# NEPAL ELECTRICITY AUTHORITY

## A YEAR IN REVIEW-FISCAL YEAR 2021/2022

**AUGUST 2022 (BHADRA 2079)**

Durbar Marg, Kathmandu, Nepal

**MOU Signing of Arun 4 Hydroelectric Project**


**Inauguration of Motipur 132/33 kV (30 MVA) Substation**

COMPLIMENTARY COPY

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**Front Cover Photo :** Tingla 132/33 kV (30 MVA) Substation

**Back Cover Photo :** Marsyangdi-Kathmandu 220 kV Transmission Line

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Hon. Pampha Bhusal
MINISTER
Energy, Water Resources and Irrigation

Government of Nepal
Ministry of Energy, Water Resources and Irrigation

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Government of Nepal
Hon'ble Minister for Energy Water Resources and Irrigation
Private Secretariat

# Message from the Minister

It gives me immense pleasure to note that Nepal Electricity Authority (NEA) is celebrating the 37th anniversary of its creation. On this auspicious occasion, I extend my greetings and congratulations to the entire team of NEA for the continuous contribution towards the development of power sector in the country.

NEA was established in the year of 1985 with the responsibility of generation, transmission and distribution of electricity across the country. It has been setting out all its plans and programs in line with the policies of the Ministry of Energy, Water Resources and Irrigation. As a result of continued collaboration and coordination with the Ministry, NEA has been able to fulfill the public wish of reliable power supply at its best over the years. This has helped NEA to be viewed in high esteem in the public sector domain.

The past year is marked with the record addition of 735 MW of power in the Integrated Power System of Nepal with the successful commercial operation of Upper Tamakoshi Hydropower Project, a national pride project developed by NEA Subsidiary. With this, the installed capacity in the country has reached to 2,190 MW. However, because of dominance of RoR projects in the system, we still need to wait for few more years to become self-reliant in electricity.

Another major milestone achieved by NEA in the year is the enhancement in electricity trading with India. Following the concurrence from the Government of India, NEA has been exporting up to 364 MW power from six hydropower projects to India in the Day Ahead Market of Indian Energy Exchange This will decrease the country's trade deficit with India and at the same time, help to manage the seasonal surplus energy till our domestic demand increases significantly. The Joint Vision Statement in the Power Sector Cooperation issued during the visit of the Rt. Honorable Prime Minister of Nepal to India, will open further avenues of cooperation in the cross border electricity trade including grid connectivity infrastructures and adequate market.

I am delighted to recall that, in the past year, we started providing free energy to consumers consuming less than 20 units of electricity in a month. Similarly, electricity for irrigation users is being provided at a much reduced rate, whereas the domestic tariffs also has been adjusted to encourage increase in electricity consumption. I appreciate that NEA still could achieve much better financial situation with the improved performance and operational efficiency.

NEA has to play a major role in meeting the GoN's target of providing access to electricity to the entire population within a couple of years. In addition, the priority shall remain in increasing domestic electricity consumption by providing reliable, quality and affordable electricity to all categories of consumers. For this purpose, NEA is required to put immense efforts in strengthening the transmission and distribution facilities in coming days with the optimum use of expertise and technology blended with adequate investment.

I believe that NEA would be able to catch the opportunities and meet the challenges in the days ahead with its relentless dedication and renewed commitment towards the services it has been providing to the nation. I once again congratulate the entire NEA management and all staff for successfully adding another year of services of excellence and wish for every success in the coming years.

Pampha Bhusal
Minister
Ministry for Energy, Water Resources and Irrigation

Pampha Bhusal
Minister

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# Message from the Secretary

I feel honored and privileged to congratulate the entire family of Nepal Electricity Authority on the auspicious occasion of its 37th anniversary. As a predominant player in the country's power sector, NEA has continued to perform a crucial role in energizing the industrial growth and socio-economic development of the country. NEA has continued to serve as a medium in order to meet GoN's obligation of supply of electricity to the general people and the industries of the country despite many challenges on its way.

NEA is moving forward to supply the regular, reliable and affordable electricity to its consumers, also maintaining the financial health. Even during the recent global energy crisis following the situations of Russia-Ukraine conflict, which has affected our neighboring countries severely, NEA has been able to meet the power demand of it's consumers. I appreciate NEA's dedication and commitment towards the services to its consumers.

The past year has been a successful year for NEA in many aspects. NEA's own generation has increased to the record high, whereas the successful commercial operation of Upper Tamakoshi Hydropower Project has made a significant contribution in reduction of electricity import from India. Nepal has become the first country in South Asia to participate in Indian Energy Exchange (IEX). NEA has started to export its surplus energy of the wet season in the Day Ahead Market of India. In addition, with the reduction of the system loss over the year, NEA has been able to achieve the much better financial performance.

Electrification in additional 10 districts has been achieved in the past year and 93% of the population across the country now has access to electricity from the national grid. The number of NEA's consumers has reached to 4.77 million. The GoN has set a target to provide electricity access to the entire population by FY 2023/24. The GoN policy of "Quit LPG Gas and Use Electricity", maximum use of EVs, long term irrigation electrification in the Terai and Hilly region and promotion of industries to increase the domestic electricity consumption. In this aspect, NEA has to be able to provide reliable and quality supply of electricity to its consumers by improving its existing transmission and distribution infrastructure across the country.

NEA has completed the construction of several crucial transmission lines- 220 kV Marshyangdi-

Kathmandu, 132 kV Solu Corridor, 220 kV Koshi Corridor and many Substation projects that has enhanced the grid connectivity in the country. This will serve to transmit the increasing generation of electricity from power plants in the various river corridors and support domestic market as well as cross border power trade. Furthermore, NEA has several other grid connectivity projects in the pipeline, which is crucial in enhancing the existing grid network.

I believe that NEA will further endeavor in it's instituational strengthening and the performance with the broader vision of development of Nepal's power sector in days ahead. Finally, I would like to thank the team of NEA for their committed and sincere efforts in performing the duties and wish for a brighter future of the organization.

**Sushil Chandra Tiwari**
Secretary
Ministry of Energy, Water Resources and Irrigation

# Board of Directors

**Pampha Bhusal**
Hon'ble Minister
Ministry of Energy, Water Resources and Irrigation
Chairman

**Mr. Sushil Chandra Tiwari**
Secretary, Ministry of Energy,
Water Resources and Irrigation
Member

**Mr. Krishna Hari Pushkar**
Secretary (Revenue), Ministry of Finance
Member

**Mr. Vishow Prakash Gautam**
Prominent Person from Commerce,
Industry, Financial Sector
Member

**Mr. Rajendra Bahadur Chhetri (Safal)**
Prominent Person in Power Sector
Member

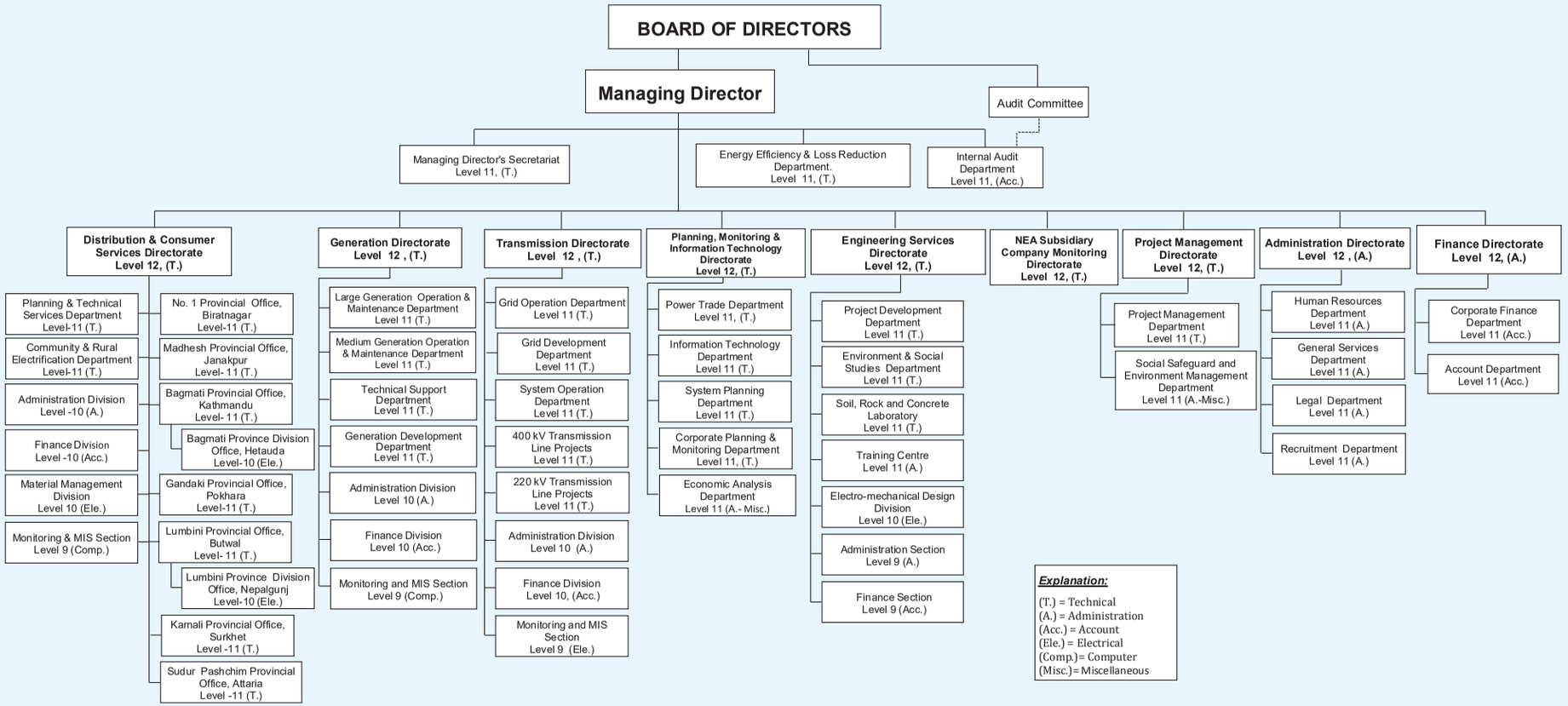
**Mr. Bhakta Bahadur Pun**
Member from Consumers Group

**Mr. Kapil Acharya**
Prominent Person in Power Sector
Member

**Mr. Kul Man Ghising**
Managing Director, NEA
Member Secretary

# Nepal Electricity Authority

## Organization Structure



# Deputy Managing Directors

**Mr. Hitendra Dev Shakya**
Deputy Managing Director
Deputed to Water and Energy Commission Secretariat

**Mr. Har Raj Neupane**
Deputy Managing Director
Generation Directorate

**Mr. Madhav Prasad Koirala**
Deputy Managing Director
Deputed to Engineering Company Ltd.

**Mr. Lok Hari Luintel**
Deputy Managing Director
Finance Directorate

**Mr. Ramji Bhandari**
Deputy Managing Director
Engineering Services Directorate

**Mr. Manoj Silwal**
Deputy Managing Director
Distribution and Consumer Services Directorate

**Mr. Pradeep Kumar Thike**
Deputy Managing Director
Planning, Monitoring and IT Directorate

**Mr. Dirghayu Kumar Shrestha**
Deputy Managing Director
Transmission Directorate

**Mr. Tularam Giri**
Deputy Managing Director
Administration Directorate

**Mr. Madan Timsina**
Officiating Chief
NEA Subsidiary Company Monitoring Directorate

**Mr. Tara Prasad Pradhan**
Officiating Chief
Project Management Directorate

# MANAGING DIRECTOR'S REPORT

It is our immense pleasure to celebrate the 37th anniversary of Nepal Electricity Authority (NEA), with a greater determination in fulfilling our commitments for reliable, affordable and quality power supply to our esteemed consumers and ensuring electricity access to all.

This Annual Report is a reflection of the achievements made in the previous year and the targets to be met in the coming years. The past year has been noteworthy in the context of increased generation, expansion of transmission and distribution system, enhancement of domestic consumption, export of surplus electricity and profit earning.

It is relevant to recall here that the Russia-Ukraine war has led to an unprecedented global energy crisis. This has eventually made fossil fuel-based energy sources like coal and petroleum products scarce, leading to the soaring energy prices throughout the world. Nevertheless, it is our pride to state that we could maintain continuous power supply to our consumers without increasing the tariff even during this crisis.

With the addition of a generation capacity of 735 MW, including NEA's solar power into the system in Fiscal Year (FY) 2021/22, Nepal has entered into the era of energy surplus during the wet season months. This is likely to increase in subsequent years with more projects being integrated into the system. It is to be noted that the total generation capacity of our system a few years ago was less than the added capacity in the last FY alone. We are likely to see more projects to be completed and connected to the system at a much faster pace. This will include the projects from the private sector and NEA's subsidiary Companies.

Now with surplus electricity during the wet season months, we are in a position to export power to the neighboring countries. It is encouraging to mention here that Government of India (GoI) has granted concurrence to Nepal for the export of about 364 MW of power from various hydropower projects and, accordingly, NEA has been exporting the same through Dhalkebar-Muzaffarpur 400 kV transmission line to the Day-Ahead Market of Indian Energy Exchange (IEX). We are confident that GoI will provide approval for more hydropower projects for export to India in near future.

This gradual increase in power export not only enhances NEA's financial health but also plays a significant role in helping the nation increase foreign currency reserves.

It is our pride to state that NEA has achieved a record high net profit of NRs 16,165 million in the FY under review over its 37 years of operation. The main factors attributable to this profit are increase in sales, reduction in system loss,

increase in NEA's own generation including the commissioning of Upper Tamakoshi HEP (456 MW), reduction in import and increase in export, effective cost control and increase in financial and other incomes.

NEA has received AA++ rating from International Credit Rating Association (ICRA), Nepal, proving itself as a highly secured organization with a sound financial capacity. This has opened avenues for issuing IPO at a premium value, which will further enhance NEA's investment capability for the development of major infrastructure projects in future.

In keeping with the worldwide trend of using Information and Communication Technology (ICT) for systematic and efficient management of a successful organization, NEA has been implementing various ICT tools such as Enterprise Resource Planning (ERP), Revenue Management System (RMS), Geographical Information System (GIS) Mapping, Smart Metering and Substation Automation for transforming NEA into a complete digital entity. Likewise, Security Information and Event Management System (SIEM) will be implemented to help the organization recognize potential security threats, unauthorized access or identities and vulnerabilities before they have a chance to disrupt business operations.

Unfortunately, some cases of injuries and deaths of the NEA's employees and the general public due to electrical accidents were recorded in the last FY too. I, on behalf of the entire organization, would like to pay homage to the departed souls and assure greater vigilance and awareness to minimize accidents in the days ahead.

The performances and achievements of NEA in the year under review, 2021/22, are highlighted below:

## Operational Performance

The number of consumers of NEA has been increasing gradually over the years and, in FY 2021/22, it has reached 4.77 million, an increase by 5.23 % against 4.53 million in the previous year. The figure does not include the consumers under Community Rural Electrification, which is serving about 0.55 million consumers in rural areas. Hence, the total consumers served has reached 5.32 million. As it has been in the past, the domestic consumer category remained the largest sector with 92.71% share of the total consumers. Industrial consumer accounted for 1.36% and commercial, non-commercial and others consumers accounted for 5.93 % respectively. The total population with access to grid connected electricity has reached 92.51% in FY 2021/22.

NEA's hydropower plants including small power stations generated the highest recorded annual energy of 3,259 GWh in FY 2021/22, an increase by 16.23 % over the generation of 2,804 GWh in FY 2020/21. This can be attributed to proper maintenance with the adoption of effective methodologies. Annual generation from hydropower stations reached 103.22 % of the target generation.

The energy purchased from Independent Power Producers (IPPs) and NEA's subsidiaries was 4,286 GWh and 1,976 GWh, an increase by 38.57 % and 1,235.14 % from the figure of 3,093 GWh and 148 GWh in FY 2020/21 respectively. The total energy imported from India was 1,543 GWh in FY 2021/22 as compared to 2,806 GWh in FY 2020/21, a decrease by 45.01%. The total available energy in the system increased by 25% to 11,064 GWh in FY 2021/22 over the corresponding figure of 8,851 GWh in FY 2020/21. Out of the total available energy, NEA and its subsidiaries contributed 47.32%, whereas import from India and purchase from domestic IPPs accounted for 13.94% and 38.74% respectively. The contribution of the total internal generation to the total available energy has increased from 68% in FY 2020/21 to 86% in FY 2021/22.

The total energy consumption in FY 2021/22 was 8,823 GWh, an increase by 21.28 % over

the corresponding figure of 7,275 GWh in FY 2020/21. The total export to India soared to 493 GWh in FY 2021/22 against the previous year's figure of 38 GWh only. Likewise, the net import of electricity after deduction of export was 1,050 GWh, which accounts only 9.49 % of the total available electricity in FY 2021/22.

NEA has also been successful in reducing the system loss from 17.18 % in FY 2020/21 to 15.38 % in FY 2021/22.

## Financial Performance

As compared to the corresponding previous year, NEA's operating performance has improved significantly. The net profit before tax has increased by 157.73 % to NRs. 16,165 million in 2021/22 from NRs. 6,272 million in FY 2020/21.

In FY 2021/22, NEA received an institutional rating of AA++ from ICRA Nepal Ltd, substantiating that NEA has a high capability to meet its financial obligations on time.

The gross revenue generated from energy sales and other income in FY 2021/22 reached NRs 96,622 million, with an increase of 22.71 % over the figure of NRs 78,740 million in FY 2020/21. NEA's cost of sales including power purchase cost stood at NRs 64,255 million, an increase by 14.16 % from NRs 56,285 million of the previous year. The amount spent for power purchase alone was NRs 47,850 million in FY 2021/22, an increase by 17.15 % from NRs 40,846 million in FY 2020/21. Though the total power purchase cost has increased, the power import cost has decreased by 29.12 % from NRs 21,821 million in FY 2020/21 to NRs 15,466 million in FY 2021/22.

Other operating expenses for generation, royalty, transmission and distribution in FY 2021/22 amounted to NRs 1,946 million, NRs 1,576 million, NRs 2,174 million and NRs 10,709 million respectively.

The interest expenses in FY 2021/22 have been calculated as NRs 5,250 million as against NRs 5,482 million in FY 2020/21, a decrease by 4.23 %. Similarly, the depreciation expenses amounted to NRs 6,998 million in FY 2021/22, an increase of 10.62% from NRs 6,326 million in FY 2020/21. Due to the depreciation of Nepali Currency against US Dollars, the foreign exchange loss increased to NRs 994 million from NRs 225 million in the previous year. The accumulated investment in Capital Works in Progress (CWIP) reached to NRs. 159,728 million with the net addition of NRs. 19,244 million for the year 2021/22.

NEA estimated a provision of NRs 2,750 million against the actual of NRs 2,730 million last year towards the long-term employee liabilities in respect of gratuity, pension, medical facilities and accumulated leave facilities under employees' benefit scheme.

## Ongoing Projects

There are several hydropower projects at various stages of development under the Engineering Services Directorate. They are Chainpur Seti HEP, Aandhi Khola Storage HEP and Begnas Rupa Pump Storage HEP. Following the issuance of Joint Vision Statement on Power Sector Cooperation during the visit of the Rt. Honorable Prime Minister to India, NEA has signed MOU with Satluz Jal Vidyut Nigam (SJVN), India for the joint development of Arun 4 HEP with an indicative capacity of 490.2 MW.

NEA was successful in commissioning the highest number and capacity of transmission lines and grid substations in FY 2021/22. The major transmission line projects commissioned were Koshi corridor 220 kV (106 ckt km.), Solu Corridor 132 kV (180 ckt km.), Marshyangdi – Kathmandu 220 kV (164 ckt. Km.), Motipur – Sandhikharka 132 kV (74 ckt km), Bardaghat – Sardi 132 kV (28 ckt km), Butwal – Mainahiya 132 kV (36 ckt. Km) and New Modi - Lahachowk 132 kV (40 ckt. Km.). Likewise, the new grid substation projects commissioned were New Butwal 220/132 kV ( 100 MVA ), Motipur

132/33/11 kV (46 MVA), Sandhikharka 132/33/11 kV (46 MVA), Mainahiya 132/33 kV (45 MVA), Lahachowk 132/33/11 kV (38 MVA), New Modi 132 kV switching station, Nawalpur 132/33/11 kV (79 MVA), Bharatpur (Anptari) 132/11 kV (30 MVA), New Khimti 220/132 (100 MVA), Kirtipur 132/11 (10 MVA), Ghorahi 132/33 (63 MVA), Singati 132/33 (30 MVA), Garjyang 132/33 (30 MVA), Inaruwa 220/132/33 kV (446 MVA), Baneswor 220/33 kV (60 MVA) and Tumlingtar 220/132/33 kV (260 MVA).

The total length of transmission lines of 66 kV and above in operation is 5,329 circuit kilometer (ckt.km) and those constructed in FY 2021/22 is 455 ckt.km. The last seven years has seen a drastic increase in the completed transmission lines under operation to a total of 2,705 ckt.km. Similarly, a total of 715 MVA substation capacity, including up-gradation of existing substations has been added to the system in FY 2021/22. This has increased the total substation capacity to 7,149 MVA, with 5,017 MVA being added in the last seven years only. The total lengths of under-construction transmission lines at 132 kV, 220 kV and 400 kV levels are 1,430 ckt. km, 930 ckt. km and 754 ckt. km respectively, with the total of 3,114 ckt. km. Similarly, the total capacity of substations under construction is 7,857 MVA. The total of 1,470 ckt.km, 251 ckt.km and 3,010 ckt. Km of 132 kV, 220 kV and 400 kV transmission lines respectively are planned and proposed. Similarly, 10,463 MVA of additional substation capacity is also planned to be built within the next few years.

NEA managed to substantially electrify 10 additional districts in FY 2021/22. This is in addition to the 32 districts already electrified in the previous years. NEA commissioned 11 new distribution substations of 33/11 kV corresponding to the capacity of 136 MVA in FY 2021/22 to bring the total number to 172 corresponding to the total capacity of 2,064 MVA. Likewise, the total line lengths corresponding to 33 kV, 11 kV and 0.4/0.23 kV voltage levels completed as of FY 2021/22 were 6,620 ckt. km, 44,840 ckt. km and 1,36,595 ckt. km respectively, whereas the line lengths commissioned in FY 2021/22 alone were 572 ckt. km, 3,659 ckt. km and 8,577 ckt. km respectively. A total of 39,361 distribution transformers with the capacity of 3,845 MVA has been installed in the system up to the fiscal year under review, which includes 2,198 numbers of distribution transformers of capacity 222 MVA installed in FY 2021/22.

In addition, 256 MVA capacity of 33/11 kV substation, 2,475 km of 33/11 kV overhead line, 840 km of 11 kV underground distribution line, 12,120 km of 400 Volt overhead line and 1,117 km of 400-volt underground line are being constructed in different parts of the country under Project Management Directorate (PMD).

Following Government of Nepal's electricity roadmap, NEA's commitment to light up every household of Nepal by FY 2023/24 through adequate network expansion plans all over the country still remained a top priority. Enhancement of system reliability through network strengthening will continue unabated. Similarly, for safety, reliability as well as from the aesthetic point of view, underground cable laying works to upgrade the distribution system are underway in different parts of Kathmandu, namely; under Ratnapark, Maharajgunj, Kuleshwor, Kirtipur, Jorpati and Baneshwor distribution centers. Similarly, survey works have been completed for underground cable laying in Thimi, Bhaktapur, Pulchowk and Lalitptur distribution centers and the construction work will start soon. Furthermore, contract has been signed in FY 2021/22 for underground cable laying works in Pokhara and Bharatpur and currently the survey work is going on.

NEA has also started adopting modern digital technology into its system to enhance its operational efficiency, reduce energy theft and enable itself to serve its consumers in a better

way. The implementation of Smart Grid and Smart Metering system will increase efficiency and reduce losses. Smart meter installation in areas under Ratnapark and Maharajgunj Distribution Centers has been completed and results from the project are very encouraging. Bid for the supply and installation of smart meters for the remaining consumers of the valley will be invited by FY 2022/23.

NEA has already initiated the implementation of Enterprise Resource Planning (ERP) in NEA offices and Revenue Management System (RMS) in distribution centers. Proper implementation of this system is only possible with a Distribution Command Control and Data Centre. This Distribution Command Control and Data Center is nearing completion at the Load Dispatch Center premises at Suichatar, Kathmandu.

Substation Automation System in all transmission grid substations throughout Nepal is being implemented. Automation of grid substations will ensure controlled and systematic operation of the grid system. This will ultimately lead to reliable power supply and remarkable savings in the operation of the grid substations. Substation Automation System (SAS) being installed in 13 grid substations within the valley will be completed by FY 2022/23. Similarly, bidding process is undergoing for the automation of an additional 40 grid substations in different parts of the country.

The demand side management with energy efficiency program implemented in the past to reduce peak and energy demands of the system as a whole will be continued in the coming years. Capacitor Bank installation project for different substations and distribution transformers, which has helped improve voltage profile and reduce technical loss will be implemented in all Grid and Distribution Substations as required. Consumer awareness campaign for using efficient electrical appliances will be conducted effectively all over Nepal.

With the view to keep in track the future need of infrastructures, PMD has been involved in detail engineering and environmental study of more than 2000 ckt. km of 400 kV transmission line and associated substations, 300 ckt. km of 132 kV transmission line and associated substations. Moreover, in order to ensure adequate transmission capacity to deliver required power in major cities of Nepal, including Kathmandu, for the next 30 years, Consultant has been recruited and studies are underway.

## Subsidiary Companies

The successful implementation of Chilime Hydropower Project under a subsidiary company of NEA encouraged the development of more projects under the company mode to ensure early decision making, public participation and mobilizing domestic fund. The major projects operating under the Company mode are as follows;

**Chilime Hydropower Company Limited (CHCL):** CHCL, the first subsidiary company of NEA, owns the Chilime HEP (22.1 MW). It has formed three subsidiary companies, namely; Rashuwagadhi Hydropower Company Limited (RGHCL) to develop Rashuwagadhi HEP (111 MW), Madhya Bhotekoshi Jalvidyut Company Limited (MBJCL) to develop Middle Bhotekoshi HEP (102 MW) and Sanjen Jalvidyut Company Limited (SJCL) to develop Sanjen HEP (42.5 MW) and Upper Sanjen HEP (14.8 MW). All four projects are in different stages of construction. Rasuwagadhi HEP after bearing the brunt of devastating floods, landslides and rockfalls in the recent past is scheduled to complete by March 2023. Middle Bhotekoshi HEP, also after many difficulties with flooding and landslides, is scheduled to commission the first unit by May 2023. Upper Sanjen, after all the delays, is likely to be completed by the end of 2022. Similarly, Sanjen HEP is scheduled for completion within this FY. These projects are part of the GoN's programme, "Nepal ko Pani Janata ko Lagani:

Harek Nepali Bidyut ko Share Dhani". Similarly, CHCL has established Chilime Engineering and Services Company Ltd (ChesCo) to provide Consultancy Services for the development of hydropower projects.

**Upper Tamakoshi Hydropower Limited (UTKHPL):** Upper Tamakoshi HEP (456 MW), a national pride project, started commercial generation from August, 2021. UTKHPL is also planning to start construction of Rolwaling Khola HEP (22 MW) under the EPC model in FY, 2022/23.

**Tanahu Hydropower Limited (THL):** Tanahu Hydropower Project (140 MW) is being developed under THL, a subsidiary company of NEA, under co-financing from ADB, JICA and EIB. The Package 2 Contractor has successfully completed the excavation of the underground powerhouse and the tailrace tunnel. The Package 3 Contractor is undertaking tower foundation works of 220 kV double circuit transmission line from Damauli to New Bharatpur Substation. After signing of contract, the Package 1 Contractor has started the diversion tunnel and dam excavation. The project is scheduled for completion by May 2026.

THL further envisages to develop Lower Seti Hydropower Project with an installed capacity of 126 MW in the downstream reaches of Seti River. The Consultant, JV of WAPCOS Limited, India and Nippon Koei Co. Ltd, Japan are preparing the final design by incorporating the comments of the Panel of Experts (PoE).

**Trishuli Jal Vidhyut Company Limited (TJVCL):** This Company was established with NEA and Nepal Telecom as promoters, to develop Upper Trishuli 3B HEP (37 MW) as a cascade of Upper Trishuli 3A HEP. GoN has included this project into its "Nepal ko Pani Janata ko Lagani: Harek Nepali Bidyut ko Share Dhani" programme. The construction, which was stalled in March 2020 due to the lockdown, resumed after more than a year in April 2021. The project is scheduled for completion by September 2023.

**Raghuganga Hydropower Limited (RGHPL):** RGHPL was established as a subsidiary company of NEA to develop Rahughat Hydroelectric Project (40 MW). The Contractor for civil and hydro-mechanical works - Jaiprakash Associates Limited, India and the Contractor for electro-mechanical works- Bharat Heavy Electrical Limited, India are being engaged in their works. The scheduled completion date of the project is August 2023.

**Upper Arun Hydroelectric Ltd (UAHEL):** UAHEL was formed as a subsidiary company of NEA for the development of Upper Arun Hydroelectric Project (1,061 MW) and Ikhuwa Khola Hydroelectric Project (30 MW). EIA study for the Project is being carried out in parallel with the Detailed Engineering Design. EIA report was submitted to Department of Electricity Development (DoED) recently. GoN has declared the project as a "Game Changer Project" giving utmost priority for development. The Supervision Consultant and the Access Road Construction Contractor selection process have been started. The main construction of the project is scheduled to start from November 2024.

**Tamakoshi Jalvidyut Company Limited (TKJVC):** Tamakoshi Jalvidyut Company Limited has been incorporated for the development of Tamakoshi V HEP (99.8 MW), which is a cascade development of the Upper Tamakoshi HEP.

Employers Provident Fund (EPF) has committed for the complete debt funding for the construction of Tamakoshi –V HEP. A tripartite Memorandum of Understanding (MoU) was signed between NEA, TKJVC Ltd and EPF.

**Dudhkoshi Jalvidyut Company Limited:** This Company, as a subsidiary of NEA, has been established for the implementation of Dudhkoshi Storage HEP (635 MW). The Consultant is finalizing the reports and documents with the

incorporation of the comments/ suggestions of the Panel of Experts and the ADB Experts. The Consultant's work schedule shows the finalization of the Detailed Design Report will be completed by October 2022.

Discussions for concessional loan for the construction of the project is underway with ADB and EIB. Similarly requests have been sent to Citizen Investment Trust (CIT), Employees Provident Fund (EPF) and Hydroelectricity Investment and Development Company Limited (HIDCL) for commercial loan. Financial arrangement should be completed by September 2023 and the actual construction is scheduled for early 2024. NEA has categorized this storage project as a priority project.

**Modi Jalvidyut Company Limited (MJCL):** MJCL is a Subsidiary Company of NEA established to develop and implement two projects namely Upper Modi A Hydroelectric Project (UMAHEP) 42MW and Upper Modi Hydroelectric Project (UMHEP) 19.8 MW in Kaski District of Gandaki Province.

As the part of financial closure of UMAHEP, a Term Sheet has been signed with NMB Bank Limited as a lead bank and Hydroelectricity Investment and Development Company Limited (HIDCL) in April, 2022.

**Utterganga Power Company Limited UGPCL)**: This company was established as a subsidiary of NEA to undertake the study and development of Uttarganga Storage Hydroelectric Project (828 MW) in Baglung district of Gandaki Province.

In FY 2021/22, Mahab Ghodds Consulting Engineering Company, Iran was selected to prepare the Detailed Engineering Design Report and Bidding Documents.

**NEA Engineering Company Limited (NEC):** NEA established NEC as a subsidiary company in 2017 to provide complete engineering services and solutions in the development of the energy sector as well as other infrastructures. NEA holds majority ownership of 51% and remaining 49% is held by Vidyut Utpadan Company Limited (VUCL), Rashtriya Prasaran Grid Company Limited (RPGCL) and HIDCL. NEC is providing the consulting services for feasibility studies, detailed engineering design, review of the design and documents, project management, construction planning and supervision of hydroelectric and other Infrastructure projects in different fields such as civil, hydro-mechanical, electro-mechanical, transmission line and distribution system, plant operation, maintenance and rehabilitation works etc.

The company intends to build national engineering capability for medium to large hydro-projects, extra high voltage engineering and similar techno-intensive areas. Since the establishment, NEC is gradually progressing towards its Core Vision and Mission in the field of Engineering Consulting Services.

**Nepal Power Trading Company Limited (NPTC):** NPTC has been established with the objective of carrying out power trading within and outside the country. Business Plan for its operation was approved by the Company's Board and GoN has recently issued the license for business operation.

**Power Transmission Company Nepal Limited (PTCN):** This is a subsidiary company of NEA, established with the objective of developing high voltage transmission interconnection system between Nepal and India for mutual benefit. The Nepal portion of the 400 kV double circuit line between Dhalkebar and Muzaffarpur was implemented by PTCN.

## Private Sector Participation

NEA has been facilitating the participation of the private sector through Power Purchase Agreements (PPA) to ensure meeting the energy demand. NEA has fixed posted rates for energy purchase from three categories of hydro projects; viz Run of River (ROR), Peaking Run of

River (PROR) and Storage type projects.

A total of 24 new projects developed by the Independent Power Producers (IPPs) with a combined installed capacity of 717 MW were commissioned in FY 2021/22. This has increased the total number of IPPs-owned projects in operation to 132 with a combined installed capacity of 1,532 MW, with NEA subsidiary company projects contributing 478 MW.

A total of 141 projects to be developed by IPPs, with a combined installed capacity of 3,281 MW are under construction after financial closure. Similarly, 84 IPPs-owned projects with a combined installed capacity of 1,553 MW are at various stages of development.

During FY 2021/22, a total of 12 new PPAs with a combined installed capacity of 183 MW were signed. This included 7 hydropower and 5 solar power projects with combined installed capacity of 145 and 38 MW respectively. This has increased the total number of PPAs signed with the various IPPs to 357 with the combined installed capacity of 6,366 MW as of FY 2021/22.

So far as power purchase from domestic solar power developers is concerned, NEA Board decided to purchase it through the competitive bidding only with the bench mark price of NRs 5.94 per kWh, considering the significant price fall of solar power in the neighboring countries and all over the world. NEA has completed the preparations of bid documents for the same so that it can invite the Bids as soon as the consent from the Electricity Regulatory Commission is granted.

Likewise, NEA has been prioritizing the Power Purchase Agreements (PPA) for the Peaking Run-Off-River projects and accordingly signing PPAs in Take-or-Pay basis is in progress. As GoN decided a new Generation Mix by increasing the content of ROR hydro-projects from a maximum 35 % to 45 %, thereby decreasing the content of storage and pumped storage projects by 10 %, NEA is looking forward to signing more PPAs for RoR projects in line with some changes in the policy measures.

## Cross Border Power Trading

Over the past year, a record commissioning of 717 MW of new hydropower projects from NEA's subsidiary companies and the private sector has mustered enough confidence to NEA for exporting significant quantum of power to India during the wet season. It was for the first time that the Government of India (GoI) granted an approval of around 364 MW of power export from 6 hydropower projects in Nepal to "Day-Ahead Market" of IEX soon after the visit of the Nepalese Prime Minister to India, during which a Joint Vision Statement on Power Sector Cooperation was issued on 2 April, 2022. With this approval, NEA started selling power in the IEX's Day-Ahead Market everyday through the submission of sell-bids for the next day's every 15-minute time slot through the power export to IEX. This took place for the first time on 3 November, 2021 through Dhalkebar-Muzaffarpur 400 kV transmission line. Likewise, the last FY was important in view of power import on the Day-Ahead basis from IEX through 132 kV Tanakpur-Mahendranagar transmission line since 15 January, 2022 instead of relying on bilateral mode of transaction alone before it. NEA has already submitted applications for other various hydropower projects for power export to India and they are in the process of approval of GoI. In the last FY, NEA also invited tenders from the Indian entities for selling 200 MW of power from 1st July to 15th November, 2022 though it ended in a fiasco. The Bid process had to be called off as the price was not attractive relative to the prices in the Power Exchanges in India. However, NEA has gained the experience of competitive bidding in power export involving Indian participants for the first time.

The last FY witnessed some key developments in the cross border grid connectivity, too, as GoN granted approval for equity investment on the Indian portion of New Butwal – Gorakhpur 400 kV transmission line through JV Company between NEA and POWERGRID of India on 3 August, 2021 and the Joint Venture & Shareholders' Agreement was eventually signed by the said entities on 8 September, 2021.By virtue of dominance of RoR projects, Nepal still needs to rely on India for the power during the dry months despite surplus situation in the wet season. In the last FY, NEA imported 1,543 GWh of electricity from India through bilateral mode and IEX, whereas total power export to India increased to 493 GWh, which valued as NRs 15,466 million and NRs 3,884 million respectively.

The experience of last year's cross border power trade has shown that NEA is taking great strides to earn foreign currency through power export to India and this will further grow in future as more hydropower projects get commissioned.

Likewise, under the Nepal-China cooperation in power sector for the construction of the Ratmate-Rasuwagadhi-Kerung 400 kV transmission line, the feasibility study has been completed.

## Way Forward

NEA as a power sector utility has always been moving forward to meet its main objective of satisfying its consumers with reliable, quality and affordable supply of electricity as well as maintaining sound financial health for further development. Succeeding in meeting this objective has culminated in people's trust and optimism in our endeavors towards achieving the long-standing goal of becoming self-reliant in our energy uses and reducing trade deficit by exporting surplus electricity to neighboring countries.

NEA will continue its efforts in developing hydropower projects on its own and with joint venture partners, through subsidiary companies and IPPs as per the concept of generation mix. Our focus will be more on large-size reservoir and peaking hydropower projects. NEA is initiating construction of Dudhkoshi reservoir (635 MW), Upper Arun (1061 MW), Chainpur Seti (210 MW), Tamakoshi V (99 MW) and Upper and Lower Modi (60 MW) projects with utmost priority. Likewise, Arun 4 Hydropower Project (490.2 MW) is being developed by joint venture company between NEA and Satluj Jal Vidyut Nigam, India. It is hoped that this will make the system operation more flexible and reliable, meeting the varying demands of a single day as well as of the entire season.

NEA will be implementing new PPA policies like procuring solar power through competitive bidding and allowing the optimum probability of exceedence for designing hydropower projects in order to generate maximum energy during the wet season months.

More transmission interconnections are being planned between Nepal and India for commissioning in different timeframes. NEA is also developing a 400 kV transmission line backbone inside Nepal with the support from various donor agencies like the World Bank, Asian Development Bank, KfW, Norad, JICA and EIB.

Considering the prospects of high demand growth in Kathmandu and other major urban areas of the country, NEA has formulated plans for building transmission and distribution infrastructures to meet the demands of the next thirty years. Various studies in this regard are being conducted, whereas the land acquisition for 20 different substations within Kathmandu valley is in progress. Similarly, the studies on the transmission system for 17 major cities outside Kathmandu valley shall be concluded to start the construction activities soon. This will not only meet the power demands until 2050 but also enhance the reliability and quality of power

supply. Furthermore, studies on dedicated 400 kV and 220 kV multi-circuit south corridor transmission lines, approximately 600 km, along the postal highway are underway. This will connect various industrial corridors to meet the load demands of the upcoming industries near the Indo-Nepal border. The transmission lines and substations built near the border will ultimately support cross border power trading between Nepal and the neighboring states of India. NEA will manage the fund requirement for the implementation of these projects with its own resources and concessional loans from various multilateral financing agencies including Exim Banks.

With the commissioning of Upper Tamakoshi HEP into the system, we have been experiencing surplus electricity situation during the wet season. With more projects scheduled for commissioning in the near future, we will reach the situation of electricity surplus throughout the year.

The primary aim will be to increase domestic consumption and then go for export. We have already initiated steps to increase domestic consumption in various ways including electric cooking and the use of Electric Vehicles (EVs). This will not only help consume additional energy but also save the country from millions of dollars being spent on oil and gas.

With the rise in the production, reliability and longer range of EVs, as well as with the government's initiative in lowering taxes on them, use of EVs should be given top priority from all sectors, wherever practically possible. The increasing number of these vehicles on the road is a clear indication of the public's inclination towards them due to the ever-increasing cost of fuel. It should be the initiative of the government to ensure that, at least, all government offices gradually switch to EVs. Similarly, public transportation can also be gradually converted to EVs. NEA has already started the installation of EV charging stations based on DC Fast Charging Technology at 51 prime locations all over Nepal, whereas it is encouraging to note that numerous private companies have started to establish charging stations at different locations.

Domestic use alone will not be sufficient to consume the ever-increasing electricity generation in the country in the upcoming years. Industrialization is another source for consumption of a large chunk of energy. Initiatives should be taken to encourage industrialization from the private sector as well as from the government on a larger scale. For this purpose, NEA has already carried out Grid Impact Study (GIS) of nearly 500 MVA for bulk load industries and, with the continuous improvement of transmission and distribution system, the industrial load is expected to rise significantly in the days ahead.

Nepal has been transitioning from a nation of chronic electricity deficit to the changed landscape of electricity surplus. NEA will continue to play a crucial role to enhance cross border power trading with India and expand it to Bangladesh in near future. As envisaged by India-Nepal Joint Vision Statement on Power Sector Cooperation issued in April 2022, NEA is committed to prepare itself for the adequate market access of neighboring countries by developing more high voltage transmission interconnections with India and using the existing transmission network in India for power trade with Bangladesh in line with the provision of India's Guidelines for Import / Export (Cross Border) of Electricity-2018. The Third Meeting of Joint Working Group and Joint Steering Committee on Nepal-Bangladesh Cooperation in the Field of Power Sector held in September 2021 has designated NEA on behalf of GoN for exploring and initiating power trading between the two countries. NEA is making all efforts to trigger this trade business with Bangladesh through the designated

counterpart, Bangladesh Power Development Board (BPDB), by utilizing the spare capacity of the existing India-Bangladesh cross border transmission lines. NEA has also been consulting with the Indian power traders, which are already engaged in the power trade with Bangladesh.

