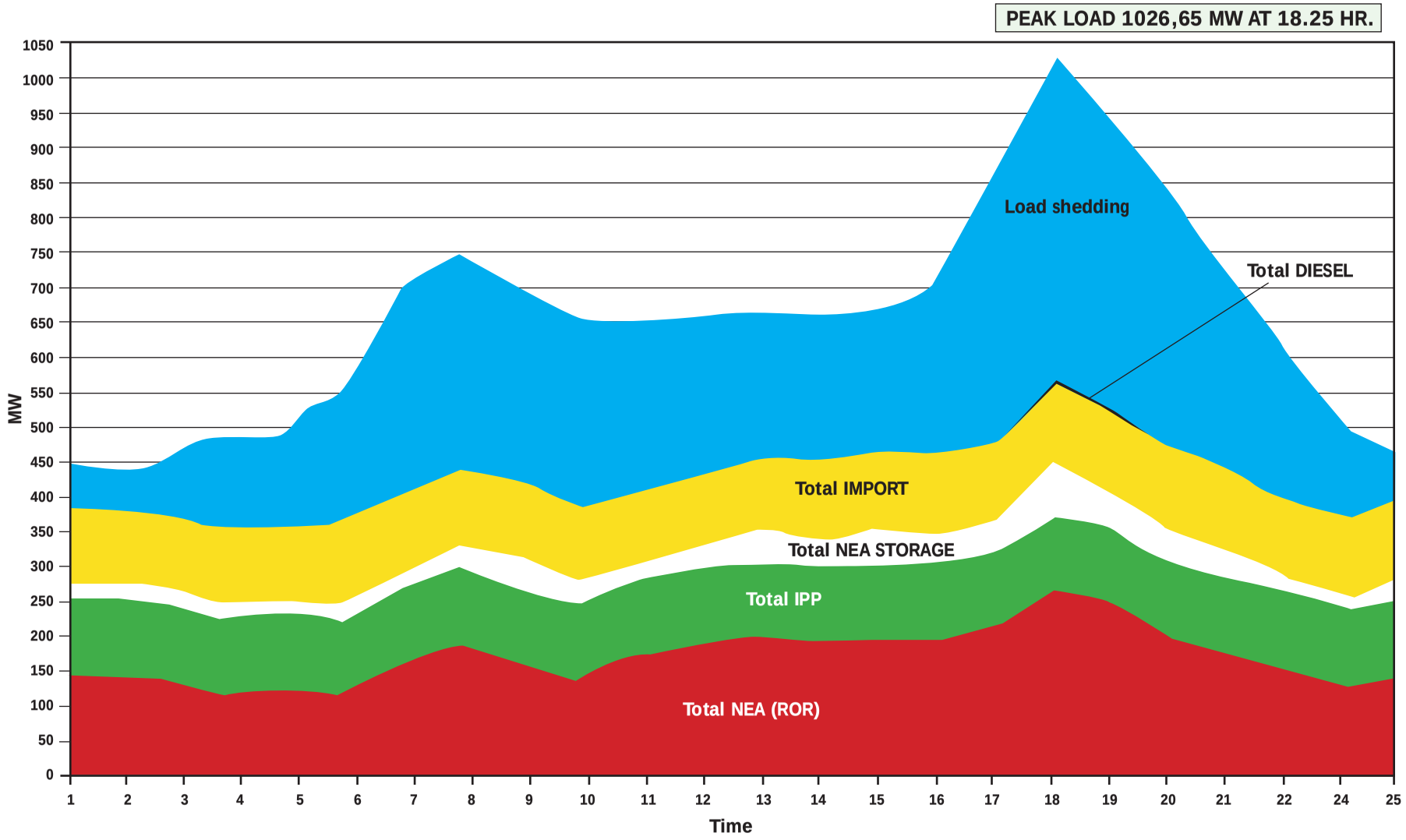
Load Forecast



Fiscal Year	Energy (GWh)	System Peak Load (MW)
2012-13	5,349.6	1,163.2
2013-14	5,859.9	1,271.7
2014-15	6,403.8	1,387.2
2015-16	6,984.1	1,510.0
2016-17	7,603.7	1,640.8
2017-18	8,218.8	1,770.2
2018-19	8,870.2	1,906.9
2019-20	9,562.9	2,052.0
2020-21	10,300.1	2,206.0
2021-22	11,053.6	2,363.0
2022-23	11,929.1	2,545.4
2023-24	12,870.2	2,741.1
2024-25	13,882.4	2,951.1
2025-26	14,971.2	3,176.7
2026-27	16,142.7	3,418.9
2027-28	17,403.6	3,679.1