Further, NEA will be signing Implementation and Transmission Service Agreement (ITSA) in near future with the JV Company of NEA and Power Grid Corporation of India for the development and construction of the Indian portion of New Butwal-Gorakhpur 400 KV (Quad Moose) Transmission Line and the partnership with the POWERGRID shall be continued for the development of other cross border interconnections also to the extent possible so that there is adequate power transfer capacity in the cross border transmission lines to export Nepal's surplus power to the markets of neighboring countries in various timeframes.

Likewise, NEA will carry out necessary consultations and deliberations with the concerned agencies in India to allow power trading through other entities besides North Bihar Power Distribution Company Limited (NBPDCL), by paying the wheeling charges for the existing transmission system within Bihar, to avoid non-utilization of various 132 kV Nepal-Bihar transmission links during the wet season, when Nepal will have enough surplus electricity for export.

As Nepal Power Trading Company, NEA's subsidiary, has already obtained the trading license from GoN in the year foregone, NEA will emphasize its operation for both domestic and cross border power trade through it from this FY 2022/23 onwards.

The 400 kV transmission line from Ratamate (Nepal) to Kerung (China) will lead to Nepal-China power trading in the years to come. The feasibility study of Nepal side of transmission line has been completed and, at the same time, the Cooperation Agreement between the two countries has been extended by two years on 26 March, 2022 during the visit of the Chinese Foreign Minister to Nepal. We look forward to trading power with the neighboring countries on long-term basis through PPAs. Our ultimate goal will be to expand cross border power trading to sub-regional and regional levels.

Green Hydrogen is becoming a major source of fuel for transportation in the world in near future. Hydrogen Vehicles (HVs) have been manufactured by many countries and started its commercial use. Green Hydrogen is not only used for transportation but also to produce ammonia and chemical fertilizer (Urea). Nepal should focus on production of Green Hydrogen, Ammonia and Urea to ensure our energy and food security in future. With the abundance of water and hydropower, Nepal can play a major role in this new field of energy source.

As an initiative, NEA has signed an MOU with Global Green Growth Institute (GGGI) to explore the possibility for the production of Green Hydrogen, Ammonia and Fertilizer. Similarly, NEA has also signed an MOU with the School of Engineering, Kathmandu University, for feasibility study of Green Hydrogen, Ammonia and Urea production. Its main objective is to prepare a Detailed Project Report for pilot-scale Green Ammonia production and ensure better utilization of hydropower.

NEA has the vision and understanding for the need to continually expand its Information Technology (IT) infrastructure in the years ahead. To achieve this goal, IT Roadmap has been prepared for its systematic implementation in all its business functions.

In line with this vision, NEA IT Policy has been reformed, which aims to modernize its functioning through the use of ICT to ensure secure, stable and standard IT infrastructure. Our endeavor towards this direction will lead to "Digital NEA" which will be in line with the GoN's vision of "Digital Nepal."

NEA will establish an IT Communication Network Infrastructure to connect all offices along with the SCADA System of all the substations, and shall also co-ordinate to work in collaboration for the operation of the Data Center located at LDC, Syuchatar. This Communication Network Infrastructure backbone along with Data Center shall not only benefit NEA as a whole, but also can be used as a revenue generating source by leasing bandwidth and data space in the coming days.

Emphasis will be given to the fast deployment of automation and digitization in our businesses. The use of automation system to monitor, control and manage the power system from generation to distribution shall remain our priority for facilitating the reduction of operational cost and providing better services to our valued consumers. Likewise, digitization of paper-based processes shall be our initial step towards digitalization, which is an essential element of digital transformation of NEA for its future.

Organizational restructuring of NEA will continue to be our top priority to be addressed in the days to come and it will be accomplished with the adoption of an agreeable modality by allowing amendment to the NEA Act, 2041. The initial framework for restructuring has been formulated in Corporate Development Plan, 2019, as approved by the NEA Board.

Capacity building programs will be continued on a larger scale for efficient operation and implementation of NEA's activities. In this regard, training for all levels of employees within the organization will be effectively conducted in the years to come.

It is our firm belief that ensuring the best service delivery and improving morale and financial health of our organization will definitely improve our credibility and will open avenues for all-round development of the organization in a better way. Our every endeavor shall be focused for better and efficient NEA.

## Acknowledgements

I, on behalf of NEA, would like to take this opportunity to acknowledge the contribution of everybody, directly or indirectly associated with the performance and achievements of NEA. I would like to express my sincere gratitude to the honorable Minister of Energy, Water Resources and Irrigation, Chairman of NEA Board of Directors, for her dynamic and proactive leadership in boosting the morale of team NEA and providing the right direction to the organization. I am also grateful to the Secretary, MoEWRI, for his continuous support and direction in meeting the targets assigned to NEA. My sincere gratitude also goes to the members of the NEA Board of Directors for their expert and valuable guidance in decision making and formulating policies for the overall organizational performance and achievements within the framework of authorities and responsibilities envisaged in the NEA Act, 1984.

I would also like to thank the Government of Nepal, Ministry of Energy, Water Resources and Irrigation, Ministry of Finance and other concerned Ministries of the GoN for their continued support, encouragement and patronage in the development of energy sector. I sincerely acknowledge the great concern shown by the parliamentary committees in our regular operation and development pursuits. I would also like to express my sincere gratitude to Electricity Regulatory Commission (ERC) for effective regulatory functions.

I am also grateful to the donor communities, including World Bank, ADB, JICA, EIB, AIIB, KfW, NORAD, Exim Bank of China, Exim Bank of India, Exim bank of Korea, who have always helped us in the past and are willing to continue their involvement in the coming days to achieve our goal of fulfilling the growing needs of energy. I also extend my sincere appreciation to Employees Provident Fund (EPF), Citizen

Investment Trust (CIT), HIDCL and Rashtriya Beema Sangsthan for their help in fulfilling our investment needs. I sincerely appreciate the banks, auditors, IPPs, suppliers and investors for bestowing faith on us and helping us move forward. Likewise, my thanks also goes to the Indian power trading companies- NTPC Vidyut Vyapar Nigam (NVVN) and PTC India Limited- for continuously trading power with Nepal.

The role of the media in disseminating factual information about the organization to the general public has always been encouraging. I look forward for similar support in the days ahead. I would also thank and express my gratitude to all my predecessors, who have contributed to NEA's growth.

The entire staff of NEA including the Employee Unions deserve appreciation for their hard work, support and cooperation for daily operation of activities and in implementing the policies even in difficult situations. Finally, I would like to express my sincere thanks and appreciation to our valued consumers and different professional organizations for bearing with us at times of extreme difficulties and boosting our morale by recognizing our untiring efforts. I would like to assure our valued consumers that every possible step will be taken to maintain a continuous, reliable and safe power supply in the coming days.

**Thank You.**

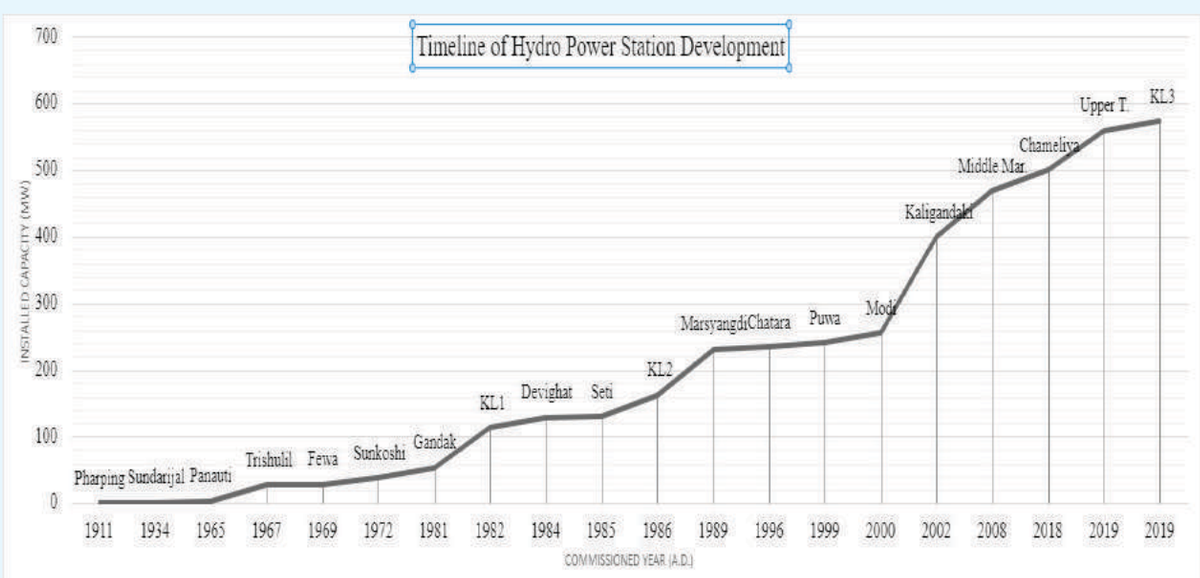
**Mr. Kul Man Ghising**
Managing Director, NEA
Member Secretary

# GENERATION DIRECTORATE

Generation Directorate (GD), headed by the Deputy Managing Director, is responsible for the construction of the new power generation projects together with optimum operation and maintenance of the hydropower stations owned by Nepal Electricity Authority (NEA). Currently there are twenty (20) generating hydropower stations and two (2) thermal power plants under this Directorate having total installed capacity of 627.03 MW. Hence, the maximum generation of energy by optimally utilizing the resources available while undertaking periodic overhauling, major maintenance works and rehabilitation projects of the generating stations; is the mission of the GD.

The Directorate is supported by four Departments, namely Large Generation Operation and Maintenance Department (LGO & MD), Medium Generation Operation and Maintenance Department (MGO & MD), Generation Development Department (GDD) and Technical Support Department (TSD) each headed by a Director. Further, there are three divisions/sections for the functions of Finance, Administration and Monitoring & IT.

Currently, this Directorate has undertaken the projects for rehabilitation of Seti Fewa HPS, Gandak HPS and Trishuli HPS.




**Timeline of Hydropower Development**

FY 2021/22 can be reviewed as a historic year as three hydropower stations achieved the all-time highest generation record in history. The record-breaking generation has been achieved as per the Table shown below.

| S.N. | Name of Hydropower Station | Design Generation (GWh) | Target Generation (GWh) | Previous Record Generation (GWh) | FY 2021/22 Generation (GWh) |
|---|---|---|---|---|---|
| 1 | Kaligandaki | 842 | 896.48 | 929.98 | 974.83 |
| 2 | Modi | 92.5 | 72.54 | 69.556 | 79.60 |
| 3 | Puwa Khola | 48 | 37.45 | 36.41 | 37.72 |

**Highest Generation Record of the Hydropower Stations till Date**

Along with these, Trishuli HPS generated the highest, 137.1 GWh energy, in the history of last 21 years. Kaligandaki, Middle Marsyangdi, Kulekhani I, Kulekhani II, Kulekhani III, Modi, Puwa Khola and Panauti HPS have achieved generation more than 100 % of target, whereas, Marsyangdi, Chameliya, Trishuli, Devighat, Seti HPS have achieved more than 90 % of target.

Further, in Chameliya HPS, both the units were overhauled for the first time by the complete in-house manpower of NEA. It was achieved within the limited time frame and without any external technical assistance. It affirms the presence of a higher level of skilled manpower in NEA for the purpose.

The record-breaking generation has been achieved due to proper repair and maintenance works, effective operational methodologies adopted, and excellent support and guidance from higher management. The increment in river discharge due to enough rainfall during the pre-monsoon period has also contributed to the increment in the generation.

During the Rt. Honorable Prime Minister Sher Bahadur Deuba's visit to India in early April, the Joint Vision Statement on Power Sector Cooperation was issued. As the application of the statement, the Designated Authority (DA) has so far allowed NEA to sell a total of 364 megawatts in the Day Ahead Market through India Energy Exchange Limited (IEX) of India. It includes the electricity generated by six hydropower projects namely Kaligandaki 'A', Middle-Marsyangi, Marsyangdi, Trishuli, Devighat, and Likhu HPS. Being a major contributor to such an important milestone in the power sector development of Nepal is another achievement for the GD.

In FY 2021/22, the total generation from all power plants under GD is 3,242.48 GWh whereas, in the FY 2020/21, the generation was 2,800.9 GWh. This is the highest recorded annual generation to date with an increment of 15.77% from the generation of the past year. The annual energy generation from hydropower stations reached 103.22 % of the target generation in this year.

## Large Generation Operation and Maintenance Department

The operation and maintenance of seven (7) hydropower plants and one (1) multi-fuel power plant (with an installed capacity of 30 MW and above) fall under the jurisdiction of this Department. The total installed capacity of these plants is 504 MW. Total generation from the power plants under this Department in the fiscal year 2021/22 is 2,749.4 GWh, with an increment of 15.91 % as compared to that of the last fiscal year's generation.

All the hydropower stations under this Department are operated continuously throughout the year. Except for Kulekhani I and II Hydropower Plants, which are of seasonal storage type and Upper Trishuli 3A Hydropower Plant, which is a ROR type, all other remaining power stations are daily PROR-type plants. These plants require both scheduled/ preventive and corrective maintenance, as well as special maintenance. General regular maintenance works are such works, which can be carried out without plant shutdown or within a few hours of plant shut downs. Special maintenance works require multiple days of plant shutdowns. Overhauling of generating units, up-gradation of control and protection system, installation

of SCADA, and maintenance works in headwork site are the special maintenance works. As such works require multiple days of plant shutdowns, it is a normal practice as far as possible to carry out such works in the lean/ dry season to minimize the energy loss. This ensures that design capacity is available during the wet season.

Kulekhani I, being the reservoir type plant, water is collected throughout the year, in which monsoon rainfall contributes the most, and the plant is generally operated to aid the peaking load demand.

### Kali Gandaki 'A' Hydropower Station

Kali Gandaki 'A' Hydropower Station (KGAPS), located at Beltari, Syangja was commissioned in 2002 AD. It is the largest power station of the Department with an installed capacity of 144 MW. The plant has 3 units each having capacity of 48 MW. It is a six-hour daily peaking run-of-river type power station having an annual design generation of 842 GWh.

**Floating Debris during Flood**

The cumulative generation of the station till F/Y 2021/22 has reached 15,582.84 GWh from the first run. The plant generated 974.808 GWh of energy, this year which is 115.77 % of the annual design generation and 108.74% of annual energy declaration. The generation of the year is the hightst recorded annual energy generation of the plant since its first run.

The major repair and maintenance activities in FY 2021/22 are as follows:

- Installation & commissioning of vibration monitoring system at all three units;
- Installation, testing and commissioning of online bushing monitoring system at 56.5 MVA, 132 kV high voltage bushing of Power Transformer Unit No. 3;
- Replacement of the bronze seal strips (top, bottom and lateral sides), stainless steel guide plates (top, bottom and lateral sides) and Guide blocks (both side) of under sluice gates as per the requirement; and
- Repair & maintenance of access road from Zero kilometres to Damsite & Power House (Gabion works, Gravelling & Pitching patches etc.).

### Middle Marsyangdi Hydropower Station

Middle Marsyangdi Hydropower Station (MMHPS) generates electricity by diverting the water of Marsyangdi River originating from the Tilicho Lake in Manang district. Located in the Lamjung district of Gandaki Province, MMHPS has an installed capacity of 70 MW and a design annual generation of 398 GWh.

MMHPS is a Peaking Run-of-River (PRoR) plant with a daily peaking capacity of 5 Hrs at the maximum discharge. The plant was commissioned in December, 2008 and commercial generation started one month later. The cumulative generation of this station till the end of FY 2021/22 is 5,794 GWh and the total generation during this FY is 468 GWh.

The major repair and maintenance activities in FY 2021/22 are as follows:

- Replacement of 132/33 kV, 7.5MVA power transformer by another 132/33 kV, 12.5MVA power transformer sent by Pokhara grid ;
- Overhauling of Unit No.1;
- Repairing of eroded sliding plate and the fixed plate of the flushing mechanism by welding and grinding along with painting

of the gate leaf of spillway radial gates, and change of rubber seals of all spillway radial gates and under sluice gate;
- Repairing of steel lining at sill beam of radial gates and epoxy mortar application at spillway chutes on Radial Gate No 1, 2 and 3; and
- Left and right bank protection works at downstream of the dam site by PCC, gabion with stone masonry retaining wall.

**Damaged Condition of U/S Left Bank**

An invitation for Bid (IFB) was issued for the maintenance of damaged portion of the upstream left bank, caused by the heavy rainfall followed by heavy flood of 1st Ashad 2078. Though the contract has been awarded for the protection and rehabilitation works by RCC toe wall and gabion structure, the work has been postponed to the dry season of FY 2022/23 due to the national energy crisis and thereby unavailability of plant shutdown,

## Marsyangdi Hydropower Station

Marsyangdi Hydropower station is a Peaking Run-off-River (PROR) type power station, located at Aabookhaireni, Tanahun in the Gandaki province with an installed capacity of 69 MW and annual design generation of 462.5 GWh. It was commissioned in 1989 AD. The cumulative generation of the station reached 13,714.39 GWh until the end of FY 2021/22. In FY 2021/22, it generated 464.27 GWh of energy, which is 99.8% of target and 100.3 % of annual design generation. Repairing of MIV Seal

The major repair and maintenance activities in FY 2021/22 are as follows:

- Replacement of Main Inlet Valve (MIV) seal and repair works on the retaining ring, rotor disc, seal ring on MIV valve body of all the three units;
- Replacement of bypass needle valves and gate valves of MIV in all the three units which were leaking since a long period;
- Overhauling of Unit No. 2;
- Repair and maintenance works of Diversion Radial Weir Gate number 1, 2 and 5 including bottom rubber seal replacement and repairing of sill beam;
- Replacement of old digital governor control system with double channel redundant type digital governor control system in Unit No.1 and 2;

**Repairing of MIV Seal**

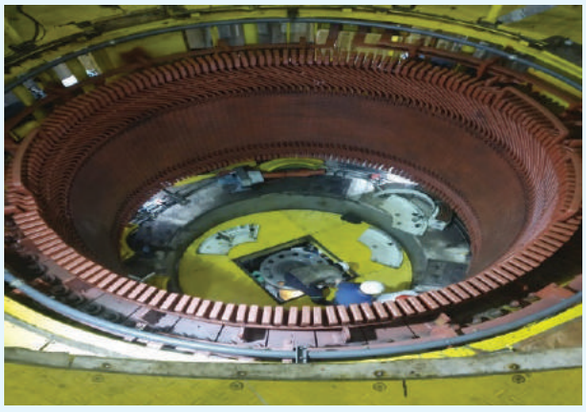
- Installation and charging of newly procured 800kVA, 11/11kV Isolation transformer which distribute power to damsite and Dhakaltar colony area;
- Painting of weir radial gate and overhead crane structures;
- High strength works at weir surface of radial gate no.2 at dam site, epoxy painting works at turbine floor and wall, corrosion resistance coating works at powerhouse, high strength concrete work in weir surface at the dam site;

- Shaft seal cooling water supply pipeline rectification/ replacement works at the power house site; and
- Construction of 150 mm diameter and 150 m deep tube well for water supply drinking purpose at the colony.

### Upper Trishuli 3A Hydropower Station

Upper Trishuli 3A (UT3A) Hydro Power Station, located in Rasuwa and Nuwakot districts of Bagmati Province in Nepal, is the largest hydropower station of NEA in terms of energy generation after Kaligandaki 'A' Hydropower Station with an annual design generation capacity of 489.76 GWh. It is the Run-of-River type power station of 60MW installed capacity with two units of vertical shaft Francis Turbine of 30MW each. Commissioned in July 2019, the plant is fully operating under GD from 30th Sep, 2021 after the completion of DLP.

Upper Trishuli 3A Hydropower Station has been consistently supplying energy to the national grid in an increasing trend. In FY 2021/22, the total generation of the power station is 432.832 MWh, which is 37.51% more compared to the generation of previous FY. The cumulative generation till this year is 1,168.99 GWh.



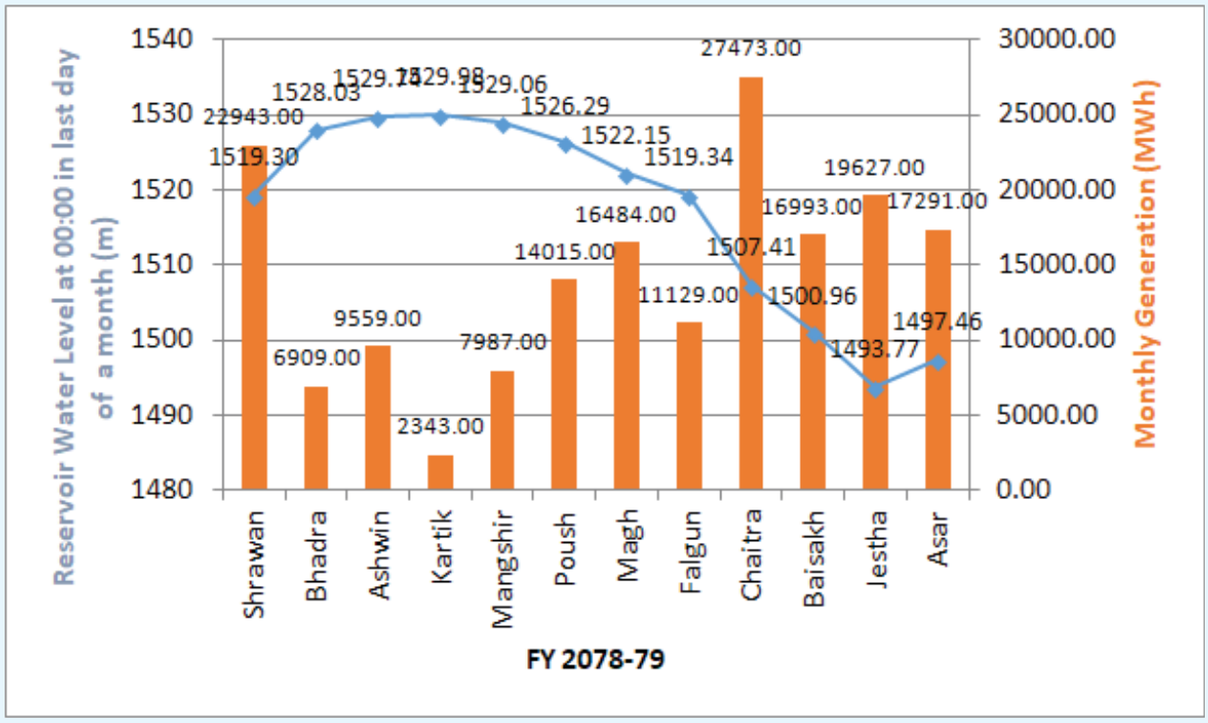
A view of Stator

During the months of Shrawn and Bhadra 2078, both units of the power station were overhauled for replacement of the worn-out Bottom Ring, Guide Vanes, Headcover Labyrinth, and other components. The overhaul was successfully done and commissioned in coordination with the Contractor, China Gezhouba Group Company (CGGC).

In addition, civil and mechanical parts of hydro-mechanical structures were extensively repaired and treated during Falgun, Chaitra 2078, and Jestha 2079 as a mandatory preparation before the beginning of this year's monsoon.

### Kulekhani I Hydropower Station

Kulekhani –I Hydropower Station (K1HPS) is the only reservoir type Hydro-electric Power Station in Nepal. It is situated in lower Mahabharat range of Makwanpur District, Central region of Nepal at about 30 Km to the Southwest of Kathmandu, whereas the Kulekhani dam itself is located at about 21 Km Southwest of Kathmandu. It covers two basins of different river systems i.e., the Kulekhani river basin and the upper Rapti river basin neighboring to south of the Kulekhani river basin. It has installed capacity of 60 MW with two units, each of 30 MW. This station was designed as a peaking power station but it is often being operated to the system requirements for voltage improvement & system stability. The Power Station is designed to generate 165 GWh as primary energy and 46 GWh as secondary energy.




**Response of Reservoir Water Level with Corresponding Monthly Generation**

The cumulative generation of Kulekhani-I HPS has reached 5383.9 GWh. The plant generated 172.753 GWh of energy in FY 2021/22.

The daily reservoir water level pattern recorded this year is shown in the given plot. The maximum water level was recorded in October and November of 2021 as 1,529.98 masl and the minimum on June 13, 2022 as 1,493.45 respectively.

In FY 2021/22, following major repair and maintenance activities are carried out:

- Application of shotcrete works at Chakhel outlet and intake area and Chakhel dam repair works (High strength concrete works);
- Construction of gabion check wall at different Sources of Kulekhani reservoir;
- Installation, testing and commissioning of new Blower panel in 10 No near valve house;
- Maintenance of 11 kV Bus bar and Vacuum Circuit Breakers of colony feeder;
- Installation of external oil cooler of generators; and
- Greasing of Rocker type ring girder in Penstock Pipeline.

**Repair and Maintenance of Spillway Radial Gate**

Furthermore, Bathemetric Survey was conducted to identify the sediment deposition in the reservoir and average annual siltation rate. The loss of reservoir volume due to sediment is found to be 17.429 M $m^3$. The average siltation rate per unit catchment over the past 39 years

has come out to be 3,546.80 $m^3/km^2$/year.

To carry out the measurement of different settlement points for monitoring the actual condition, dam settlement survey has carried out. From the survey results, there is a significant horizontal shift and vertical settlement at the different settlement points. Hence, it is recommended to apply proper dam monitoring tools and stabilization techniques .

Electrical Resistivity Tommography (ERT) survey work at dam crest area was carried out. From this test, it is recommended to apply proper stabilization techniques in consultation with dam experts and geotechnical engineers at the left side (0-90m) and central (125-220m) part of the dam upto the depth of 30m to 35m and the right side (220m and onwards) upto the depth of 15m only.

### Kulekhani II Hydropower Station

Kulekhani-II Hydropower Station, located at Bhimphedi Rural Municipality-4, Nibuwatar, Makwanpur is a cascade of Kulekhani-I HPS with an installed capacity of 32 MW and the annual design generation of 104.6 GWh. It was commissioned in 1986 AD.

The plant is designed to generate energy utilizing the water from the tailrace of KL-I HPS, further adding the water of Mandu River and through Rapti pumping station. Every year Mandu Intake is cleaned after the wet season to allow the filtered water into the intake pond. Likewise, Rapti Pumping Station is operated as per requirement in the dry season by carrying out effective maintenance works to generate power.

The cumulative generation of Kulekhani-II HPS has reached 1337.73 GWh and in F/Y 2021/22 it generated 82.69 GWh of energy. Since the station is a cascade of Kulekhani-I HPS, it is operated as per instructions of Load Dispatch Center (LDC) according to the system requirements for voltage improvement & system stability.

In FY 2021/22, following major repair and maintenance activities are carried out:

- Procurement of Digital AVR system for both units;
- Ongoing Procurement process for the Numerical Relay based protection system for generators and main transformer, 4000A-Vacuum Circuit Breaker (VCB) for protection of main transformer, construction of water tank with filtration system at the powerhouse and replacement of filter material of Mandu intake;
- Installation of newly procured governor oil pump-motor set, bearing oil cooler for Unit No.2 generator;
- Deep boring works for water supply management at colony area and up-gradation of the existing system;
- Repair & maintenance of retaining structure at landslide area on Surge tank road; and
- Construction of temporary reservoir on Rapti Intake and flushing of sediment deposited on Mandu dam, which played a major role in the increment of the generation.

Repair Work of Cooling Water Pump

### Chameliya Hydropower Station

Chameliya Hydropower Station (CHS), a daily peaking run-of-river (PROR) scheme with an installed capacity of 30 MW is located in the west of Kathmandu on Chameliya river, a tributary of Mahakali river, in Shailya-Shikhar Municipality-1, Balanch, Darchula. The powerhouse is located

at Shailya-Shikhar Municipality, Ward No. 1, Balanch, Darchula, and the dam site is located in Marma Rural Municipality, Bitule, Darchula. The site is located 85 km from the district headquarter, Khalanga, Darchula, and is 270 m from the nearest city, Dhangadhi. It has designed an annual generation of 184.21 GWh.

In this FY, the plant generated 153.981 GWh energy which is 83.59 % of annual design generation and 90.27 % of the annual set target. The cumulative energy generation to date is 679.895 GWh energy.

In FY 2021/22, following major repair and maintenance activities are carried out:

- First time overhauling of Unit No. 1 and 2 by complete in-house manpower of NEA;
- Installation of CCTV Surveillance System in the powerhouse, 132 kV & 33 kV switchyards, control rooms, damside, desanding basin, office, and colony areas for regular monitoring and observation;
- Upgradation of flood warning Siren System to alert local inhabitants from the rise in river level due to opening of spillway radial gate; and
- Upgradation of Balanch - Ganna road to blacktopped standard.

Runner with Shaft

### Multi- Fuel Power Plant

Multifuel Power Plant located at Bansbari, Morang in the Eastern Industrial corridor of Nepal has an installed capacity of 39 MW. Out of total installed capacity of 39 MW, 26 MW capacity was put into service in FY 1990/91 and an additional 13 MW capacity was put into service in FY 1997/98. Multifuel Power Plant has 6 (Six) Wartsila Diesel Engines that use furnace oil (FO) as a source of energy. There are two generator units, each of 7.5 MVA from Leroy Somer France and four units, each of 8.144 MVA from Alstom, France.

The major overhauling of all the six units were concluded in 2013 A.D.

## Medium Generation Operation and Maintenance Department

Medium Generation Operation and Maintenance Department (MGO&MD), headed by the director, is responsible for the operation and maintenance of thirteen (13) hydropower stations and one (1) diesel power plant with individual installed capacity below 30MW owned by NEA. It has always strived to uphold economy, operational efficiency and an acceptable level of reliability in its drive for improvement. The installed capacity of 13 hydropower stations and 1 diesel power plant is 122.7 MW. The actual generation from the hydropower generating stations under this department in FY 2021/22 is 492.89 GWh, a increment of 14.89 % in generation as compared to previous FY. Under this department, rehabilitation of Sundarijal and Tinau HPS is ongoing with GON funding and loan assistance from the Asian Development Bank (ADB) under Energy Access and Efficiency Improvement Project (EAEIP).

### Trishuli Hydropower Station

Trishuli Hydropower Station (THS) is constructed on the right bank of Trishuli River at Trishuli Bazar, Nuwakot. It was commissioned in 1967 AD in assistance with the Government of India at a

cost of INR 140 millions with its initial installed capacity of 21 MW having 7 units of 3 MW each. It was later rehabilitated in 1995 AD and upgraded to 24 MW with 6 units each 3.5 MW and one unit of 3 MW.

THS is a peaking run-of-river plant with a peaking capacity of 21 MW and annual design generation of 163 GWh. The annual Generation in FY 2021/22 is 137.1 GWh which is 106.38% of target and the cumulative energy generated till date is 5,693.94 GWh. The electro-mechanical renovation and modernization work of THS is in progress. As a major work of the renovation project, the construction of bypass canal to reduce the sediments in the reservoir is near to complete.

In FY 2021/22, following major repair and maintenance activities are carried out:

- Overhauling of Unit No. 3 and MIV repair work;

**Repair and Maintenance of MIV**

- Construction of bypass canal in reservoir;
- Replacement of thrust Pad in Unit No.2;
- Fencing works from desander to head gate; and
- Gate maintenance of head gate of Gate No. 3, 4 and 6.

## Devighat Hydropower Station

Devighat Hydropower Plant (DHS) is a cascade development of Trishuli Hydropower Plant with an installed capacity of 15 MW and annual design generation of 114 GWh. It is located at Devighat, Nuwakot. The capacity of the units was improved and upgraded from initial 14.1 MW, which was initially commissioned in 1984. The actual generation of FY 2021/22 is 98.38 GWh, which is 98.53 % of annual generation target. Till date, the plant has generated 3,243.99 GWh energy.

In FY 2021/22, following major repair and maintenance activities are carried out:

- Repair & replacement of turbine nut guard of all units with adjustment of guide bearing shaft clearance;
- Repair & replacement of Unit 2 generator ghrust gearing oil cooler and inspection/ adjustment for bearing shaft clearance and shaft vibration;
- Repair of shaft, bearing block, coupling bush & gear of spillway gate, replacement of escape gate and tailrace gate seal, replacement of turn buckle and pin with check plate of guide vanes;
- Replacement & installation of the standby air compressor system;
- Replacement of manual disconnection switch difficult with motorized disconnection switch; and
- Placement of new 33 kV breaker in Chaugada line and 10 MVA 66/ 33 kV Power transformer.

**Replacement of Unit Surge Arrestor**

### Kulekhani III Hydropower Station

Kulekhani III Hydro Power Station (KL3HS) with an installed capacity of 14 MW (Annual Energy Generation of 40.85 GWh) is a cascade scheme of Kulekhani storage project (Kulekhani I and Kulekhani II Hydro Power Stations). Predominantly, KL3 utilizes the regulated flow of Kulekhani II Hydro Power Station and the natural flow of Khani Khola for the generation of electricity. The headwork is located about 40 km southwest of Kathmandu and about 10 km north of Hetauda city in Bhaise, Makwanpur district in Bagmati Pradesh.

With the onset of generating activities, the plant has a gross generation of 92.17 GWh cumulated within three years of continuous run. The total generation of FY 2021/22 is 36.2 GWh, which is 88.71% of design generation, with an increment of 1.5% compared to the generation of previous FY.

In FY 2021/22, following major repair and maintenance activities are carried out:

- Corrective work of adding stoppers to avoid full rotation of the guide vane, which has been successful as the guide vane retains position despite breakage of the shear pin;
- Repair works of guide vane and facing plates due to sudden load rejection after guide vane rotated due to breakage of shear pins;
- Completion of repair works of spillway downstream reinforced concrete and protection works;
- Repair of left bank and spillway downstream;
- Initiation of construction of intake control room and permanent power supply works; and
- Protection and repair of head-pond syphon right bank protection work.

**Replacement of Power Transformer Radiator**

### Gandak Hydropower Station

Gandak Hydro Power Station is located at Pratappur Gaun Palika Ward No. -7, Nawalparasi, Nepal about 235 km from Kathmandu and about 5 km North of the Indian border point called Jhulenipur, Mahrajgunj, Uttar Pradesh. The powerhouse is a part of the irrigation cum power generation scheme on Gandak River.

The plant has three Horizontal mounted tubular bulb turbines; low head high discharge Kaplan Turbo-Generators of 5 MW each with an aggregate capacity of 15 MW and annual design generation of 106.38 GWh. The project was built in1979 AD with the assistance of the Government of India and the Government of Nepal with the total cost of NRs. 170 million. It was handed over to NEA on 31st, Aug 1981.

Among three units, the power generation capacity of Unit No. 2 is limited up to a maximum 3 MW due to excessive sand deposition in upstream side, whereas the Unit No.1 is out of operation for last 13 years due to problem in generator's stator coil. The Unit No. 3 is in operation condition after repair and maintenance of turbine guide bearing from 2078/9/26 which was in shutdown condition from Magh 2075.,

The actual generation of FY 2021/22 is 15.2 GWh, which is 49.05 % of its target generation of 30.9 GWh.

In FY 2021/22, following major repair and maintenance activities are carried out:

- Repair and maintenance of turbine guide

bearing and its components of Unit No. 3 and runner blades of Unit No. 2;
- Repair and maintenance of generator VCB of Unit No. 2 and 3, replacement of 120 mm2 LT control cable from cooling water panel board to the main panel board; and
- Installation of new 45 KW motror on Unit No. 1, temperature sensor & meter with alarm system for protection in thrust and turbine guide bearing of Unit No. 3.

Repairing of Unit No. 2

## Modi Khola Hydropower Station

Modikhola Hydropower Station (MHS) is located at Dimuwa in Parbat district about 46 km towards west from Pokhara City. It has installed capacity of 14.8 MW with two vertical shaft Francis Turbines of 7.4 MW each and annual design generation of 92.5 GWh. The cumulative generation of this plant since its first run has reached 1,216.77 GWh. It generated 79.60 GWh in FY 2021/22, which is 109.73 % of total annual target.

The plant has achieved the record generation, which was due to proper repair and maintenance works and effective operational activities by the staffs members.

In FY 2021/22, following major repair and maintenance activities are carried out:
- Overhauling of Unit No. 1 turbine and generator;
- Repair & maintenance of MIVs of both Units;

Repairing of MIV

- Upgradation of CTs from 300/5 A to 800/1 A at 132 kV Pokhara bay at 132 kV switchyard;
- Replacement of 11 kV indoor circuit breakers at 33 kV Substation, 33 kV circuit breakers, 33 kV disconnecting switch & upgradation of power cable at 33 kV incomer;
- Construction of canal from Gaira Khola to desandar basin for additional water supply for the purpose of sand flushing in order to enhance generation by decreasing down time;
- Installation of CCTV camera at power house for monitoring of switchyard, turbine & generator floor;
- Repair and maintenance of Flushing, sand purging, intake gates, diesel generator at powerhouse and intake, excitation system, governor pump , speed sensor, mini MCR, hydraulic governor, pumps, adjustment of valves, installation of accumulator bladder and refilling of nitrogen gas;

In FY 2021/22, 132 kV transmission line tower

compensation cost was charged to Middle Modi Hydropower Company for using land of NEA at intake area. It was the first case in NEA having such a agreement with IPP's to pay compensation charge annually.

### Sunkoshi Hydropower Station

Sunkoshi Hydropower Station (SHS), located at 81 km east from Kathmandu, in Sindupalchowk district is a Run-of-River daily pondage power station with an installed capacity of 10.05 MW and annual design generation of 70 GWh. This station has 3 units of 3.35 MW each. The powerhouse was commissioned in January 1972 with a friendly cooperation of the Water Conservancy and Electric Power Ministry of the People's Republic of China to GoN. The cost of the project was approximately NRs. 109.4 million including the transmission line up to Kathmandu.

SHS generated 63.52 GWh of electricity in FY 2021/22 (99.71% of the given target) as compared to 59.26 GWh in the previous fiscal year. The cumulative generation of the station till date is 2,559.79 GWh.

In FY 2021/22, following major repair and maintenance activities are carried out:

- Overhauling of Unit No 3;
- Installation of new trash-rack at canal intake and bypass canal gate;
- Repair of intake and gallery gates at forebay;
- Installation of earthing mat at powerhouse switchyard and damsite;
- Maintenance of 6.3 MVA power transformer including oil filtration and replacement of HT bushing & cable heads;
- Installation of 110V DC battery charger and 48V DC battery bank;
- River training works at damsite and powerhouse

River Training Works at Damsite

- Protection of canal syphon at Tauthali River; and
- Debris removal and channel excavation work at dam site.

### Ilam (Puwa Khola) Hydropower Station

Ilam (Puwakhola) Hydropower Station (IHS), Run-off River type plant, located at Golakharka, Ilam having installed capacity of 6.2 MW and annual design generation of 48 GWh was commissioned in 1999 AD. It was jointly commissioned and constructed with the in-house management of the Nepal Electricity Authority. The total cost of of the project was US$ 15.7 MUSD and the source of fund was the Government of Nepal and Nepal Electricity Authority,

It is the only sizeable hydel plant of NEA in the Eastern part of Nepal. It has two identical units of 3.1 MW each. IHC generated 37.71 GWh of energy in FY 2021/22, which is an increase of 13.85% compared to the generation of previous FY and 0.72% more than the target generation. The generation of the year is also the maximum generation till date. The cumulative generation of the plant has reached 695.57 GWh.

The major repair and maintenance activities carried out in FY 2021/22 are as follows:

- Replacement of runner, needle, nozzle with its assembly along with oil sealing rings during overhauling of Unit No. 1;
- Replacement of MIV of Unit No.1;
- Repair, maintenance and cleaning of oil coolers and generator air coolers of both Units, generator varnishing etc.;
- Maintenance of crack at forebay; and

Runner Replacement Works

- Construction of gabion wall at Intake and cleaning of deposited debris at forebay.

## Chatara Hydropower Station

Chatara Hydropower Station, a canal drop type hydropower station, is located at Chatara, Sunsari with an installed capacity of 3.2 MW (2 units, each of capacity 1.6 MW) and the annual design generation of 6 GWh. It was commissioned in 1996 AD with the assistance from Government of India at a cost of NRs. 162.6 million.

The total energy generation of the plant in FY 2021/22 is 2.878 MWh and the cumulative generation till this FY is 58.9 GWh .Out of two units installed, only single unit is in operation. The major repair and maintenance works carried out this year are replacement of analog input module of governor system and new AVR module card.

Generator Stator

## Panauti Hydropower Station

Panauti Hydropower Station is the third oldest Hydropower Station in Nepal. It is a ROR scheme hydropower plant with intake on the right bank of Roshi Khola. The powerhouse is located at Khopasi, Kavre, nearly 35 km east of Kathmandu.

The installed capacity of the plant is 2.4 MW with the annual design generation of 6.97 GWh. It was commissioned in 1965 A.D. and developed jointly by Soviet Union Government and GON at a cost of NRs. 27 million. The station was developed with joint purpose of hydropower generation and irrigation. However, the water in the canal has also been used for drinking purpose as well.

Currently, the water of the river is mainly being used for drinking purpose. Recently the power station control, monitoring, substation and protection system have been upgraded.

The cumulative generation of the station has reached 144.27 GWh till F.Y.2021/22 from its first run. The station has generated 3.25 GWh in FY 2021/22

The major repair and maintenance activities carried out in FY 2021/22 are as follows:

- Unit No. 3 overhauling Works;
- Repair, maintenance, installation and commissioning of DC generator for excitation System;
- Upgrading distribution lines of office and forebay areas;
- Repair of MIV of Unit No 2; and
- Organization of Operation and Maintenance Training for the assistant level technical staff of different powerhouses.

Operation and Maintenance Training

## Seti Hydropower Station

Seti Hydropower Station is a RoR type plant with an installed capacity of 1.5 MW consisting of 3 units each of 0.5 MW. It is located at Nadipur, Pokhara and was commissioned in 1985 AD with assistance from Government of People's Republic of China to Government of Nepal. The canal for this power plant, primarily used for irrigation purposes, is being looked after by Irrigation Division Office, Pokhara and hence, the operation is affected by irrigation as well.

The design generation of the plant is 9.8 GWh The cumulative generation of the plant has reached 359.45 GWh till 2021/22 from its first run. The station has generated 10.95 GWh in FY 2021/22.

The major repair and maintenance activities carried out in FY 2021/22 are as follows:

- Overhauling of Unit No. 3;

**Dismantling of MIV during Overhauling of Unit No. 3**

- Replacement of stoplog seal (J seal, Flat seal); and
- Installation of new motor control panels of forebay gates.

## Fewa Hydropower Station

Phewa Hydropower Station is a canal drop type power station having an installed capacity of 1.0 MW. It is located at Pardi, Birauta, Pokhara with an annual design generation of 6.5 GWh. It consists of 4 units each 0.25 MW. It was commissioned in 1969 AD and developed jointly by Government of India and Government of Nepal. The public encroachment of power canal leading to powerhouse is a concern for normal operation regardless of the availability of generating units.

The cumulative generation of the station has reached 101.39 GWh till FY 2021/22 from its first run. The station generated 1.86 GWh in FY 2021/22.

The major repair and maintenance activities carried out in FY 2021/22 are as follows:

- Overhauling of Unit No. 1;

**Overhauling of Unit No. 1**

- Rewinding of main coil, stator coil of Unit No.3;
- Installation of 415V,800A synchronizing breaker of Unit No.1;
- Replacing bushing, copper studs, silica breather and top-up oil of power transformers; and
- Repairing of plant AC distribution system with new under/overvoltage protection system,

## Sundarijal Hydropower Station

Sundarijal Hydropower Station is located at Sundarijal, 15 km northeast of Kathmandu and

serves twin purpose of water supply and energy.

The tail-water discharge is utilized for water supply system to Kathmandu Valley. It has two turbo-generator sets with total installed capacity of 640 kW & annual generation 4.77 GWh. This Plant was erected under Colombo Plan scheme whereby the main equipment was supplied by English Electric Company Ltd., England. Commissioned in 1934 AD, it is the second oldest hydropower plant constructed in Nepal.

The actual generation from this plant in FY 2021/22 is 6.101 GWh and cumulative generation till now is 137.78 GWh. The plant has achieved of 86.03 % of the generation target.

In FY 2021/22, the steel rib erection and backpacking works at the tunnel is going on. The nearly a century-old tunnel, which had collapsed at some portion, was rehabilitated by replacing existing support of woods with steel ribs and backpacking it.

**Protection Works of Tunnel at Sundarijal HPS**

## Pharping Hydropower Station

Pharping Hydropower Station is the first Power Station built in Nepal having the legacy of hydropower development in Nepal for more than a century. It was inaugurated by the late king Prithivi Bir Bikram Shah Dev on Monday, 22 May 1911 (B.S. 1968, 9th Jestha).

**Outlook of Powerhouse**

Located at Pharping, nearly 12 km south from Kathmandu, it was constructed with a grant from British Government at a cost of NRs. 0.713 million. There are two units each 250 kW with an aggregate installed capacity of 500 kW. As the water from the penstock has been diverted to drinking water supply to Kathmandu by KUKL, the plant is not being operated for generation nowadays though it has been placed in standby mode to operate occasionally and to demonstrate to the visitors.

The Government of Bagmati Province has allocated a budget to promote the powerhouse as a hydropower museum. NEA Engineering Company has been assigned the task of performing the necessary study works.

## Hetauda Diesel Powerhouse

Hetauda Diesel Power Plant, with an installed capacity of 14.41 MW is located at Hetauda, Makawanpur. The first phase with three sets of English Units was commissioned in 1963 and the second phase with four sets of Russian Units was commissioned in 1980 from assistance from British Government to Government of Nepal.

The plant operates during peak time; however, the soaring fuel price has made its operation costlier compared to that of hydropower stations. Presently, the plant has been operating

at capacity of 10 MW in need of system peak load and for regular testing purposes.

The cumulative generation of the plant has reached 155.53 GWh from its first run. The station has generated 32.5 MWh in FY 2021/22.

## Generation Development Department

Generation Development Department (GDD) has the main objective of performing regular monitoring, inspection and resource management of under-construction projects of GD. After the successful completion and handover of Kulekhani III hydropower project (14 MW) and Upper Trishuli-3A HEP, this Department has been given the responsibility of regular monitoring and inspection of under-construction hydropower projects being executed through NEA Subsidiary Companies. A task team has been formed from this Department to regularly monitor and inspect the under-construction projects. This team will explore the progress updates of the projects till date and develosp a format to get the progress reports on a regular monthly basis.

## Technical Support Department

Technical Support Department, headed by the director, provides expert advice for the under-construction projects and existing generating power plants. The Deputy Managing Director of GD coordinates between the Technical Support Department and Operation and Maintenance Department.

Recently, via this department, NEA has signed an MOU with the School of Engineering, Kathmandu University for "Green Hydrogen Technologies Contributing to the Domestic Economy with Better Utilization of Hydropower Electricity" for mutual benefits of both Parties. Under this program, NEA shall provide grant of NRs. 30 Millions to School of Engineering, Kathmandu University. The prime objective of this program is to expedite the capacity development of Academic Institutions and NEA for better utilization of hydropower electricity for the promotion of industrial development in Nepal. KU will prepare a DPR for pilot-scale green ammonia production in Nepal for contribution to the domestic economy and better utilization of hydropower electricity and provide engineering and associated services for implementation of Green Hydrogen Technologies within the broad interest of improvisation in grid quality, reliability and energy storage in the wet season.

## Electromechanical Workshop Construction Project

NEA has envisioned a electromechanical workshop capable of repair and maintenance of almost all types of electromechanical equipment used in powerhouses of NEA. For the purpose, GD will commence 'Electromechanical Workshop Construction Project' from the beginning of FY 2022/23 with the completion targey by F/Y 2024/25.

For the initial phase, the project has set a target to build the capability for, repair of turbine and associated parts for NEA owned HPP, fabrication of smaller to medium components, fabrication of hydro mechanical components (gate, penstock etc) for IPPs and HVOF coating. While, in the long run the project has planned to extend project for fabrication of large hydro mechanical components, on site overhauling, erection and rehabilitation works of HPPs, testing of material properties, testing of electrical and electronic systems and components, human resources development related to repair and maintenance.

# TRANSMISSION DIRECTORATE

Transmission Directorate (TD), headed by the Deputy Managing Director, is fully devoted to its responsibility of planning, constructing, operating and maintaining high-voltage transmission lines and substations from 66 kV to 400 kV voltage level.

The transmission system bridges an important link between the various generation power plants and distribution networks ensuring the reliable and quality power to the consumers. TD leads to plan and construct the new transmission lines and associated substations along with the necessary reinforcement/upgradations of existing transmission lines and substations.

Grid Operation Department (GOD), System Operation Department (SOD), Grid Development Department (GDD), and Major 220 kV Transmission Line Department are the four Departments under this Directorate and each of them is headed by a Director. In addition, the major 400 kV Transmission Line Projects is also under this Directorate.

The main objectives of the Directorate are:

- To ensure the development and construction of efficient, coordinated and economical system of transmission lines from 66 kV to 400 kV voltage level for smooth flow of electricity from generating stations to the distant load centers;
- To operate, monitor and maintain the ttransmission system (66 kV to 400 kV voltage level) in an efficient manner;
- To ensure the quality and reliable power supply to consumers by reducing system outages and continuous supervision of INPS;
- To envisage, formulate, and implement short term, medium-term and long term development plans of transmission system network of 66 kV and above voltage levels to evacuate the power generated as per the GoN strategy (15,000 MW in 10 years) as well as to serve the rapidly growing demand of the country; and
- To reinforce/ up-grade the existing transmission lines and substations capacity.

The Directorate has responsibility to operate INPS in synchronous mode with Indian Grid to make the system reliable, secured, and robust in the future. Moreover, TD is also responsible for power exchange across border countries through cross-border transmission lines. The first-ever 400 kV Dhalkebar-Muzzaffapur cross-border transmission line has played a central role in the strengthening of the transmission network of INPS. Also, preparation of financial and implementation modality for the construction of the Butwal-Gorakhpur 400 kV cross-border transmission line is in the final stage. Similarly, the preparation of the comprehensive design of 400 kV Inaruwa-Purniya and New Lumki (Dododhara) - Bareli cross border transmission lines is in progress.

## Recently Completed Projects

### Solu Corridor 132 kV Transmission Line

The objective of this project was to evacuate power from IPP's Projects of Solu river basin and commence rural electrification in Solukhumbu

and Okhaldunga districts. The cost of the project was 44 MUSD and jointly funded by GoN and EXIM Bank of India. The project was initiated in FY 2067/068 (2010/11) and completed on February 14, 2022.

The Project has successfully constructed 90 km 132 kV double circuit transmission line with ACSR Cardinal conductor from existing 132 kV Mirchaiya substation (Siraha District) to 132 kV Tingla substation and 132/33kV, 30 MVA and 33/11kV, 8 MVA Tingla substation at Dudhkunda Municipality of Solukhumbu district.and also the 2x4.5 km, 33 kV line from Belidada, Solukhumbu to Tingla substation.

### Nawalpur 132 kV Substation

The project was initiated with the objective of improving the power supply quality in the region by supplying the power to different load centers of Sarlahi District. The cost of the project was about NRs 535 Million and funded by GoN. The project was initiated in FY 2074/75 (2017/18) .

The scope of the project was to construct Nawalpur Substation with the power transformer capacity of 132/33kV, 63MVA, 3 Phase and 33/11kV, 16 MVA, 3 Phase.

Construction of the substation works was completed and charged on October 19, 2021 and is in satisfactory operation.

Nawalpur Substation

### Bhaktapur-Baneshwor-Patan 66kV Transmission Line Up-gradation

The project was initiated to upgrade the existing power supply system of Lalitpur and Kathmandu districts through the up gradation of the existing conductor of 66 kV transmission lines in Kathmandu Valley. The scope of the project includeed the replacement of a 20 km existing ACSR LGJ 120 sq. mm conductor and ACSR Wolf conductor from Bhaktapur to Suichatar substation via Baneshwor and Patan substations and a 5 km existing ACSR Dog conductor between Chapali and Chabahil substations with High Temperature Low Sag (HTLS) conductor. The cost of the project was 2.5 MUSD and was funded by GoN. This project was started in FY 2074/075 (2017/18) and completed on April 27, 2022. The upgradation of these existing 66 kV transmission lines has helped to increase the transmission capacity by almost twice.

New Conductor Stringing Works near Balkhu

### Motipur-Sandhikharka 132 kV Transmission Line Section

This section is a part of Burtibang- Paudi Amrai-Tamghas- Sandhikharka- Gorusinghe 132 kV transmission line project. The objective of this section was to extend the transmission line from Kapilvastu district to Arghakhachi district to improve the power supply situation, reduce faults in distribution system and decrease the technical loss. Further, it will provide a reliable network for power evacuation of proposed hydroelectric projects in this region. The cost of this section was around 11.2 MUSD and funded by GoN. This project was initiated in FY 2065/066 (2008/09).

The scope of this section of the project was to construct 37 km, 132 kV double circuit transmission line with ACSR Bear conductor and new 132/33kV, 30MVA & 33/11kV, 16 MVA substations each at Motipur (Kapilvastu district) and Sandhikharka (Arghakhachi district).

Recently, Motipur and Sandhikharka 132/33/11 kV substations and Motipur-Sandhikharka 132 kV transmission line works were completed and have been charged on March 25, 2022.

Switchyard of Motipur Substation

### New Modi-Lahachowk 132 kV Transmission Line Section

This section is a of the part of New Modi Lekhnath 132 kV transmission line project. The objective of this section was to improve the supply situation in the Gandaki province and to evacuate power from hydropower plants that have started generation or in the pipeline of the construction in Modi river basin of Parbat and Seti-Mardi-Sardi river of Kaski district. The cost of this section of the project was about 13.0 MUSD and jointly funded by EXIM Bank of India and GoN.

The overall scope of this section was to construct 20 km 132 kV double circuit transmission line with ACSR Bear conductor and connect existing Modi HEP with Lahachowk substation through New Modi & Lahachowk substations. The project has successfully constructed and commissioned 132 kV Switching substation at Korunga (New Modi) and 132/33kV, 30MVA substation at Lahachowk and 132 kV transmission line from New Modi to Lahachowk.

The New Modi –Lahachowk 132 kV transmission line section was successfully charged on 18th January, 2022.

### Lamahi Ghorahi 132 kV Substation Expansion

The objective of this project was to supply adequate power to Ghorahi Cement Factory and other industrial, commercial and domestic consumer of Dang district.

The scope of the project included installation of one number of 132/33 kV, 63 MVA transformer, two numbers of capacitor banks of 12.5 MVAR and 20 MVAR with necessary bays and bus bar arrangement, control and protection works at existing Ghorahi substation and bay expansion works at Lamahi 132 kV substation.

For this project, the fund was allocated by GoN and the cost of Project is NRs 28.89 million. The contract agreement was signed in June 2020 with M/S Hightension Switchgears Pvt. Ltd, Kathmandu Nepal and was completed on June, 2022.

### Butwal-Lumbini 132 kV Transmission Line

The objective of this project was to enhance

transmission capacity, improve power quality, reliability and reduce line loss in Rupandehi district through construction of 132 kV double circuit transmission line. The estimated cost of project was 9.5 MUSD and funded by GoN.

The scope of project was to construct 18 km double circuit 132 kV transmission line from Jogikuti substation, Butwal to Mainahiya substation with ACSR BEAR conductor including 2 km 500 Sq. mm XLPE underground cable, one 132/33/11 kV substation at Mainahiya with 132/33 kV, 2x45 MVA and 33/11 kV, 16 MVA power transformers and 132 kV line bay extension at Jogikuti substation.

As of July 2022, the entire substation works has been completed except the supply of one 132/33 kV, 45 MVA and one 33/11 kV, 16 MVA power transformers. The substation has been charged and the load has been supplied from one 132/33 kV, 45 MVA power transformer from July 8, 2022. The construction of transmission line has also been completed and the line has been charged successfully on July 6, 2022.

### Hetauda-Birgunj 66 kV Transmission Line Upgradation

Before completion of this project, Hetauda-Birgunj 66 kV double circuit transmission line was supplying power to small and medium scaled industries like Hetauda Cement, Hulas Steel, Jagadamba steel, Jagadamba wire, Surya Nepal, Ashok Steel, Jagdamba enterprizes, Sarbottam Steel with ACSR Wolf conductor. The quantum of power required by these industries and associated substations was increasing day by day. To address the problem of low current carrying capacity of existing ACSR Wolf conductor, this project was initiated with the objective of replacing existing Wolf conductor with High Temperature Low Sag (HTLS) INVAR conductor. Estimated project cost was 3 MUSD and funded by GoN. The project was started in FY 2072/073 (2015/016) and completed in May, 2022.

The project scope of works included replacing 20.20 km Wolf conductor with HTLS conductor and associated hardware from Simara Tower No 276 to Birgunj substation via Parwanipur substation. In addition, erection of 43 number of intermediate supporting towers between the existing towers from Simara to Birgunj Substation was also in the scope of this project. The project has successfully completed all the scope of works and currently transmission line has supplying higher power to the industries.

**Comparison of Transmission Line Length in last Eight Fiscal Years**

| S.N. | FY | Cicuit km | | | | Total | Total Increment (ckt. Km) |
|---|---|---|---|---|---|---|---|
| | | 66 kV | 132 kV | 220 kV | 400 kV | | |
| 1 | 2071/072 | 494 | 2130 | | | 2624 | |
| 2 | 2072/073 | 494 | 2417 | | | 2911 | 287 |
| 3 | 2073/074 | 494 | 2596 | 75 | 78 | 3243 | 332 |
| 4 | 2074/075 | 514 | 2717 | 75 | 78 | 3384 | 141 |
| 5 | 2075/076 | 514 | 3142.5 | 255 | 78 | 3989.50 | 606 |
| 6 | 2076/077 | 514 | 3240 | 437 | 78 | 4269 | 279.50 |
| 7 | 2077/078 | 514.00 | 3540.54 | 741.20 | 78 | 4874 | 604.74 |
| 8 | 2078/079 | 514.00 | 3816.54 | 896.60 | 102.00 | 5329 | 455.40 |
| | | | | | | **Total Increment in Eight Years** | **2705.44** |

**Comparison of Substation Capacity in last Eight Fiscal Years**

| S.N. | FY | Total Capacity (MVA) | Total Increment (MVA) |
|---|---|---|---|
| 1 | 2071/072 | 2132 | |
| 2 | 2072/073 | 2223 | 92 |
| 3 | 2073/074 | 2618 | 394 |
| 4 | 2074/075 | 3198 | 580 |
| 5 | 2075/076 | 3935 | 738 |
| 6 | 2076/077 | 4299.70 | 364.40 |
| 7 | 2077/078 | 6433.90 | 2134.2 |
| 8 | 2078/079 | 7148.60 | 714.7 |
| | | **Total Increment in Eight Years** | **5017** |

**Comparison of Capacitor Bank Capacity in last Eight Fiscal Years**

| S.N. | FY | Total Capacity (MVAr) | Total Increment (MVAr) |
|---|---|---|---|
| 1 | 2071/072 | 443.644 | |
| 2 | 2072/073 | 463.644 | 20 |
| 3 | 2073/074 | 473.644 | 10 |
| 4 | 2074/075 | 473.644 | 0 |
| 5 | 2075/076 | 516.144 | 42.5 |
| 6 | 2076/077 | 546.144 | 30 |
| 7 | 2077/078 | 643.644 | 97.5 |
| 8 | 2078/079 | 656.144 | 75 |
| | | **Total Increment in Eight years** | **275** |

## Grid Development Department

The Department is headed by the Director and is responsible for planning, constructing, supervising and commissioning of new transmission line and substation projects up to 132 kV voltage level. Brief summary of the projects being executed by this Department is presented below:

### Projects under Construction

### Ramechap (Garjyang) -Khimti 132 kV Transmission Line

The objective of this project is to evacuate power generated from IPP projects in Khimti and Likhu corridors. The Garjyang-New Khimti transmission line, Garjyang substation and line bays extension at New Khimti started in FY 2067/068 and New Khimti 220/132 kV, 200 MVA transformer installation and other associated works started in FY 2076/77 and these are expected to be completed by the end of FY 2079/80. The estimated project cost is about 20 MUSD and funded by the GoN.

The scopes of work include:

- Construction of 31 km 132 kV of double circuit transmission line with ACSR Bear conductor as well as 132/33/11 V new substation with 132/33kV, 30 MVA, 3 phase power transformer and 33/11kV, 6/8 MVA, 3 phase power transformer at Garjyang and construction of 132 kV bays at New Khimti substation. For this work, contract was signed in February 2017 with Pinggao Group Co. Ltd
- Extension of 220 kV GIS at New Khimti substation with 1 No. of 220 kV bay for connecting 220/132 kV, 200 MVA (4*66.67, 1 phase) bank of auto transformers as well extension of 132 kV at New Khimti substation with 3 Nos. of 132 kV bays and construction of 33 kV Indoor system with 8 nos of 33 kV

bays. For this work, contract was signed in March 2020 with MSIPL-CHINT J/V.

As of July 2022, 105 tower foundations and 102 tower erections out of 105 have been completed, transmission line materials (conductors, insulators, tower parts) have been reached at site, 70.15 ckt km of transmission line has been strung, civil construction works such as control building, transformer foundation, gantries foundation etc. have already been completed at Garjyang substation. The 132/33/11kV Garjyang substation is charged under contingency plan on 2022/4/28 and some power is evacuated to 33/11kV Jiri substation. Right of Way compensation distribution of both Dolakha and Ramechhap district is ongoing rapidly.

In New Khimti substation, Upper Tamakoshi Hydropower Project has already installed 220/132kV, 100 MVA power transformer to evacuate power from IPP's of Likhu Corridor. However, the capacity is found insufficient to evacuate the power from IPP's of Likhu and Garjyang corridor, so NEA decided to install additional 220/132/33 kV, 200 MVA power transformer at New Khimiti under New Khimti Augumentation as part of Ramechhap, Garjyang,Khimti 132 kV Transmission Line Project. The 220/132 kV,200 MVA (4*66.67, 1 phase) bank of auto transformers, 2 nos of 30 MVA power transformer and 1 nos of 6/8 MVA has already reached at site.

Garjyang Substation Charged as per Contingency Plan

### New Modi-Lekhnath 132 kV Transmission Line

The project has been initiated with the objective of improving the power supply situation in Gandaki province and evacuating power from hydropower plants in Modi River basin of Parbat and Seti-Mardi-Sardi river of Kaski district.The project is funded by EXIM Bank of India and GoN. The project is located at Parbat and Kaski districts of Gandaki province.

Overall scope of the project includes construction of 43.28 km 132 kV double circuit transmission line with ACSR Bear conductor, which shall connect existing Modi HEP with Lekhnath substation through proposed New Modi & Lahachowk substations.

With the completion of land acquisition of about 64 Ropani at Korunga, Parbat and about 62 Ropani at Lahchowk, Kaski, the project awarded the substation work package to M/S Hitachi Energy Ltd. India (Formerly Known as ABB India Ltd.) on 21 June 2018. These substations were successfully commissioned on 29th December, 2021 and finally charged with load on 18 January, 2022.

The Transmission line package was awarded to M/S Kalpataru Power Transmission Limited on 21 June 2018. As of July 2022, out of 140 towers, 136 Nos. of stub foundation works has been completed, 131 Nos. of towers has been erected and 37.01 km of line stringing has been completed. On supply part, all equipment has been delivered in site store. As a whole, about 92 percent of transmission line construction work has been completed. It is targeted to be completed by September, 2022.

### Thankot – Chapagaon – Bhaktapur 132 kV Transmission Line

The project is initiated with the objective of completing 132 kV ring main in Kathmandu valley to improve the power transmission capacity,

power quality, reliability and reduce line loss in the valley. The initial project cost estimate was 23 MUSD. Recently the project is being under execution with the fund of GoN.

About 6 km transmission line in Kathmandu district and 4 km transmission line in Bhaktapur district have been completed. Construction of remaining 18 km transmission line in Lalitpur district was stopped due to protest by local people demanding 100% RoW compensation or complete shift of transmission line and consequently previous contract was terminated. NEA is taking initiations and conduct dialogs with concerned people and authorities to complete the remaining works. However, there is no progress in the construction of remaining works

### Burtibang- Paudi Amrai- Tamghas-Sandhikharka- Gorusinghe 132 kV Transmission Line

The objective of this project is to extend the transmission line from Kapilvastu district to Arghakhachi, Gulmi and Banglung districts to improve the power supply situation, reduce faults in distribution system and decrease the technical loss. It will also provide the electrical network for power evacuation of proposed hydroelectric projects in this region. The overall cost of the project is around 39.5 MUSD and funded by GoN. This project was initiated in FY 2065/066 (2008/09) and is expected to be completed by 2022/23.

Complete scopes of the project include construction of 86 km, 132 kV double circuit transmission line with ACSR Bear conductor and construction of new 132/33kV, 30MVA & 33/11kV, 16 MVA substations each at Motipur (Kapilvastu district), Sandhikharka (Arghakhachi district), Tamghas & Paudi-Amarai (both in Gulmi district) and Burtibang (Baglung district). Out of these, Motipur 132/33/11 kV substation, 37.605 km (75.21 circuit km) Motipur - Sandhikharka 132 kV transmission line and Sandhikharka 132/33/11 kV substation has been charged on 2078/08/09, 2078/12/11 and 2078/12/12 respectively. Further, civil construction works such as buildings (Staff Quarter, Control Building, Guard House and Store House) and switchyard foundations in Tamghas and Paudi-Amarai substation have almost been completed. Similarly construction works of Burtibang substation has also been started. Regarding Sandhikharka Burtibang 132 kV transmission line, check survey, geotechnical investigation, tree counting and 2 tower foundation have been completed.

### Dordi Corridor 132 kV Transmission Line

The ojective of this project is to evacuate power from IPP projects of Dordi river and its tributaries in Lamjung district. The cost of this project is estimated to be 8.4 MUSD and funded by GoN.

Scopes of the project include construction of 10.167km long 132 kV double circuit transmission line from Kirtipur to Udipur with ACSR Cardinal Conductor and 132/11 kV, 10 MVA substation at Kirtipur.

As of July 2022, Kirtipur 132/11kV substation has been charged with 11 kV back feed. Due to unavailability of supply at 132 kV voltage level, the substation is yet to be fully commissioned. Regarding Kirtipur-Udipur 132 kV transmission line, foundation works as well as tower erection and stringing works of conductor and OPGW were entirely completed. But due to heavy rainfall and devastating flood at Dordi river in Asadh 2078, total of 4 Nos. of transmission tower were collapsed affecting the completion schedule of project. Out of four collapsed towers, foundation works of all are complete and two towers are fully erected. For the rest of two towers, erection works, and associated conductor stringing works are in progress.

Kirtipur 132/11 kV Substation

### Kushaha (Inaruwa) - Biratnagar 132 kV Transmission Line

The objective of this project is to reinforce the power supply system of Morang and Sunsari districts to meet the increasing power demand of domestic, commercial and industrial consumers as well as to minimize overloading problem of existing Duhabi Grid Substation , 33/11 kV Rani substation and 33/11kV Tankisinwari substation. The cost of the project is estimated to be 19 MUSD and is funded by GoN. The project is expected to be completed by April 2023.

Scopes of the project include construction of 23 km, 132 kV double circuit transmission line with HTLS Cordoba Conductor from Inaruwa 400/220/132 kV substation to under construction Biratnagar substation with 132/33 kV, 2*63MVA and 33/11kV, 16MVA Power Transformers at Ramganj Belgachiya.

As of July 2022, construction of 66 Nos. of tower foundations out of 80 has been completed. Likewise, 12 Nos. of tower erection have been completed. Land acquisition process for tower pad has been completed and compensation distribution work is in progress. Regarding substation construction works, about 65% of switchyard foundation, 90% of control building and 85% of staff quarter construction works are completed. Switchyard Equipments such as disconnecting switches, CRP, SAS Panels, communication equipments, capacitor banks have been delivered to the site. Switchgear equipments (CT/PTs, Lightning Arrestor, VCBs) have reached in Nepal Custom and power transformers have been dispatched from Manufacturer's factory.

Tower Erection Work of Kusha-Biratnagar Transmission Line

### Chameliya- Syaule- Attariya 132 kV Second Circuit Transmission Line

The objective of this project is to reinforce the power supply system and lay down infrastructure for power evacuation from different IPP's in Darchula and Bajhang districts. The scopes

of this project are to construct 131 km second circuit transmission line on same double circuit tower of existing Chameliya-Attariya 132 kV transmission line and bays extension work at associated substations. Cost of this project is 4.5 MUSD and funded by GoN. This project is initiated in FY 2074/075 (2017/018) and expected to be completed by December 2022.

As of July 2022, 124.5 km of conductor stringing works and construction of a new tower at Syaule S/S and the bay extension work at Chameliya S/S have been completed. The bay Extension work at Attariya S/S and Syaule S/S has progress of around 90% and is expetected to complete in a month.

In the transmission line, local residents nearby tower No. 13 to tower No. 17 of Darchula district have forced to halt conductor stringing work demanding insertion of additional towers. Further, local residents nearby tower no. 194 to tower no. 212 at Dadeldhura district have created obstruction for conductor stringing demanding for compensation for household structures under RoW which was constructed after the completion of first circuit.

132 kV Lattice Tower Construction at Syaule Sub-station

## Bardghat - Sardi 132 kV Transmission Line

The objective of this project is to provide power supply to Hongshi - Shivam Cement Industry. The scope of the project includes construction of 20 km long 132 kV double circuit transmission line with ACSR Bear conductor from Bardghat substation to Sardi and 132 kV line bay extension at existing Bardghat substation. The cost of the project is estimated to be 6 MUSD and funded by GoN through Ministry of Industry, Commerce & Supplies. The project is initiated in FY 2073/074 (2016/17) and expected to be completed by the end of December 2022.

As of July 2021, all the civil construction works including staff quarter, control building and foundation works have been completed. Major substation equipments have been installed. Regarding the transmission line, out of 68 towers, all foundations and 61 tower erection works and 13 km out of 20 km conductor stringing works have been completed. Likewise, land acquisition and RoW compensation distribution work have also been completed. Single circuit transmission line has been charged on 13 November, 2021 to supply Hongshi-Shivam Cement Industry. Delay in approval of additional tree cutting in the RoW of transmission line has affected the completion of the project.

Ongoing Conductor Stringing Works

## Kushaha- Kataiya 132 kV Second circuit Transmission Line

Considering high generation & surplus power in Nepal and high demand in India during

wet season and reverse scenario of power generation/demand in dry season, Nepal and India government have agreed to construct cross border transmission line for import/ export of power. Kushaha-Kataiya 132 kV second circuit transmission line project is proposed for further strengthening of Nepal-India power transmission line. The estimated cost of the project is 5.5 MUSD and funded by GoN. The contract has been awarded to M/S Sigma Con - Narendra Nirman JV on September 19, 2019. The project is targeted to be completed by December 2022.

The scope of this project includes construction of 16.5 km second circuit transmission line on same double circuit tower of existing Kushaha-Kataiya 132 kV transmission line and upgradation of existing Kusaha switching station to a complete substation with 132/11kV, 22.5 MVA power transformer and necessary 132 kV line bays to connect transmission lines from Rupani, Duhabi and Kataiya substations.

As of July 2022, all the civil works for all equipment have been completed except for existing line bays and all electrical equipment has been delivered at the site and stored at the contractor's premises. Moreover, Control Building foundation, plinth beam and first floor slab beam works has been completed and the finishing works will be completed soon. Furthermore, stringing of total 12.5 km ACSR "PANTHER" conductor and OPGW has been completed. Land Acquisition and foundation for all seven LILO towers has been completed and the erection of tower started at location AP 01. Although, the project is targeted to be completed by July 2022, but due to the Covid-19 hinderance, the progress of construction have been affected.

### Sunwal 132 kV Substation

The objective of this project is to provide adequate power supply to Palpa Cement Industry, Laxmi Steel Industry as well as other existing industries along with the reliable power supply to existing and newly constructed 33 kV distribution network. The substation is going to be constructed in Charpala, Ward No. 7 of Sunwal Municipality of Nawalparasi (Susta Paschim) district.

For this project the fund has been allocated by the GoN through Ministry of Industry, Commerce and Supplies and the cost of Project is NRs. 687 Million. The contract agreement has been signed in September 2019 with Energy Pac and Sigma Con JV. This project contract work was effective from November 10, 2019 and expected to be completed in September 2022.

The scope of work includes construction of a new substation with 132/33 kV, 2x63 MVA, 3-phase and 132/11 kV, 22.5 MVA, 3-phase power transformers and construction of 7 Nos. of 33 kV feeders and 4 Nos. of 11 kV feeders with complete relay & protection system and substation automation system

As of July 2022, construction of boundary wall, control building, staff quarter and store cum guard house have been completed. Almost all the materials except power transformers have been delivered to the site. Control panel wiring and other equipment installation works are going on.

Sunwal Substation under Construction

### Balefi-Barhabise Corridor 132 kV Transmission Line

The objective of this project is to evacuate power from different IPP projects at Balefi Corridor. The project will construct Pangtang-Bahrabise 20 km 132 kV double circuit transmission line with ACSR Cardinal Conductor. Initial cost estimate of the project is NRs 546.69 Million and funded by GoN. The contract agreement has been signed with M/s Sigma Con Pvt. Ltd in May 2020 and the project is expected to be completed by July 2023.

As of July 2022, check survey, detail engineering, resistivity measurement and soil test works have been completed. Tower design, foundation design, tower schedule works have also been completed and notice for acquiring private lands in Sindhupalchok district for tower pads have been published. Tower foundation works in 6 locations have been completed and ongoing in few more locations. EIA implementation and approval for tree cutting is under process.

### Kohalpur-Surkhet-Dailekh 132 kV Transmission Line

The objective of this project is to meet the increasing power demand of Surkhet and Dailekh districts, improve power supply quality and facilitate power evacuation from hydropower projects in Bheri, Babai and Karnali river basins of Karnali Province.

The scopes of project include construction of 52 km Kohalpur-Surkhet 132 kV double circuit transmission line with ACSR Bear conductor, 31 km Surkhet-Dailekh 132 kV double circuit transmission line with ACSR Cardinal conductor, 132 kV bay extension works at Kohalpur and 132/33 kV substation at Dailekh. Estimated project cost is 29 MUSD and is funded by GoN. The transmission line package from Kohalpur to Surkhet has been awarded to M/S M/s RS Infraprojects Pvt. Ltd. and this section of the line is expected to be completed by October 2023.

As of July 2022, in Kohalpur-Surkhet 132 kV transmission line section; 45 tower foundation out of 162 have been completed. Notice for acquiring private lands in Banke and Surkhet districts has been published and compensation is distributed to few land owners. Tree cutting of the transmission line has been approved. Similarly, all design drawings have been approved and civil construction works of bays in Kohalpur substation have been started. Circuit breaker has arrived to the site.

Further, in Surkhet-Dailekh 132 kV transmission line section, land acquisition for Dailekh (Chupra) substation has been completed and IEE has been approved. Construction of boundary wall and Guard house in Chupra substation have been started. The tender document for construction of the transmission line is under preparation.

### Mainahiya - Sampatiya 132 kV Transmission Line

The objective of this project is to facilitate cross-border power trade between Nepal and India. The Joint Steering Committee (JSC) on Nepal - India cooperation in power sector held on 24 January 2019 at Pokhara has agreed to proceed for the implementation of 132 kV cross border transmission line which interconnects Mainahiya substation (Nepal) and Sampatiya substation (India). The cost of project is estimated to be 8.0 MUSD and funded by GoN. The project is initiated in FY 2075/076 (2017/18) and is expected to be completed by end of December 2022.

The scope of the project includes construction of 28 km double circuit transmission line with ACSR Bear conductor in Nepal side from 132/33/11 kV Mainahiya substation to Marchawar (Shree Rampur) border point at Rupandehi district, Nepal and bay extension works at Mainahiya substation.

As of July, 2022, in Mainahiya substation, all the civil construction works have been completed.

Major substation equipment have been delivered to site. Regarding the transmission line, out of total 96 locations, 96 tower foundation and 95 tower erection works and 8 km out of 28 km conductor stringing works have been completed. Land acquisition process for tower pad has been completed, RoW compensation work is in progress and all equipment have been delivered to site.

### Dhalkebar- Loharpatti 132 kV Transmission Line

The objective of this project is to reinforce the power supply system, cater increasing power demand, enhance quality and reliability of power supply of Mahottari and Dhanusha districts.

The scopes of project include construction of 20 km long 132 kV double circuit transmission line with ACSR Cardinal Conductor from existing Dhalkebar substation to Loharpatti with 132/33 kV, 2*30 MVA and 132/11 kV, 22.5 MVA substation at Loharpatti. The estimated cost of the project is NRs 1125 Million and is funded by GoN. The project was started in February, 2021 and expected to be completed in 2023.

As of July 2022, in the transmission line, land acquisition for the tower pad is completed. For the substation, the foundation construction of the gantry structure and equipment structure is almost completed. Construction of control room, staff quarter and store cum guard house is in the final stage. Manufacturing and testing of transmission line tower are completed and will be delivered to the site soon. Design and drawings of substation steel structure have been completed. Submission and approval of design and drawings of other equipment is under the process.

### Raxaul Parwanipur 132 kV Second Circuit Transmission Line

Raxual – Parwanipur 132 kV second circuit transmission line project has been initiated for increasing import/export of power between India and Nepal. This line will be helpful to meet increasing industrial demand of Birgung corridor. The scopes of this project include construction of 22 km second circuit transmission line on same double circuit tower of existing Raxaul-Parwanipur 132 kV transmission line and expansion of 132 kV bay at Raxaul and Parwanipur substation. Estimated cost of the project is 1.5 MUSD and funded by GoN.

As of July 2022, stringing of total 16.5 km ACSR "PANTHER" conductor and OPGW has been completed. Moreover, the foundation works for second bay of Raxaul Parwanipur 132 kV line have been completed at Parwanipur substation. All the electrical equipment have been delivered at the site and stored at the contractor's premises. The project is expected to be completed by December 2022.

### Dhalkebar – Balganga 132 kV Transmission Line

This project is initiated with the objective of improving voltage and supplying adequate and reliable power in Dhanusha district. The total project cost is about NRs. 2000 Million and funded by Government of Nepal. The project is initiated in fiscal year 2075/76 and is expected to be completed by the end of FY year 2080/81.

The scopes of the project include construction of about 24 km long, double circuit 132 kV transmission line with Cardinal conductor and construction of 132/33 kV, 2x63 MVA substation at Balganga, Hansapur Municipality – 9. The proposed line will originate from AP 13 of under construction Dhalkabar Loharpatti 132 kV transmission line and will be connected to the proposed Balganga substation. The Balganga substation will feed Mujeliya, Yadukoha, Dhanusha Dham, Birendra Bajar, Lohna and Nagrain 33/11 kV substations.

As of July 2022, the IEE study and land acquisition

at Balganga substation have been completed. The contract for construction of the boundary wall and guard house with store at Balganga substation has been awarded and 85 % of total work has been completed. Soil testing work for substation is going on. For transmission line, the contract has been awarded to Sigma Con. Pvt. Ltd. and the contractor has mobilized to the site.

**Construction of Store cum Guardhouse**

### Kaligandaki-Ridi 132 kV Transmission Line Project

The objective of this project is to increase the quality and reliability of power supply in Palpa, Gulmi, Argakhachi and Syangja districts. In addition, NEA will supply power to CG Cement after the completion of Ridi 132 kV substation. The project is initiated in FY 2075/076 (2018/19) with the funding by GoN through Ministry of Industry, Commerce and Supplies. The cost of this project is estimated to be NRs 1,450 Million.

The scopes of works include construction of about 23 km single circuit transmission line on double circuit tower and 60 MVA, 132/33/11 kV substation at Kuseni, Palpa and 132 kV bay extension works at Kaligandaki HEP.

As of July 2022, boundary wall and store cum guard house construction works are in final stage of completion. Likewise, contract for transmission line construction was awarded in April 2022 and currently is in the phase of check survey, tower spotting and finalizing the tower design works. For substation construction, estimate has been approved, and the tender has been floated in July 2022.

### Sunwal (Bhumahi) – Hakui 132 kV Transmission Line Project

The objective of this project is to meet the increasing industrial power demand in Bumahi – Bhairahawa Corridor of Nawalparasi (Susta Pachim), enhance the transmission capacity, improve supply reliability, reduce loss and improve voltage profile of distribution system in Nawalparasi.

The scope of the project includes construction of 14.4 km long 132 kV double circuit transmission line from Sunwal 132 kV substation (under Construction) to new 132 kV substation in Hakui with ACSR Cardinal Conductor in steel lattice structure. The new 132/33/11 kV substation shall be constructed at Hakui with 132/33 kV, 2x 100 MVA, 3 phase power transformer, 7 numbers of 33 kV feeders and 2 numbers of 25 MVAR Capacitor Bank.

As of July 2022, technical bid approval of Sunwal-Hakui 132 kV Transmission Line is under process. The works are expected to complete within 24 months from date of signing of contract agreement. Invitation for bid for substation works has been published. The works are

expected to be completed in 21 months from date of signing contract agreement.

Survey Work

### Amarpur-Dhungesaghu 132 kV Transmission Line

The objective of this project is to interconnect the Kabeli Corridor and Koshi Corridor transmission line projects so that the power from Kabeli Corridor 132 kV transmission line project can be partially diverted to the Koshi Corridor 220 kV transmission line project during normal operation. This project shall be a link for evacuation of power effectively from the growing number of IPPs in the Kabeli river basin. Also, in case of any fault in the Kabeli Corridor in the lower sections this project intends to improve the reliability by diverting the power into koshi corridor transmission line. The Project is initiated in FY 2075/76 (2018/19) and expected to be completed by end of the year 2023/24. The estimated cost of the project is NRs. 1042 Million and funded by GoN.

The scopes of project include construction of about 19.2 km double circuit transmission line from Amarpur, Panchthar to Dhungesaghu, Taplejung and necessary 132 kV bay extension works at respective substations.

As of July 2022, feasibility study of the project has been completed and Initial Environmental Examination (IEE) has been approved. The project has floated the tender for the transmission line and is under technical evaluation.

### Lekhnath Pokhara 132kV Transmission Line Up-gradation

The objective of this project is to reinforce existing power supply system of Pokhara city districts by upgrading the conductor of existing 132 kV transmission lines . It also helps to supply quality, reliable and uninterrupted power supply in Pokhara City.

The scopes of project include replacement of 7 km ACSR Wolf conductor from Pokhara substation to Lekhnath substation with High Temperature Low Sag (HTLS) conductor. Estimated cost of the project is NRs 45 Million and funded by GoN. This project is initiated in FY 2077/078 and is expected to be completed by 2079/80.

### New Khimti-Lamosanghu-Kathamandu Transmission Line Up-gradation

The objective of this project is to increase the existing power supply system of Kathmandu Valley by upgrading the conductor of existing 132 kV transmission lines from New Khimti to Bhaktapur via Lamosanghu 132 kV substation. It also helps to supply quality, reliable and uninterrupted power supply in Kathmandu Valley.

The scope of project in the first phase includes replacement of 45 km ACSR Bear conductor from New Khimti substation to Lamosanghu substation with High Temperature Low Sag (HTLS) conductor. Estimated cost of the project is NRs 500 Million and funded by GoN. This project is initiated in FY 2078/079 and expected to be completed by 2079/80.

As of July 2022, the contractor has completed check survey of the existing line and submitted

for approval to project. Simalarly, design drawing approval is in progress.

### Malekhu 132 kV Substation Expansion Project

The objective of this project is to increase the reliability of the existing distribution lines in the Dhading district by expansion of the existing 132 kV Malekhu switching station.