System Load Curve of Peak Load Day

Poush 29, 2068 (Jan 13, 2012 Friday)



Electricity Generating Stations & Projects

	Major Hydropower Stations Existing			
1	Middle Marsyangdi		70,000	kW
2	KaliGandaki "A"		144,000	kW
3	Marsyangdi		69,000	kW
4	Kulekhani No. 1		60,000	kW
5	Kulekhani No. 2		32,000	kW
6	Trisuli		24,000	kW
7	Gandak		15,000	kW
8	Modi Khola		14,800	kW
9	Devighat		14,100	kW
10	Sunkosi		10,050	kW
11	Puwakhola		6,200	kW
		Sub Total	**459,150**	
	Small Hydropower Stations			
12	Chatara		3,200	kW
13	Panauti		2,400	kW
14	Tatopani/Myagdi(i) & (II)		2,000	kW
15	Seti (Pokhara)		1,500	kW
16	Phewa (Pokhara)		1,000	kW
17	Tinau (Butwal)		1,024	kW
18	Sundarijal		640	kW
19	Pharping***		500	kW
20	Jomsom**		240	kW
21	Baglung		200	kW
22	Khandbari**		250	kW
23	Phidim**		240	kW
24	Surnaiyagad (Baitadi)		200	kW
25	Doti		200	kW
26	Ramechhap		150	kW
27	Terhathum**		100	kW
		Sub Total	**13,844**	**kW**
		Total	**472,994**	**kW**
	Small Hydropower Stations Existing (Isolated)			
1	Dhankuta***		240	kW
2	Jhupra (Surkhet)***		345	kW
3	Gorkhe (Ilam)***		64	kW
4	Jumla **		200	kW
5	Dhading***		32	kW
6	Syangja***		80	kW
7	Helambu		50	kW
8	Darchula (I) & (II)**		300	kW
9	Chame**		45	kW
10	TapleJung**		125	kW
11	Manang**		80	kW
12	Chaurjhari (Rukum)**		150	kW
13	Syarpudaha (Rukum)**		200	kW
14	Bhojpur**		250	kW
15	Bajura		200	kW
16	Bajhang**		200	kW
17	Arughat Gorkha		150	kW
18	Okhaldhunga**		125	kW
19	Rupalgad (Dadeldhura)		100	kW
20	Achham		400	kW
21	Dolpa		200	kW
22	Kalikot		500	kW
23	Heldung (Humla)		500	kW
		Total	**4,536**	**kW**

	Diesel Power Stations Existing			
1	Duhabi Multifuel		39,000	kW
2	Hetauda		14,410	kW
		Total	**53,410**	**kW**
	Solar Power Stations Existing			
1	Simikot		50	kW
2	Gamgadhi		50	kW
		Total	**100**	
	Total Major Hydro (NEA) - Grid Connected		472,994	kW
	Total Small Hydro (NEA) - Isolated		4,536	kW
	Total Hydro (NEA)		477,530	kW
	Total Hydro (IPP)		187,581	kW
	Total Hydro (Nepal)		477,530	kW
	Total Thermal (NEA)		53,410	kW
	Total Solar (NEA)		100	kW
	Total Installed Capacity (Including Private & Others)		**718,621**	**kW**
	Under Construction			
1	Upper Tamakoshi		456,000	kW
2	Chamelia		30,000	kW
3	Kulekhani III		14,000	kW
4	Upper Trishuli 3"A"		60000	kW
5	Rahughat		32000	kW
6	Gamgad		400	kW
		Total	**592,400**	**kW**
	Planned & Proposed			
1	Upper Trishuli-3'B'		37,000	kW
2	Budhi Gandaki		600,000	kW
3	Upper Seti (Storage)		140,000	kW
4	Dudh Koshi (Storage)		510,000	kW
5	Upper Modi 'A'		47,000	kW
6	Nalsing Gad (storage project)		400,000	kW
7	Tamor (Storage)		530,000	kW
8	Uttar Ganga (Storage)		300,000	kW
		Total	**2,564,000**	**kW**

NOTE : ** Line length within Nepal Portion ** Leased to Private Sector *** Not in Normal Operation*