The scopes of project include construction, installation of 2x30 MVA power transformers at Malekhu switching station and 33 kV line bay expansion at existing Jahare and Dhading Besi 33 kV substation. Estimated cost of the project is NRs 290 Million and funded by GoN. This project is initiated in FY 2078/079 and expected to be completed by 2079/80.

As of July 2022, the contractor has submitted design drawings of various equipment for approval and mobilized to the site.

### Surkhet Substation

The objective of this project is improve supply system of Surkhet areas.The estimated cost of project is Nrs. 750 million and funded by GON.

Scope of the project includes construction of 2*30 MVA,132/33 kV Substation at Surkhet. As of July 2022, NEA has signed the contract agreement with NHE (Nepal Hydro& Electric Limited.) on May 4, 2022 for all the works and the Contractor has already mobilized his manpower and machineries to the site. Approval of civil and electrical designs are in progress.

### Projects under Planned and Proposed

- Lalbandi-Salimpur 132 kV Transmission Line
- Godak – New Anarmani Transmission Line
- Godak –Soyak 132 kV Transmission Line
- Pathlaiya – Harniya Transmission Line
- Sunkoshi 132 kV Substation
- Bafikot-Khungri 132 kV Transmission Line
- New Pokhara (Birauta) 132 kV Substation
- Lahan - Sukhipur 132 kV Transmission Line
- Rupani – Bode Barsain 132 kV Transmission Line
- Chandrapur - Sukhdevchauk 132 kV Transmission Line
- Jhurjhure 132 kV Transmission Line
- Kathmandu Valley Transmission System Upgradation
- Syaule Sanfebagar 132 kV Transmission Line
- Prasauni Birgunj 132kV Underground Electricity Transmission Line

## Major 220 kV Transmission Line Department

### Koshi Corridor 220 kV Transmission Line

The objective of Koshi Corridor 220kV Transmission Line Project is to support this requirement and to make the transmission and distribution network of NEA more resilient in Arun and Tamor basin. This project is jointly financed by the Government of Nepal and the Government of India. EXIM Bank of India provided the Line of Credit 250 MUSD to the GoN, whereas 90 MUSD will be funded by the GoN.

### The scope of Koshi Corridor 220kV Transmission Line Project covers, inter alia, the following:

- **Under Package KC1:** Through a contract with M/s Kalpataru Power Transmission Ltd., Design, Supply & Construction of ~35km long 220kV Twin ACSR Moose D/C Transmission Line from Tumlingtar Substation to Basantapur SS via Baneshwar SS, and ~76km long Quad ACSR Moose D/C TL from Basantapur SS to Inaruwa SS;
- **Under Package KC2:** Through a contract with M/s Larsen and Toubro Ltd., Design, Supply, & Construction of 220kV Air Insulated Substation at Tumlingtar (2x100 MVA; 2x 25/30MVA), Baneshwar (2x 25/30MVA), and Basantapur (2x 100MVA; 1x 20/30MVA) and Bay Extension (2x 220kV Bays) works at the Inaruwa substation; and
- **Under Package KC3:** Through a contract

with KEC International Ltd., Design, Supply, & Construction of 35km long 220kV Twin ACSR Moose D/C TL from Dhungesanghu SS to Basantapur SS and a 132/33 kV AIS (2x 15MVA).

This transmission line will only be charged at 132kV level in the present scope of the project. The consultancy service is being provided by M/s WAPCOS India Ltd.

Initially, the scope of the project was for single circuit stringing. After the scope of the project is expanded to include stringing of second circuit, Koshi Corridor 220kV TLP will be capable of realizing its full potential of evacuating as much as 2,000MW of power. The tender for stringing of second circuit in the Dhungesanghu-Basantapur section has been floated.

### Progress Status

Package KC-1 has been completed barring charging at full rated voltage, and some works such as revetment/ protection works etc. This line has been partially (66km stretch) charged since August 18, 2021 at 33kV level and schedule to be charged by the end of July 2022.

Package KC-2: Almost all works at Tumlingtar, Baneshwar and bay-extensions at Inaruwa substation have been completed and is scheduled to be charged by the end of July, 2022. Basantapur Substation still requires additional time because of its extreme climatic conditions (rain, and snow at altitude: 2,450m above mean sea level), extreme topographic conditions (substantial cutting, filling, and stabilization works for bench formation).

Package KC-3: Civil works at Dhungesanghu substation are almost complete barring road, drainage, and some protection & finishing works. Most of erection works are also complete within the substation. On the transmission line of this package, out of 130 numbers of 220 kV DC towers, >85% of foundations have been cast, ~83% towers have been erected, and more than 30% stringing has been completed.

**Baneshwar Substation**

### Target

- **KC2:** The completion of all facilities under KC2 is expected by September, 2022; and
- **KC3**: The completion of all facilities under KC-3 is expected by December, 2022.

### Chilime-Trishuli 220 kV Transmission Line

The objective of this project is to evacuate power generated from hydropower projects in Upper Trishuli Valley being constructed by Chilime Hydropower Company Limited notably Upper Sanjen, Sanjen and Rasuwagadhi and other Independent Power Producers (IPPs). The project is funded by German Development Cooperation through (KfW), European Investment Bank (EIB), European Union and GoN. The contract price for construction of 72 km Circuit length of 220 kV transmission line with total of 79 Nos. of towers is US$ 6,884,897.67 + NPR 722,555,332.49 and the contract price for construction of 320 MVA capacity 220/132/33 kV Chilime Hub New GIS Substation is US$ 6,432,900.86 + NRS 547,472,116.35. The Power Grid Corporation of India has been awarded the Consultancy Service contract for the project supervision on 6 July 2016.

The scope of the project includes construction of 28 km long 220 kV transmission line from Chilime Hub to Trishuli 3B Hub substation and construction of 2x160 MVA, 220/132 kV plus 1x50 MVA, 132/33 kV substation at Thambuchet,

Rasuwa. The line has two sections, one section (Chilime Hub substation to Mailung) is 20 km line of double circuit twin Bison ACSR conductor and the other section (Mailung to Trishuli 3B Hub) is 8 km line of four circuit twin Bison ACSR conductor. The 220/132 kV transformer includes two banks of 160 MVA auto transformers formed with 7 numbers of 220/132 kV, 53.33MVA single phase auto transformers and 132/33 kV transformer includes 50 MVA, 132/33 kV, 3 phase power transformer.

The project is mainly divided into two contract packages and is currently under implementation phase. An EPC contract was signed between NEA and Pinggao Group Co., Ltd, China for the Package-1 (220kV Chilime Hub-Trishuli-3B Hub Transmission Line) and Package-2 (Chilime Hub GIS Substation & Trishuli-3B Hybrid Substation) on 13 November 2017.

As of July 2022, regard to the transmission line construction, 39 out of 79 complete tower foundation and 15 Nos. of legs foundation have been completed with 23 Nos. of tower erected. Major supplies like conductor, earth wire, insulators, line hardware, tower earthing materials and most of the tower parts have been dispatched and reached to the site. Type test of OPGW has been completed and FAT is remaining, OPGW and Hardware combine type test is under the process. The transmission line is scheduled to be completed by February 2023.

Tower Erection Works

## Trishuli 3B 220 kV HUB Substation

The objective of this Trishuli 3B 220 kV Hub substation is to accumulate about 600 MW of power to be generated in Trishuli basin and evacuate those power via Trishuli-Matatirtha transmission line to INPS. The scope of the project includes construction of 2x160 MVA 220/132 kV plus 1x50 MVA 132/33 kV substation at Manakamana VDC of Nuwakot district. The 220/132 kV transformer includes two banks of 160 MVA auto transformers formed with 7 numbers of 220/132 kV, 53.33MVA Single phase auto transformers and 132/33 kV transformer includes 50 MVA, 132/33 kV, 3 phase power transformer. The 220 kV bays will be of Hybrid GIS type, which will be the first in Nepal at 220kV voltage level.

The project cost is estimated to be 16 MUSD with the joint funding of Government of Nepal, Germany (KfW) and European Investment Bank (EIB). Contract was signed with M/s PINGGAO GROUP CO., LTD (China) on November 13, 2017 with the contract value of 12.5 MUSD and the contract became effective from December 20, 2017.

The overall physical progress of the project is about 92.91%. The progress on design/drawing is about 99.5%. Major challenges of the project were to complete the site leveling and river/rivulet protection works. About 95% of site leveling and 95% of the river/rivulet protection have been completed.

Since it is very urgent project to evacuate the power from various IPPs (around 600 MW in near future), the project is given a high priority. Due to COVID-19 Pandemic, project is impacted and is re-scheduled to be completed by January, 2023.

Under Construction Trishuli 3B Hub Substation

### Lekhnath-Damauli 220 kV Transmission Line

The objective of this project is to augment the power evacuation capacity of the Integrated National Power System from the western basin of Nepal with the construction of a 220 kV, 45 km long double circuit transmission line with MOOSE ACSR conductor from Lekhnath Substation to New Damauli Substation, and 220/132 kV (6x100 + spare 1x100 MVA) GIS substation at Lekhnath, and 220/132 kV (2x63 MVA), 132/33 kV (2x30 MVA), 33/11 kV (2x8 MVA) GIS substation at Damauli. The cost of this project is estimated at 65 MUSD and 31 million EURO. The project is funded by the GoN and Germany (KfW). The project is expected to be completed in F/Y 2081/82

As of July 2022, construction works for the access road to New Damauli Substation and bridge over the Chhabdi River are in progress. The contractor M/S Kirateshwor Construction & Drilling Company Pvt. Ltd till now has completed the construction of the foundation and raft works of the right Pier of the Chhabdi Bridge. The tender notice for the construction of quarter building at New Damauli Substation has been published with the target to complete within FY 2079/80. Project Implementation Consultant FICHTNER, Germany, has prepared the detailed design and the bid documents. Bids will be invited for construction of substation and transmission line within August 2022. The construction schedule will be 24 months from the date of contract effectiveness. The commissioning of the project is scheduled by March 2025.

### Tumlingtar-Sitalpati 220 kV Transmission Line

The objective of this project is to extend the reach of the INPS at 220kV level from the existing Tumlingtar SS to the proposed Sitalpati SS, which can later function as a hub for evacuating power generated from the Arun River basin at Sankhuwasabha and Bhojpur district. Additionally, the Sitalpati SS will also pool the power of local IPPs, transmit it to Tumlingtar SS which can readily evacuate that power using the transmission infrastructure laid down under Koshi Corridor 220kV TLP. This project's estimated cost is NPR 4,482 million and is funded by the Government of Nepal. The project is initiated in August 2022 and expected to be completed in February 2025.

The scope of Tumlingtar-Sitalpati 220kV Transmission Line Project covers the following:

- Construction of ~14km long 220kV Twin Moose ACSR D/C Transmission Line from Tumlingtar SS to Sitalpati SS;
- Construction of 220kV(GIS)/ )/132kV/33/11 kV AIS substation at the Sitalpati Substation with 220/132 kV, 400 MVA (6*66.67 MVA+ 1*66.67 MVA) single phase bank and 132/33 kV, 2*24/30 MVA three phase transformer; and
- Construction of 2 line-bay extensions at the existing Tumlingtar Substation.

As of July 2022, IEE of the transmission line has been completed. The bid for the construction of the Transmission line and substations was floated on 3 February, 2022 and the contract was awarded to M/S Kalpataru Power Transmission Limited, India on 28 June, 2022. The construction of the Compound wall and staff quarter has been completed at the Sitalpati substation.

### Projects under Planned and Proposed

- Trishuli 3B - Ratmate 220kV Transmission Line;
- Dhaubadi Iron Mines Electricity Transmission Line;
- Dharan 220/33 kV Substation; and
- Palpa 220 kV Substation.

## Major 400 kV Transmission Line Project

### Hetauda- Dhalkebar-Inaruwa 400 kV Substation Expansion

Hetauda-Dhalkebar-Inaruwa 400kV Substation Expansion Project is funded by the Government of Nepal which includes Nepal's first three major grid substations of 400 kV voltage level at Hetauda, Dhalkebar and Inaruwa. The Dhalkebar 400kV substation is connected to the Muzaffarpur (India) substation via. Dhalkebar-Muzaffarpur 400kV cross border transmission line that will also be connected to Hetauda and Inaruwa via. Hetauda-Dhalkebar-Inaruwa 400kV Transmission Line. The Dhalkebar- Muzzaffarpur cross-border link became instrumental for exporting/importing the electricity between Nepal and India. All three substations aim to serve as a backbone to transmission line system in the national grid of Nepal. This project was started in the fiscal year 2073/74 .

The scopes of project include the construction of 400 kV six line bays for termination of 400 kV double circuit lines from Muzaffarpur (India), Hetauda and Inaruwa, 400/220 kV, 3×315MVA 3 phase transformers, 80MVAr 3 phase bus reactor and its associated bays at Dhalkebar substation, 400 kV four line bays for termination of 400 kV double circuit lines from Dhalkebar and Ratmate, 400/220 kV, 4X167 MVA 1 phase transformers, 50 MVAr 3 phase bus reactor and its associated bays at Hetauda substation and two line bays for termination of 400 kV double circuit lines from Dhalkebar, 400/220 kV, 3×315MVA 3 phase transformers, 50MVAr 3 phase bus reactor and its associated bays at Inaruwa substation.

All three substations are 400 kV gas insulated switchgear (GIS) type with one and half breaker busbar scheme. These substations will be equipped with a state-of-the-art control, protection and automation system based on IEC 61850 open standards to facilitate communication between numerous devices within the substation and beyond. NEA Engineering Company has been appointed as a design check and construction supervision Consultant for this project.

For the construction of 400 kV GIS substation at Dhalkebar the contract had been awarded to ABB India Limited on December 2017 (later on assignment of the project had been transferred to Linxon India Pvt. Limited on July 2020). The cost of project is 17.58 MUSD and NPR 220.33 million. Despite Covid -19 pandemic and lockdown imposed by GoN, the construction of the Dhalkebar substation has been completed and in operation since November 11, 2020. Similarly, for the construction of 400 kV GIS substation at Hetauda and Inaruwa, the contract has been awarded to Siemens Limited, India on December 2018 with contract price of 28.41 MUSD and NPR 410.54.

However, COVID-19 pandemic and lockdown imposed by Government of Nepal has affected the works schedule of the substation. Furthermore, due to flooding of Inaruwa Substation on 19-21 October 2021, some of the parts of the GIS have been damaged and re-manufacturing of the same is in the progress. As of July 2022, all the engineering & design works has been completed. Most of the civil works at both sites are almost completed. Majority of equipments including 400 kV GIS, 400/220 kV outdoor equipments, reactors, transformers, CRP & SAS Equipments, Battery & charger, communication equipment, firefighting material, earthing materials have been delivered to the site and installation,

testing and commissioning works are under progress at both sites. The project is expected to be complete by December 2022.

Aerial View of Dhalkebar 400/220/132/33 substation

### Nepal-India Electricity Transmission and Trade Project (NIETTP)

Nepal-India Electricity Transmission and Trade Project (NIETTP) funded by World Bank was started with the objective of establishing high voltage cross-border transmission link capacity of about 1,000 MW to facilitate exchange of power with India and to enhance the reliability of electricity supply. Furthermore, under NIETTP additional funding, the scopes include construction of Hetauda-Bharatpur -Bardaghat 220 kV transmission lines and 132 kV substation at Hetadua, Bharatpur and Bardaghat. In addition, Transmission System Master Plan of Nepal had been prepared under this project, which is now being implemented by NEA. All substations are Air insulated switchgear (AIS) type with double main and transfer bus bar scheme for 220 kV and double main bus bar scheme for 132 kV.

## Projects Under Construction

### Hetauda - Dhalkebar - Inaruwa 400 kV Transmission Line Project

The objective of this project is to establish high voltage cross-border transmission link capacity of about 1,000 MW to facilitate exchange of power with India and to improve the reliability of power supply. The Power Grid Corporation of India (PGCIL) was appointed as a Design and Construction Supervision Consultant for the project. This project was started in the year 2012 and is expected to be completed by the year 2023. The estimated project cost is around 170 MUSD and it is funded by World Bank, GON and NEA. The contract was, awarded to Angelique International Limited, India – LTB Leitungsbau GmbH, Germany Joint Venture (AIL-LTB JV) on February 3, 2013. The original completion time was 30 months after the contract effective but due to delay in the site clearance by the various issues of Right of Way (ROW) of lines, the completion schedule was revised and expected to be completed by the year 2023.

The scopes of the project include followings:

- Design, supply and construction of approximately 288 km of Hetauda-Dhalkebar-Inaruwa 400 kV, double circuit Quad Moose ACSR conductor transmission line.
- Design, supply and construction of Hetauda substation: 220/132 kV, 2X160 MVA and 132/11 kV, 10 MVA Transformers and its associated bays, and 220 kV line bays for the termination of 220 kV Double Circuit lines from Bharatpur.
- Design, supply and construction of Dhalkebar substation: 220/132 kV, 2X160 MVA Transformers and its associated bays, 2X315 MVA , 220/132 kV Transformer bays, 2 Nos. of 220 kV lines bays for termination of 220 kV Khimti-Dhalkebar D/C Lines, 2 Nos. of 220 kV lines bays for termination of 220 kV Hetauda-Dhalkebar D/C Lines, 2 Nos. of 220 kV lines bays for termination of 220 kV Dhalkebar-Inaruwa D/C Lines and 2 Nos. of 220 kV lines bays for termination of 220 kV Dhalkebar-Muzzaffarpur D/C Lines
- Design, supply and construction of Inaruwa substation: 220/132 kV, 2X160 MVA and 220/33 kV, 2X63 MVA Transformers and its associated bays; 132 kV, 25 MVAr Bus Reactor and its associated bay; 2 Nos. of 220 kV line

bays for the termination of 220 kV double circuit lines from Basantpur ( Koshi Corridor transmission line), 6 Nos. of 33kV line bays and 4 Nos. 132 kV line bays for loop in loop out of existing 132 kV double circuit lines from Lahan to Duhabi.

All substations are Air Insulated Switchgear (AIS) type with double main and transfer bus bar scheme for 220 kV and double main bus bar scheme for 132 kV. These substations will be equipped with a state-of-the-art control, protection and automation system based on IEC 61850 open standards to facilitate communication between numerous devices within the substation and beyond.

**Inaruwa Substation**

As of July 2022, Out of 792 tower pads, 706 foundation have been completed and 681 towers have been erected. The remaining parts fall in the forest area and the community dispute locations. The process of tree-felling and stacking along the right-of-way of the route is under process in Makwanpur district. There is public disputes at some location, which is also hindering the progress. Pile foundation work is critical activity of the project. Out of eight pile foundations, six pile foundation works at Koshi river have been completed.

Similarly, for the construction of 220/132 kV Substation at Hetauda, Dhalkebar and Inaruwa, the contract was awarded to Central China Power Grid International Economic & Trade Co., China in June, 2014. However, due to non-performance of the Contractor, the contract was terminated on September 22, 2017. After termination of the contract, the contract for balance works of Dhalkebar substation has been awarded to M/S Telmos Electronics on January 23, 2018. Initially, Dhalkebar-Muzzaffaur 400kV Transmission Line was charged at 132kV for import of 100 MW power from India. After successfully charging of 220 kV Dhalkebar substation at 220 kV voltage level on August 16, 2018, the power in the tune of 260 MW power is being imported during peak hours through Dhalkebar-Muzzaffaur 400 kV transmission line charged at 220 kV level. Dhalkebar substation is the Nepal's first 220 kV AIS substation having the capacity of 950 MVA.

Further, the contract for balance works of 220/132 kV Hetauda and Inaruwa substation has been awarded to M/S Consortium of Siemens Limited and Telmos Electronics on December 20, 2018. As of now, majority of the substation equipment has been delivered at site for Hetauda substation. Equipment foundation, equipment & its structure installation, firefighting water tank, firefighting pump house, switchyard panel room and cable trench works are in progress. Hetauda substation is expected to be completed by the end of year 2022.

At Inaruwa substation, 220kV, 132kV and 33kV equipment installation and testing works are completed. LILO of double ckt 132 kV Rupani-Duhabi line is completed at with the help of ERS tower. The 132 kV switchyard of Inaruwa substation is charged on 17 July, 2022 and the substation will be commissioned by July 2022.

### Hetauda – Bharatpur - Bardaghat 220kV Transmission Line

This World Bank funded project started in 2008 with the objective of enhancing the transmission capacity and bolstering the reliability of the Integrated Nepal Power System (INPS). However, as the funding of the World

Bank has been closed since 31 October 2021, the Project is being constructed using fund from the Government of Nepal and NEA's internal budget. The project aims to evacuate the power to be generated by various hydropower plants and to serve as a highway for the power flow from the western to eastern region of Nepal and vice versa.

### Bharatpur-Bardaghat 220 kV Transmission Line

The scope of the project is to construct 74 km long, 220 kV Double Circuit Transmission Line with Twin Bison ACSR Conductor (initially charged at 132 kV) from Bharatpur to Bardaghat. After the termination of contract with M/S Central China Power Grid International Economic & Trade Co. Ltd, China (CCPG) on June 5, 2017, the new contract for balanced work (Contract No. NIETTP/BB/AF/5/ICB) was awarded to M/S Hengton-Optics Electric Company, China on August 6, 2018 with the contract value of 5.5 MUSD. The Contractor has completed all works except two towers located in Dumkibas region of the corridor. The plea for the stay order against the construction of tower in this region was revoked by the Supreme Court of Nepal with additional directional order to start construction after providing reasonable compensation for the affected families.

As of July 2022, out of 246 tower pads, 244 tower foundations, 244 tower erections and stringing of 142 circuit kilometers of conductors have been completed. 100% of the site is cleared and 95% of Project Affected Families (PAFs) are compensated for their structure damage. The line is expected to be completed by September, 2022 after reaching a mutual agreement between the project team and the affected families to construct the section with proper compensation to the affected families as directed by the Supreme Court of Nepal.

### Hetauda-Bharatpur 220 kV Transmission Line

The scope of this project is to construct 74 km long, 220 kV double circuit transmission line with twin Bison ACSR Conductor (to be charged initially at 132 kV) from Hetauda to Bharatpur. The contract with M/S ICOMM Tele Ltd, India signed on March 9, 2009 with the contract value of 15.3 MUSD was terminated on 29 April, 2019. After the termination of contract, the new contract for balance work (Contract No. NIETTP/AF/HB/ICB/02) was awarded to M/S KEC International Ltd., India on 05 June, 2020 with the contract value of 5.4 MUSD and NPR 368.8 Million.

As of July 2022, out of 226 tower pads in Hetauda Bharatpur line section, 208 tower foundations have been casted, 204 towers have been erected, 80 circuit km stretch has been strung and almost 97% of the tree cutting and its supplementary tasks have been completed. Almost all compensation amount has been disbursed barring only the unregistered land. The overall progress of the construction of substation is about 96%. and it is expected to be completed within December of 2022.

The scopes of Hetauda-Bharatpur 220 kV Transmission Line Project also include construction of new 132 kV substations at Hetauda and Bharatpur and bay extensions at old Hetauda and Bardaghat substations. The contract with M/s ZHONGDING INTERNATIONAL Co. LTD., CHINA for the substation construction signed on December 16, 2009 with the contract value of 5.8 MUSD has been terminated on 17th April 2022.

### Planned and Proposed Projects

- Arun-Inaruwa-Tingla-Mirchaiya 400 kV Transmission Line
- Bheri Corridor 400 kV Transmission Line
- Ratmate-Rasuwagadhi-Kerung 400 kV Transmission Line

## System Operation Department

The Load Dispatch Centre (LDC) centrally located at Siuchatar, Kathmandu under the System Operation Department (SOD) is the apex body to ensure integrated operation of the power system in Nepal. The main faunction of LDC are as follows:

- LDC supervises and controls the national grid and cross-border transmission lines to ensure continuous and quality power supply to consumers.
- LDC is responsible for carrying out real-time operations for grid control and dispatch of electricity within the country and neighbor India through the secure and economic operation of the National grid per the Grid Standards and Code.
- LDC sanctions the shutdown of transmission elements and generators.
- LDC restores the normal functioning of the power system as early as possible after the occurrence of the fault in the system.

To achieve the effective and precise supervision of the power system, a SCADA (Supervisory Control and Data acquisition system) is being used in LDC. SCADA system in the LDC is the combination of software called sinuate spectrum power 7 and its hardware. It facilitates collecting real-time system data of the power system elements like generators, transmission lines, power transformers, feeders, etc. which is then processed and converted into a usable format by SCADA software enabling the operator to take timely and decisive action for the competent operation of the system.

The major highlights of this fiscal year are presented below.

| | | |
|---|---|---|
| 1 | Annual System Peak Demand | 1,963.98 MW |
| 2 | Annual System Energy Demand | 11,179.77 MWh |
| 3 | Annual National Peak Demand | 1,747.53 MW |
| 4 | Annual National Energy Demand | 10,686.17MWh |
| 4 | Annual Load Factor | 65 % |
| 4 | Total Exported Energy (Annual) | 493.6 GWh |
| 5 | The maximum Exported Energy of the Day | 9.25 GWh |

### Key Accomplishments of LDC in FY 2021/22

- **Export through IEX DAM:**
  NEA started exporting power to India generated from Trisuli and Devighat hydropower stations in October 2021 by participating in the Day Ahead Market through the Indian Energy Exchange with the support from NVVN, the trading partner. To date, six hydroelectric plants in Nepal have been approved by the Designated Authority of India for selling their generation to India and since June 2022 NEA is selling the generation from these plants to India. The scheduled quantum can be sold on a day-ahead basis through the IEX_DAM platform. The power trading unit in LDC has been given the responsibility to bid daily on IEX-DAM for selling and purchasing power from India. Depending upon the national demand and availability of generation, selling more and purchasing less quantum during the high price is the strategy adopted by the power trading unit. The total energy of 493.6 has been sold to India from IEX in FY 2021/22, which helps to generate a substantial amount of revenue thereby contributing positively to the financial health of NEA.

- **Frequency and Voltage Control**
  Frequency and voltage are the crucial parameters of the power system as it determines the quality of power supply to customers. In FY 2021/22, the system frequency is maintained at 50 Hz for most of the time the. The voltage attained in most of the load centers' substations is in the range of permissible limit of

+/- 10% limit at 132 and 66 kV as per NEA Grid Code.

- **Dispatching and Scheduling**
  Effective short-term forecasting, daily energy scheduling of INPS, and proficient dispatching of IPPs generation have made it possible to optimize available generation and import and export of power from India. This has enabled LDC to realize the economic dispatch of power keeping the voltage and frequency of the system within a standard limit.

- **Shutdown Coordination**
  On the coordination of LDC, the shutdown of major power plants and transmission lines was completed in FY 2021/22. Likewise, different grid divisions also took a scheduled shutdown of major transmission lines for maintenance and emergency shutdown during a breakdown. Similarly, the approved shutdown schedule and emergency shutdown plan of IPPs were implemented successfully.The skillful handling of the system by the operator during the shutdown period has made it possible to supply power with minimum interruption.

- **Addition of Transmission Line**
  The addition of the Markichowk- Matatirtha 220 kV line (charged at 132 kV) to the system has improved the reliability of the system helping to supply steady power in Kathmandu valley and improvement in the system voltage. The connection of the transmission line from the New Bharatpur substation to the kawasoti-Bardghat line at 132 kV level (to be charged at 220 kV in the future) strengthens the transmission network in the western part of the country, which is now playing a key role for smooth supply of power in the west.

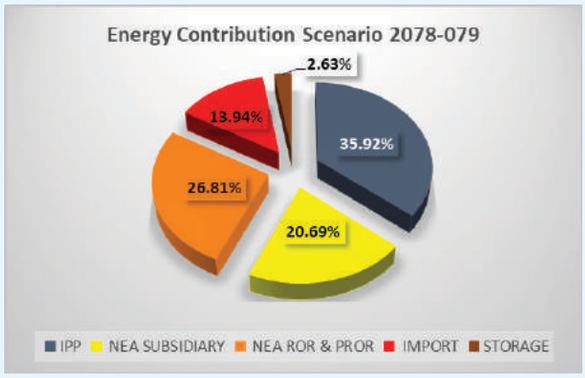
- **Partial system tripping:**
  The watchful monitoring of the system and the prompt decision of the system operator during abnormal situations helped significantly to control the partial tripping of the system. In FY 2021/22, the number of total partial system tripping has increased slightly to 44 as compared to 40 last year. The transmission line constraint in the western part of the country plays a role in the slight rise of partial tripping.

- **Maintenance of SCADA and Communication Facilities**
  For the continued smooth functioning of the INPS, the data acquisition from the power stations and substations must 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, through the regular maintenance works of three primary components of SCADA, RTU, communication equipment and optical fibers and master stations. A significant amount of revenue is being received annually by leasing the optical fiber cable to Nepal Telecom and other private companies.

- **Status of Supply and Demand**
  In this fiscal year, 717 MW of power is added to the INPS including Upper Tamakoshi (456 Mw), Likhu-IV (52 MW), Nyadi (30 MW), Likhu-A (24.2 MW) and other IPP's project. This assisted to fulfill the increasing demand of the system and also helped to minimize power import to a certain extent in the dry season and made it possible to export in the wet season. The quantum of imported power has decreased by 45 % as compared to the previous FY. The overall energy demand and peak demand increased by 19.8 and 24.5 percent respectively in FY 2021/22 compared to FY 2020/21.

The contribution of a different generation to

meet the total annual energy demand of the INPS for FY 2021/22 is given below.




**Energy Contribution from Different Generation Sources**

### Challenges

- Because of the addition of more and more generations in the system, the existing aging transmission arrangements are inadequate to evacuate power to load centers. Depending on the system scenarios, the transmission line Hetauda-Bharatpur 132 kV, Damauli- Bharatpur 132kV, Bharatpur-Kawasoti- Bardghat132 kV, Lekhnath-Syanga-Kaligandaki A, Marsyangdi-Bharatpur 132 kV, Duhabi-Anarmani 132 kV were being operated almost in full capacity continuously, which might have originated the power cut in some areas.
- In FY 2021/22, the difficulty in the smooth power supply to the western part of the country (west from Bharatpur) has been realized due to the unavailability of sufficient generation in the western part of the country to cater to the growing demand in that area. Due to the transmission line's inadequate capacity, surplus generation of the eastern part of the country cannot be transmitted to the west. Hence, major areas of the western part of the country have been supplied from the imported power from the Tanakpur (India). Despite Nepal being a generation surplus country in the wet season. still imported power is playing a vital role in the supply of power in the western part.
- The frequent forced outages of power plants during the rainy season and frequent unforced shutdown of transmission line has created difficulty in the smooth operation of the system thus influencing the export schedule intermittently.

### Future Plan

The synchronization of the INPS with the Indian system requires the installation of an Special Protection Scheme (SPS) and a communication system within the Nepalese Power Sstem. LDC has been given the responsibility to implement the project. For the same, the Contractor had already completed installation works of the SPS system at the existing Dhalkebar, Chandranigahapur, Kamane, Bharatpur, Butwal, Hetauda, Bhaktapur, and Lamahi substations but the system is yet to be commissioned.

A study has been already carried out to install AGC (Automatic generation Controller) in some power plants and WAMS (Wide Area Monitoring System) in some substations, which are also prerequisites for the synchronization of two grid synchronization of two grids.

## Grid Operation Department

Grid Operation Department (GOD) is one of the Departments under Transmission Directorate, which is responsible for transmitting reliable and quality power from remote generating stations to various load centers. This Department has to manage the operation of 66 kV and higher voltage substations and transmission lines up to 400 kV. This Department also carries out preventive and breakdown maintenance works of the substations and associated transmission lines. In addition, works related to substation capacity expansion, equipment replacement, reactive power compensation, rehabilitation & reinforcement are under the scope of this Department. It also looks after connection

facilities to IPPs and Bulk Consumers at different voltage levels by performing Connection Agreement as per NEA Grid Code. The operation and maintenance of Nepal portion of 400 kV Dhalkebar – Muzaffarpur transmission line which was charged at 400 kV on 2077/07/26 and owned by Power Transmission Company of Nepal (PTCN) is also performed by this Department. It supervises three grid division offices located at Kathmandu, Hetauda & Butwal and four grid branch offices located at Duhabi, Pokhara, Attaria & Dhalkebar.

### Major Reinforcement/Upgradation Works

This Department has executed numbers of transformer reinforcement/upgrading works at various substations. Up-gradation, reactive power compensation and rehabilitation of power system equipment are being carried out to meet increasing power demand and reduce voltage drop problem. The replaced transformers are reused at other substations after necessary overhauling and maintenance works. Relocations of such power transformers are cost effective and immediate solution for load management. Various works executed by this Department have supported to reduce power interruption due to inadequate substation capacity.

### Grid Connection Agreement

The Department has successfully signed the Grid Connection Agreement with 44 Independent Power Producers (IPPs) for 2403.45 MW power to meet the future load demand. This includes 37 IPPs's 2346.55 MW from hydropower and 7 IPP's 56.90 MW from solar power.

### Transmission Loss Status

The comparison of transmission line loss of different F/Y is shown below:

| S.N. | F/Y | Total Import Energy(MWh) | Total Export Energy(MWh) | Transmission Line Loss Energy (MWh) | Transmission Line Loss in Percentage |
|---|---|---|---|---|---|
| 1 | 2070/71 | 4,120,153.81 | 3,889,823.10 | 230,330.71 | 5.59% |
| 2 | 2071/72 | 4,394,005.17 | 4,193,004.03 | 201,001.14 | 4.57% |
| 3 | 2072/73 | 3,097,302.02 | 2,934,259.90 | 163,042.12 | 5.26% |
| 4 | 2073/74 | 5,552,927.57 | 5,275,058.79 | 277,868.78 | 5.00% |
| 5 | 2074/75 | 6,347,849.13 | 5,980,995.92 | 366,853.21 | 5.78% |
| 6 | 2075/76 | 7,005,397.48 | 6,700,648.12 | 304,749.37 | 4.35% |
| 7 | 2076/77 | 7,149,391.47 | 6,826,833.47 | 322558.00 | 4.51% |

# DISTRIBUTION AND CONSUMER SERVICES DIRECTORATE

Distribution and Consumer Services Directorate (DCSD) is responsible for overall management of electricity distribution network, which include planning, expansion, operation, maintenance and upgradation of electricity distribution networks and substations up to 33 kV voltage level. DCSD is entrusted with consumer services activities, for instances consumer connection, grievances handling, meter reading, billing and revenue collection through 129 distribution centers (DC) established throughout the country. In addition, the operation and maintenance of off grid small hydro power plants also fall under the jurisdiction of this Directorate.

DCSD is headed by the Deputy Managing Director. Planning and Technical Services Department (PTSD) and Community Rural Electrification Department (CRED) are two departments at the central level. Seven provincial and two divisional offices headed by provincial/division chiefs manage overall distribution and consumer services in effective and efficient manner.

DCSD holds majority of the NEA staffs based on approved positions, 66.31% staffs of NEA are working under DCSD. The Directorate is in leading front to collect revenue for sustaining, planning, expansion, operation, maintenance and growth of NEA.

## Key Performance Highlights

In FY 2021/22, total number of consumers has increased by 5.25 % and reached to 4,766,021 (including internal consumption and bulk supply).

| Customer Category | No of consumer (% of total consumers) | Sales % | Revenue % |
|---|---|---|---|
| Domestic | 92.71% | 42.11% | 38.74% |
| Non-Commercial | 0.67% | 2.94% | 4.18% |
| Commercial | 0.75% | 7.42% | 10.77% |
| Industrial | 1.36% | 38.98% | 39.16% |
| Others | 4.51% | 8.55% | 7.16% |

Similarly, 8,623 GWh of energy was sold in FY 2021/22, which is an increase of 1,346 GWh in comparison with FY 2020/21. The gross revenue from energy sales reached to Rs. 83,804.5 million. Industrial and commercial categories contribute 46.40% and domestic consumers contribute 42.11% of the total sales. The industrial and commercial consumers together represent 2.11%, whereas domestic consumers represent 92.71% of total consumers. Sales and revenue increment in comparison with last FY are 18.49 % and 18.04 % respectively.

Likewise, in FY 2021/22, a total of NRs. 85,474.4 million was collected, with an increase of 14,852.3 million compared to last FY. As per government's subsidy policy, NEA provided free energy of 85,997,784 kWh was distributed to approximately 2,000,000 numbers of Domestic Consumers of capacity 5 Amp. Collection has increased by 20.54% in this fiscal year. The average collection period (ACP) reduced by 8.13 days in the reporting year and recorded as 46.97 days excluding Government subsidy, street light dues and dedicated/trunk line dues.

Further, the calculated average selling price was Rs.9.76/kWh, the sales per employees increased from 1,607,000 kWh to 1,809,000 kWh and the collection from online payment increased to NRs.17.25 Billion from NRs.12.52 Billion.

With continuous efforts and performance of NEA's staffs for loss reduction, the distribution system loss has been reduced to 10.86% in F/Y 2021/22.

In F/Y 2021/22, DCSD added 590 ckt-km of 33 kV Line, 2,974 ckt-km of 11 kV line, 4,319 ckt-km of 0.4/0.23 kV line, 2,829 numbers of distribution transformers and 11 numbers of 33/11 kV distribution substations of 106 MVA in the distribution system. Along with these distribution infrastructures, total length 6,638 ckt-km, 44,156 ckt-km and 132,338 ckt-km of 33 kV, 11 kV and 0.4/0.23 kV line respectively, 172 numbers of 33/11 kV substations with total capacity of 2,191 MVA and 39,992 numbers of distribution transformers constitute in the distribution system.

Out of 753 local levels, 476 local levels are substantially electrified and 242 local levels are partially electrified so far. Substantially electrified and partially electrified local levels were 365 and 342 respectively in previous year. 35 local levels are yet to be electrified. Additional 10 more districts namely Ramechhap, Kavrepalanchok, Rasuwa, Dhading, Chitwan, Nawalpur, Pyuthan, Dang, Banke and Kailali are enlisted as substantially electrified districts. With this numbers, the substantially electrified districts have reached to 42.

In spite of our sincere and best efforts, expected number of consumers and distribution infrastructures couldn't be added due to insufficient energy meters and line materials available in stock. A great lesson has been learnt about the importance of timely procurement and requirement of sufficient stock of the materials. DCSD assures to achieve better performance in coming year towards the addition of new consumers and new distribution infrastructures.

### Programs and Activities

The worldwide energy crisis and spike on the price of line material caused by the Russia-Ukraine war also affected the DCSD activities of construction, upgradation of distribution network and new connection. The situation is being normalized in recent days. During this period, DCSD took special drives to monitor and execute loss reduction activities, in metering and billing and in increasing the collection of amount receivables. The goods on stock were closely monitored, which resulted in substantial use of the stocked material. As part of the expansion and reinforcement of distribution system, many programs, projects and activities were undertaken by departments and provincial/divisional offices in F/Y 2021/22 to expand and improve the supply quality and service delivery.

Safety programs and trainings have been conducted at central/provincial offices as well as in distribution center to minimize electrical accidents and to adopt the safe working practices among the staffs and consumers.

DCSD has given its most priority for reliable and quality supply of electricity. In this regard, activities like upgrading of the distribution network, construction of new feeders, upgrading of distribution transformers, and addition of new transformers in the system have been initiated. DCSD will follow the GoN policy of reducing fossil fuel consumption by increasing the use of electricity in cooking, transportation and in industrialization, which would stress in distribution network reinforcement and upgradation for quality and reliable supply.

One Door System in Bardaghat Distrbution Center

Further, in order to provide electricity access to all as envisioned by GoN, the bid has been invited for all the unelectrified Districts / Municipality / Rural Municipality, which is feasible to electrify through national grid of NEA. All other remaining areas, where electrification through national grid are not feasible, will be electrified by AEPC through isolated solar plants and mini/ micro hydropower plants.

## Safety

Training of Occupational Health and Safety (OHS) has been made mandatory to all the technical staffs specially lineman and substation operators. OHS trainings have been conducted in provincial offices, division offices and in DCs to include all the needy staffs. Substantial numbers of staffs have been trained during the reporting period. Training certificates of two (2) years validity have been issued to all the trained staffs authorizing them to work in NEA distribution network. OHS training shall be made compulsory to all the personnel working in NEA distribution network including the personnel of Contractors in coming days. Before expiry of the training certificates, the staffs need to go through the refreshment OHS training for its renewal.

Giving high priority to the safety of the personnel and to enhance safe working practices, DCSD is working on to provide adequate safety equipment, tools and PPE to the concerned staffs. Procurement of PPE and safety gears for 3,000 staffs, testing and measuring instruments like relay test set, high voltage detector, insulation tester, earth resistance tester, earthing set, etc; are underway.

Demonstration of Use of Safety Equipment by Lumbini Provincial Office

NEA marked Chaitra 26 as "Electrical Safety Day" organizing an interaction program at the center office in collaboration with Society of Electrical Engineers (SEEN). Provincial offices, divisional offices and distribution center offices also marked the day as safety day organizing interaction program with employees, displaying safety related banners, posters, pamphlets etc. to express NEA commitment on electrical safety as well as to create awareness.

## Quality Control and Monitoring

Increased numbers of customers, dense electrical network, strong desire of reliable and quality supply and augmented electricity demand has pushed DCSD, NEA to focus on strict quality control and monitoring. In order to address the need of quality control and monitoring, a unit named "Quality Control and Monitoring Unit" has been established in each department, provincial office and division office consisting of at least three members. Reliable and quality supply can be guaranteed, if the distribution infrastructures are built by adopting appropriate standard and using materials of good quality. In this context, the Quality Control and Monitoring Unit is primarily focused for the quality control on construction of line, substation, and building and associated civil works, monitoring of different construction activities, safe working practices and other relevant activities as required by the concerned offices.

In order to ensure the quality of the procured distribution line materials and equipment, DCSS is going to establish an Acceptance Testing Laboratory at Kharipati, Bhaktapur. The Lab will be established within a year, where most of the electrical equipment / line material up to 33 kV Voltage level can be tested with the similar facility of an international accredited laboratory.

### Norms, Standard and Guidelines

DCSD has prepared and issued the standard design and drawing of the office building for distribution centers. Two types of standard design of the building are available having two types of foundations for each type of building. The standard design and drawing of these building shall ease the construction works, ensure quality of the construction, optimize cost of the building, possess uniformity in look and remain as an icon for NEA Distribution Centers.

DCSD is also preparing Distribution Construction Standard, Construction Guidelines, Operation and Maintenance Guidelines and Safety Guidelines. Norms for the electrical construction works as well as repair and maintenance works are being revised keeping in mind of working at night and at off peak hours. Construction works and schedule maintenance works will be done at night in the city areas to the extent possible which would minimize disturbances to the public and energy not served.

### Grievance Handling and No-Light Service

Consumer satisfaction is our first priority and DCSD is always committed to improve its service delivery. To minimize the customer's complaints in no light services and to address the customer grievances in a speedy manner, a call center has been operated to take care of customers of 11 (Eleven) Distribution Centers of Kathmandu Valley. Toll free number 1150 has been assigned for reporting the grievances. Grievances can be recorded by voice call and through messages as well. The feedback from the customers about service delivered from call center has encouraged to expand it in other provincial and divisional offices in coming years.

In addition to this, the online service for three phase line connection has been rolled out. More than 500 three phase customers have been benefitted with the quick services. Three phase load approval time and connection time has been reduced to a satisfactory level. Further a time line has been fixed for different type of new customer connection including the time for GIS study.

### Reliable and Quality Supply

After elimination of the nationwide load shedding, DCSD has set a new objective of ensuring reliable and quality supply. Further, as the reliable and quality supply is basic requirement for increasing electricity demand, two projects have been introduced namely

- Capacitor Bank Installation Project; and
- Auto-recloser and Sectionalizer Installation Project.

The projects will be implemented by Planning and Technical Services Department. The Capacitor Bank Project includes the scope of installation of capacitor banks in 33/11 kV substations throughout the country, which would improve the voltage profile of the electricity supply. Likewise, the scope of Auto Re-closer and Sectionalizer Installation Project includes the installation of auto recloser and sectionalizer in 33 kV and 11 kV feeders of distribution network throughout the country, which would minimize the outage hours, ease maintenance work, reduce energy not served and increase overall reliability of the distribution system.

Similarly, scheduled maintenance of distribution network, working at off peak hours and other initiatives to minimize the supply interruption have been adopted to improve reliability of power supply. Further, medium voltage cover conductor for 11 kV line and insulated air

bundled conductor for 400 Volt line are being used instead of bare ACSR conductor. Soon, NEA will stop procuring the bare ACSR conductor.

### Demand Stimulation

Increased electricity generation in the country has created another big challenge to NEA towards demand stimulation within the nation. DCSD firmly believe that the electricity demand can be increased through ensuring quality, reliable and adequate supply, improving service delivery and developing comfortable tariff and acting accordingly.

Numbers of project have been launched to improve quality and increase reliability of power supply. Electricity tariff has been reduced in overall with much more cheaper rate applied in irrigation and charging station, which will be helpful to promote irrigation and electric vehicles. NEA Distribution Bylaw has been revised which would obviously play an important role to increase electricity demand and improve service delivery. Some of the provisions encompassed in Revised NEA Distribution Bylaw are:

- Connection from NEA transformers up to 100 kVA Load;
- NEA will provide transformers up to 200 kVA for irrigation, community cold storage, community drinking water and charging stations;
- Individual meter connection for housing and apartments;
- Separate meter connection for people living in rent;
- Meter connection for people living in non-title holder land (Ailaani and Guthi Jagga);
- No recommendation required from local entity for new meter connection etc.

### Loss Reduction Activities

As usual DCSD made great efforts for loss reduction in the distribution system. Loss prone areas were identified and necessary actions were taken to reduce both technical and non-technical losses. Loss reduction activities were closely monitored at the central level and directives were issued regularly to achieve the assigned loss target.

DCSD has been actively propelling loss reduction campaigns through line disconnection for long term payment of due consumers, theft control by meter resealing, equipment seize, discouraging hooking activities, etc. During such operation, Province No. 1 Provincial Office has disconnected more number of lines among all other provincial offices with 23.10% disconnection in total, equal to 28,493 numbers of line disconnection, whereas Madhesh Provincial Office shares 35.09% of line disconnection amount equal to NRs. 1,282.7 million out of NRs. 3,655.3 million in total across the country.

Province No. 1 Provincial Office has reconnected the highest number of consumers with 25,122 with the sum of NRs. 398.50 million, while Madhesh Provincial Office has collected the biggest sum of NRs. 846.72 million from 21,488 reconnected consumers out of 107,816 reconnected consumers all over Nepal.

All province/division offices have been involved in reducing electricity pilferage and Madhesh Provincial Office has recorded 6,967 counts of electricity pilfering out of total 11,254 numbers around all provinces, with a sum of NRs. 66.43 million pilfering amount out of NRs. 103.33 million in total pilferages. However, Bagmati Pradesh has recorded the most pilferage units of 4.76 million out of 11.11 million pilferage units across the country.

Provincial/Division Offices/Distribution Centers were assigned to certain loss targets to achieve within the fiscal year and linked with the performance evaluation of distribution center chief. With all these efforts, distribution loss has been reduced to 10.86%. Loss reduction is regular activity of DCSD and shall be continued in coming years.

**Loss Reduction Activities in Simroungadh Distribution Center**

The following steps were taken to reduce the technical and non-technical losses during the year under review:

- Continuous loss reduction program for hooking control with mobilization of teams for meter resealing and on the spot inspection of meter in distribution centers;
- Regular monitoring, data downloading and analysis of large industrial and commercial consumers;
- Replacement of electromechanical meters, both three and single phase, with smart digital meters and replacement of unmatched current transformers to eliminate possible errors in multiplying factors;
- Organization of public awareness and media campaign regarding the theft control in the central as well as in provincial/division level;
- Augmentation of handheld meter reading devices to minimize human errors in meter reading and improve the energy sales;
- Special efforts with the help of employees, trade unions, local administration, Govt. bodies etc. in meter tamper investigations and electricity pilferage control;
- Replacement of bare conductor with Ariel Bundled Conductor (ABC) cable in loss prone areas;
- Upgrading of overloaded conductors and transformers;
- Addition of new feeders and distribution transformers;
- Replacement of bare ACSR conductor by medium voltage covered conductor and insulated Air bundled cable;
- Replacement of 3 phase Electro-mechanical meters with smart electronic meter for 3 phase customer of load ranging from 25 kVA to 50 kVA continued; and
- Use of electronic/smart energy meter used for all three phase connections.

**11 kV Line maintenance works at Pokhara Distribution Center**

On the other hand, DCSD has completed Distribution Loss Reduction Master Plan with detailed loss analysis of whole Nepal, to separately identify technical and non-technical losses of the distributed network system. This master plan has recommended its strategies and actions to implement for reduction of technical and non-technical losses.

## Plans and Programs

After elimination of load shedding, NEA has shifted its priority towards the supply of safe, reliable and quality electricity to its consumers. In addition to this, service delivery improvement, automation of the distribution system, electricity access to every households

are also the major objectives of DCSD. In order to fulfill these aims, DCSD has made its future plans and programs as mentioned below:

- DCSD is executing distribution system expansion plan to avail electricity for all within next two years and upgrading distribution system so as to enhance per capita consumption to 400 kWh by FY 2022/23.
- DCSD is planning to complete substantial electrification in 22 more districts in next two (2) years including Taplejung, Ilam, Terhathum, Panchthar and Udaypur in Province No. 1; Kavre, Dhading, Ramechhap, Chitwan and Makawanpur in Bagmati Province; Tanahu, Myagdi and Nawalpur in Gandaki Province; Arghakhachi, Dang, Rolpa and Rukum East in Lumbini Province; Surkhet and Jumla in Karnali Province; and Kailali, Doti, and Dadeldhura in Sudur-Paschim Province.
- Loss reduction activities will be continued to limit Distribution Loss within 10% in FY 2022/23. Distribution Loss reduction master plan will be strictly implemented.
- Centralized customer care center (one door system) will be expanded in distribution centers to avail single point of contact for all consumer related services, which ensures less processing time for new connection, centralized control and monitoring over the entire customer care process.
- Call centers will be established in each provincial and division offices to address consumer grievances including the issues of No Light Services.
- Electromechanical/electronic meters of all three phase consumers will be replaced by smart meters. Existing TOD meters will be replaced by smart TOD meters. Use of smart meters will be helpful to maintain proper energy accounting.

**Kohalpur Transformer Workshop**

- Consumers will be encouraged to pay their electricity bill through internet based payment system (On-line payment).
- A project will be launched to roll out smart meters in provincial basis. Financial model of the project is under discussion and most likely it would be capex-opex model.
- DCSD has started to automate existing 33/11 kV substations. All new 33/11 kV substations will be fully automated or unmanned type.
- Fifteen (15) Nos. of 33/11 kV substations will be upgraded with Substation Automation System (SAS) and sixty-six (66) numbers of other substation will be upgraded adopting the n-1 contingency criteria to enhance the reliability of the distribution system.
- Acceptance Testing Laboratory will be established at Kharipati, Bhaktapur for testing the electrical equipment up to 33 kV voltage level.

Major projects executed under DCSD are listed below.

### Grid Solar & Energy Efficiency Project

The Government of Nepal (GoN) has received a credit from the World Bank (WB) towards the cost of Grid Solar and Energy Efficiency Project (GSEEP) under IDA Credit No. 5566-NP (Project ID P146344) for an amount of USD 130 million under a counter financing of USD 8 million by

the GoN. The financial agreement between GoN and the WB was concluded on February 20, 2015. The GSEEP Project comprises of following two components.

- **Component 1: Grid–connected Solar PV Farms Development** with an estimated cost of 46 million USD, which deals with the Design, Planning, Engineering, Procurement (Manufacturing / Supply) Construction/ Erection, Testing, Commissioning and Five Years of Operation and Maintenance of 25 MWp Utility Scale Grid Tied Solar Farms. Among seven different locations selected for solar plant, energy of 21.58 MWp Solar Plant is being evacuated via National Grid and has generated 17.74 GWh of energy this fiscal year. Remaining 3.42 MWp is planned to be completed within August 2022.

25MWp Grid Tied Solar Farm

- **Component 2: Distribution System Planning and Loss Reduction** with an estimated cost of 80 million USD dealing with the Rural Electrification in seven (7) packages along with Distribution Business Management and Implementation of Loss Reduction and Distribution System Rehabilitation. Under this component, following Projects are in process:
  1. Design, planning, engineering, procurement, installation, testing and commissioning of 8 New 33/11 kVsubstations and 33 kV lines in the development of the NEA grid. (Kapilbastu, Arghakhachi, Sindhuli, Ramechap & Gulmi.);
  2. Design, Supply, Installation/Erection, Testing and Commissioning of 11/0.4 kV Distribution System (Dolakha, Sindhuli & Ramechap);
  3. Design, Supply, Installation/Erection, Testing and Commissioning of 11/0.4 kV Distribution System (Gulmi, Arghakachi & Kapilbastu);
  4. Design, Supply, Installation/Erection, Testing and Commissioning of 11/0.4 kV Distribution System (Taplejung, Panchthar & Ilam).;
  5. Preparation of Distribution Loss Reduction Master Plan along with Design, Supervision and Monitoring of Loss Reduction Activities;
  6. Design, Supply and Installation of total 13 Nos. of Substations and 33 kV Lines in Bharatpur, Dhading, Hetauda, Kavre, Lagankhel, Nuwakot, Palung, Ramechhap, Dolakha and Sindhupalchok districts;
  7. Design, Supply and Installation/Erection, Testing and Commissioning of of 11/0.4 kV Distribution System in Kavre, Dhading and Nuwakot districts; and
  8. Design, Supply and Installation/ Erection, Testing and Commissioning of Distribution System in Melamchi, Dolakha, Ramechhap, Rasuwa, Palung, Bharatpur and Sindhuli districts.

### Distribution System Upgrade and Expansion Project (DSUEP)

The Government of Nepal has implemented the project to extend power supply to the western and far western areas of Nepal as a part of the program to achieve affordable electricity for all. NEA has received loan-financing from Asian Infrastructure Investment Bank (AIIB) and

European Investment Bank (EIB) towards for the financing of the proposed project. The districts selected under DSUEP is shown in Table below:

| Province | Name of Districts selected | No. of S/S |
|---|---|---|
| Lumbini | Parasi, Rupandehi, Rolpa, Dang, Banke, Bardiya, Rukum East | 14 |
| Karnali | Surkhet, Salyan, Jajarkot, Kalikot, Jumla, Mugu, Rukum West, Humla | 13 |
| Sudurpaschim | Bajhang, Bajura, Baitadi | 5 |

DSUEP will construct thirty-two new 33/11 kV substations, more than 500 km of 33 kV lines and more than 3,000 km of 11 kV distribution lines. The project will also include installation of LT lines, distribution transformers and consumer energy meters so as to achieve cent percent electrification in the project implementation areas. The project plans to provide 150,230 number of single-phase and 701 number of three-phase new connections.

Land for 29 substations has been finalized and the land acquisition is in progress for three substations. The contract for the first package of EIB funded portion has been awarded.

## Planning and Technical Services Department

Planning and Technical Services Department (PTSD) is responsible for planning and preparation of distribution system expansion programs and supporting DCSD in the technical and commercial matters. Major scopes under this department include:

- Identification of potential rural electrification and substation rehabilitation projects and implement them;
- Programming/re-programming, data download and analysis of TOD energy meters and metering equipment;
- Monitoring and evaluation of region wise monthly distribution system losses. Assist to identify and implement programs for loss reduction in distribution systems;
- Implementation of modern technology in the field of meter reading, billing and revenue collection;
- Execution of distribution planning, demand side management and loss reduction;
- Preparation and review of the construction standards and guidelines for electrical installations and construction activities up to 33 kV voltage level; and
- Testing and locating faults of underground cables of 11 kV and 33 kV feeders throughout the country with the help of cable testing equipment along with technical support.

As of now, 179 collection centers out of 181 have computerized billing system. It is planned to extend the system to all centers in the coming year. The Computerized Billing Division under PTSD has successfully implemented 'Any Branch Payment System' in all distribution centers in Kathmandu valley. This system will be extended to the whole country in coming years.

Arrear billing of 12,932,069.49 units equal to Rs 124,613,980.86 from 283 consumers was made in this year, as it was left out during initial billing by distribution centers.

### Energy Monitoring and Metering Enhancements

Under this program, static meters installed in community consumers of different provincial/ divisional offices were monitored through field inspection and download, and recommended for re-programming, replacing and installing meters, wherever necessary. For consumers like IPPs, Solar Power and our own grid, static meters were programmed along with the provision of net metering features. In order to make static meters compatible and communicable with the AMR system, Automatic Metering Infrastructure and static meters were communicated and the output data was validated so that AMR could give required data in desired format.

In order to expand the coverage of smart

metering to three phase consumers, the Department is working on the procurement and implementation of 3-phase whole current smart energy meters. After the execution of this project, all remaining 3-phase whole current electro-mechanical meters will be replaced by 3-phase whole current smart energy meters and new 3-phase consumers will be integrated in the smart metering.

### Rural Electrification Programs

To materialize the Government of Nepal's announcement to fully electrify the whole area of the country, PTSD has initiated the bidding process for its implementation. Eight number of electrification projects have been formulated and the electrification programs are being implemented through different construction packages. These projects are being funded by GoN and NEA.

### Upgrading and Rehabilitation of Substations

To enhance the quality and reliability of the distribution system, PTSD has been continuing the upgradation and augmentation of 33/11 kV distribution substation. In this scope, PTSD has initiated the procurement process to upgrade fifteen number of substation with Substation Automation System (SAS) and further 66 numbers of substations will be upgraded in conventional manner.

### GIS Mapping

In order to make the distribution system more technology friendly, PTSD has initiated the bidding process for the implementation of GIS Smart Grid Project. In the first phase, the project is being implemented in the distribution network of Kathmandu Valley.

### Safety

Safety always remains the matter of priority for NEA and PTSD is working to make necessary arrangement of high voltage safety equipment as well as high voltage testing, which will be helpful to minimize the outage of power supply as well as to fortify the safety of personnel.

### Computerized Billing and Networking Division

Computerized Billing and Networking Division (CBND) has always been striving towards enhancing the revenue collection of NEA. Mpower Billing Software System has provided NEA, a competent billing system with several features and modules for monitoring the entire process and transparency of the revenue system.

Mpower Billing system has already been implemented in 179 revenue collection centers out of 181 revenue collection centers. This division has targeted the data migration/ implementation of Mpower Billing System in all the remaining revenue collection centers of NEA within this Fiscal Year. Currently, Mpower Billing System covers more than 99% of the total consumer count and also covers more than 99.7% of the total NEA revenue. Handheld Meter Reading Device (HHD) is currently operating in more than 110 revenue collection centers which have helped in reducing human errors during meter reading and improve the energy sales. With the innovation in new technology, the division has implemented Online Meter Reading Handheld Device (Online HHD) with GPRS functions. The meter reader directly uploads the meter reading data to the concerned branch server after collecting the data from the consumer premises, which results in efficient meter reading and swift payment. This division has targeted to operate HHD to all over the revenue collection centers.

Online payment system was introduced from Bhadra, 2074 and has been successfully implemented in 173 revenue collection centers. This system has focused all the groups of consumers, where the consumer can pay their electricity bills through various online banking, mobile banking services, kiosks, cooperatives etc.

Web Based Services wereprovided to the customers to view the bills (https://www.neabilling.com/viewonline), where the consumers can query the bills through NEA website. The Customer Management Information System (LAGAT) has been implemented in various revenue collection centers, which will help in keeping the customer database up to date.

The process of migrating community consumers to NEA billing system is ongoing. In F/Y 2021/22, the migration of community consumers for the following DCs namely Dhangadhi DC, Taplejung DC, Lamjung DC, Syangja DC and Udayapur DC are in progress.

With the concept of making centralized system, the division is planning to move on Digital Collection Centre to reduce the hustle and bustle of the collection counters. Furthermore, CBND along with IT department has done enhancement on existing DCS Activities to get a Real time Revenue Management Information, which will help MIS for Data Analysis and evaluate NEA's financial health.

### Smart Metering Smart Grid Project

The scope of the project includes:
Phase 1: It included implementation of Automatic Meter Reading (AMR) System with implementing Advanced Metering Infrastructure in TOD meters. For this purpose, 10,000 Intelligent GPRS/GSM Modem were procured and installed in consumer sites.

Phase 2: It includes installation of Smart Three Phase Energy Meter replacing Three Phase Electromechanical Meter. Out of 60,000 numbers of Three Phase Smart Meter procured, around 43,500 Electro- mechanical meters have been replaced with the new Smart Meter and about 16,500 meters have been installed as new connections. Total 150,000 Three Phase Smart Meters are being procured which will help to replace the existing Electro-mechanical meter with the Smart Meters and for new connection also.

### Solu Corridor Rural Electrification Project

The project was funded by Government of Nepal (GoN). The contract agreement was signed in FY 076/077 and has recently been completed. Under this project, the distribution system of Solukhumbu, Okhaldhunga and Udayapur district has been expanded and reinforced in the area affected by Solu-Corridor 132 kV Transmission Line Project, by constructing 486 km of H.T line, 375 km of L.T line and installing 79 distribution transformers:

### Reconstruction and Improvement of Electricity Distribution System Neighborhood Electrification Project

Under financing of Germany through KfW and GoN, Chilime-Trishuli 220 kV transmission line has been supporting for the neighborhood electrification in the corridor of Nuwakot and Rasuwa districts.

The project includes the construction of a 33/11 kV Sub-Station at Bhalche, a 33 kV transmission line between Bhalche and Trishuli 3B Hub Substation and a network of 11 kV and 0.4 kV distribution lines in Nuwakot and Rasuwa District.

### Reconstruction and Improvement Project

The project aims constructing two new 33/11 kV substations at Kalikasthan and Ratmate under electrical component and construction and rehabilitation of infrastructures under social development component in Rasuwa and Nuwakot districts respectively. The project is under construction phase and it is expected to be completed in the fiscal year 2022/23 providing reliable electricity supply to 1,200 households of the two districts.

Power Grid Corporation of India Limited (POWERGRID) in association with Jade Consult Pvt. Ltd. (JADE), was appointed as an Implementation Consultant in 2017 and Contractor M/s. Waiba Infratech Pvt. Ltd. was

appointed for Electrification component, M/s. Dhulikhel Nirman Sewa Pvt. Ltd. was appointed for social development component and M/s MAW Vridhi Commercial Vehicles Pvt. Ltd. was appointed for supply and delivery of Ambulances.

Under the electrification contract, the 33/11 kV Ratmate substation was energized on 13 July, 2022.

Switchyard of Ratmate Substation

The construction activities at 33/11 kV and Kalikasthan substation are under progress.

Similarly, each unit of Ambulance was handed over to Kispang Rural Municipality of Nuwakot and Aamachodingbo Rural Municipality of Rasuwa respectively under Corporate Social Responsibility (CSR) component.


Ambulance Hand over Jointly by NEA and KfW to RM

### Promotion of Solar Energy in Rural and Semi-Urban II Regions

NEA had acquired sizable land at generation sites during the hydropower project construction period with access of national grid connection making the sites more suitable for putting solar PV farms. At the request of NEA, KfW Development Bank conducted a potential sites inspection study in December 2020. NEA management discussed the study findings with KfW Development Bank in January 2021, and agreed to study a project for the installation of solar PV farms at three locations with total capacity of about 8-9 MW. The estimated total Project cost is approximately 11.5 million Euros. Germany has expressed its commitment for a grant amount of EUR 6.0 million through KfW Development Bank.

### Khokana- Nijgadh 33/11 kV Substation Project

The project is funded by Government of Nepal and primarily aims to meet the electricity demand of Kathmandu - Nijgadh Fast Track Project. It also will meet growing demand of electricity in Thingan, Len Danda, Dhendhre and Simpani areas of Makanwanpur District. The scope of this project includes the construction of 33 kV Sub-Transmission Line and 33/11 kV, 16.6 MVA Substation. The Project is scheduled to be completed by F/Y 2023/24.

### 33 kV Line Expansion and Rehabilitation Project

The project, funded by GoN, aims to meet the growing demand of electricity in various parts of country by rehabilitation/capacity upgradation / construction of 33 kV lines. The construction of Bhurigaun-Gulariya (Bardia) 33 kV line of length 35 km has been charged successfully. The scope of this project also includes construction of Yadukuha-Dhanushadham 33 kV line of 15 km length.

### Madankudari-Makaibari-Singati 33 kV Line Project

The project funded by Government of Nepal aims to meet the growing demand of electricity in Madankudari– Majhifeda area of Kavre District and its vicinity. The scope of the project includes the construction of 33/11 kV, 6/8 MVA Substation at Majhifeda of Kavre District with interconnection facilities. Power generation from IPPs will be connected to this substation and the part of this power will be evacuated at Mude-Lamosanghu, Sindhupalchok district. The construction of substation has been completed.

Majhifeda Substation, Kavre

### Chautara-Sindhupalchok 33 kV Substation Project

The project funded by GoN aims to meet the growing demand of electricity in Chautara area of Sindhupalchok District and its vicinity. The scope of the project includes the construction of 33/11 kV, 6/8 MVA Substation with inter-connection facilities. Following the completion of 33 kV line from Lamosanghu to Chautara along with 11/0.4 kV distribution network, 33/11 kV, 6/8 MVA Chautara Substation has been charged and handed over to local DCS for operation.

### Transformer Testing Lab Construction Project

The project is funded by Government of Nepal. The scope of the project includes construction of transformer testing lab at Biratnagar, Butwal and Nepalgunj. Transformer testing lab and workshop building including installation of transformer testing equipment have been completed. The project has been handed over to Province No. 1 Provincial Office, Lumbini Provincial Office and Nepalgunj Division Office for opertion.

### Matatirtha Markhu 33 kV Transmission Line Project

The main scope of the project includes the construction of 33/11 kV, 6/8 MVA substation at Markhu with single circuit 15 km Transmission line from Matatirtha to Markhu. After the completion of the construction of Markhu substation, it has been operating as switching substation taking the backfeed from 11 kV source. The Markhu substation has already been handed over to Palung Distribution Center for operation and maintenance. The construction work of 33 kV transmission line from Chakhel tapping point to Markhu substation has also been completed.

Inspection and supervision markhu substation

### Matatirtha Malta 33 kV Transmission Line Project

This project aims to supply power to Laxmi Cement Industry Pvt. Ltd. in Malta, Lalitpur and evacuation of the power generated by Khani

Khola Hydropower Company Limited (6MW) as well as supplying existing NEA consumers in the vicinity. The scope of the project includes the construction of 33/11 kV, 6/8 MVA substation along with double circuit 35 km 33 kV line. Civil and electrical works of Malta substation have already been completed and the substation is now in operation after charging with Khani Khola hydropower and Tungun Thosne hydropower feeder. The Malta substation is handed over to Lagankhel Distribution Center for operation and maintenance. Construction of 33 kV line from Matatirtha to Malta is in progress.

### GIS Smart Grid Project

NEA has planned to develop GIS (Geographical Information System) software to manage DCS asset inventories like substation, feeder, transformer, poles and meters along with its global positioning. It will help to identify the actual information about substation, feeder, poles, transformers, consumers' capacity etc. and also to balance the transformer's load as per connection to the consumer. It also helps to facilitate the consumer service faster and reliable against any fault in distribution system. Additional benefits of this smart distribution system include aid for outage management, no light management and optimal connection path for new consumer. GIS based data survey work for 30 branches across the country has been conducted in F/Y 2020/21. This project is funded by the Government of Nepal (GoN).

The bidding process for first phase has been initiated to implement the Electric Utility GIS Mapping of Distribution Network in Kathmandu Valley (11 DCS Offices).

### 33/11 kV Substation Rehabilitation Project

The project aspires for rehabilitation of existing substations to strengthen the distribution system and improve the reliability of distribution network. This project funded by Nepal Government (Energy Crisis Prevention Program) has been operating since F/Y 2017/18.

This project has accomplished rehabilitation of 36 substations under different distribution center across the country, by replacement or addition of new power transformers of 33/11 kV, 6/8 MVA, 10/13.3/16.6 MVA or 20/24 MVA along with substation components as per necessity. All substations have been charged and handed over to respective distribution centers with smooth operation till date.

This project is anticipating rehabilitation and upgrading of 33/11 kV substations with automation system (SAS) so as to operate existing substations from local control center at individual substation as per conventional system as well as from remote control center located at each distribution center office. Bids have been invited for substations' rehabilitation across the country through International Competitive Bidding for Substation Automation System (SAS) of existing substations and through National Competitive Bidding for upgrading of 66 numbers of existing substations, by 33/11 kV, 6/8 MVA, 10/13.3/16.6 MVA and 20/24 MVA power transformers with other necessary electrical equipment.

### Rural Electrification Projects

Although the national grid has reached to almost all districts of Nepal, the districts with relatively low electrification like Ilam, Panchthar, Taplejung, Okhaldhunga, Khotang, Solukhumbu, Bhojpur, Sankhuwasabha, Udayapur, Kavre, Makwanpur, Dhading, Nawalpur, Darchula and Dolpa are to be completely electrified within 2 years as per the declaration of the Government of Nepal. NEA has been implementing electrification programs to meet the GoN's target to completely electrify all districts of Nepal in the next 2 years. The electrification programs include construction of 33/11 kV substations, 33 kV lines, 11 kV lines and 0.4/0.23 kV distribution networks. The following projects

have been formulated to materialize the above mentioned objective.

- Taplejung - Panchthar - Ilam - Jhapa Rural Electrification & Substation Construction Project;
- Bhojpur-Sankhuwasbha 11/0.4 kV Rural Electrification Project;
- Solukhumbu-Okhaldhunga 33 kV Rural Electrification & Substation Construction Project;
- Khotang - Udayapur 11/0.4 kV Rural Electrification Project;
- Kavre-Makwanpur-Ramechhap-Sindhuli Rural Electrification Project;
- Nawalpur Rural Electrification and Chusang (Mustang) 33 kV Transmission and Substation Construction Project;
- Darchula - Dolpa 11/0.4 kV Rural Electrification Project; and
- Khotang -Bhojpur - Udayapur - Sankhuwasabha 33 kV Transmission line and Substation Construction Project

Rural Electrification Works at Dharche Rural Municipality of Gorkha

### Taplejung-Panchthar-Ilam-Jhapa Rural Electrification and Substation Construction Project

This project aims for fully electrification of Ilam, Panchthar and Taplejung district. Total estimated cost for the project is around NRs. 3.5 billion. The project will construct 33/11 kV substations at Phaktanglung, Miringden, Fhalelung, Sandakpur and Mai Rural Municipalities of Taplejung, Panchthar and Ilam district. Land acquisition process has already been initiated for the construction of substations in those rural municipalities. Project has already floated tenders for construction of 11/0.4 kV distribution network in all the districts.

### Bhojpur-Sankhuwasabha Rural Electrification Project

This project targets fully electrification of Bhojpur and Sankhuwasabha districts. Total estimated cost for the implementation of project is around NRs. 1.8 billion. The scopes of work in Bhojpur district include 11 kV line length of 110 km,0.4/0.23 kV line length of 260 km and 90 distribution transformers and scopes of work in Sankhuwasabha district include 11 kV line length of 225 km,0.4/0.23 kV line length of 347 km and 80 distribution transformers.

### Solukhumbu - Okhaldhunga 33 kV Rural Electrification and Substation Construction Project

This project aims for fully electrification of Okhaldhunga and Solukhumbu district. Total estimated cost for the project is around NRs. 3 billion. The project will construct four number of 33/11 kV substations at Sunkoshi and Khijidemba Rural Municipalities of Okhaldhunga District and Khumbu Pasanglamhu and Thulung Dudhkoshi Rural Municipalities of Solukhumbu district. Land acquisition process has already been initiated for the construction of substations in those rural municipalities.

### Khotang - Udayapur 11/0.4kV Rural Electrification Project

This project aims for fully electrification of Khotang and Udayapur districts. Total estimated cost for the implementation of the Project is around NRs.2.1 billion. The scopes of work in

Khotang district include 11 kV line length of 140 km, 0.4/0.23 kV line length of 400 km and 109 distribution transformers and scopes of work in Udayapur district include 11 kV line length of 175 km,0.4/0.23 kV line length of 430 km and 108 distribution transformers. Project has already floated tenders for construction of 11/0.4 kV distribution networks in both districts.

### Kavre-Makwanpur-Ramechhap-Sindhuli Rural Electrification Project

This project aims for fully electrification of Kavre, Makwanpur, Ramechhap and Sindhuli districts. The total estimated cost for implementation of the Project is around NRs.2 billion. The scopes of work in Makwanpur district include HT line length of 95 km, composite line length of 25 km, LT line length of 200 km and 126 distribution transformers. The scopes of work in Sindhuli district include HT line length of 120 km, composite line length of 35 km, LT line length of 250 km and 75 distribution transformers. The scopes of work in Kavre district include HT line 35 km, composite line length of 203 km, LT line length of 90 km and 29 distribution transformers and the scope of work in Ramechhap district includes HT line length of 45Km, composite line length of 15 km, LT line length of 110 km and 16 distribution transformers.

### Nawalpur Rural Electrification and Chusang (Mustang) 33 kV Transmission and Substation Construction Project

This project aims for fully electrification of Nawalpur and Mustang districts. Under this project, 118 km of 11 kV line and 105 km of 0.4/0.23 kV line will be constructed across Nawalpur district. Similarly, two 1.5 MVA, 33/11 kV substations will be constructed in Chaile and Charang area of Mustang districts. Project has already floated tender for construction of 11/0.4 kV distribution network in Nawalpur district and the land for construction of substation in Charang has already been acquired.

### Darchula - Dolpa 11/0.4 kV Rural Electrification Project

This project aims for complete electrification of Darchula and Dolpa district. Total estimated cost for the implementation of project is around NRs. 2 billion. The scope of the project has one 33/11 kV substation to be constructed at Lekam of Darchula district. Land acquisition work for the sub-station has been completed. Project has already floated tenders for construction of 11/0.4 kV distribution network in all the districts which includes 230 km 11 kV network extension and 375 km LT extension in Darchula District and 130 km 11 kV network extension and 225 km LT extension in Dolpa District.

### Khotang-Bhojpur-Udayapur-Sankhuwasabha 33 kV Transmission line and Substation Construction Project

This project targets full electrification of Khotang, Bhojpur, Udayapur and Sankhuwasabha district. The project will construct two Substations in Udapapur district, one Substation in Sankhuwasabha district and required 33 kV Line. Suitable site for the construction of substation is already selected and the land acquisition process has already been initiated for the construction of the substation.

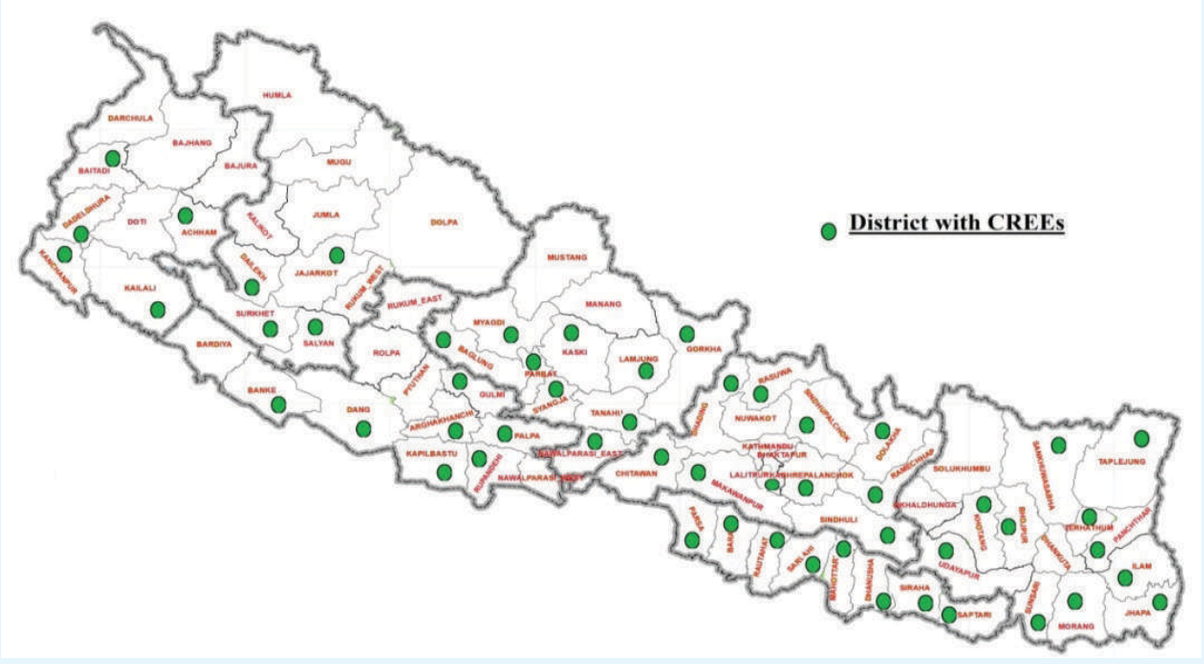
## Community Rural Electrification Department

In order to expand the access to electricity services to the rural areas on people's participation approach, the Government of Nepal (GoN) has brought forward Community Rural Electrification Program (CREP) since 2003, which is being executed efficiently through Community Rural Electrification Department (CRED) under DCSD, NEA.

NEA sells bulk power to the CREEs and they are responsible for operation and management of electricity distribution within their concerned areas. NEA provides services up to 11 kV line

and the REC itself is responsible for 400/230 volt line. NEA, Community Rural Electrification By-Law 2071(with amendments) governs the electrification activities of NEA and Community Rural Electrification Project (CREP).

CREP is becoming more effective to promote energy access, build consumer capacity, develop livelihood, alleviate poverty, and empower Community Rural Electrification Entities (CREEs). In the journey of 19 years, CRED has achieved a major success of providing access to electricity to around 604,001 consumers of 55 districts through 516 (including KKREP) Community. In this year, 20 number of community have been returned to NEA with around 50,377 numbers of consumers. The actual numbers of Consumer on community are 553,624 of different CREDs (300 CBOs and 216 Entities of Kailali Kanchanpur Gramin Bidhyut Chhata Sansthan and Rural Municipalities/ Municipalities). The districts with CREEs have been depicted in the following map:




The households have been electrified through 3,032 numbers of distribution transformers in Fiscal year 2021/22.

Despite some technical and administrative issues, performance of CRED of FY 2021/22 was satisfactory. During this review period, CRED initiated activities to resolve and complete ongoing community rural electrification works and initiated new electrification works and substations in different areas of Nepal. CRED's major activities of this year are as follows:

- Thirty (30) Rural Electrification Projects and 2 Substation Project (Kapilakot and Udipur) have been completed this year. In previous years a total of 327.69 km of HT line, 1,329.36 km of LT line and 169 distribution transformer installations have been completed and capitalized in this review period.
- The works related to replacement of 2,606 wooden poles by steel tubular poles have been completed and capitalized in this review period.
- 33/11 kV Substations in the rural areas of Kapilakot, Sindhuli and Udipur, Lamjung have been completed and 33 kV line extensions work at Panchthar and Taplejung are in progress.

CRED is planning different activities (replacement

of wooden poles, upgrading load center, major rehabilitation work) in coming fiscal years to achieve meaningful result by augmenting implementation of CREP which will strengthen the CRED and support the empowerment and sustainability of the CREEs too.

## Province No. 1 Provincial Office, Biratnagar

There are 24 Distribution Centers under Province No. 1 Provincial Office spread over 14 districts. The distribution loss is 11.72%. The sales contribution to NEA system of this office is 16.19%. The performance highlights of this provincial office during review period are as follow.

Energy sales (MWH) – 1,396,239
Revenue (million) – Rs.13,094.346
Numbers of consumers – 906,838

**Tumlingtar 8 MVA Substation**

The major projects being implemented under this provincial office for construction of 33 kV line, 33/11 kV substations and distribution line network are under following headings.

- Rajarani 33/11 kV 3MVA Sub-station Project
- Bhokraha – Khanar 33 kV Transmission Line & Sub-station Project
- Rehabilitation works at Katahari and Jaljale Substation Project
- Keraun-Letang 33 kV Transmission Line & Sub-station Project.
- Harinagara 33 kV Transmission Line & 16.6 MVA Sub-station Project.
- Bhedetar-Rajarani 33 kV Transmission Line Project
- Reinforcement of 33 kV Biratnagar circuit
- Reinforcement of Anarmani Grid-Ghailadubba, Chandragadhi Sub-transmission Line
- Aggrandizement of 33/11 kV 6/8 MVA Urlabari Sub-station
- Reinforcement of 33 kV Anarmani Grid-Dhulabari and 33/11 kV Dhulabari Sub-station
- Rehabilitation of 33 kV Padajungi-Damak and Duhabi Industrial Line
- Reinforcement of Kataiya-Duhabi 33 kV Sub-transmission Line

## Madhesh Provincial Office, Janakpur

There are 23 Distribution Centers under Madhesh Provincial Office spread over 8 districts. The distribution loss is 14.17%. The sales contribution to NEA system from this office is 22.19%. The performance highlights of this provincial office during review period are as follow.

Energy sales (MWH) –1,913,348
Revenue (million) – Rs.17,317.531
Numbers of consumers – 983,023

The major projects being implemented under this provincial office for construction of 33 kV line, 33/11 kV substations and distribution line network are under following headings.

- Gadahia-Dumaria 33/11 kV S/S Construction Project.
- Haripurwa-Basantpur 33 kV Transmission Line & Sub-station Construction project.
- Bhagwanpur 33/11 kV S/S Construction project.
- NijgadhKolhvi 33/11 kV S/S Construction project.

Maintenance of Transformer in Mirchaya Distribution Center

## Bagmati Provincial Office, Kathmandu

There are 20 Distribution Centers under Bagmati Provincial Office spread over 10 districts. The distribution loss is 6.97%. The sales contribution to NEA system from this office is 23.32%. The performance highlights of this provincial office during review period are as follow.

Energy sales (MWH) – 2,010,527
Revenue (million) – Rs.22,006.129
Numbers of consumers – 840,082

The major projects being implemented under this provincial office for construction of 33 kV line, 33/11 kV substations and distribution line network are under following headings.

- Khurkot Nepalthok (Rakathum) 33/11 kV Transmission Line and Substation Project
- Electrical Line Shifting for Road Expansion Project

Electrification works at Rolwaling Valley (3,800 m)

## Bagmati Division Office, Hetauda

There are 6 Distribution Centers under Bagmati Division Office, Hetauda spread over 3 districts. The distribution loss is 7.38%. The sales contribution to NEA system from this office is 7.34%. The performance highlights of this divisional office during review period are as follow.

Energy sales (MWH) – 632,921
Revenue (million) – Rs. 6,100.313
Numbers of consumers – 302,845

The major projects being implemented under this divisional office for construction of 33 kV line, 33/11 kV substations and distribution line network are under following headings.

- Chanauli-Madi 33 kV underground Sub-Transmission Line Project

Underground Fault Location at Madi by Chanauli Distribution Center

## Gandaki Provincial Office, Pokhara

There are 13 Distribution Centers under Gandaki Provincial Office spread over 11 districts. The distribution loss is 9.10%. The sales contribution to NEA system from this office is 6.89%. The performance highlights of this provincial office during review period are as follow.

Energy sales (MWH) – 594,264
Revenue (million) – Rs 5,712.695
Numbers of consumers – 418,851

The major projects being implemented under this provincial office for construction of 33 kV line, 33/11 kV substations and distribution line

network are under following headings.