High Voltage Transmission Lines & Substations

EXISTING		Type of Ckts	Length	Conductor	Conductor
132 kV Transmission Line			Circuit km	Type	Size (Sq.in.)
1	Anarmani-Duhabi	Single	75.76	BEAR	0.25
2	Kusha-Katiya(India)	Single	15	BEAR	0.25
3	Duhabi-Lahan-Cha-pur-Pathaliya/Parwanipur-Hetauda	Double	598	BEAR	0.25
4	Hetauda-KL2 P/S	Single	8	BEAR	0.25
5	Bharatpur-Marsyangdi P/S	Single	25	DUCK	0.3
6	Hetauda-Bharatpur	Single	70	PANTHER	0.2
7	Marsyangdi P/S-Suichatar	Single	84	DUCK	0.3
8	Suichatar-KL2 P/S	Single	36	BEAR	0.25
9	Suichatar-Balaju-New Bhaktapur	Single	26.9	BEAR	0.25
10	New Bhaktapur-Lamosangu	Double	96	BEAR	0.25
11	Lamosangu-Khimti P/S	Single	46	BEAR	0.25
12	Lamosangu-Bhotekoshi P/S	Single	31	BEAR	0.25
13	Bharatpur-Damauli	Single	39	WOLF	0.15
14	Bharatpur-Kawasoti-Bardghat	Single	70	PANTHER	0.2
15	Bardghat-Gandak P/S	Double	28	PANTHER	0.2
16	Bardghat-Butwal	Double	86	BEAR	0.25
17	Butwal-KGA P/S	Double	116	DUCK	0.3
18	KGA P/S-Lekhnath	Double	96	DUCK	0.3
19	Lekhnath-Damauli	Single	45	PANTHER	0.15
20	Lekhnath-Pokhara	Single	7	DOG	0.1
21	Pokhara-Modikhola P/S	Single	37	BEAR	0.25
22	Butwal-Shivapur-Lamahi	Single	112	BEAR	0.25
23	Lamahi-Jhimruk P/S	Single	50	DOG	0.1
24	Lamahi-Kohalpur-Lumki-Attariya	Single	243	BEAR	0.25
25	Attariya-Mahendranagar-Gaddachauki	Single	49	BEAR	0.25
26	Marsyangdi -M. Marsyangdi	Single	40	BEAR	420 sq mm
	Total		2,129.7		
66 kV Transmission Line					
1	Chilime P/S-Trishuli P/S	Single	39		0.15
2	Trisuli P/S-Balaju	Double	58		0.1
3	Trisuli P/S-Devighat P/S	Single	4.56		0.15
4	Devighat P/S-Balaju	Single	30		0.1
5	Devighat P/S-New Chabel	Single	33		0.1
6	Balaju-Lainchor	Single	2		0.2
7	Balaju-Siuchatar-KL1 P/S	Double	72		0.15
8	KL 1 P/S-Hetauda-Birgunj	Double	144		0.15
9	Suichatar-Teku	Single	4.1		0.25
10	Suichatar-New Patan	Double	13		0.15
11	Teku-K3 (underground)	Singlecore	2.8	XLPE Cable	400 sq.mm.
12	Suichatar-K3	Single	6.9	XLPE Cable	0.25+500 sq.mm.
13	New Patan-New Baneswor	Single	2.8		120 sq mm
14	Bhaktapur-New Chabel	Single	23		250 & 100 sq.mm.
15	Bhaktapur-Banepa-Panchkhal-Sunkoshi P/S	Single	48		120 sq. mm.
16	Indrawati- Panchkhal	Single	28		95 sq.mm.
	Total		511.16		

EXISTING GRID SUBSTATIONS							
132KV SUBSTATIONS (CAPACITY IN MVA)						66KV SUBSTATIONS (CAPACITY IN MVA)	
1	Mahendranagar	15.5				1. Birgung	55.0
2	Attariya	25.5	14. Dhalkebar	68.0		2. Amlekhgunj	3.2
3	Lumki	10.5	15. Lahan	74.0		3. Simra	20.1
4	Kohalpur	37.5	16. Duhabi	159.2		4. Hetauda	20.0
5	Lamahi	18.0	17. Anarmani	75.0		5. Siuchatar	36.0
6	Shivapur	41.0	18. Pokhara	45.0		6. K-3	45.0
7	Butwal	142.6	19. Lekhnath	12.5		7. Teku	45.0
8	Bardghat	13.5	20. Damauli	26.0		8. Patan	36.0
9	Kawasoti	38.0	21. Lamosangu	15.0		9. Baneshwor	36.0
10	Bharatpur	55.0	22. Bhaktapur	94.5		10. Bhaktapur	
11	Hetauda	40.0	23. Balaju	45.0		11. Banepa	22.5
12	Parwanipur	90.0	24. Siuchatar	113.4		12. Panchkhal	10.0
13	Chandranigahapur	38.0	25. Matatirtha	22.5		13. Lainchour	45.0
						14. New-Chabel	45.0
						15. Balaju	45.0
	Total		1,315.20			Total	463.75

High Voltage Transmission Lines & Substations

UNDER CONSTRUCTION		Type of Ckts	Length	Conductor	Conductor
132 kV Transmission Line			Circuit km	Type	Size
1	132 kV Thankot-Chapagaon	Double	57	BEAR	0.25
2	132 kV Chameliya-Attaria	Single	129	BEAR	0.25
3	132 kV Butwal-Kohalpur-Mahendranagar 2nd Circuit	Double	208	BEAR	0.25
4	132 kV Mid. Marsyangdi-Dumre- Damauli-Marsyangdi	Double	76	BEAR	0.25
6	132 kV Kabeli-Damak	Double	180	BEAR	0.25
7	132 kV Singati-Lamosangu	Double	76	BEAR	0.25
8	132kV Kusum -Hapure	Single	22	BEAR	0.25
9	132kV 2nd Circuit Hetauda-KL-II-Siuchatar	Double	45	BEAR	0.25
	Total		793.0		
220 kV Transmission Line		Type of Ckts			
1	220 kV Khimti-Dhalkebar	Double	150	BISON	
2	220 kV Hetauda-Bharatpur	Double	146	BISON	
3	220kV Bharatpur-Bardghat	Double	150	BISON	
	Total	Double	446		
PLANNED & PROPOSED					
220 kV Transmission Line					
1	Koshi Corridor	Double	350		
2	Kaligandaki Corridor	Double	219.8		
3	Lekhnath-Damauli	Double	80		
4	Marsyangdi-Kathmandu	Double	170	MOOSE	
5	Marsyangdi-Bharatpur	Double	50		
6	Marsyangdi Transmission Corridor	Double	180		
7	Chilime-Trishuli	Double	80		
8	Tamakoshi-Kathmandu 220/400kV	Double	170		
	Total		1129.80		
132 kV Transmission Line					
1	Butwal-Lumbini	Double	44	BEAR	0.25
2	Dhalkebar-Loharpatti	Double	40	BEAR	0.25
3	Gulmi-Arghakhanchi-Gorusinghe	Double	220	BEAR	0.25
4	Ramechap-Garjyang-Khimti	Double	60	BEAR	0.25
4	Dordi Corridor	Double	32	BEAR	0.25
6	Modi-Lekhnath	Double	84	BEAR	0.25
7	Samundratar-Naubise/Chapali	Double	40	BEAR	0.25
8	Kohalpur-Surkhet	Double	100	BEAR	0.25
9	Karnali Corridor	Double	120	BEAR	0.25
10	Bajhang-Deepayal-Attariya	Double	260	BEAR	0.25
11	Hapure-Tulsipur	Double	36	BEAR	0.25
12	Surkhet-Dailekh-Jumla	Double	214	BEAR	0.25
13	Kaligandaki-Gulmi (Jhimruk)	Double	86	BEAR	0.25
14	Solu Corridor (Katari-Okhaldhunga-Solu)	Double	180	CARDINAL	
15	Baneshwor-Bhaktapur	Double	24	XLPE	800 sq.mm.
	Total		1540.00		
Planned & Proposed 400kV Cross Border Transmission Line					
1	400 kV Dhalkebar-Muzzaffarpur Cross Border Line*	Double	78	MOOSE	
2	Hetauda-Dhalkebar-Duhabi	Double	570	MOOSE	
3	Duhabi-Jogbani*	Double	52	MOOSE	
4	Hetauda-Butwal-Lamki-Mahendranagar	Double	1140	MOOSE	
5	Butwal-Sunauli*	Double	40.74	MOOSE	
	Total		1880.74		

UNDER CONSTRUCTION GRID SUBSTATIONS						
1	132/11 kV Matatirtha	2.5	12	132/33kV Mirchaiya		30.0
2	132/33/11 kV Syangja	38.0	13	132/33kV Ghorahi		30.0
3	132/33/11 kV Damak, Illam, Phidim, Kabeli	124.0	14	132/11kV New Bharatpur		30
4	132/11 kV Chapali	120.0		Total		529.50
5	132/33/11 kV Matatirtha	52.5				
6	132/33 kV Hapure	30.0	PLANNED & PROPOSED GRID SUBSTATIONS			
7	132 kV Hetauda (Kamane)	30.0				
8	132/11 kV Pathlaiya	22.5	Voltage Level		No. of Substations	Total Capacity (MVA)
9	132/33 kV New Marsyangdi	30.0	1. Up to 400kV		5	2025
10	132/33 kV Singati	30.0	2. Up to 220kV		18	3876
11	132/33 kV Kusum	30.0	3. Up to 132kV		21	917
			Total			7877.00