- Bhorletar 33/11 kV Substation Project
- Righa-Kharbang 33 kV Transmission Line and Substation Project
- Syarkhu-Thanchowk-Manang 33 kV Transmission Line and Substation Project
- Gorkha-Siranchowk Chipleti 33 kV Transmission Line and Substation Project
- Ghyampesal-Khorlabesi 33 kV Transmission Line and Substation Project

**33/11 kV Syarkyu Substation at Elevation of 2,700m Sea Level at Manang**

## Lumbini Provincial Office, Butwal

There are 11 Distribution Centers under Lumbini Provincial Office, Butwal spread over 6 districts. The distribution loss is 12.83%. The sales contribution to NEA system from this office is 13.32%. The performance highlights of this provincial office during review period are as follow.

Energy sales (MWH) – 1,148,384
Revenue (million) – Rs 10,998.049
Numbers of consumers – 509,499

The major projects being implemented under this provincial office for construction of 33 kV line, 33/11 kV substations and line network are under following headings.

- 33/11 kV Saljhandi Substation and 33 kV line.
- Jitpur-Thada 33 kV Substation Project
- Bhairahawa-Taulihawa Distribution System Reinforcement Project
- Ridi 33 kV Transmission line and Substation Project
- 33 kV Double Circuit Yogikutti-Shitalnagar Line Construction
- 33 kV Double Circuit Dhakdhai-SEZ Bhairahawa and Breaker installation at Dhakdhai
- 33/11 kV 3 MVA Substation at Siluwa, Palpa
- Construction of 33 kV double circuit from Gandak Power House to Parasi S/S.

## Lumbini Division Office, Nepalgunj

There are 10 Distribution Centers under Lumbini Division Office, Nepalgunj spread over 6 districts. The distribution loss is 9.81%. the sales contribution to NEA system from this office is 6.22%. The performance highlights of this divisional office during review period are as follow.

Energy sales (MWH) – 536,371
Revenue (million) – Rs 5,070.658
Numbers of consumers – 377,111

The major projects being implemented under this divisional office for construction of 33 kV line, 33/11 kV substations and 11 distribution line network are under following headings.

- Koholpur- Dhampur 33 kV Transmission Line Project
- 33/11 kV, 6/8 MVA Tulsipur New Substation Project
- Pyuthan 33 kV Transmission line, 11 kV Distribution Line and 33 kV,3 MVA Damti Substation Project
- Khawang 33 kV Transmission Line and Substation Project
- Rajwada 33 kV Transmission Line and Substation Project

**Tulsipur New Substation**

## Karnali Provincial Office, Surkhet

There are 10 Distribution Centers under Karnali Provincial Office spread over 10 districts. The distribution loss is 15.27%. The sales contribution to NEA system from this office is 0.78%. The performance highlights of this provincial office during review period are as follow.

Energy sales (MWH) – 67,507
Revenue (million) – Rs 662.587
Numbers of consumers – 119,766

The major projects being implemented under provincial office for construction of 33 kV line, 33/11 kV substations and distribution line network are under following headings.

- Dailekh- Dullu 33 kV Transmission Line Project
- Dullu – Kalikot 33 kV Transmission Line Project
- Musikot Substation Project
- Surkhet Gangate Matela Project 33 kV Transmission Line Project
- Ramghat 11kV Line Project
- Surkhet- Babiyachaur 33 kV Transmission Line Project
- Dailekh Chilkha Jumla 33 kV Transmission Line and Substation Project
- Nagma-Gamgadi, Mugu 33 kV Transmission Line and Substation Project
- Kudu –ChaukhabaBajar 33 kV Transmission Line and Substation Project
- Chaukhaba Bajar- Dolpa 33 kV Transmission Line and Substation Project
- Gamgadi, Mugu and TripurakotDolpa Substation Project
- Rakam, Dailekh 33 kV Substation Project
- Solta Bazar, Kailali – Babiyachaur, Surkhet 33 kV Transmission Line

33/11 kV, 3 MVA Rukum Substation at Musikot

## Sudurpaschim Provincial Office, Attariya

There are 12 Distribution Centers under Sudurpaschim Provincial Office spread over 9 districts. The distribution loss is 13.30%. The sales contribution to NEA system from this office is 3.75%. The performance highlights of this provincial office during review period are as follow.

Energy sales (MWH) –323,394
Revenue (million) – Rs. 2,842.236
Numbers of consumers –308,006

The major projects being implemented under this provincial office for construction of 33 kV line, 33/11 kV substations and distribution line network are under following headings.

- Sanfebagar - Achham – Martadi 33 kV Transmission Line & Substation Project
- Sanfebagar-Chamara-Chautara 33 kV Transmission Line and Substation Project
- Budar-Jogbuda, Bagarkot (Dadeldhura) 33 kV Transmission Line and Substation Project
- Sanfe-Manma-Jumla 33 kV Transmission Line & Substation Project
- LamkiSugarkhal 33 kV Transmission Line and Substation Project
- Belauri-Punarbash 33 kV Transmission Line and Substation Project
- Patan (Baitadi) - Melauli 33 kV Transmission Line and Substation Project
- DadeldhuraSakayal 33 kV Transmission Line and Substation Project
- Priabagar- Latinath 33 kV Transmission Line & Substation Project
- Baitadi Electric Expand Project
- Chemeliya Electrification Project
- Lekam 33 kV Line & Substation Project
- Huti 33 kV Line & Substation Project

Construction Site of Tikhatar Substation Chamarachautara of Doti District

# PLANNING MONITORING AND INFORMATION TECHNOLOGY DIRECTORATE

Planning, Monitoring and Information Technology Directorate (PMITD), acting as a corporate wing of Nepal Electricity Authority, is headed by the Deputy Managing Director. The Directorate directs and monitors the functioning of five different departments namely System Planning Department, Corporate Planning and Monitoring Department, Information Technology Department, Power Trade Department and Economic Analysis Department. Each of these departments is headed by a Director. System Planning Department is responsible for load forecasting together with generation planning and transmission planning of power system of Nepal. Corporate Planning and Monitoring Department is entrusted with the responsibility of developing the Corporate Plan of NEA along with monitoring of NEA implemented projects. Information Technology Department develops innovative IT services so as to automate various activities of NEA. Power Trade Department is responsible for trading of power both in domestic as well as in cross border market as per NEA's strategy and policy. Finally, Economic Analysis Department carries out the financial analysis of the projects and proposes electricity tariff adjustments and service charge adjustments.

## System Planning Department

System Planning Department (SPD) is mainly responsible for load forecast, generation and transmission line planning of Integrated Power System of Nepal. The Department also conducts the power evacuation study of generation projects to be interconnected in Integrated Nepal Power System (INPS) to identify constraints in the grid that could pose operational risk and that reduce efficiency due to outages in the INPS. For this purpose, SPD develops transmission configurations and carries out different technical studies such as load flow, short circuit, steady and transient stability etc. Furthermore, SPD also supports to update the Corporate Development Plan of NEA and assists other departments of NEA by providing necessary data and suggestion regarding implementation of planned projects.

Grid Impact Study (GIS) for new generation projects as well as for bulk load industries has become the main focus of SPD in recent years. 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 and provides recommendations for requirement of additional transmission lines, reinforcement in the network and requirement for the installation of capacitors and reactors.

In FY 2021/22, System Planning Department carried out following technical studies at the request of NEA's different departments:

- Energy Simulation for Formulation of Corporate Development Plan;
- Power Demand Forecast of Nepal until the year 2042;

- Conducted Network Analysis Study of India and Nepal;
- Updating of INPS Model of Nepal until 2040;
- Grid Impact Study of total 2,137.32 MW capacities of 62 hydropower projects to be developed by IPP's; and
- Grid Impact Study of total 381.3 MVA capacities of 30 bulk load industries to be connected to the INPS.

SPD was associated in the power grid interconnection study conducted by Joint Technical Group (JTG) of State Group Corporation of China (SGCC) and Nepal Electricity Authority (NEA). It has been providing necessary supports to the study named "Integrated Power System Development Plan of Nepal" being conducted by JICA. In addition, SPD was associated with Joint Technical Team (JTT) of India and Nepal in preparation of "Supplementary Report on Integrated Master Plan for Evacuation of Power from Hydro Projects in Nepal, Power Exchange Requirements till 2027" and "Report on Power Transfer between India and Nepal (Phase – IV)"

## Information Technology Department

Information Technology Department (ITD) is responsible for providing the IT infrastructure for automation and plays a vital role in core ICT activities within the organization. It implements the governance for the use of network and software systems, as well as assists the operation units by providing the required IT related supports. Apart from the implementation of new IT systems, ITD provides continuous ICT support, maintenance and trainings to all NEA offices round the clock. After conducting the Information Technology Audit, the department has upgraded the necessary hardware for server requirements, network security equipment and software requirements.

ITD has been providing supports and maintenance to the implemented application software systems such as CAIS, Payroll, Pension, Asset Management, Online Application, DCS's Activity information System, Consumption Analysis System etc. Centralized E-attendance System is in operation, where all the attendance activities can be accessed centrally for the entire NEA offices. Device Integration Application (DIA) has also been implemented to assess the real time attendance data of employee. The Decentralized Inventory Management System has been upgraded to the Centralized Inventory Management system, where the entire inventory can be monitored in a single location.

In FY 2078/79, the Customer Relationship Management Software has been introduced, where consumers would be able to post complains and view the feeder information through NEA mobile App and web portal. Furthermore, ITD has introduced online application for three phase consumers, where customers can apply for new three phase connection. Centralized Call Center has been introduced for Bagmati Provincial Office, where all no light/maintenance/power, billing and other consumer related complaints will be handled from the one location. Furthermore, ITD has introduced the Vehicle Management Information System to bring in transparency and efficiency and lower the operation cost. Global Positioning System (GPS) shall be incorporated in the vehicles used by no light/maintenance team for efficient management.

In line with NEA's vision of becoming a modern utility in the power sector, the IT Policy is being drafted to modernize NEA's processes through the use of Information Technology. NEA Mobile App will be upgraded to a newer version in Android/Apple Version with integration of more customer related features. ITD in coordination with Finance Directorate will implement Centralized Payroll and Pension Management System. To strengthen and automate the Internal Audit Management System, Online Audit Database Management System

(IOADBMS) software will be developed to enhance efficiency in the internal audit processes and reporting. Retirement Fund Management System (RFMS) will also be upgraded to a new web based centralized system.

ITD will implement Security Information and Event Management System (SIEM) along with the Privilege Access Management System (PAM), which have become a staple in modern-day security operation centers (SOCs) for security and compliance management use cases. The Department also intends to implement the SD-WAN products and services to create a backup for the Communication Network to support the interconnectivity between offices for data transfer of different applications used in NEA.

An IoT Communication Network Infrastructure is being established to connect all the offices of NEA (including No-Light centers) along with the SCADA System of all the substations. For this initiative, ITD has taken into consideration of all the optical fiber infrastructure of the Transmission Directorate and the free core to be provided by Internet Service Providers on the distribution side. ITD will also co-ordinate to work in collaboration for the operation of the Data Center located in the LDC office, Syuchatar. This Communication Network Infrastructure Backbone along with Data Center shall not only benefit NEA for it's functions, but also can be used as a revenue generating source by leasing bandwidth and data space in days to come.

## Corporate Planning and Monitoring Department

Under Planning Monitoring and Information Technology Directorate (PMITD), the Corporate Planning and Monitoring Department (CPMD) is established primarily to assist the NEA management in devising plan for corporate development, preparing the annual budget and monitoring of entire NEA development and operational activities. The responsibility of appropriation of the received ceiling of annual budget from GoN and mobilization of internal resources to ensure the realization of targets set forth is undoubtedly a complex task, wherein best trade off among competing activities have to be assessed. The whole process involves repeated discussion on various levels within the setup of NEA.

Monitoring of status of, to be implemented and ongoing, plans, projects and activities on continuous basis and reporting to the management are other vital responsibilities of the Department. In addition to the need based reporting, periodic reporting is also carried out on month, trimester and annual basis. These reports indicate the status of various activities with reference to pre-set targets such as increase in generation capacity, transmission line length and sub-station capacity, added number of consumers, increase in per capita electricity consumption, loss reduction and coverage of rural electrification etc.

Development of suitable monitoring and evaluation directives assisting the NPC, Ministry of Energy, Water Resources and Irrigation (MoEWRI) and Ministry of Finance (MoF) in functions related to NEA and entry of annual budget in the Line Ministry Budget Information System (LMBIS) are other works being carried out by the Department.

CPMD provides necessary supports to the NEA management for carrying out various studies related to institutional reform and development. In addition, the Department provides inputs for the studies undertaken by various organizations on the topics related to NEA. It also plays the coordinating role in the development of projects under different financing mode.

In FY 2021/22, CPMD evaluates the progress of 10 projects of the feasibility study of storage and large/ medium hydropower projects, 2 hydropower projects under construction, 16 projects of rehabilitation and maintenance

of hydropower stations, 90 projects of transmission line and 106 projects of distribution system expansion and rural electrification projects thereby 224 projects in total.

## Power Trade Department

Power Trade Department (PTD) is responsible for trading of electric power in both domestic and cross border market. It is the single window interface of NEA with Independent Power Producers (IPPs) for processing their applications for Power Purchase Agreement (PPA). Functions of Power Trade Department may be broadly classified into three categories, i.e., PPA processing and signing, PPA administration after its execution till the commercial operation and PPA administration after the commercial operation. The department has 3 divisions to carry out these functions, namely, Business Development, Construction Vigilance, and Commercial & Finance in the respective order. The administrative tasks are carried out by another division, namely Resource Management.

Various reform measures have been introduced in the Fiscal Year under review so as to make the processing of the PPA applications systematic and transparent. The applications are put on a processing sequence based on pre-established criteria. The different stages involved are document screening, technical review, grid impact study followed by grid connection agreement, PPA draft preparation and negotiation, seeking for NEA management's approval followed by Electricity Regulatory Commission (ERC)'s approval and finally, signing of PPA.

In FY 2021/22, a total of 717.1 MW from 24 different projects were commissioned. Similarly, 12 new PPAs having the combined installed capacity of 183.5 MW were concluded, which include 7 hydropower projects and 5 solar projects having the combined installed capacity of 145.5 MW and 38.0 MW respectively. The current status of IPP's and NEA subsidiary companie's projects under PTD is shown in Table below:

| S.N. | Status | Numbers | Capacity (MW) |
|---|---|---|---|
| 1 | Projects under Operation | 132 | 1,531.8 |
| 2 | Projects under Construction | 141 | 3,280.9 |
| 3 | Projects under Different Stages | 84 | 1,553.4 |
| | **PPA Concluded Projects** | | **6,366.1** |
| 4 | PPA Applications | 269 | 11,739.8 |
| | **Total** | | **18,105.9** |

Nepal has been participating in Indian Power Exchange (IEX) for power import since May 1, 2021 subsequent to the issuance of Designated Authority (DA)'s Procedure by India on February 26, 2021. From November 3, 2021, Nepal started to sell 39 MW of power in IEX via NTPC Vidhyut Vyapar Nigam immediately after DA approval for 2 hydropower projects, namely, Trishuli and Devighat HEPs. After the issuance of Joint Vision Statement in Power Sector by India and Nepal on April 2, 2022, DA granted approval for 6 hydropower projects, namely, Trishuli, Devighat, Marsyangdi, Middle Marsyangdi, Kaligandaki "A" and Likhu IV HEPs for the period of one year to sell power in the Day Ahead Market of IEX. Nepal started exporting 364 MW of power all together in IEX since June 2, 2022. Some other hydropower projects are in the process of approval by India. Similarly, a new market dimension was explored in the past FY, when NEA invited bids on June 5, 2022 for the sale of 200 MW power generated from hydropower projects in Nepal though the bid could not be materialized.

## Economic Analysis Department

Economic Analysis Department (EAD) is mainly responsible for conducting the activities related to the economic and financial analysis of NEA. As a focal unit for adherence with regulatory compliance, EAD is also entrusted with the preparation of electricity tariff petition to be submitted to Electricity Regulatory Commission (ERC) of Nepal, The Department is assigned to

the following tasks:

- Formulate criteria for economic and financial analysis of NEA's projects;
- Study on financial resource requirement;
- Commercial and market analysis of NEA;
- Cost Benefit Analysis (CBA) of NEA projects;
- Prepare Log Frame of generation and transmission line projects of NEA;
- Cost analysis of services distributed by NEA;
- Carry out comparative benefit study of hydropower generation and transmissions lines of NEA.
- Carry out study and evaluation of economic and financial sustainability of completed projects by NEA; and
- Assists other departments of NEA in prioritizing the selection of the projects.

EAD also contributes to the Demand Side Management (DSM) via revision of tariff. A study on encouraging off- peak demand and reducing peak demand has been planned so that the Time -of -Day tariff revision will be implemented in addition to the periodic tariff revision. The Department also assists to conduct Cost Benefit Analysis related to G, T & D activities of NEA. Its role has been both extensive and intensive in the context of identifying the factors that leads to manage the internal demand and studying the avenues. An initiation has been taken in establishing coordination among various departments while performing these activities. The Main activities conducted by the Department in FY 2021/22 are as follows:

**Review of Electricity Tariff:** EAD successfully filed the tariff petition to ERC via authorization of NEA Board abiding by the regulation of ERC. After revising the petition of NEA, new electricity tariff has been implemented from Marga 2078. The new tariff has the provision of free energy to domestic consumers consuming upto 20 units per month. The rate of irrigation consumer has been reduced by an average of 40%. In addition, the tariff for domestic consumers has been adjusted to encourage the use of electric cooking and other appliances.

**Regulatory Compliance:** All the work of regulatory compliance for NEA has been reported.

**Study of Consumption Pattern:** Consumption behavior of various consumer categories has been studied and analyzed with development of a new software for projection of demand and growth pattern of various categories of consumers.

**Retail Tariff Module Development:** It has been developed to outline the average tariff requirement for different customer categories. International Standard has been considered while modeling based on the ground reality. The cost of service for various consumer categories has been calculated and the neutral tariff for each category has been prepared. While developing module, care has been taken to represent the actual scenario. However, there are some cases like hybrid assets and costs, demand allocation factors, and energy allocation factors, in which best estimate has been made on the basis of some assumptions.

**Update of Corporate Development Plan (CDP) of NEA:** After formulation of CDP in order to materialize the future prospects of NEA, EAD has taken an initiation to update the CDP as needed along with the KPIs, to evaluate whether the predetermined targets have been met through ongoing regular activities.

**Financial analysis:** EAD has carried economic and financial analysis for NEA. Various financial parameters have been considered and best analysis has been made in co-ordination and collaboration with various departments and related agencies.

**NEA Financial Viability Action Plan (FVAP):** Final audited data has been taken as basis and the estimated energy balance, revenue,

and cost related figures have been replaced by the actual figure of 2021. To cop-up with the changing scenario of investment requirement, NEA's contribution has been identified and the estimation will be further revised in the coming years of the plan period. It basically focusses on the study of Cost of Service and Financial Resource Requirement and Tariff Adjustment to prepare the basis for tariff requirement under different scenarios. The Financial Viability Gap Funding (FVGF), as a grant of GoN, will be required, in case the tariff is not able to meet the resource requirement of NEA.

**Demand Stimulation Action Plan:** In order to increase the electricity consumption within the country, Demand Stimulation Action Plan (DSAP) has been prepared by the Department.

**Capital Investment Plan:** In accordance with the GoN policy of increasing the internal consumption of generated energy, NEA has to enhance its existing transmission and distribution capacity. EAD has prepared Capital Investment Plan (CIP) of NEA to estimate the capital investment required for the purpose.

# ENGINEERING SERVICES DIRECTORATE

Established along with the formation of NEA, Engineering Service Directorate (ESD) is entrusted with the responsibility to carry out engineering studies beginning from the identification to feasibility study, geological and geotechnical studies, detailed engineering design and environmental studies for development of hydropower and transmission line projects. Apart from providing related trainings, the Directorate is mandated to provide consulting and advisory services in the hydropower and transmission line sectors and other infrastructure projects to NEA and private sector. Headed by the Deputy Managing Director, ESD has four departments namely Project Development Department (PDD), Soil Rock and Concrete Laboratory (SRCL), Environmental and Social Studies Department (ESSD) and NEA Training Center. There is an Electromechanical Division under the Directorate to provide EM related technical services and supports to various departments within NEA and also to the private sector.

The scopes of services provided by the directorate are mentioned below:

- To identify hydropower projects, their screening and ranking;
- To carry out feasibility studies of hydropower projects and transmission line projects;
- To carry out geotechnical survey;
- To carry out surveying and mapping;
- To carry out EIA/IEE study;
- To prepare tender documents and engineering norms;
- To carry out detailed design study;
- To provide construction supervision services;
- To produce local transmission pole;
- To repair and maintenance of distribution transformer up to 500 kVA and above; and
- To provide training and enhance human resources in engineering and environment fields.

The operations and activities of different departments, divisions and projects operating under ESD are described below.

### Dudhkoshi Storage Hydroelectric Project

Dudhkoshi Storage Hydroelectric Project (DKSHEP) with the total installed capacity of 635 MW has been envisaged to address the prevailing power and energy deficit during dry season. The project is located on Dudhkoshi River bordering Khotang and Okhaldhunga, close to a settlement called Rabuwa, which is about 140 km (aerial distance) east from Kathmandu or approximately 1.5 km northwest from Lamidanda airport at Khotang.

NEA has been conducting the Updated Feasibility Study and Detailed Design of this project with the grant support from Asian Development Bank (ADB). A contract agreement was concluded between NEA and ELC Electro-consult S.P.A. (Italy) in association with NEWJEC Inc. (Japan) to perform updated Feasibility Study, Environmental and Social Impact Study and Detailed Design Study along with the preparation of Bidding Documents.

The Consultant has submitted Updated

Feasibility Study Report, Pre-qualification Document, Detailed Design Report, Environmental Impact Assessment (EIA) Report for hydropower component, Terms of Reference (ToR) for Initial Environmental Examination (IEE) for Transmission Line and Bidding Documents for Civil Works and Hydro Steel Structures (HSS) & Access Roads contract, EM Plant contract and 400 kV Transmission Line contract. The Consultant is being engaged for the remaining activities (Physical Model Testing and Hydro fracture Testing) and additional investigations-Audio Magneto Telluric (AMT) Survey. As per the work schedule of the Consultant, the remaining activities and finalization of Detailed Design Report will be completed by the end of October 2022.

An International Panel of Experts (PoE) and ADB experts have reviewed the reports and documents submitted by the Consultant and provided comments on the documents. The Consultant has been requested to submit the final reports within schedules after fulfilling the gaps and incorporating the comments in consultation with the PoE.

**Physical Model Study of the Spillway and Site Visit of Country Director, Nepal Resident Mission, ADB along with Project Team and Representatives of Local Authorities**

The proposed layout in the Detailed Design Report includes following components:

- 220 m high Concrete Face Rockfill Dam (CFRD) having a crest length of 630 m, located on Dudhkoshi River in a gorge nearly one kilometer downstream of the confluence between Dudhkoshi River and Thotne Khola (a tributary);
- Headrace tunnel of length 13.3 km;
- An underground powerhouse with the installed capacity of 600 MW located on Sunkoshi river;
- A surface powerhouse with an installed capacity of 35 MW located in the right abutment immediately downstream of the dam site to generate energy from the release of the environmental flow

A combined spillway (gated and labyrinth overflow) has been provisioned in the left abutment. Even in case all radial gates are out of operation, an emergency spillway (fuse gates) at the left side of the main spillway will ensure the safety of the dam. The total storage capacity of the reservoir is 1,581 $Mm^3$ out of which the live storage capacity is 1,342 $Mm^3$ and the dam body volume is about 26.7 $Mm^3$.

The annual energy production is 3,443 GWh with an average energy production of 1,358 GWh in dry season and 2,084 GWh in wet season. The power generated from the project is planned to be evacuated by double circuit 400 kV Transmission Line connecting to Dhalekbar. The Consultant has also conducted the survey for Transmission Line. The base cost of the Project is estimated to be 1,531 MUSD.

The Project is also conducting Environmental and Social Implementation Program during pre construction phase of the project through Environmental and Social Studies Department (ESSD) of NEA. ESSD has established Environment and Social Unit at the site to carry out Public Consultation Program, Information Disclosure Campaign and Public Awareness

Program and also to facilitate in land acquisition process.

GoN has initiated groundwork with development partners to raise investment required for the project. ADB conducted the Reconnaissance Mission from 21 June to 2 July 2021 and the modality of project financing was discussed among the authorities of the Ministry of Finance (MoF), Ministry of Energy, Water Resources and Irrigation (MoEWRI) and NEA. Accordingly, MoF has requested to the ADB for the confirmation of 1,300 MUSD concessional loan required for the development of project. MoF has also sent the letter to EIB requesting an investment of 500 MUSD for the project. Following the receipt of the Letter of Intent, a meeting was held between NEA and EIB regarding the current status and potential investment for the project.

In addition, requests have been sent to Citizen Investment Trust (CIT), Employees Provident Fund (EPF), Hydroelectricity Investment and Development Company Limited (HIDCL) for commercial loan and the discussion is ongoing for the purpose. The financial arrangement for the project is expected to complete by the end of September 2023, whereas the physical construction of the project will commence from the start of 2024. As the construction period of the project is 7 Years, the project is scheduled to be completed by the end of 2030.

### Chainpur Seti Hydroelectric Project

Chainpur Seti Hydroelectric Project (CSHEP) is a Peaking Run off River type Hydropower Project with six hours of daily peaking capacity. The project is located in Saipal, Talkot and Mastha Rural-Municipality in the Bajhang District of Sudur Paschim Province. The proposed headworks site is located about 150 m downstream from the confluence of the Seti River and Ghatganga River, while the proposed powerhouse site lies near the Basti village on the right bank of Seti River.

The Project site is accessible via Attariya-Chainpur black topped road and an earthen track road of about 16 km connecting Chainpur to the proposed powerhouse site. The road connecting Chainpur Bazar to Taklakot is under construction with the fund of GoN. This road passes nearby the project headworks area. The main project features are as follows:

| | |
|---|---|
| Dam | 40 m High Concrete Gravity with 4 radial gates |
| Intake | 3 Nos. 8m x 3.5m |
| Desilting Basin | Underground, 130m x15m |
| Headrace Tunnel | 12,468m, 5.4 Diameter |
| Surge Shaft | 87.3 m High, 12,5m Diameter |
| Pressure Shaft | 161.3m, 2.0m Diameter |
| Penstock | 1,575m, 3.5 m Diameter |
| Powerhouse | Semi Surface |
| Turbine | Pelton, (3x70) MW |

The power generated from the project will be evacuated to the INPS through the proposed 400/132 kV Bajhang Substation. The project will have an installed capacity of 210MW utilizing a net head of 474.5m and the design discharge of 50.68 $m^3/s$. The annual energy generation is about 1,158.02 of which the dry peak energy generation is 219.50 GWh.

**Drilling Work at Headworks Site**

The project has signed a contract agreement with Chilime Engineering Services Company Limited (ChesCo) for the review of feasibility study and the preparation of bidding documents. The feasibility study has been completed, whereas the preparation of EPC bid document

is at completion stage.

In FY 2021/22, the geotechnical investigation works like MASW, 2D-ERT, core drillings at proposed headworks site and powerhouse site were completed. Bids have been invited for the construction of adit tunnel leading to headrace tunnel and horizontal pressure shaft, whereas the bids are under evaluation for the construction of access road to powerhouse and camp area. The Environmental Impact Assessment (EIA) Report of the project has been approved by Ministry of Forests and Environment (MoFE). The distribution of compensation for land acquired for powerhouse and camp area has been initiated, whereas the review of bid documents of camp area is ongoing for bidding process.

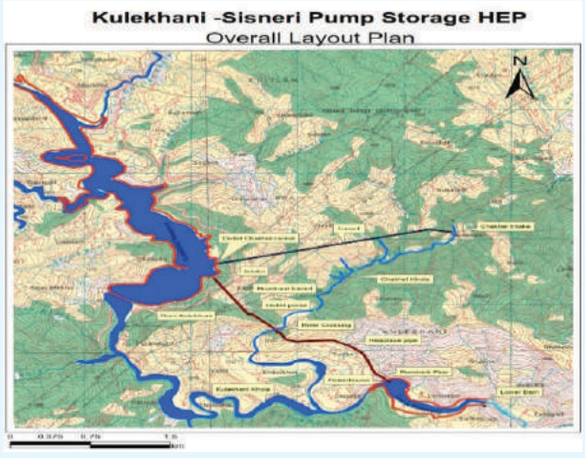
## Project Development Department

Project Development Department (PDD) under Engineering Directorate focusses on preparation of hydropower projects for development by NEA. This includes identification of potential projects, screening and ranking, carrying out feasibility studies followed by preparation of tender documents and detailed drawings through the detailed engineering study. PDD has also been providing construction supervision services for the projects under construction as per agreements with the concerned projects of NEA. In addition, it has been providing consulting services for detailed survey of a number of transmission line projects being developed by Grid Development Department of NEA. There are six divisions under the Department to carry out those activities.

### Kulekhani Sisneri Pump Storage Hydroelectric Project

Kulekhani Sisneri Pump Storage Hydroelectric Project (KSPSHEP) was identified in the year 2077. NEA has obtained the Survey License of Generation issued by Department of Electricity Development. The project is located at Lambagar village of Indrasarovar Rural Municipality in Makwanpur district of Bagmati Province. Due to easy access for construction and favorable location, this pump storage project could be a promising scheme for implementation in days to come.

The existing dam of Kulekhani-1 Storage Hydropower Scheme acts as the upper reservoir of the project, whereas the lower reservoir will be created by the construction of a dam of 36m height from the river bed. The side intake is proposed on the right side at about 900 m upstream of the existing Kulekhani dam. The water conveyance consists of headrace tunnel of 650 m length and steel pipe of length 1,550m with the provision of surface surge tank at the end of headrace pipe. The water will be released to the sub-surface powerhouse via the penstock pipe of diameter 3.5m. The electro-mechanical equipment will consist of two Francis type generation/pumping units having capacity of 50 MW each.




General Layout

In FY 2020/21, the Pre-feasibility Study Report has been prepared after completion of field investigation works including Regional Geological Mapping, Topographical Survey and Bathometric Survey. In addition, the hydrological study is being continued with continuous measurement of water level at lower dam axis. Memorandum of Understanding (MoU) between the KSPSHEP and Environment

and Social Service Department (ESSD) has been signed for the study of Environmental Impact Assessment (EIA). Similarly, an MoU between the KSPSHEP and Soil Rock and Concrete Laboratory (SRCL) was concluded for Detailed Engineering Geological Mapping and geotechnical investigation. The works of EIA study and geotechnical investigation will be continued after assessment of the technical and financial viability of the project.

### Begnas Rupa Pump Storage Hydroelectric Project

Begnas Rupa Pump Storage Hydroelectric Project (BRPSHEP), the first of its kind in Nepal, was identified in the year 2074. The Project is located at Pokhara Metropolitan City in Kaski District of Gandaki Province. The natural head of 57m available between the Begnas Lake and Rupa Lake shall be utilized for reserving INPS spill energy anticipated in the near future. The project's major features include the two lakes serving as the upper and lower reservoirs, headworks, steel lined pressure tunnel, semi surface powerhouse and embankment dam structures at the lakes. The proposed headworks site is located at the base of Sundari danda near Jyamire in Begnas Lake and the proposed powerhouse site lies at the base of Simal danda near Rupa Lake. The installed capacity of the project is proposed to be 150 MW.

During FY 2021/22, the hydrological study is continued with recording of gauge levels at three locations. In addition, three piezometers have been installed at the downstream of Begnas Dam and water levels of those piezometers are being measured continuously.

### Andhikhola Storage Hydroelectric Project

Andhikhola Storage Hydroelectric Project is situated in Syangja district of Gandaki Province. The proposed dam of this project is located just 3.1 km upstream of Kaligandaki/Andhikhola confluence, whereas the powerhouse site is located 12 km downstream of Kali Gandaki 'A' (KG-A) Powerhouse site. The existing Sidhartha Highway and access road of Kaligandaki 'A" HEP provide an easy access to the project site.

This project with an installed capacity of 180 MW will generate about 674.45 GWh of total annual energy. The estimated cost of the project is 539 million US$.

In FY 2021/22, the updated Feasibility Study has been completed after completion of field investigation works including geological drilling, geological mapping, ERT survey, topographic survey. The hydrological study is being continued with continuous gauge reading and discharge measurement in different time frame. Sediment samplings of Andhi Khola River are being carried out on various time frame of the year.

The EIA study of project has been completed by Environment and Social Studies Department of NEA. The EIA Report has already been approved by the Ministry of Forest and Environment. The project requires the resettlement of 712 households and acquisition of 966 Ha of land. The continuous interaction with the local stakeholders indicate that local people are positive for the implementation of this project.

### Arun 4 Hydroelectric Project

Arun 4 Hydropower Project is a ROR hydropower project proposed to be developed on Arun River in Bhot Khola and Makalu Rural Municipality of Sankhuwasabha District of Province No. 1. The project site can be accessed from the Koshi highway and the access road is 23.4 km from Arun 3 quarry site to the foot bridge at Gola Bazar near the headworks location. The project has been designed to utilize a design discharge of 253.5 $m^3/s$ and a net head of 222.4 m for an installed capacity of 490.2 MW. The average annual generation has been estimated to be 2,137 GWh.

The main components of the project are as follows:

| | |
|---|---|
| Diversion Weir | 23.5m high, 40.2m long with 8 Radial Gates of size 7.5mx4m |
| Intake | 4 Nos. of size 8.3mx3.25m |
| Settling Basin | 4 Nos. of size 131.5m x 23.1m |
| Headrace Tunnel | 9.0 m Diameter, 9,305m long |
| Surge Tank | Cylindrical, 25.1m Diameter |
| Pressure Shaft | 5.0 m Diameter |
| Powerhouse | Underground |

The electro-mechanical equipment consists of 4 units of Francis turbine each having rated capacity of 122.5 MW. The energy generated from the project will be evacuated to Haitar Substation via 4.51 km long transmission line at 220 kV voltage level. The estimated cost of the project is NRs. 79.12 Billion. It is expected to yield an IRR of 12.87% and B/C ratio of 1.27 at a debt equity ratio of 70:30 and an interest rate of 10 %.

NEA obtained the Survey License of generation Arun 4 Hydropower Project issued by Department of Electricity Development in October 2021. A preliminary review of the feasibility study as obtained from DOED has been carried out by PDD.

A Memorandum of Understanding was signed between NEA and Satlej Jalvidyut Nigam, SJVN India on 16 May 2022 for the joint execution of the project. According to the MOU, the project will be developed in joint collaboration between NEA and SJVN by establishing a Joint Venture Company with 51% equity participation of SJVN. The JVC will provide 21.9% of generated energy from the project free of cost to NEA from the date of commencement of commercial generation of the project. SJVN has agreed to review the feasibility study of the project and submit an inception report to NEA within 90 days from the date of signing the MOU. Similarly, it has been agreed to complete the DPR and update the EIA within 18 months from the date of signing the MOU.

## Study of New Hydroelectric Projects

GoN has been allocating the regular budget for the study and identification of new hydropower projects. In FY 2021/22, PDD has identified and studied following projects at the preliminary level.

### Kaligandaki Kowang Hydroelectric Project

Kaligandaki Kowang Hydroelectric Project is studied as Peaking Run off River Project. This project is proposed on Kaligandaki River at Mustang District of Gandaki Province. Two different dam sites and powerhouse locations are considered with the installed capacity of 128 MW and 400 MW in studied options. As per the geological conditions of site, the option having an installed capacity of 128 MW is recommended. A rockfill dam is proposed to divert 76.0 $m^3/s$ of water through approx. 4.0 km long headrace tunnel to generate 728.28 GWh energy annually.

### Kaligandaki Upper Hydroelectric Project

Kaligandaki Upper Hydroelectric Project is studied as a ROR project. This project is proposed on Kaligandaki River at Myagdi District of Gandaki Province. The headworks site is located about 1.7 km downstream from the confluence of Kaligandaki River and Beg Khola. An underground desander basin is proposed on the right bank, which connects to the headrace tunnel of about 3.5 km in length. A surface type powerhouse is proposed, which is connected to HRT via penstock of about 300 m in length. With the estimated gross head of 103 m and the design discharge of 131.10 $m^3/s$, the project of the installed capacity 110 MW will generate the total energy of 549.61 GWh annually.

### Sunkoshi 3 Hydroelectric Project

Sunkoshi 3 Hydroelectric Project is studied as a storage project. This project is proposed on Sunkoshi River in Sindhupalchowk, Sindhuli, Kavrepalanchowk and Ramechhap District of Bagmati Province. A 180 m high Dam is proposed near the boundary of Temal Gaunpalika Ward No. 9 and Khandadevi Gaunpalika Ward No. 1, whereas the powerhouse site is proposed near

the Temal Gaunpalika Ward No. 9 Bhandaribesi. Two Headrace Tunnels of diameter 9.5 m and average length of 538 m are proposed to connect the intake area and powerhouse. With the gross head of 165 m and the design discharge of 490 $m^3/s$, the project of the installed capacity 680 MW will generate the total energy of 2,530.16 GWh annually.

## Feasibility Study & Detailed Survey of Various Transmission Lines, Substations and Hydropower Projects

PDD has been conducting a detailed survey and feasibility study of various transmission lines, substations and hydropower projects. In FY 2021/22, following survey works have been accomplished by the Survey Division of PDD.

**Survey Works in F.Y. 2021/22**

| SN | Transmission Line Projects | Districts | Status |
|---|---|---|---|
| 1 | Pokhariya Nijgadh 400 kV T/L (Details survey study) | Bara, Parsa and Rautahat | Completed |
| 2 | Feasibility study and Cadastral survey of Kusma-Lower Modi-New Modi 132 kV TL | Parbat | Completed |
| 3 | Feasibility study of Parwanipur-Raxaul 132 kV Underground TL | Bara & Parsa | Completed |
| 4 | Pathlaiya Harniya 132 kV TL (Re-route Survey & Cadastral Survey) | Bara | Completed |
| 5 | Chameliya Attaria 132 kV Reroute Detail survey & Protection work | Kailali | Completed |
| 6 | Detailed Re-route survey and protection work of Dordi Corridor 132 kV TL | Lamjung | Completed |
| 7 | Dudhkoshi Storage HEP's Access Road Detail survey and Design Work | Khotang | Completed |
| 8 | Bathymetric Survey of Kulekhnai-I H. Plant | Makwanpur | Completed |
| 9 | Burtiban Gorusinghe 132 TL's Road detail study | Baglung | Completed |
| 10 | Topographical survey for the geological investigation of Upper Arun HEP | Sankhuwasabha | Filed work completion/ Reporting phase |
| 11 | Bathymetric Survey of Tamaksohi HEP | Dolakha | Completed |
| 12 | Topography, cadastral & Bathymetric survey of Lower Marsyandi Power Plant | Tanahu & Gorkha | Completed |
| 13 | Feasibility study and cadastral survey of Galchhi Ratmate 220 kV TL | Nuwakot & Dhading | Completed |
| 14 | Palpa 220 kV TL's Substation Feasibility study | Palpa | Ongoing |
| 15 | Feasibility study of Ratmate-Rasuwagdi-Kerung 400 kV | Nuwakot & Rasuwa | Completed |
| 16 | Central Store Building (Hetauda) of DCS Survey-Design work | Makwanpur | Ongoing |
| 17 | Feasibility study of Upper Arun's TL (400 & 132 kV) | Sankhuwasabha | Ongoing |
| 18 | Dhaubadi Iron Mines 220 kV TL's Details survey | Nawalparasi | Ongoing |

## Building and Physical Infrastructure Construction Project

Nepal Electricity Authority initiated Building and Physical Infrastructure Construction Project (BPICP) in the year 2017. The main objective of this project is to construct the corporate office building at Durbarmarg and other similar office buildings of NEA at various prime locations in an urban area. BPICP is currently being engaged for construction of three office buildings namely Corporate Office Building at Durbarmarg, NEA Office Building at Lainchaur and NEA Building at Bhagwanpaau. Further, BPICP has initiated the design works of other multistory buildings outside the Kathmandu Valley.

## Corporate Office Building (COB) at Durbarmarg

NEA had planned to construct a sixteen storied Corporate Office Building at Durbarmarg, Kathmandu. The design and drawing of the building was submitted to Kathmandu Metropolitan City (KMC) for the building permit approval. KMC denied providing the building permit because of the due amount of the building and land tax. The dispute between KMC and NEA delayed the building permit process. As the Ministry of Urban Development (MoUD) imposed a new bylaw, "बस्ती विकास, सहरी योजना तथा भवन निर्माण सम्बन्धि आधारभूत निर्माण मापदण्ड २०७२", after the earthquake of 2015, demanding a setback of one-fourth of the building height in all sides of the building, the design became unfit. MoUD did not approve the Initial Environment Examination (IEE) Report. Accordingly, BPICP revised the architectural design of COB, acceptable to both the bylaws of MoUD and KMC and updated the IEE report. MoUD approved the IEE Report on 2078/10/28.

**Proposed Outlook of New Corporate Building at Durbar Marg**

As MoUD revised its bylaw on 2079/02/16, by removing the height setback ratio limitation, BPICP revised the design of COB for the second time. According to this design, the building will have eleven storeys with a double basement. The detailed design work and updating IEE Report are in the process.

## New Office Buildings at Lainchaur and Bhagwanpau

NEA had planned to construct new office buildings at Lainchaur and Bhagwanpaau to accommodate some of the directorate offices and subsidiary companies. BPICP had selected the Consultant for the detailed design of new office buildings. After completion of the survey and the geotechnical investigation, the Consultant submitted the detailed design reports with architectural design, structural design, sanitary design, electrical design, HVAC and communication on 30 Bhadra 2078. Further, Ministry of Urban Development (MoUD) approved the IEE report on 09 Kartik 2078.

**Proposed Outlook of New Office Building at Bhagawan Pau**

BPICP published the Invitation for Bids (IFB) from eligible construction companies on 21 Magh 2078. The Contract Agreement between BPICP and KC-EG Infra- Hanuman JV was concluded on 19 Asadh 2079 for the "Construction of NEA Office Buildings at Lainchaur and Bhagwanpaau". The Contractor is in the process of mobilization. The construction period is 30 months from the date of the contract agreement.