Projects Developed by Independent Power Producers

S.No.	Name of Company	Name of Project	Location (District)	Capacity (kW)
Projects In Operation				
1	Himal Power Ltd.	Khimti Khola	Dolkha	60,000.00
2	Bhotekoshi Power Company Ltd.	Bhotekoshi Khola	Sindhupalchok	36,000.00
3	Chilime Hydro Power Company Ltd.	Chilime	Rasuwa	22,000.00
4	National Hydro Power Company Ltd.	Indrawati - III	Sindhupalchowk	7,500.00
5	Butwal Power Company Ltd.	Jhimruk Khola	Pyuthan	12,000.00
6	Butwal Power Company Ltd.	Andhi Khola	Syangza	5,100.00
7	Syange Bidyut Company Limited	Syange Khola	Lamjung	183.00
8	Arun Valley Hydro Power Company Ltd.	Piluwa Khola	Sankhuwasava	3,000.00
9	Rairang Hydro Power Development Co. (P) Ltd.	Rairang Khola	Dhading	500.00
10	Sanima Hydro Power Company Ltd.	Sunkoshi Khola	Sindhupalchok	2,500.00
11	Alliance Power Nepal Pvt.Ltd.	Chaku Khola	Sindhupalchok	3,000.00
12	Khudi Hydro Power Ltd.	Khudi Khola	Lamjung	3,450.00
13	Unique Hydel Co. Pvt.Ltd.	Baramchi Khola	Sindhupalchowk	4,200.00
14	Thoppal Khola Hydro Power Co. Pvt. Ltd.	Thoppal Khola	Dhading	1,650.00
15	Gautam Buddha Hydropower (Pvt) Ltd	Sisne Khola	Palpa	750.00
16	Kathmandu Small Hydropower Systems Pvt. Ltd.	Sali Nadi	Kathmandu	232.00
17	Khoranga Khola Hydro Power Co. Ltd.	Pheme Khola	Panchtar	995.00
18	Unified Hydropower (P) Ltd.	Pati Khola	Parbat	996.00
19	Task Hydropower Company (P.) Ltd.	Seti-II	Kaski	979.00
20	Ridi Hydropower Development Co. (P.) Ltd.	Ridi Khola	Gulmi	2,400.00
21	Centre for Power Dev. And Services (P.) Ltd.	Upper Hadi Khola	Sindhupalchowk	991.00
22	Gandaki Hydro Power Co. Pvt. Ltd.	Mardi Khola	Kaski	4,800.00
23	Himal Dolkha Hydropower Company Ltd.	Mai Khola	Ilam	4,500.00
24	Baneshor Hydropower Pvt. Ltd.	Lower Piluwa	Sankhuwasabha	990.00
25	Barun Hydropower Development Co. (P.) Ltd.	Hewa Khola	Sankhuwasabha	4,455.00
26	Bhagawati Hydropower Development Co. (P.) Ltd.	Bijayapur-1	Kaski	4,410.00
	Total			**187,581.00**

Projects Developed by Independent Power Producers

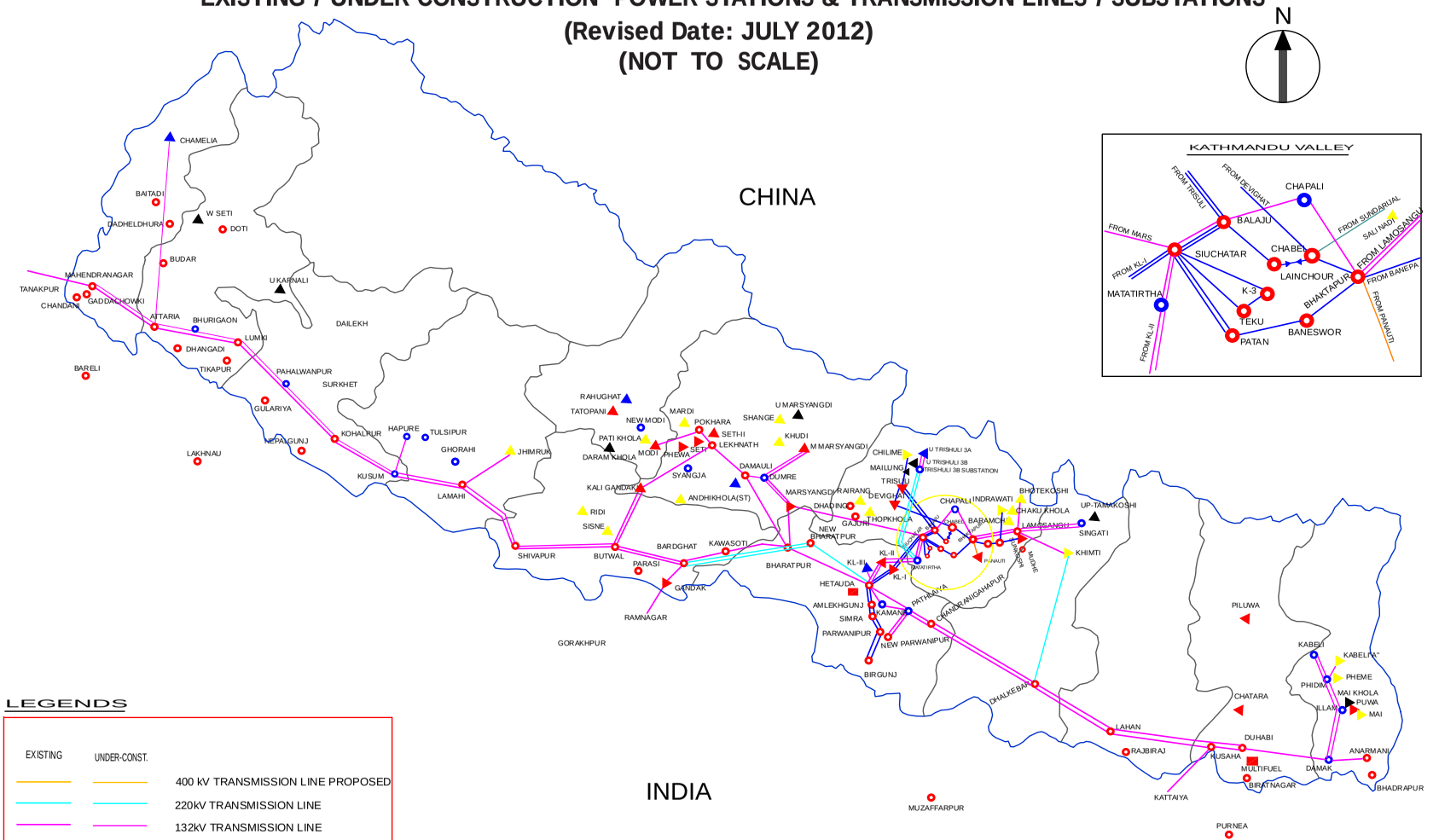
S.No.	Name of Company	Name of Project	Location (District)	Capacity (kW)
Projects Under Construction				
1	Sunkoshi Hydro Power Co. Pvt. Ltd.	Lower Indrawati Khola	Sindhupalchok	4,500.00
2	United Modi Hydropwer Pvt. Ltd.	Lower Modi I	Parbat	9,900.00
3	Synergy Power Development (P.) Ltd.	Sipring Khola	Dolkha	9,658.00
4	Nyadi Group (P.) Ltd.	Siuri Khola	Lamjung	4,950.00
5	Ankhu Khola Jal Bidhyut Co. (P.) Ltd.	Ankhu Khola - 1	Dhading	8,400.00
6	Laughing Buddha Power Nepal (P.) Ltd.	Middle Chaku	Sindhupalchowk	1,800.00
7	Bhairabkunda Hydropower Pvt. Ltd.	Bhairab Kunda	Sindhupalchowk	3,000.00
8	Nepal Hydro Developer Pvt..Ltd	Charanawati Khola	Dolakha	3,520.00
9	Laughing Buddha Power Nepal (P.) Ltd.	Lower Chaku Khola	Sindhupalchowk	1,765.00
10	Bojini Company Private Limited	Jiri Khola	Dolkha	2,200.00
11	Eastern Hydropower (P.) Ltd.	Pikhuwa Khola	Bhojpur	2,475.00
12	Sanima Hydro Power P.Ltd.	Mai Khola	Ilam	22,000.00
13	Upper Tamakoshi Hydropower Co. Ltd.	Upper Tamakoshi HPP	Dolkha	456,000.00
14	Prime Hydropower Co. Pvt. Ltd.	Belkhu	Dhading	518.00
15	Mailung Khola Hydro Power Company (P.) Ltd.	Mailung Khola	Rasuwa	5,000.00
16	Electro-com and Research Centre Pvt.Ltd	Jhyadi Khola	Sindhupalchowk	2,000.00
	Total			537,686.00

POWER DEVELOPMENT MAP OF NEPAL

EXISTING / UNDER CONSTRUCTION POWER STATIONS & TRANSMISSION LINES / SUBSTATIONS

(Revised Date: JULY 2012)

(NOT TO SCALE)