## DCS Office Buildings

BPICP designed the typical DCS office building for the Terai region. The building is a three-storied RCC framed structure. The plinth area is 328 sqm, and the floor height is 3.5 m. The opening is a glazed aluminium window, whereas the façade is exposed brick.

Typical Outlook of DCS Office Building

The building comprises the revenue collection counter, waiting area, central courtyard for lighting and ventilation and office area.

## Electro-Mechanical Design Division

Established under Engineering Services Directorate, the Electromechanical Design Division (EMDD) has been providing electro-mechanical related technical supports to the Engineering Directorate. The scopes range from the design of electro-mechanical and hydro-mechanical equipment of hydropower projects under various stages of study as well as electrical installation for various projects. It also carries out Power Evacuation Study of hydropower projects with collaboration of System Planning Department of NEA. Furthermore, the Division is also involved in procurement and maintenance of vehicles under ESD.

EMDD has been monitoring of pole plants located at different locations and central workshop located at Hetauda. It has been involved in the establishment of new concrete pole plant in Lamki, Kailali. In near future, it is also planning for the establishment of a concrete pole plant in the central region of Nepal, which shall ease the PSC pole supply to this region.

### Lamki Pole Plant Project

The pole plant is located in Lamkichuha Municipality, Ward No.1, Kailali, Sudurpaschim Province. The objective of the plant is to produce PSC poles of 8m, 9m and 11m size and distribute it to Provincial Offices of NEA and private firm as well.

Civil structures like office and store building, cement and HT wire store, boiler house, guard house have already been completed. Other civil structures like pole yard and aggregate stacking zone are under construction. Likewise, production equipment and systems like Modular Concrete Batching Plant, Boiler & Piping, PSC Pole Mould, Double Acting Type Hydraulic Power Pack, and Hydraulic Cylinder Assembly Tensioning are in testing and commissioning phase.

Lamki Pole Plant

The plant has production capacity of 14 Nos. of 8m pole, 48 Nos. of 9m pole and 20 Nos. 11m pole having total 82 Nos. of poles per day. The production will start from FY 2022/2023, which will fulfill the demand of PSC poles in Western part of Nepal.

### Kotre Pole Plant

Kotre Pole Plant is located in Shuklagandaki Municipality, Ward No. 2, Kotre of Tanahun along Prithvi Highway. It was jointly established by Government of Nepal & Finland Government in 2042 B.S. to implement Pokhara Electrification Project.

Kotre Pole Plant

Currently the plant has been producing 8m, 9m and 11m sizes PSC poles as per design norms to meet the requirements of DCS offices of NEA under the Gandaki, Lumbini and Bagmati Province. The daily production capacity of plant is 8 Nos. of 8m Pole, 24 Nos. of 9m Pole and 24 Nos. of 11m Pole thereby totaling of 56 nos. of poles in a day. In F/Y 2021/22, the plant has produced 13,214 poles in total.

## Amlekhgunj Pole Plant

The concrete pole plant, located at Amlekhgunj, Bara, Madhes Pradesh was established in 2051 BS. The plant produces PSC poles of size 8m, 9m and 11m and distribute them to various offices of DCS and private firm as well. Currently the plant has daily production capacity of 78 poles (12 Nos. of 8 meter, 50 Nos. of 9 meter and 16 Nos. of 11m).

Amlekhgunj Pole Plant

In FY 2021/22, the pole plant produced 19,131 poles in total exceeding the annul target of 17,580 poles.

## Tankisinuwari Concrete Pole Plant, Morang

Concrete Pole Plant, Tankisinuwari was established in the month of Baisakh, 2079 B.S. The plant is located at Budhiganga Rural Municipality; Ward No.2, Tankisinuwari, Morang district, Province No. 1, along the famous Morang-Sunsari Industrial Corridor, almost 6 km distance from Biratnagar Airport.

Tankisinuwari Pole Plant

This plant has production capacity of 14 Nos. of 8m pole, 48 Nos. of 9m Pole and 30 Nos. of 11m pole having total of 92 poles per day, thus becoming the largest pole plant of Nepal. The production has been started from the 14 Magh, 2078 B.S., whereas the pole dispatch was started from 09 Baisakh, 2079 B.S. after bending test performed in presence of representatives from Province No.1 DCS Office of NEA. The plant is expected to fulfill the demand of PSC Poles in the eastern part of Nepal.

## Central Workshop

NEA Central Workshop (NCS) was established in 2055 BS at Bhairav Road, Hetauda-5, Makwanpur. The main objective of NCS is to test/repair distribution and power transformer of NEA and for others as and when required. In addition, it caters rental services of available heavy equipment like wheel loader, excavator, mobile crane, dumps truck etc.


**Central Workshop at Hetauda**

The achievement of the Workshop in FY 2021/22 is tabulated below:

| S.N. | Description | Numbers |
|---|---|---|
| 301 | Distribution Transformer Repair | 1,120 |
| 2 | Power Transformer Repair | 9 |
| 3 | Transformer Testing | 4,536 |

The Workshop has generated the income of NRs. 30,36,994 only by leasing out the heavy equipment, whereas the total income is NRs. 16,38,55,690 for the year.

## Soil, Rock and Concrete Laboratory

Soil, Rock and Concrete Laboratory (SRCL) is established under Engineering Services Directorate to provide services in geological and geotechnical investigations, in-situ and laboratory testing for different phases of hydropower studies and other development works as well. These services include geological mapping, geophysical surveys including Resistivity (ERT), Seismic (SRT, MASW, and MAM), core drilling, construction material investigations and laboratory testing of soil, rocks and concrete at different levels for different departments of NEA and private entities as well. SRCL now has added a state of art technology to map out the borehole by the help of Digital Borehole Camera, Optical Televiewer, Acoustic Televiewer and Triple Sonic Logging. SRCL has purchased all the necessary equipment required for the tunneling works and is technically able for all size of Test Adit Tunneling works.

SRCL has executed followings geological/ geotechnical investigation works in FY 2078/79:

- Additional geotechnical investigation works of Phukot Karnali Hydroelectric Project, Kalikot;
- Geotechnical investigation works of Betan Karnali Hydroelectric Project, Surkhet/ Achham;
- Geotechnical investigation works of Uttarganga Storage Project, Baglung;
- Geophysical and geotechnical investigation works of Chainpur Seti HEP, Bajhang;
- Geological, geophysical and laboratory tests of Samples of Sunkoshi Hydropower Station, Sindhupalchowk;
- Geophysical investigation works of Kulekhani-1 Hydropower Station, Makwanpur;
- Geological investigation Works of Kulekhani - Sisneri Pump Storage Project, Makwanpur
- Geophysical investigation Works of Upper Trishuli 3B Hydroeletric Project, Nuwakot/ Rasuwa;
- Geophysical and geotechnical investigation works of Dhalkebar – Balganga 132 kV Transmission Line Project, Dhanusha;
- Geotechnical investigation works of Lower Solu Hydroelectric Project, Solukhumbu;
- Site investigation works for Detailed Engineering Design of Upper Arun Hydroelectric Project, Sankhuwasabha;
- Geotechnical investigation Works of Dharan Substation, Sunsari;
- Geotechnical investigation Works of Dhalkewar Balganga 132 kV Transmission Line Project, Balganga Substation, Dhanusha;
- Geotechnical investigation Works of Burtibang Substation, Baglung, Project Development Department, NEA and

- Geotechnical investigation Works of Kaliganaki Corridor 132 kV Transmission Line Project, Myagdi, Project Development Department, NEA.

In addition, SRCL carried out different sorts of laboratory tests for following projects as per ASTM, AASTHO and IS standards:

- Construction material survey, laboratory testing & rock mechanical tests works of Chainpur Seti Storage Hydroelectric Project, Bajhang;
- Rock mechanical tests including triaxial compression tests of Betan Karnali Storage Hydropower Project, Surkhet;
- Sediment analysis of Dudhkoshi Storage Hydroelectric Project, Khotang;
- Various laboratory tests on soil samples of Peoples HPP Company Limited;
- Various laboratory tests on sediment samples of Middle Marsyangdi HEC, Generation Directorate, NEA;
- Various laboratory tests on soil samples of Project Implementation (Irrigation) Unit, Department of Irrigation, Guheshwori, Gaurighat;
- Compressive strength tests on compressed stabilized bricks of Build UP Nepal Engineering Pvt. Ltd. Chakupat, Lalitpur;
- Various laboratory tests on base and sub-base samples collected by Commission for the Abuse of Authority (CIAA) Tangal, Kathmandu;
- Compressive strength tests on over cored concrete samples collected by Commission for the Abuse of Authority (CIAA) Tangal, Kathmandu;
- Various laboratory tests on soil samples of Kusaha Biratnagar 132 kV Tranmission Line Project, NEA;.
- Various laboratory tests on soil and aggregate samples of Dugar Brothers & Sons Pvt. Ltd.;
- Various laboratory tests on soil samples of Water Resources & Development Centre, Ministry of Energy, Water Resources & Power, GoN, Singhdurbar;
- Various laboratory tests on soil & soil core samples of InnoCSR Nepal Pvt. Ltd. Shifal, Kathmandu;
- Various laboratory tests on construction material samples of Ghalemdi Khola HPP, Myagdi collected by Niltara W & E Pvt. Ltd, Kathmandu;
- Compressive strength tests on compressed stabilized bricks of Grassroots Movement In Nepal ;
- Over coring of concrete core samples and their compressive strength testing works of Central Jail Building, Nuwakot by Intensive Urban Development & Building Construction Project, Dhading;
- Laboratory test works on sediment samples of Marsyangdi HEC, Proejct Development Department, NEA; and
- Other various miscellaneous laboratory test works on soil, aggregate and rock samples collected from different private client/ parties.

## Environment and Social Studies Department

Realizing the need of addressing environmental and social issues associated with hydropower related development, an Environmental Unit was established in 1987 under the Project Preparation Department. Later in 1993, the Environmental Unit was upgraded to Environmental Division. It was only in 2000, the division was finally upgraded to Environment and Social Studies Department (ESSD) as the integral department of Engineering Service Directorate of NEA. In due course of time, with the evolution from a unit to a full-fledged department and increasing complexities of hydropower development with environment and society, the work scope of ESSD has increased significantly.

ESSD executes all the activities related environmental and social aspects of hydroelectric Projects, solar projects and

transmission line projects (TLPs) which are being planned, designed, constructed or operated by NEA. This department is a commercial wing of NEA with its technical expertise involved in conducting Environmental Impact Assessment (EIA), Initial Environmental Examination (IEE), Brief Environmental Study (BES), Social Impact Assessment (SIA), Vulnerable Community Development Plan (VCDP), Resettlement Action Plan (RAP), Land Acquisition and Compensation Plan (LACP), Environment and Social Management Plan (ESMP), Biodiversity Impact Assessment (BIA), Cumulative Impact Assessment (CIA) and other studies along with environmental monitoring and implementation of mitigation measures and community support programs of hydroelectric, transmission line and distribution line projects.

ESSD has been actively engaged in environment and social studies, monitoring and protection of the environment. The following sections provide a brief of different tasks carried out by ESSD in FY 2021/22.

### Study Projects Requiring Environmental Impact Assessment (EIA)

In the fiscal year 2021/22, ESSD was involved in the EIA/EMP update of following 9 projects, out of which EIA of 4 projects and Updated EMP of 3 projects have been approved by the Ministry of Forest & Environment.

- Andhikhola Storage HEP (180MW): EIA approved by MoFE on June 19, 2022;
- Rolwaling Khola HEP (22MW): EIA approved by MoFE on June 19, 2022;
- Chainpur Seti HEP (210MW): EIA approved by MoFE on April 20, 2022;
- Access Road of Upper Arun HEP: EIA approved by MoFE on March 27, 2022;
- Uttarganga Storage HEP (828MW): EIA report submitted to MoFE for approval;
- Bardghat-Sardi 132 kV TLP: Updated EMP approved by MoFE on June 19, 2022;
- Kohalpur-Surkhet 132 kV TLP: Updated EMP approved by MoFE on March 6, 2022;
- Hetauda-Bardghat 220kV TLP: Updated EMP approved by MoFE on January 27, 2022; and
- New-Modi Lekhnath 132 kV TLP: Supplementary EIA report submitted to DoED.

### Projects Requiring Initial Environmental Examination (IEE)

In FY 2021/22, ESSD was engaged in IEE of 25 projects, of which IEE of 13 projects was approved from the concerned Ministry. Similarly, ToR for IEE of 7 projects were also approved by the Ministry. The status of projects requiring IEE is presented as follows;

- Surkhet-Dailekh 132 kV TL Project: IEE approved on May 18, 2022;
- Bhaktapur-Thimi 132 kV Underground TL Project: IEE approved on April 27, 2022;
- Godak-Soyak 132 kV TL Project: IEE approved on March 9, 2022;
- Corporate Building of NEA: IEE approved on Feb. 8, 2022 (by Ministry of Urban Development);
- Parwanipur-Pokhariya 132 kV TL Project: IEE approved on Jan 25, 2022;
- Trishuli 3B-Ratmate 220 kV TL Project: IEE approved on Jan 21, 2022;
- Amarpur-Dhungesanghu 132 kV TL Project: IEE approved on Jan 5, 2022;
- Bhumahi-Hakoi 132 kV TL Project: IEE approved on Dec 24, 2021;
- Lalbandhi-Salempur 132 kV TL Project: IEE approved on Nov 15, 2021;
- Kaligandaki-Ridi 132 kV TL Project: IEE approved on Nov 15, 2021;
- Tumlingtar-Sitalpati 220 kV TL Project: IEE approved on Aug 29, 2021;
- Grid Tied Solar Power Project Block No.5 (6.5MW): IEE approved on Aug 12, 2021;
- Dhalkebar-Balganga 132 kV TL Project: IEE approved on July 20, 2021;
- Pathlaiya-Harniya 132 kV TL Project: ToR approved on May 8, 2022; IEE report under

preparation;
- 132 kV TL Project of Upper Modi A and Upper Modi HEP: ToR approved on May 4, 2022; IEE report under preparation;
- Kohalpur-Nepalgunj 132 kV TL Project: ToR approved on March 9, 2022; IEE report submitted to DoED;
- Dharan 220/33/11 Substation Project: ToR approved on Feb. 9, 2022; IEE report submitted to DoED;
- Lahan-Sukhipur 132 kV TL Project: ToR approved on Nov 15, 2021; IEE report submitted to DoED;
- Rupeni-Bodebarsain 132 kV TL Project: ToR approved on Oct 20, 2021; IEE report submitted to DoED;
- Bafikot-Khungri 132 kV TL Project: ToR approved on Aug 10, 2021; IEE report submitted to DoED;
- Butwal-Lumbini 132 kV TL Project: Revised IEE submitted to DoED;
- Prasauni-Birgunj 132 kV Underground TL Project: MoU signed, ToR submitted to DoED;
- Tamakoshi V 220 kV TL Project: ToR Submitted to DoED; waiting for study permission from Department of National Parks and Wildlife Conservation;
- Thimi-Balkumari 132 kV Underground TL Project: MoU signed, ToR under preparation; and
- Nijgadh-Pokhariya 400 kV TL Project: MoU signed, ToR under preparation

### Projects Requiring Brief Environmental Study (BES)

In the FY 2021/22, ESSD was engaged in BES of Gondryang-Devnagar 33 kV TL Project. The ToR has been submitted to DoED though the project is yet to obtain the survey license.

### Other Studies

Besides EIA/IEE/BES studies as required by national legislation, ESSD has been engaged in other studies mainly for fulfilling the requirements of multilateral partners and donor agencies. In FY 2021/22, ESSD was involved in the following studies:

- Grid Solar and Energy Efficiency Project (in 8 districts): Screening and ESMP (Environment and Social Management Plan) submitted to the World Bank;
- Marsyangdi Corridor 220 kV TL Project;
- BIA (Biodiversity Impact Assessment) submitted to European Investment Bank (EIB) through the Project for clearance.\;
- CIA (Cumulative Impact Assessment) submitted to EIB through the Project for clearance; and
- Indigenous Peoples (IPs) Study report submitted to EIB through the Project. The report has received clearance from the EIB.

### Monitoring Projects

ESSD was involved in environmental monitoring and mitigation of 13 different projects by establishing Environmental and Social Management Unit (ESMU) at project sites. ESSD prepared and submitted the quarterly and semi-annual monitoring reports to the respective projects as per the provisions made in the Memorandum of Understanding (MoU). The status of different monitoring projects is as follows:

- Hetauda - Dhalkebar - Duhabi 400 kV TL Project: 33rd Quarterly report submitted;
- SASEC Project: Semi-Annual Report (January-June, 2022) submitted;
- Kaligandaki Corridor 220 kV TL Project;
- Marsyangdi-Kathmandu 220 kV TL Project;
- Marsyangdi Corridor (Udipur-Markichowk-Bharatpur) 220 kV TL Project;
- Tamakoshi-Kathmandu 220/400 kV TL Project: Semi Annual report (Jan-June, 2022) submitted;
- 132/220 kV Chilime Substation Hub and Chilime-Trishuli 220 kV TL Project: 19th Quarterly Report submitted;

- Hetauda-Bharatpur-Bardghat 220 kV TL Project : 33rd Quarterly report submitted;
- Trishuli 3B Hub substation Project: final (project completion) report submitted;
- Garjyang-Khimti 132 kV TL Project: 18th Quarterly Report submitted;
- New Modi Lekhnath 132 kV TL Project: 12th Quarterly Report submitted;
- Dudhkoshi Storage Hydropower Project: 2nd Quarterly Report Submitted; and
- Kohalpur-Surkhet 132 kV TL Project: 1st Quarterly Report Submitted.

### Mitigation and Enhancement Programs

ESSD has been involved in mitigation and enhancement programs of following projects

- Hetauda - Dhalkebar - Duhabi 400 kV TL Project;
- SASEC Power System Expansion Projects;
- Tamakoshi - Kathmandu 220/400 kV TL Project;
- Trishuli 3B Hub Substation Project;
- Garjyang-Khimti 132 kV TL Project;
- New Modi-Lekhnath 132 kV TL Project;
- Dudhkoshi Storage HEP (635MW); and
- Kohalpur-Surkhet 132 kV TL Project

**Water Sample Collection at Sunkoshi River and Air Quality Monitoring at Dhitung, Khotang**

### Community Support Programs

ESSD has been implementing community support programs for following under-construction projects:

- Hetauda-Dhalkebar-Duhabi 400 kV TL Project;
- SASEC Project: Kaligandaki Corridor (Dana-Kushma) 220 kV TL Project;
- Tamakoshi-Kathmandu 220/400 kV TL Project;
- Hetauda-Bharatpur-Bardaghat 220 kV TL Project; and
- 132/220 kV Chilime-Trishuli 220 kV Project.

**Support for Maintenance of School Building at Rautahat and Support for the Construction of Building at Smriti Park, Bardibas**

## NEA Training Center

NEA Training Center (NEATC) situated at Kharipati, Bhaktapur has been providing different skill enhancing trainings to the staff of NEA and other entities. During the last 32 years, NEATC has trained 23,063 employees from the different core group of NEA and other organizations. With the view to expand its training programs for clients outside of NEA,

upon their request, NEATC is also conducting various programs to non NEA staff also.

NEATC occupies around 203 Ropanis of land with well-equipped academic as well as hostel buildings for residential training. It has a two stories academic building having 48 rooms for training purposes, which include classrooms, computer labs, electrical labs, mechanical labs and seminar halls. It has one Administrative building for office use. In addition, there are 3 hostel buildings with the capacity of 130 beds, one VIP Guest House and a modern type of canteen building.

NEATC aims to be developed as an engineering and management center of excellence with academic standards comparable with the best SAARC regional institutions. The objectives of NEATC are as follows:

- Provide knowledge, skill and attitude enhancing tips;
- Supply need based trainings to NEA employees for enhancing their work efficiency and enabling them for serving the customers effectively;
- Train the employees enabling them to plan, implement, maintain and operate NEA's system today and in the future;
- Promote knowledge and skill of the employees to interface them to the changing environment and technology;
- Conduct problem oriented interactions, research and development and seminars relating to service business; and
- Design training packages and implement.

In FY 2021/22, NEATC conducted 48 numbers of trainings in different fields to 1,513 trainees in total. The total numbers of officer level and assistant level participant were 396 (26.31%) and 1,109 (73.68%) Respectively.

In addition to training programs, NEATC provides seminar halls, class rooms, hostels and ground space on rent to different users, groups / organizations etc. Various Engineering Colleges, Political Parties, Co-operatives, NGOs/ INGOs, Shooting Unit and other institutions used the facilities available in the NEATC for various purposes. The total income generated from these services amounted to NRs.36,51,653 (including VAT) in FY 2021/22. The Training Center has also provided space and services to various offices of NEA at its premises. A Transformer Testing Lab is also established in the premises of the Training Centre.

NEATC has planned to provide service training for all staffs of NEA, accordance to NEA Employee Regulation 2075, for which curriculum preparation is underway. The duration of induction training to the newly recruited staffs will be extended to 6 weeks for officer level and 3 weeks for non-officer level in coming days. For FY 2022/23, NEATC has proposed to conduct 30 training programs for 790 employees of NEA.

# PROJECT MANAGEMENT DIRECTORATE

Project Management Directorate (PMD) in Nepal Electricity Authority's organogram has a role to execute and facilitate projects funded by Asian Development Bank (ADB) and European Investment Bank (EIB). PMD is responsible for project preparation, procurement and implementation of all new and existing projects funded by ADB & EIB. At present, PMD is executing diverse projects in energy sector including transmission line, substation, distribution system, distribution system modernization, smart meters and automation under ADB financed (i) Electricity Transmission Expansion and Supply Improvement Project (ETESIP), (ii) SASEC – Power System Expansion Project (SPSEP), (iii) Power Transmission and Distribution Efficiency Enhancement Project (PTDEEP), (iv) SASEC Power Transmission and Distribution System Strengthening Projects (SASEC PTDSSP) and (v) Electricity Grid Modernization Project (EGMP & EGMP-AF). PMD has also taken a lead role in environmental and engineering study of different transmission lines up to 400 kV voltage level with length of more than 1,000 km and substations associated with it under the ADB Grant No. 0361: Project Preparatory Facility for Energy (PPFE).

## Electricity Transmission Expansion and System Improvement Project (ETESIP)

### Tamakoshi – Kathmandu 220/400 kV Transmission Line Project

This is one of the sub-projects undertaken and being executed by PMD under Loan No. 2808 - NEP: Electricity Transmission Expansion and System Improvement Project (ETESIP). This project will play an important role to evacuate power from upcoming generating stations in Khimti (Tamakoshi) and Barhabise area. The project includes three sub-projects viz. (i) New Khimti – Barhabise 400 kV DC Transmission Line of length 44 km (ii) Barhabise-Lapsiphedi 400 kV DC Transmission Line of length 46 km & Lapsiphedi-Duwakot 132 kV DC Transmission Line of length 14 km and (iii) Barhabise GIS substation (220/132 kV, 160 MVA (3x53.33 MVA) & 132/11 kV 5 MVA). Due to inadequate fund in ETESIP, one of the sub-projects -220 kV GIS Substation Construction in Barhabise has been financed through the Loan No. 3542 - NEP (SF): Power Transmission and Distribution Efficiency Enhancement Project (PTDEEP).

The contract for construction of New Khimti – Bahrabise 400 kV Transmission Line has been signed with M/S KEC International Limited, India. Out of 118 nos. of towers of 400 kV TL, 74 tower foundations have been completed and 54 towers have been erected. Overall physical progress achieved for this package is 60%.

**Stringing for New Khimti – Bahrabise 400 kV Transmission Line**

The contract for construction of Barhabise-Kathmandu 400 kV and 132 kV Lapsiphedi-Changunarayan Transmission Line has been awarded to M/s Larsen and Toubro Limited, India. Out of 122 towers of 400 kV voltage level, 106 numbers of foundation works and 95 numbers of tower have been erected. Land acquisition process for tower pad in Sindhupalchwok and Kavrepalanchwok district are completed and the almost 99% of respective land owners have received the compensation. About 90% of the Transmission line equipment have been delivered at the site. The physical progress of this package is 75%.

The contract for procurement of plant for 220 kV Barhabise GIS SS has been awarded to M/S JV of Guangxi Transmission & Substation Construction Co. and Shenzhen Clou Electronics Co. Ltd, China. Survey and soil investigation have been completed. Site preparation works like cutting filling and levelling along with constructions of boundary wall and retaining wall and 132 kV gantry foundation have been completed. Construction of staff quarter is near completion. Transformer foundation, Firefighting pump house and substation earthing works are under progress. The Physical Progress of this package is 45%.

**Transformer Foundation works under Progress at Bahrabise Substation**

## SASEC Power System Expansion Project (SASEC PSEP)

### Samundratar- Trishuli 3B 132kV Transmission Line

The project was conceptualized to evacuate power generated from several hydropower projects being developed in Tadi River Basin located in eastern part of Nuwakot District. The double circuit transmission line which has the capacity to evacuate 270 MW power generated from hydropower projects was successfully completed in F/Y 2021/22 with the connection arrangement made to one of the 132kV line bays of Upper Trishuli 3A HPP, which is already connected to the national grid at Matatirtha Substation.

The major components of the project are Samundratar Substation with 2 Nos. of 132/33kV, 30 MVA and 2 Nos. of 33/11kV, 8 MVA transformers and 26 km double circuit 132kV transmission line (including 3 km of four circuits; two circuits to be utilized by Upper Trishuli 3B HPP). Similarly, the transformer capacity of Chaughada Substation was upgraded to 8 MVA in 33/11kV level with replacement of instrument transformers and Switchgears.

Moreover, 26 km of 132 kV double circuit transmission line and 132/33/11 kV substation are in operation phase. Two Nos. of 11kV outgoing feeders, one towards Satbise on the western side of the substation and the other towards Ghyangphedi on the eastern side of the substation are under operation and delivering continuous electricity to those areas. This has drastically solved the unreliable power supply and under voltage problems in the supply areas.

The EPC contract for the project was signed between NEA and ETERN-CCCE-FEPEC JV, China and the contract was effective on 28 November, 2016. The financing agreement for this project was concluded on 20 April, 2015 with European Investment Bank in coordination

with Asian Development Bank to finance the loan equivalent to USD 12 Million. The total cost of the project including land and ROW cost was estimated to be NRs. 1.55 Billion.

Aerial view of Samundratar 132 kV Substation

## Marsyangdi Corridor 220 Transmission Line Project

Marsyangdi Corridor 220 kV Transmission Line Project once completed shall evacuate approximately 1,600 MW of power generated by the hydropower stations in the Marsyangdi River basin to the Integrated Nepal Power System (INPS). The Project planned to construct 113 km long Double Circuit 220 kV Transmission Line from Manang SS (220/132 kV, 100 MVA & 132/33 kV, 30 MVA) at Dharapani, Manang to New Bharatpur SS (220/132 kV 320 MVA) at Aanpatari, Chitwan via Khudi SS (220/132 kV, 160 MVA & 132/33 kV, 50 MVA) at Khudi, Lamjung, Udipur SS (220/132 kV, 160 MVA & 132/33 kV, 50 MVA) at Udipur, Lamjung and Markichowk substation. The Project is financed by EIB for loan of 90 MUSD.

The complete scope of the project has been divided into 3 contract packages. The first package consists of the construction of about 67 km of 220 kV, a double circuit transmission line with twin ACCC Drake conductors from Udipur to Bharatpur. The second package consists of the construction of 220/132 kV substations at Udipur and Bharatpur. The third package consists of the construction of about is 46 km of 220 kV, double circuit transmission line with twin conductors (ACCC Drake and ACSR Moose) from Dharapani, Manang to Udipur, Lamjung.

Stringing of Udipur – Markichowk Section

The contract of first package was awarded to M/S Pinggao Group Co. Ltd, China and the construction work is in progress. As of now, 54 tower foundations have been completed and 18 towers have been erected. The project has started to distribute RoW compensation in Lamjung District and the land acquisition process for tower pad in Tanahun, Gorkha and Chitwan is nearly completed.

The contract of second package for Udipur and Bharatpur 220/132/33 kV substations was awarded to M/S Larsen and Toubro Limited, India. About 85% of works associated with supply and delivery have been completed, nearly about 85% of the civil work and 20% of erection work have been completed. The Bharatpur Sub-station and Udipur Sub-station are expected to be commissioned by September & December 2022 respectively.

Under Construction Udipur Sub-station

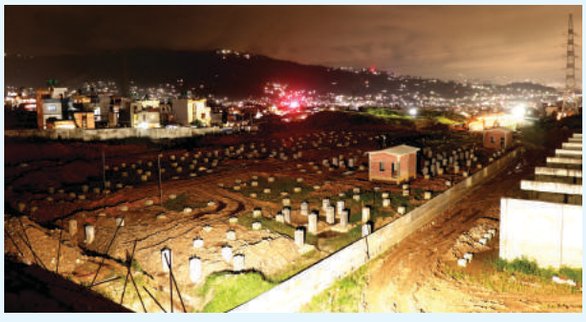
The contract of third package for the construction of the transmission line from Dharapani to Udipur has been awarded to the M/s TBEA Co., Ltd, China. About 30% of the work associated with the supply portion about 10% of civil work has been completed.

The project is expected to be completed by end of FY 2022/23. The overall progress of the Project is about 46%.

### Marsyangdi – Kathmandu 220 kV Transmission Line Project

This project was conceptualized to transfer power from Marsyangdi Corridor to Kathmandu valley, which ultimately reinforces INPS and improve reliability of transmission system. The scope of this project includes the construction of 82 km double circuit 220kV transmission line from Markhichowk, Tanahun to Matatirtha, Kathmandu with twin MOOSE ACSR conductor and the construction of 220/132 Substations of capacity 320 MVA at Markhichowk and 320 MVA (2*160 MVA) at Matatirtha. The substation at Matatirtha is air insulated (AIS) type while the substation at Markhichowk is of GIS type.

The contract agreement for the substations was signed on 30 December, 2020 with China Machinery Engineering Corporation, China, after the termination of contract with Shenzhen Farad Electric Co.



Matatirtha substation, Switchyard

The contract agreement for the transmission line was signed in June 2016 with TATA Projects Ltd. India. The line with length of 82 km D/C including 233 towers has been commissioned and operated from 21 June 2022.

Marsyangdi Kathmandu 220 kV Line

### Kaligandaki Corridor 220 kV Transmission Line Project

The first package under the 220 Kv D/C transmission line from Dana to Kusma of the project namely the construction of 220/132 kV, 100 MVA & 132/33 kV, 25 MVA Substation at Dana (Myagdi) and 220/132 kV, 100 MVA Substation at Kushma (Parbat) were successfully completed on 4 February 2021.

The contract for second package, which includes design, supply and construction of 88 km, 220 kV D/C transmission line from Kushma to New Butwal, was awarded to M/S Larsen & Toubro Limited, India. Foundation of 217 Nos. out of 231 Nos. of towers has been completed. This transmission line is planned to be commissioned by December 2022.


Stringing with Spacer Installation

### New Butwal – Bardaghat 220 kV Transmission line and Substation Project

The major objective of this project is to construct 21 km of 220 kV transmission line from New-Butwal to Bardaghat and 220/132 kV, 100 MVA substation in New Butwal, Nawalparasi.

The contract for construction of 220/132 kV, 100 MVA New Butwal Substation in Sunwal-13, Nawalparasi (West) had been awarded to M/S Tata projects Limited, India. The supply, delivery, construction, testing & commissioning of the substation have been completed in November 2021. It is in operation by LILO of existing Butwal-Bardaghat 132 KV DC Line as an input.

New Butwal Substation

The contract of design, supply, installation and commissioning of 21 km of 220 kV transmission line from New Butwal to Bardaghat has been signed with M/S POWERCHINA SEPCO1 Electric Power Construction Co. Ltd. The construction of four numbers tower foundations has been completed. The approval for the use of forest land and tree cutting is in process at the Ministry of Forest & Environment. The transmission line is expected to be completed by June 2023.

### Grid Substation Reinforcement and Capacity Expansion Project

The objective of this project was to reinforce & upgrade eight numbers of existing grid substations of NEA, which included reinforcement and upgradation of 132 kV Gandak Substation, Butwal Substation, Bharatpur Substation, Kawasoti Substation, Damauli Substation, Banepa Substation, Dhalkebar Substation and Lahan Substation. Protection upgradation and addition of Substation Automation System at Gandak Substation has already been completed successfully.

As an additional scope to this project, upgradation of both circuits of Dhalkebar - Mujeliya 33 kV Double Circuit Line of length 23 km has been successfully completed by replacing the existing 0.10 Sq. inch ACSR conductor with ACCC "Silvassa" Conductor. Further, addition of 33 kV 2x10 MVar capacitor banks at Mujeliya substations has been completed.

### Distribution System Augmentation and Expansion Project

This project was initiated to augment and expand the distribution system all over Nepal to improve reliability of distribution system, enhance quality of electricity supply and to reduce distribution system losses. The project is being executed in following 3 lots of contracts:

**Lot 1:** This lot of contract intends to expand distribution network in the eastern region of Nepal. The scope of this contract consists of construction of 13 numbers of 33/11 kV new substations, 167 km of 33 kV line, 197 km of 11 kV line, 165 km of 400/230 V line and installation of 150 numbers of 11/0.4 kV distribution transformers. The contract was awarded to M/S A2Z Infra Engineering Limited, India on 15 June, 2016. Out of total 13 numbers of substations, 6 substations have been commissioned & charged and has contributed to 48 MVA of additional capacity to the system. Similarly, a total of 131.35 km of 33 kV line, 74 km of 11 kV line and 34 km of 400/230 V line have been completed and 29 number of distribution transformers have been installed. The works have been delayed in some places due to the obstruction by locals in

constructing the 33 kV sub-transmission line at various places demanding compensation and rerouting the line. The contract is expected to be completed in December 2022.


**Katari Substation, Morang**

**Lot 2:** This lot of contract intends to expand distribution network in the western region of Nepal. The scope of this contract consists of construction of 12 numbers of 33/11 kV new substations, 181 km of 33 kV line, 147 km of 11 kV line, 140 km of 400/230 V line and installation of 182 numbers of 11/0.4 kV distribution transformers. The contract was awarded to M/S A2Z Infra Engineering Limited, India on 15 July, 2016. Out of total 12 numbers of substations, 9 substations have been commissioned & charged and has contributed to 55 MVA of additional capacity to the system. Similarly, a total of 156.87 km of 33 kV line, 85 km of 11 kV line, 25 km of 400/230 V line has been completed and 25 number of distribution transformers have been installed. The works have been delayed in some places due to the obstruction by locals in constructing the 33kV sub-transmission line at various places demanding compensation and rerouting the line. The contract is expected to be completed in December 2022.


**Inauguration of Maharajgunj S/S Kapilbastu**

**Lot 3:** This lot intends to improve distribution network all over the country. The scope of this contract consists of upgradation of 11 numbers of 33/11 kV existing substations and construction of 87 km of 33 kV line, 342 km of 11 kV line, 365 km of 400/230 V line and installation of 262 numbers of 11/0.4 kV distribution transformers. The contract was awarded to M/S East India Udhyog Limited, India on 22 February, 2016. This contract has been completed and is under successful operation.

### Rural Electrification and Distribution Network Improvement of Tanahu District

This project intends to electrify and improve the networks of the nearby villages, which will be affected by the Tanahu Hydropower Project. It is financed by ADB through Loan No.2990/2991-NEP (SF): Tanahu Hydropower Project.

The scope of this project consists of construction of two 33/11 kV, 6/8 MVA SS at Saranghat and Ghiring, 40 km of 33 kV sub-transmission line, 222 km of 11 kV line, 345 km of 400/230 V line and installation of seventy (70) nos. of distribution transformers (11/0.4 kV). The contract was awarded to M/s JV of East India Udyog and Waiba Infratech on 29 November 2018. Till date, supply of equipment has been completed along with the installation and erection of the switchyard equipment. The civil works of the substations have almost been completed. 23.5 km of 33 kV

line, 155 km of 11kV line and 320 km of 400V line have been constructed. The project is expected to complete by December 2022.

Saranghat Substation, Tanahu

### Utility Scale Grid Tied Solar Project

The aim of this project is to promote grid tied Solar PV Projects in Nepal through Viability Gap Funding (VGF). GoN has received a grant of USD 20 Million from Strategic Climate Change Fund under ADB administration of SASEC Power System Expansion Project.

In the first phase, five (5) solar power developers have been selected through competitive bidding process and the contract have been signed with them to procure solar energy generated by installed utility scale grid tied solar power plant with total capacity of 24 MW. These solar power plants will be connected at different five (5) substations of NEA (8 MW at Chanauta SS, 5 MW at Gandak SS, 2 MW at Kawasoti SS, 4 MW at Lekhnath SS and 5 MW at Buluchowk SS). Power Purchase Agreement (PPA) has been signed with four developers and is under process for one developer.

## Power Transmission and Distribution Efficiency Enhancement Project (PTDEEP)

The purpose of this project is to strengthen distribution system capacity of Kathmandu Valley including modernization of distribution system to provide safe and reliable electricity supply in the Kathmandu valley. The project value is of 189 MUSD and is jointly funded by ADB and GoN. Out of the total project cost, ADB has funded USD 150 Million as a loan and the balance is being financed by GoN and NEA. Additional 2.0 MUSD has been funded as a grant from Government of Japan from Japanese Fund for Poverty Reduction, which is being utilized (i) to strengthen the capacity of energy sector in mainstreaming Gender Equality and Social Inclusion in energy programs and projects, (ii) productive use of clean energy technologies and services by poor and vulnerable households and (iii) capacity development of NEA staff for new technology of energy.

Different sub-projects and their status under PTDEEP are as below:

### Lapsiphedi and Changunarayan Substation Construction Project

The objective of this project is to construct 220/132 kV, 160 MVA & 132/11 kV, 22.5 MVA capacity GIS substation at Lapsiphedi and 132/11 kV, 45 MVA Substation at Changunarayan. Also, the additional scopes of upgradation of existing 66/11kV Teku Substation to 132/66/11kV voltage level and construction of new double circuit 132kV line bays at Existing Suichatar 132kV substation for charging existing Suichatar-Teku 66kV Transmission Line on 132kV have been included in its new scope.

These substations will play major role to evacuate the power generated by IPPs and Upper Tamakoshi Hydroelectric Plant through Khimti–Barhabise–Kathmandu 400/220 kV Line. The addition of these substations will also help to reinforce the transmission network of Kathmandu valley and increase the reliability of transmission network supplying power to different parts of the Kathmandu valley. Further, addition of these substations will assist to improve power quality in different parts of the valley.

The contract has been awarded to M/s Larsen and Toubro Limited, India on November 2020 and expected to be completed by July 2023.

PEB erection of GIS Hall- Changunarayan Substation

Construction of foundation at Teku

## Kathmandu Valley Transmission Capacity Reinforcement Project

The major objective of the project is to augment Grid Substation capacity by constructing three new 132/11 kV GIS Substations, 2x45 MVA each at Chobhar, Phutung and Thimi. The addition of these substations inside Kathmandu Valley will not only increase the reliability of the distribution network but will also help to serve the quality electricity supply to the consumers. These new substations are very much needed to cope the growing demand in the outskirt of the valley and to reduce burden on existing substation.

The contract was awarded to M/s Pinggao Group Co. Ltd, China. Manufacturing of major equipment such as Power Transformer and GIS has already been completed and design/ drawings of most of other electrical equipment also have been concluded. Also design/ drawings related to civil works such as superstructure/ substructure design/ drawing have already been approved. Due to the geological and social problems, civil work at the site was delayed and the contract completion period was extended to 31 March 2023. Civil works are ongoing for both Phutung and Thimi Substation. Construction plot of Chovar is in the verge of handover from GoN to NEA.

## Enhancement of Distribution Network in the Central and Northern Region of Kathmandu Valley

This project intends the enhancement of distribution system and/or rehabilitation of the distribution system (11kV and 0.4kV) with the provision of automation for the areas under Maharajgunj Distribution Center in the Northern region of the Kathmandu Valley.

The scope of the project includes design, supply, installation and commissioning of underground distribution network using trenchless boring methodology under Maharajgunj Distribution Center.

Cable Looping around E1 Panel at Chabahil Site

The contract agreement was signed on 15 March, 2019 with KEI Industries Limited, India. As of now, 484 km of Pipe laying (70%), 159 km of HT cable, 281 km of LT cable (65%) and 2150 numbers (68%) of different foundation for panels/ RMU have been completed. If the permission from the Road Department for road cutting on several road sections and ring road is provided in time, this project is expected to be completed by January 2023.

### Enhancement of Distribution Network in the Eastern and Southern region of Kathmandu Valley

The project intends the enhancement of distribution system and/ or rehabilitation of distribution system (11kV and 0.4kV) with the provision of automation for the areas under Ratnapark Distribution Center. The scope of the project includes design, supply, installation and commissioning of underground distribution network using trenchless boring methodology under Ratnapark Distribution Center including reinforcement and automation. The major work includes the construction of underground 11kV line with 217 Km XLPE cable & underground 400 volt line with 388 Km XLPE cable, underground optical fiber laying: 108 Km, construction and upgrading of 11 kV overhead line by AB Cables.

The contract agreement was signed on the 15 March, 2019 with KEI Industries Limited, India. Till date, 105 Km (48.43%) HT cable laying, 182 (46.93%) Km LT cable lying has been completed in Chabahil, Paniphokari, Lazimpat, Koteshwor, Nayabazar, Thamel, Garidhara, Dhobikhola Corridor area. Cable, Pipe laying and foundation for panels/ RMU is in progress. Due to effect of Covid-19 pandemic, the project is expected to be completed by January 2023.