LEGENDS

EXISTING	UNDER-CONST.	
		400 kV TRANSMISSION LINE PROPOSED
		220kV TRANSMISSION LINE
		132kV TRANSMISSION LINE
		66kV TRANSMISSION LINE
		GRID SUB-STATION
		HYDRO-POWER STATION
		IPP's HYDRO-POWER STATION
		DIESEL/M-F POWER STATION

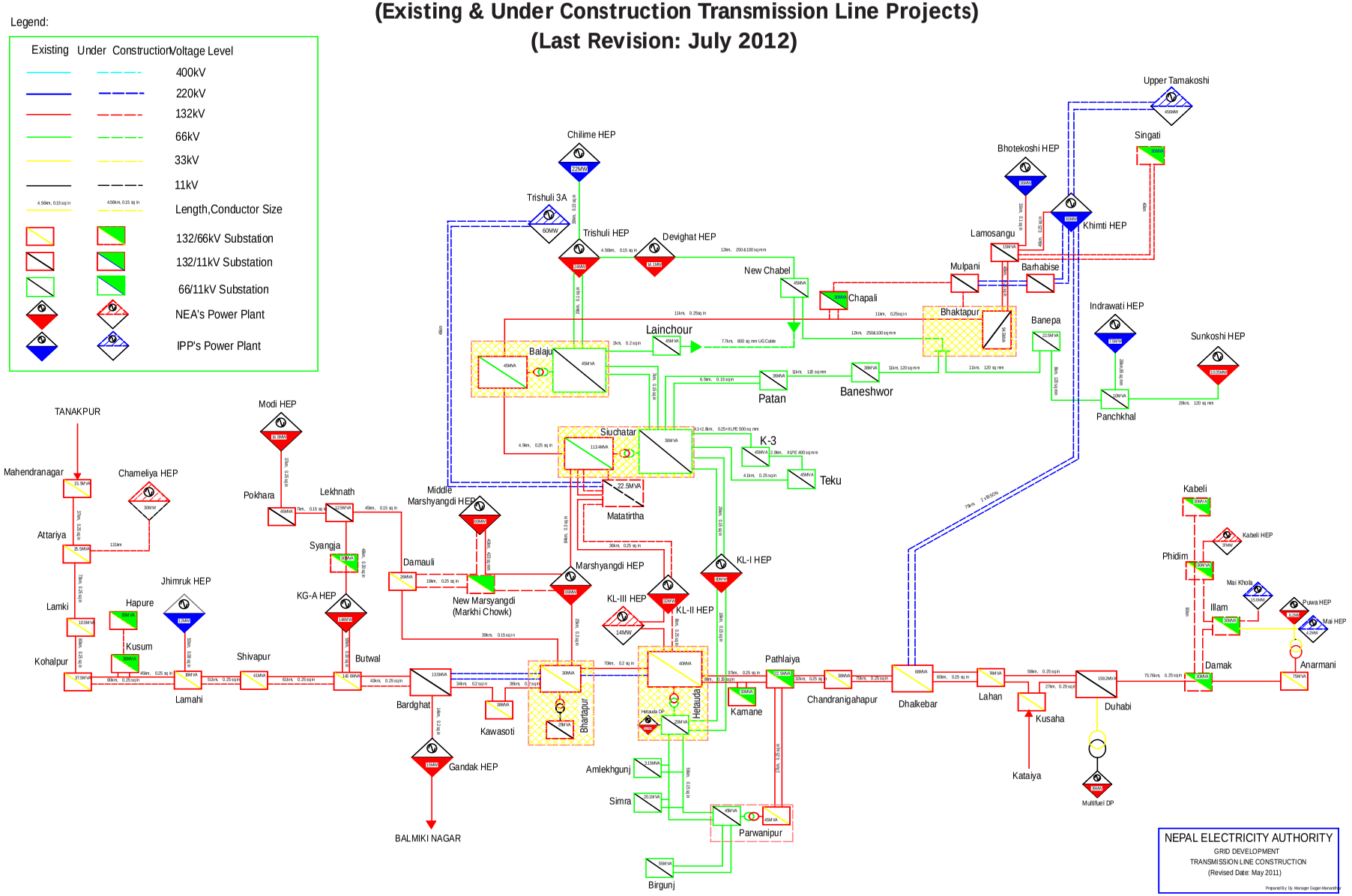
NEPAL ELECTRICITY AUTHORITY
GRID DEVELOPMENT
TRANSMISSION LINE CONSTRUCTION DEPARTMEN

Prepared by : Dy. Manager Gagan Manandha

INTEGRETED NEPAL POWER SYSTEM

(Existing & Under Construction Transmission Line Projects)

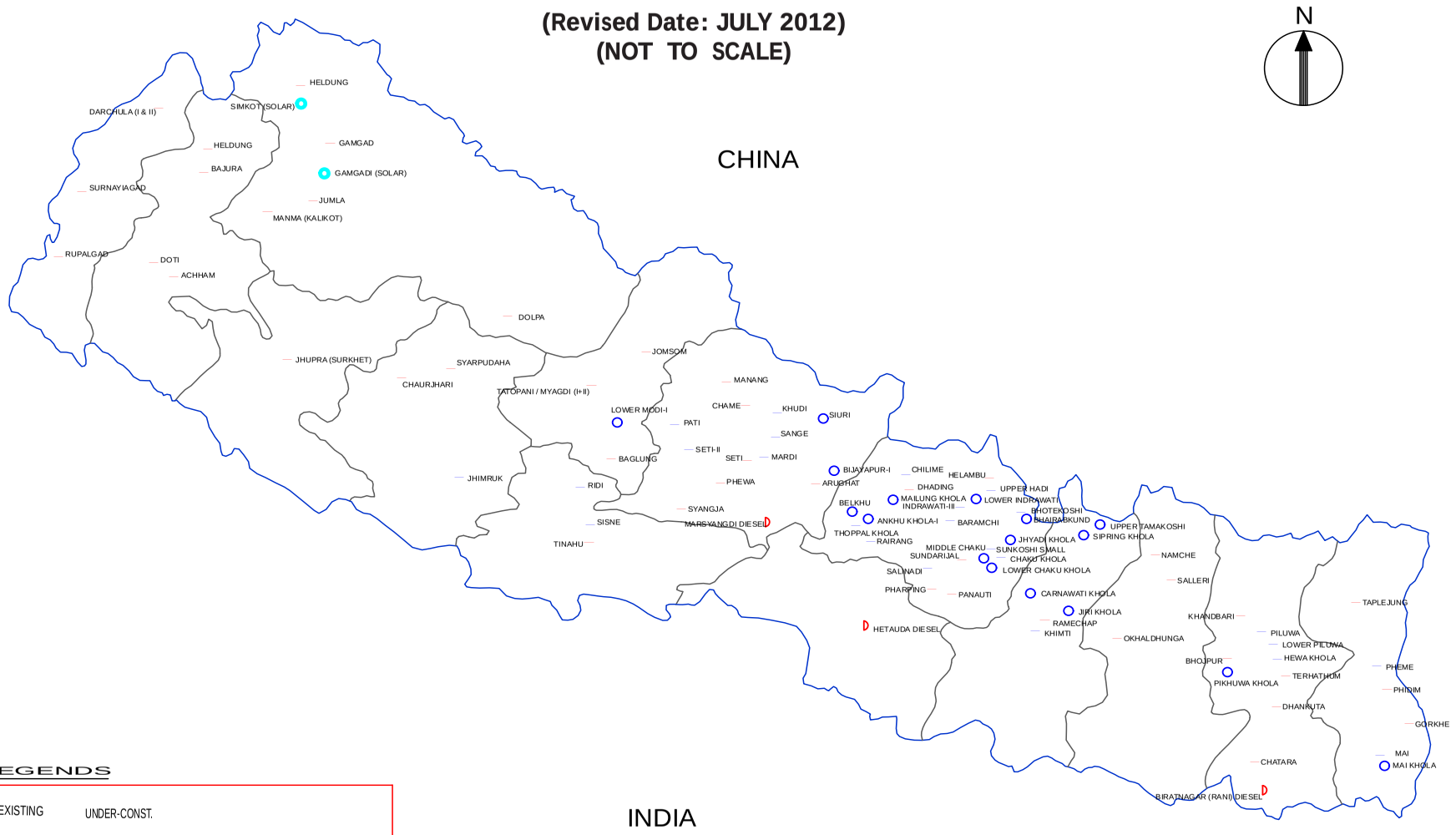
(Last Revision: July 2012)



POWER DEVELOPMENT MAP OF NEPAL

SMALL HYDRO POWER STATIONS, ISOLATED SOLAR & DIESEL POWER STATIONS

(Revised Date: JULY 2012)
(NOT TO SCALE)



LEGENDS

EXISTING	UNDER-CONST.	
—	○	NEA SMALL POWER PLANTS
—	○	IPP's POWER PLANTS
D		NEA's DIESEL POWER PLANTS
○		SOLAR POWER PLANTS

NEPAL ELECTRICITY AUTHORITY
GRID DEVELOPMENT
TRANSMISSION LINE CONSTRUCTION DEPARTMENT

Prepared by : Dy. Manager Gagan Manandhar