### Kathmandu Valley Smart Metering Project

As a first smart metering project of NEA to cover all classes of consumers to equip with smart meter, this project is a major milestone to start the modernization of the distribution business eventually improving the financial health of NEA with reduction of distribution losses and increment of overall efficiency of distribution system operation. NEA intends to introduce smart energy meters and deploy Advanced Metering Infrastructure (AMI) System with its auxiliary system all across Kathmandu valley (Kathmandu, Lalitpur and Bhaktapur) within a radius of 220 sq. miles. Through AMI implementation, NEA aims to mirror benefits to the customers as well as NEA itself that can be seen in a number of countries.

### Kathmandu Valley Substation Automation Project

NEA has strongly felt the need of a smarter and more reliable grid system that will lead the existing system not only towards digitization and modernization but also towards the centralized supervision based process for monitoring and control of power system parameters essential to maintain the health of integrated system providing uninterrupted and quality power to the end-users. Further, after completion of this project, it is expected to be a reduction of ongoing operational cost, improvement of grid reliability, lengthening the life of equipment, and improvement of organizational effectiveness. Under this project, all thirteen (13) grid SS within Kathmandu Grid Division will be fully automated and be operated remotely from Control Centre located at Baneshwor Substation. The contract of this ongoing project has been awarded to M/S GE T&D India Limited on 5 January 2020 and is expected to be completed by October 2022.

### Amlekhgunj 132kV Substation Construction Project

In order to meet the growing load demand of Simara area, NEA has decided to construct 132/66 kV GIS substation at Amlekhgunj.

The scope of the project includes the construction of 132/66 kV 2*100 MVA GIS substation and 66/11 kV 2*10 MVA substation at Amlekhgunj with LILO arrangement of existing

132 kV Hetauda - Pathlaiya double circuit line and existing 66 kV Hetauda - Amlekhgunj - Simara double circuit line. The project is under bidding process.

## SASEC Power Transmission and Distribution System Strengthening Project (PTDSSP)

The project is focused on reinforcement and modernization of power supply system, improvement energy access with the adoption of new technologies. This project also has initiated strengthening of distribution systems outside Kathmandu Valley in a systematic and phase-wise manner starting from Pokhara and Bharatpur. The sub projects under this project are:

### Kathmandu Valley Transmission Capacity Reinforcement Project (Phase II)

The project is the continuation to the Kathmandu Valley Transmission Capacity Reinforcement Project and serves the same objective, to augment grid substation capacity of Kathmandu Valley. The primary focus of this project is to reduce burden in existing Bhaktapur-Baneshwor-Patan 66 kV transmission line. The scope includes construction of 132 kV Double circuit underground cable transmission line approximately 12 km from existing Bhaktapur Substation to newly proposed GIS Substation at Balkumari with 2x45 MVA, 132/11 and 2x63 MVA, 132/66 kV Transformer. This 132 kV transmission line will also be constructed as LILO through Thimi Substation. The scope also includes LILO of existing Bhaktapur-Baneshwor-Patan 66 kV transmission line at Balkumari. Bid has been invited for construction of 132 kV underground transmission line from existing Bhaktapur substation to GIS at Thimi Substation. NEA is conducting IEE study for the remaining part of the underground transmission line from Thimi Substation to proposed Balkumari Substation.

### Upgrading of Khimti-1, Barhabise and Lapsiphedi SS to 400 kV

The major objective of this project is to upgrade the capacity of New Khimti, Barhabise and Lapsiphedi Substations at 400kV voltage level. Completion of this substation project is essential to operate the New Khimti – Barhabise - Lapsiphedi 400kV transmission line at its rated voltage level in close coordination with the transmission line project.

The scope of this project is to construct (i) New Khimti 400/220 kV substation including 2 nos. of 400kV line bays to terminate double circuit Quad Moose ACSR transmission line along with construction of two numbers of ICT bays for connecting two single phase Auto-transformers' bank of 315 MVA each with 3*105 MVA plus 1*105 MVA spare unit with total capacity of 630 MVA (ii) Barhabise 400/220 kV substation including 4 numbers of 400kV line bays to terminate double circuit Quad Moose ACSR transmission line, construction of two numbers of ICT bays for connecting two single phase Auto-transformers' bank of 3*53.33 MVA plus 1*53.33 MVA spare unit with total capacity of 320 MVA and construction of 1 bay for connecting 1 nos. of 420 kV, 50 MVAR, 3-phase Shunt Reactor along with supply and installation of the reactor and (iii) Lapsiphedi 400/220 kV substation including 2 numbers of 400kV line bays to terminate 400 kV double circuit Quad Moose ACSR transmission line along with construction of one number of ICT bay for connecting a single phase auto-transformers bank of 315 MVA with 3*105 MVA plus 1*105 MVA spare unit with total capacity of 315 MVA.

M/s Grid Solutions SAS, France is the Contractor for this project. The Contract signed on October 02, 2020 has been effective since December 11, 2020. The project is planned to be completed in 900 days since the date of contract effectiveness. At New Khimti, works associated with land development and retaining wall is about 40%, whereas the engineering design is about 60%

complete. Foundation works of Pre-Engineering Building is about 90% complete.

**Work in Pprogress at New Khimti**

Land development work at Barhabise is completed about 15%.

**Work in Progress at Barhabise**

At Lapsiphedi, all the works associated with this site is on hold due to land related issue. It is planned to initiate the preliminary survey along with engineering works immediately after the site opening upon resolution of the social issue.

## Kathmandu Valley West Distribution System Enhancement Project

This project is a sub-project under Power Transmission and Distribution System Strengthening Project (PTDSSP) which is funded by ADB under the Loan No. 3943-NEP (COL). The project intends towards the enhancement of distribution system and/or rehabilitation of the distribution system (11kV and 0.4kV) with the provision of automation for the areas under Kirtipur, Kuleshwor, Baneshwor, Balaju and Jorpati Distribution Center. The scope of the project includes design, supply, installation and commissioning of underground distribution network using trenchless boring methodology under Kirtipur, Kuleshwor, Baneshwor, Balaju and Jorpati Distribution Center including reinforcement and automation.

The project also covers the service wire connection work in Maharajgunj and Ratnapark Distribution Center.

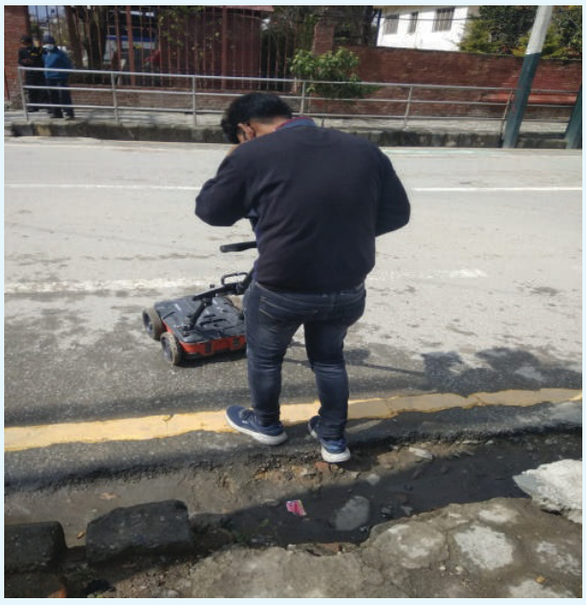
**RMU Installation at Rarahill Chowk, Kirtipur**

The contract was signed with M/s Larsen & Toubro Limited, India on 24 June, 2020. The contract effective date started from 20 December, 2020 and the time for completion of the project is 19 December, 2023. Survey and equipment GTP, drawing and type test approval work have been completed. The 34 Nos. of HT feeders and 294 Distribution network (LT) design have been approved and remaining are under process for approval. The construction work started from Rarahill chowk, Kirtipur Muncipality under Kirtipur Distribution Centre and work is under progress in Kirtipur Muncipality and Chandragiri Municipality. 30 Nos. of RMU, 88 Nos. of feeder pillars and 248 Nos. Service Pillars has been installed. HDPE pipe laying of 61.571 km and cable laying of 17.651 km have been completed.

### Lalitpur and Bhaktapur Urban Distribution Network Reinforcement

The project scope includes Design, Supply, Installation and Commissioning of Underground Distribution Network under Lagankhel, Pulchowk, Bhaktapur and Thimi Distribution Center including reinforcement and automation. The contract agreement of the project was concluded with TATA Projects Limited, India on June 4, 2021 and the contract has been effective from Sep 9, 2021, with the project completion period of three years.

The project aims for enhancement of distribution system and/or rehabilitation of existing distribution system with the provision of automation for the areas under Lagankhel, Pulchowk, Bhaktapur and Thimi Distribution Center. The major work includes the construction of underground 11 kV line: 120 circuit km and underground 400 Volt line: 100 circuit km, underground optical fiber laying: 120 km, construction and upgrading of 11 kV overhead line by AB Cable: 100 circuit km & 400 Volt overhead line by AB Cable: 120 km and RMU installation: 200 nos.



GPR Survey

Survey of existing network and consumer indexing has already been completed. Soil investigation, source approval and testing of civil materials were completed. Foundation design for LT feeder pillars has been approved. HT and LT network design (working drawing) is completed for Thimi area and rapidly progressing for Bhaktapur and Lalitpur area. Network reconfiguration of existing network is carried out for minimizing route length, and the loss. Design is carried out duly considering near future projects in the scope area to minimize duplication of work and making integrated plan to cope future demand.

Proposal has been submitted for authority approval to start excavation works to Madhyapur Thimi Municipality, Division Road Office- Bhaktapur, Kathmandu Valley Road Expansion Project, Survabinayak-Dhulikhel-Sindhuli-Bardisbas Road Project. Erection works shall be started once approval is granted by concerned authorities.

### Distribution System Reinforcement and Modernization of Bharatpur and Pokhara

The project scope includes Design, Supply, Installation and Commissioning of Underground Distribution Network under Pokhara and Bharatpur Distribution Center including reinforcement and automation. The contract agreement of the project was signed with TATA Projects Limited, India on 10 October, 2021 and has been effective from 20 January, 2022. The project completion period is two years from the contract effective date.

This project aims to the enhancement of distribution system and/or rehabilitation of existing distribution system (33kV, 11kV and 0.4kV) with the provision of automation for the areas under Pokhara and Bharatpur Distribution Center. The scope of the project includes design, supply, installation and commissioning of underground distribution network using trenchless boring methodology including reinforcement and automation.

The work under this project is divided into

two sections of Pokhara and Bharatpur. Work under Pokhara section includes underground 11 kV line: 48 circuit km & underground 400 Volt line: 33 circuit km, underground optical fiber laying: 55 km, construction and upgrading of 11 kV overhead line by AAA cable: 10 circuit km & 400 Volt overhead line by AB cable: 20 km and RMU installation: 65 Nos. Work under Bharatpur Section includes underground 33 kV line: 9 circuit km, underground 11 kV line: 75 circuit km & underground 400 Volt line: 70 circuit km, underground optical fiber laying: 28 km, construction and upgrading of 11 kV overhead line by AAA cable: 10 circuit km & 400 Volt overhead line by AB cable: 20 km and RMU installation: 85 nos.


**Soil Investigation Work Using Rotary Drilling Machine**

Some of the preliminary site works including survey, geo-technical investigation & HT route approval have been completed for both Pokhara & Bharatpur. Detailed engineering design is under progress after route approval with network reconfigurations.

### Rural Electrification and Distribution Network Reinforcements in Province 2

In order to achieve the goal of sustainable energy access and grid access to all, Government of Nepal and Nepal Electricity Authority have emphasized on improving the quality of electricity supply through construction of more distribution system infrastructures including the reinforcement of existing distribution networks.

The scope of works under this project include construction of ten (10) Nos. of new 33/11 kV substations, 33 kV lines, 11 kV lines and low voltage distribution lines and reinforcement and rehabilitation of existing distribution networks. The project area includes 8 districts of Province 2 viz. Siraha, Saptari, Dhanusa, Mahottari, Sarlahi, Rautahat, Bara and Parsa. The project has been divided into five lots viz. Lot 1, Lot 2, Lot 3, Lot 4 & Lot 5. The contract for this project has been awarded to M/s Tata Projects Limited on 17 March, 2021.

**Lot 1**: The scope of works consists of construction of six (6) completely new 33/11 kV substations and 97 circuit km of 33 kV line at Saptari, Siraha and Dhanusha districts, which will connect these new substations and old substation from the existing and/or new network. Detailed survey of 33 kV line is completed and the construction of substation control building and staff quarter has been started in 2 substations.

**Lot 2**: The scope of works consists of construction of four (4) completely new 33/11 kV substations and 226 km of 33 kV line at Mahottari, Sarlahi, Rautahat, Bara and Parsa districts, which will connect these new substations and old substation from the existing and/or new network. Detailed survey of 33 kV line is completed and the construction of substation control building, staff quarter has been started at 2 substations.

**Lot 3**: The scope of work consists of construction of 250 circuit km of 11kV, 320 circuit km of 400/230V line and installation of 170 Nos. distribution transformers at Saptari and Siraha districts. All the survey works has been completed and the erection work is in line.

**Lot 4**: The scope of work consists of construction of 360 circuit km of 11kV, 350

circuit km of 400/230V line and installation of 175 Nos. of distribution transformers at Dhanusha, Mahottari and Sarlahi districts. All the survey works have been completed and the erection work is in line.

**Pole Erection Works at Rautahat**

**Lot 5**: The scope of work consists of construction of 340 km of 11kV, 330 km of 400/230V line and installation of 175 Nos. of distribution transformers at Rautahat, Bara and Parsa districts. All the survey works have been completed and the erection work has started. The contract for this project has been awarded to M/S Tata Projects Limited on 17 March, 2021. As of present, land acquisition for all ten (10) substations has been completed. Detailed survey, investigation and preparation of pre-construction survey report are ongoing.

### Pathlaiya-Parwanipur 132 kV DC Line Upgradation and Construction of 132 kV Parwanipur-Pokhariya TL and 132 kV Substation at Pokhariya

This project basically consists construction of Parwanipur-Pokhariya Four Circuit 132 kV, approximately 21 km transmission line along with the 132/33/11 kV new substation at Pokhariya (Parsa district) and bay extension work in existing substation at Parwanipur (Bara District) to meet the current demand of industrial growth in the area. The T/L is so planned that any transmission Line User, who needs a direct connection from 132 kV system, may get the connection from that location as and when required.

Till now, the survey of the line has already been accomplished by Engineering Directorate-NEA. Likewise, the IEE report has been approved by GoN. Land acquisition work for proposed Pokhariya Substation has been completed. Bid for construction of 132 kV Substations at Pokahariya and the bay extension work at Parwanipur is under preparation. The design of special four circuit tower is being carried out by an individual international expert, which is expected to be completed within a couple of week. The bidding process for 132 kV Parwanipur-Pokhariya transmission line and Piluwa-Parwanipur 132 kV DC conductor up-gradation work shall be initiated soon after that.

Likewise, Nijgadh - Pokhariya 400 kV approximately 65 km Transmission Line along with the concomitant substations in Nijgadh and Pokhariya has also been planned to meet the future electricity demand of industrial sector in Birgunj area. Till now, the detailed survey work has been completed by Engineering Directorate of NEA, while Cadastral survey is underway on. IEE is under way by NEA-ESSD. Land acquisition works for the Proposed Nijgadh substation and transmission tower pads have also been initiated.

### Electric Vehicle Charging Infrastructure Development Project

This project supports government's vision of sustainable environmentally friendly transportation system in Nepal, which ultimately increases the consumption of electricity and reduces the import of fossil fuels. The project aims on installation of 51 (Fifty-One) numbers of 142 kW EV fast charging stations each compatible to charge EV battery (Lithium-ion integrated technology) with voltage range 200 V to 750 V, including the infrastructure to supply power followed by operation and a comprehensive onsite maintenance of the entire system for 5 (Five) years from the date of

handing over in the major cities and highways of Nepal. The charging station will be compatible with combination of charging protocols, such as CCS 2.0, CHAdeMO, GB/T and AC Type 2 with CAN/PLC Communication between Electric Vehicle Service Equipment (EVSE) and Electric Vehicle (EV). The civil structure and HT line extension work is about to complete. GB/T Charger and Transformer have already reached in Nepal and the installation is in progress. The project is expected to complete by September 2022.

## Electricity Grid Modernization Project (EGMP)

The EGMP finances high priority electricity grid modernization investment both in transmission and distribution system all over Nepal in order to achieve reliable and efficient electricity for all and to develop NEA as modern and sustainable corporate entity that provides reliable services to its customers. Subprojects under this project are as follows:

### Distribution System Control and Data Centre Project (DSCDCP)

Distribution System Control and Data Center Project (DSCDCP), a component of Electricity Grid Modernization Project (EGMP), will have SCADA (Supervisory Control and Data Acquisition System) / DMS (Distribution Management System) / OMS (Outage Management System) for underground electricity distribution system within Kathmandu Valley and an International standard Tier III Data Center for NEA. Syuchataar Substation premise (under Kathmandu Grid Division) is the site location for DSCDC. The contract agreement for the project was signed between NEA and M/S Yantai Donfang Wisdom Electric Co. Ltd, China on July 2021. Project scope of work covers 30 substations and switching stations within Kathmandu valley. But currently 24 substations and switching stations are in plan and remaining 6 substations shall be connected gradually. Distribution system can be configured, monitored and controlled remotely through SCADA/DMS/OMS system. The RTUs, RMUs, and SCADA system will be connected in a distribution ring network using 8 core optical fiber connections thus ensuring an error free network for communication. Outage can also be supervised/managed/maintained remotely from the control center.

DCC prefabricated Containers

### Smart Metering Project (Phase II)

With an aim to modernize distribution system throughout Kathmandu valley, EGMP is introducing Smart Metering Phase II project, supplementing Smart Metering Phase I project being implemented under PTDEEP. Through this project, NEA intends to replace 4,10,000 electromechanical meters of the consumers of remaining nine distribution centers (Thimi, Pulchowk, Bhaktapur, Kirtipur, Kuleshwor, Lagankhel, Baneswor, Jorpati and Balaju) inside Kathmandu valley by smart meters and integrate them into Advanced Metering Infrastructure (AMI) system of NEA. After this project, all the consumers inside Kathmandu Valley will be integrated to Advanced Metering Infrastructure (AMI). With this system at place, it will help the distribution centers inside Kathmandu to gain the required information to plan and improve energy efficiency and bring other operational benefits that will help to manage costs more

effectively and improve customer service. This project is awaiting frequency license from Nepal Government.

### Grid Substation Automation Project (Phase II)

In order to digitalize the power grid substations, NEA has implemented Grid Automation Project Phase 2, which is basically focused at installing infrastructures for digital control and monitor of grid substations outside Kathmandu valley. The project commenced from 2021-22 and is expected to be complete by 2025-26.

The scope of the project includes construction of 6 Master Control Centers (MCCs) at six grid division offices viz. Duhabi, Dhalkebar, Hetauda, Butwal, Pokhara and Attariya, installation of Substation Automation System (SAS) in 39 old grid substations and integrating altogether of 54 grid substations to LDC at Siuchatar, backup LDC at Hetauda and respective MCCs, that will help in remote control and monitoring of grid substations.

The project shall install state-of-art modern technology at all those substations and MCCs including digital surveillance at major equipment of all the grid substations, motorized isolators, separate fault detector systems, hot-line communication and SCADAs.

It is expected that the project will serve to speed up the control and monitoring tasks, assist in easy preventive maintenance, provide remote control of relays and bays and assist in data collection of power system variables for future analysis. The project is in the bidding stage.

### Dandakhet-Rahughat 132 kV Transmission Line and Substation Project

In order to evacuate power from hydropower plants in Myadgi River Basin, Rahuganga River Basin and Kaligandaki River Basin of Myadgi district, Dadakhet Rahughat 132kV transmission line project is being constructed. The project is located at Myadgi district of Gandaki Province.

The scope of this project includes following Four components:

- 132 kV double circuit transmission line from Dadakhet to Rahughat-25 km;
- Loop-In-Loop –Out of 220 kV Dana-Kusma Double Circuit Transmission Line at Rahughat S/S-Approx 0.5 km;
- 132/33 kV, 30 MVA substation at Dadakhet, ward no.7 of Malika Village Municipality, Myagdi District; and
- 220/132/33 kV, 200MVA GIS Substation at Ambang, Rakhu Piple, ward no. 3 of Rahuganga Village Municipality, Myagdi district.

Along with completion of land acquisition of about 57 Ropani at Dadakhet and about 92 Ropani at Rakhu piple, the project has successfully completed the construction of staff quarter, guard house and boundary wall work at Dadakhet substation. The land development work with boundary wall construction has also been completed at Rahughat substation.


Dandakhet Sub-station

The contract for the above-mentioned scope of works has been signed with Larsen and Toubro Limited, India on 31 December 2021 and the contract has been effective from 28 February 2022 with the completion time of 900 days.

As on date the route survey for the line

has been completed and check survey is in progress. Transmission line tower design has been completed by the Contractor. Land parcel data preparation for transmission line tower foundation is in progress.

Soil investigation works at both the substation and geological investigation at Rahughat substation has been completed. Design Layout of both the substations has been completed and site grading works with construction of retaining walls at both the substations is in progress. The construction of guard house at Rahughat substation is in progress. Design drawing review and approval of various equipment is under progress.

### Ghorahi – Madichaur 132 kV Transmission Line and Substation Project

The main objective of this project is to reinforce power supply system and power evacuation from different IPP's at Madi Khola and Lungri Khola of Rolpa district and its tributaries. This project shall evacuate approximately 200 MW of power generated to the INPS.

The project comprises of construction of approximately 40 km long 132 kV double circuit transmission line with ACSR Cardinal from Ghorahi substation, Dang to proposed Khungri substation, Rolpa and 132/33 kV, 30 MVA AIS substation hub at Khungri of Rolpa along with 132 kV bay extension at Ghorahi Substation.

The land acquisition for the Khungri substation at Khungri, Rolpa is completed. Civil works of constructing boundary wall, store building along with others protection works at substation land have been completed. The detail survey of the transmission line route and Initial Environment Examination (IEE) of the project is completed.

### Borang – Lapang 132 kV, Lapang – Ratmate 220 kV Transmission Line and Substation Project

The objective of this project is to evacuate the power generated by the IPP's of Aankhu Khola corridor & Budhigandaki corridor to INPS. The project is located in Dhading and Nuwakot districts. The cost of this project is estimated to be 39 MUSD. The project funded by GoN and ADB is expected to be completed in March 2025.

The scope of the project includes construction of 24 km 220 kV double circuit transmission line with Twin MOOSE conductor from proposed Lapang Biharthok substation to proposed Ratmate substation and construction of 24 km 132 kV double circuit transmission line with BEAR conductor from proposed Borang substation to proposed Lapang Biharthok substation along with the construction of Borang 132/33/11 kV AIS substation and Lapang Biharthok 220/132/33/11 kV GIS substation. As of July 2022, detailed survey, feasibility study and IEE have been completed. The land acquisition has been completed for both Borang and Lapang Biharthok substations. Tender has been floated for construction of all the transmission line and substation works in a single package. Technical and financial evaluation have been completed and the contract agreement with the successful bidder shall be signed soon.

### Construction of 132 kV Pangtang Substation

The purpose of this project is to evacuate power from different IPPs of Balefi Corridor in Sindhupalchowk. This project will include construction of a 132/33 kV, 30 MVA & 33/11 kV, 8 MVA substation at Pangtan and necessary bay extension works at Barhabise substation. Till date, land acquisition for the Pangtan (Balefi) substation has been accomplished. Construction of approach road, compound wall fencing and protection works have been completed at substation site. Contract agreement for the construction of substation was concluded with M/S CQNEC-NHE JV, Nepal on 22 July, 2022 with the project completion period of two year.

### Construction of 132 kV Keraun Substation

The objective of this project is to strengthen

the power supply system and improve power transfer capacity to meet increasing demand in the north-east part of Morang District. The estimated cost of the project is US 8.3 MUSD and funded by GoN and ADB. The project was initiated in FY 2018/019 and is expected to be completed by the end of 2023.

Scope of the project includes construction of Keraun Substation with power transformer capacity 2X63MVA 132/33kV and 22.5MVA 132/11kV. It also constructs 15 km Keraun-Rangeli & 25 km Keraun-Biratchowk double circuit 33 kV Sub transmission line to supply power to that substation. Keraun 132/33kV Substation shall be fed by Duhabi-Padajungi 132kV transmission line by LILO at Keraun.

As of July 2022, the construction of boundary wall, staff quarter and guard house has been completed. Details engineering design for outdoor equipment of switchyard has been approved. Construction work for civil structures foundation has been started.

**Substation site at Keraun, Morang**

### 132/66 kV Transmission Line Upgradation Project

Objective of the project is to improve the power carrying capacity of 132 kV transmission line by upgrading existing ACSR conductor of 132 kV transmission line with HTLS (High Temperature Low Sag) Conductor for five lines namely:

- Pathlaiya – Dhalkebar (Double Circuit - 102 km)
- Kushha – Duhabi (Double Circuit - 28 km)
- Suichatar – Matatirtha (Double Circuit - 5 km)
- Suichatar – Teku (Double Circuit- 4.5 km)
- Suichatar – Balaju (Double Circuit- 4 km)

The total circuit length is about 143.5 km. Also, this project will change the hardware, fitting, connectors and accessories of above-mentioned line, if required and upgradation of lower rating CTs of respective substation.

This project was initiated in FY 2021/22 and it is being funded by the ADB. The estimated cost of the project is about 15 MUSD. The contract agreement has been signed with M/S HG Power Transmission SDN BHD.

### Kohalpur – Nepalgunj 132 kV Transmission Line & Substation Project

The objective of the project is to improve the power quality and reliablity of Banke district. After construction of substation by looping in and out of existing Kohalpur-Mahendranagar 132 kV DC line at Bakaspur, Janaki Rural Municipality of Banke district, the substation can feed power to the industrial sector at Nepalgunj as well as to nearby 33/11 kV substations. This project was initiated in FY 2018/19 and later on funded by the ADB. The estimated cost of the project is 12 MUSD. The scope of the project includes the construction of about 10 km long double circuit 132 kV transmission line with ACSR Bear conductor and the construction of 2 X 132/33 kV, 63 MVA substation at Bakaspur. As of July 2022, detail survey has been concluded and the IEE approval is at the final stage. Land for substation is acquired at Banke, Janaki Rural Municipality Ward No. 06, Bakaspur. The estimate and bidding document have been prepared and the bid will be invited soon.

### Arun Khola (Dumkibas) 132 kV Substation Project

Arunkhola (Dumkibas) 132 kV Substation Project is focused to improve the power quality and

reliablity of Nawalparasi (Bardaghat Susta-East) district. After construction of substation by looping in and out of Bardaghat-Sardi 132 kV DC transmission line at Tamang Gaun, Binayee Triveni Rural Municipality, Ward No. 2, the substation can feed power to the industries nearby as well as to upcoming 33/11 kV substations. Furthermore, the 11 kV feeders emanated from the substation will reduce the lengthy feeders from Bardaghat substation and Kawasoti substation, which will feed Dumkibas, Benimanipur, Arunkhola and households around, for improving both the voltage and reliability. This project is initiated in 2018/19 and later on funded by the ADB. The estimated cost of the project is 7 MUSD. The scope of the project includes construction of 2 X 132/33 kV, 30 MVA substation and required civil structures. The project is in the bidding phase.

### Mulpani Substation Construction Project

The main objective of this project is to augment grid substation capacity of Kathmandu Valley. One 132 kV GIS substation will be constructed by this project at Kageshwari Manohara Municipality near Baba Chowk, Mulpani. This project intends to cater the demand growth of eastern part of the Kathmandu district and supply the reliable electricity to the consumers. The scope of this project includes construction of a substation with 4 Nos. of 132 kV GIS line bays, 2x45 MVA power transformer, 10 Nos. of outgoing feeder with other required facilities. The project is in the bidding phase.

### Chobhar Patan Chapagaun Underground 132 kV Transmission Line Project

The main objective of this project is to construct 4.5 km length of 132 kV double circuit underground transmission line from under construction Chobhar substation, 7.5 km length of 132 kV double circuit underground transmission line from Chapagaun substation to the existing Patan substation and upgrade the existing 66/11 kV Patan substation to 132 kV GIS substation. Preparation of bidding documents for Chobhar to Patan underground transmission line and upgradation of Patan substation is underway. The IEE of the 132 kV underground transmission line of section, Chobhar to Patan is ongoing and the detail survey of underground transmission lines has been completed.

### Engineering and Environmental study of Transmission Lines and associated Substations under ADB Grant No. 0361 (Project Preparatory Facility for Energy (PPFE))

The prime focus of services under PPFE is to prepare projects to the high level of readiness for procurement and execution. High leveled readiness project is easy to implement, cost effective and ensure timely completion of the project with adequate quality. PMD has been engaged for the project preparation of many strategically important transmission line and substations, where the consulting firm has been appointed for detail engineering and environmental study of the proposed transmission line and associated substations with the grant aid of ADB (Grant No. 0361: Project Preparatory Facility for Energy). Under the detail engineering and environmental study, the consulting firm will prepare detail project report including detail transmission and substation design with tower spotting and demarcation in site, soil tests, all necessary civil and electro-mechanical design, safeguard studies, preparation of cost estimate, preparation of bidding documents and necessary activities in detail enough to provide adequate information and data to ensure high readiness of the project for procurement so that construction can be commenced smoothly immediately after the contract award. Engineering and environmental study of following transmission line and the associated substation are underway.

### New Butwal – Lamahi – Kohalpur – New Attariya 400 kV Transmission Line project

As a part of development of East – West 400 kV trunk line, PMD is associated with the detail due diligence study of 400 kV transmission lines and substations in the western part of the country i.e. from New Butwal (Bhumahi) to New Attariya (Daiji) with the ADB grant assistance under Project preparatory Facility for Energy.

### Other Transmission Line and Associated Substations

The prime objective of the services under PPFE (Grant 0361 funded by ADB) is to procure a project preparation support consulting services from consulting firms. The consulting firm is to prepare detail project report including detail transmission and substation design with tower spotting and demarcation in the site, safeguard studies, preparation of cost estimate and preparation of the bidding documents in detail enough to provide adequate information and data to ensure that the project will be ready for procurement and construction immediately after the completion of intended project preparation support consulting services. Following project preparatory studies are ongoing under PPFE: Consulting Package (CP-1):

### Engineering and Environmental Study of Transmission Lines and Associated Substations

Under PPFE (Grant 0361 funded by ADB), three 400 kV transmission lines and two 132 kV transmission lines and associated substations are under study. Following three packages have been prepared for detail engineering and environmental studies of Transmission lines and associated substations:

**Package-1**

- Tingla Hub - Likhu Hub - New Khimti 400kV Double Circuit Transmission Line (approximately 55 km) and associated substation at Likhu Hub and bay expansion works at Tingla Hub Substation and New Khimti Substation.
- New Khimti - Tamakoshi 3 - Sunkoshi Hub - Dhalkebar 400kV Double Circuit Transmission Line (approximately 110 km) and associated substation at Sunkoshi Hub and bay expansion at Dhalkebar Substation.

Proposed Line and associated substation cater the evacuation of power generated in Zone 4 of the Transmission system Development Plan of Nepal. 5.5 GW power is planned to be evacuated from this line.

**Package-2**

- The 400 kV Double circuit Budhigandaki Corridor (Philim - Gumda - Ratamate) (approximately 95 km) transmission line and associated 400 kV substations at Philim/ Gumda (Gorkha District) and Ratamate (Nuwakot District).

Total 2.3 GW power generated from the hydroelectric projects in the Budhigandaki Corridor is planned to be evacuated from this Line.

- 132 kV Double circuit Dailekh - Kalikot - Jumla (approx. 80 km) and associated substations at Jumla and Kalikot and bay extension work at Dailekh substation

The 132 kV Transmission line from Kohalpur - Surkhet - Dailekh is being implemented by Transmission line Department of NEA. The Kalikot and Jumla district are not covered yet by the grid substations. The proposed 132 kV Line and Substation provides the easy access of National grid to these districts and adjacent districts, thus help in achieving the government target of rural electrification and provide electricity to all.

- 132 kV Double circuit Lamosanghu - Kavre/ Ramechap (approx. 40 km) transmission line and associated Substations at the bordering area of Kavre/Ramechhap and associated

bay extension work at Lamosanghu Substation

Though, the area within the Kavre and Ramechap district is currently being supplied by 66kV network, the supply quality in these areas is very poor less reliable. Rural electrification expansion is halted due to limited transmission capacity of 66 kV line. So, the Lamosanghu - Kavre/Ramechhap 132kV transmission line with substation at bordering area of Kavre and Ramechhap is proposed to strengthen the transmission and distribution capacity in these areas.

**Package-3**

- 400 kV Double circuit Damauli - Kusma - Burtibang - Bafikot (approximately 200 km) transmission line and associated 400 kV substations at Kusma, Burtibang and Bafikot and bay extension at Damauli Hub substation

This project caters the evacuation of power generated in the Zone 3 of Transmission System Development Plan of Nepal. Many small and medium capacity power plants are located in Zone 3 including Kaligandaki Gorge (164 MW) and Kaligandaki Kowan (400MW). The 1.8 GW power is planned to be evacuated from this line.

### Power Transmission System Planning for Major Cities of Nepal

The existing capacity of transmission lines and substations in the city areas will be insufficient to meet the growing energy demand as well as peak demand. Therefore, there is no alternative to upgrading the capacity of existing transmission lines and substations as well as construction of new transmission lines and substations. The power transmission infrastructures require a lot of land and right of way along the line. It is very hard to find the land and RoW in the cities to construct transmission infrastructures, which will be an evident problem in the future. Hence, NEA has decided to plan the transmission infrastructure considering the future demand of electricity till 2050 AD and develop infrastructure accordingly phase wise. Similarly, it has become essential to find some alternatives to avoid land and RoW problems in transmission infrastructure by adopting modern practices like underground transmission line, compact substation, transmission system using monopoles, etc.

This project will prepare a power transmission system plan of major cities and associated industrial areas of Kathmandu Valley, Banepa, Pokhara, Biratnagar, Itahari, Dharan, Biratchowk and adjacent cities, Janakpur, Bardibas, Hetauda, Simara, Parwanipur, Birgunj, Butwal, Bhairahawa, Nepalgunj and Kohalpur, taking into account the future load growth till 2050 AD including feasibility study and project preparation.

## Social Safeguard and Environmental Management Department (SSEMD)

Due to need of institutional structure under Project Management Directorate (PMD) and NEA's strong commitment to address environmental and social safeguard issues effectively the provision of Social Safeguard and Environmental Management Department (SSEMD) within PMD has been approved by NEA's board on 23 February 2021. The department is headed by the Director and supported by Environmental Management Division Head (Manager) and dedicated environmental and social safeguards officers, civil engineers and administrative and accounting and other support staffs.

The roles and responsibilities of SSEMD are listed as:

- Environmental studies and monitoring (internal and external), mitigation and reporting of safeguard activities of TL, SS and Distribution System Projects and

implementation of CSR programs under the PMD.

- Preparation of quarterly and semiannual environmental and social monitoring reports and submission to ADB
- Arrange meaningful public consultation, public hearing, trainings and awareness programs,
- Ensure information records and data base of the safeguard implementation activities,
- Implementation to Gender Equality and Social inclusion (GESI) related activities for mainstreaming as per ADB Manual/ guidelines,
- Waste management and compensatory plantation in project site
- Grievance redress and management (issue identification, documentation and status),
- Other environmental and social issues with RAP and rehabilitation.

The department has carried out 'Updated Initial Environmental Examination' of Kusma -New Butwal 220 kV Transmission Line Project, Revised Environmental Management Plan (EMP) of New Butwal Bardhaghat 220 kV Transmission Line of Kaligandaki Corridor and currently carrying out IEE study of Chovar-Patan 132kV Underground Transmission Line of Electricity Grid Modernization Project (EGMP). Also, a central level grievance committee for addressing grievances of Power Transmission and Distribution Efficiency Enhancement Project (PTDEEP) is established and is handling grievances received so far. Also with the Department's initiation, an agreement has been signed with Radio Nepal to disseminate PSA on social awareness and effective use of electricity under PTDEEP, which is being aired by Radio Nepal.

# NEA'S SUBSIDIARY & ASSOCIATE COMPANIES

Apart from development activities, which NEA is undertaking on its own, generation projects are being executed through NEA's subsidiary companies. In addition, subsidiary companies related to consulting services, cross border power transmission and power trading have also been established. For smooth coordination between the subsidiary companies and NEA and also for the monitoring of their activities, NEA Subsidiary Company Monitoring Directorate (NSCMD), headed by the Deputy Managing Director, was incorporated in the corporate structure of NEA in February 2018.

## Chilime Hydropower Company Limited

Chilime Hydropower Company Limited (CHCL), a subsidiary of Nepal Electricity Authority (NEA) was established in 1996 with the main objective of developing hydroelectric power projects in the country by utilizing the public shares. NEA owns 51% of the company's share, while the rest is owned by the public. CHCL has further established four subsidiary companies.

The Company commissioned Chilime Hydroelectric Plant in 24 August 2003.The plant, located in Rasuwa district, has an installed capacity of 22.10 MW with the total average annual energy generation of 155.668 GWh. The generated energy is transmitted into the NEA grid at Nuwakot district through a 38 km long 66 kV transmission line.

## Sanjen Jalavidhyut Company Limited

Sanjen Jalavidhyut Company Limited (SJCL) was established in 2010 AD as a subsidiary company of Nepal Electricity Authority and Chilime Hydropower Company Limited with promoter shares of 10.36% and 39.36% respectively. SJCL is developing two hydroelectric projects namely, Sanjen Upper Hydroelectric Project (SUHEP) of an installed capacity of 14.8 MW and Sanjen Hydroelectric Project (SHEP) of an installed capacity of 42.5 MW in cascade system. SJCL has made the financing arrangement of 50:50 as the debt equity ratio. The entire debt portion has been arranged from Employer's Provident Fund (EPF) of Nepal.

The equity shares from promoters and also public shares from depositors and employee of EPF, staffs of promoters and general public have been already paid up. The remaining 10 % public shares allocated to the project affected local people of Rasuwa district will be raised by September 2022.

## Sanjen Upper Hydroelectric Project (SUHEP)

Sanjen Upper Hydroelectric Project (SUHEP) is located in Chilime VDC (now Amachhodingmo Rural Municipality) of Rasuwa district. The headwork of project is located at Tiloche, whereas the powerhouse is located in Simbu Village. With the available gross head of 161 m and the design discharge of 11.07 m3/s, the project will have an installed capacity of 14.8 MW with the total annual energy generation 82.44 GWh. The generated energy will be transmitted into INPS through Chilime Hub 220 kV substation at Chilime.

SUHEP Peaking Pond and Machine Installation Work in Powerhouse

By the end of FY 2021/22, the overall progress of SUHEP is approximately 93.70%. About 99. 2% of civil Works have been completed including penstock installation, whereas about 95% of Hydro-mechanical Works have been installed. Installation of Electro-mechanical equipment is in progress. The project is targeted to be completed within December 2022.

## Sanjen Hydroelectric Project

Sanjen Hydroelectric Project (SHEP) is a cascade project of SUHEP with an installed capacity of 42.5 MW. The project has a gross head of 442 m and the design discharge of 11.57 m3/s with an additional discharge 0.5 m3/s from Chhupchung Khola. SHEP will have a total annual average generation of 251.94 GWh. The generated energy will be evacuated to INPS through Chilime Hub 220 kV substation at Chilime. The overall progress of the project is approximately 86 % by the end of FY 2021/22.

SHEP Headwork and Machine Installation Work in Powerhouse

In civil works, construction of Chhupchung headworks, balancing pond, syphon pipes, inlet slopes and excavation of the headrace tunnel and penstock tunnel have been completed, while the tunnel support work and final lining works are in the final stage. In hydro-mechanical part, penstock installation work is ongoing. The civil works in the powerhouse are almost completed and the installation of electromechanical equipment is in progress. The project is targeted to be commissioned within FY 2022/23.

### Consulting Services for the Projects

SMEC International Pty. Ltd., Australia was the original Consultant for the Detailed Engineering Design & Construction Supervision of both projects. Following the expiry of the contract period, Chilime Engineering and Services Company Ltd. (CHESCO) has been engaged since May 2017 as an alternative arrangement to execute the project.

### Transmission Line Works

Mudbhary and Joshi Construction Pvt. Ltd. is carrying out the construction of approx. 6 km long 132 kV transmission line works. Almost all the works under this package have been completed except for testing and commissioning.

## Middle Bhotekoshi Jalavidyut Company Limited

Madhya Bhotekoshi Jalavidyut Company Ltd. (MBJCL) was established as a subsidiary company of Chilime Jalavidyut Company Limited to execute Middle Bhotekoshi Hydroelectric Project in Sindhupalchowk district of Bagmati Province.

The capital structure of the Company has been managed with the debt and equity provision in the ration of 59:41. Employees Provident Fund (EPF) has been providing the debt portion, whereas the equity portion has the investment proportion of 51 % promoter share and 49 % public share. All IPOs have been issued for the public shares.

### Key features of the Project

| | |
|---|---|
| Type of Project: | Run-of-River |
| Design flow: | 50.8 m3/sec |
| Gross Head: | 235 m |
| Number of Units: | 3 |
| Installed Capacity: | 102 MW (3 x 34 MW) |
| Annual Energy: | 542.2 GWh |
| Transmission Line: | 4 km/220 kV |
| Project Cost: | NRs. 15.03 billion |

### Key Construction Activities

The main construction works are divided into following packages:

### Civil and Hydro-mechanical Works (Lot-1)

China Energy Engineering Group Guangxi Hydroelectric Construction Bureau (CEEC GHCB) Co. Ltd., China is the EPC Contractor of Civil and Hydro-mechanical works.

**Construction Activities at Headworks and Powerhouse Construction Works**

**Headworks:** About 98% of overall construction activities in Headworks have been completed. The construction works of intake, dam, desander and forebay are complete. The installation of gates is ongoing, whereas the pressure conduit of 271 m out of 371 m has been completed.

**Underground Works:** The excavation of 41 m out of total 7,116 m long headrace tunnel is remaining. Tunnel invert concreting works is on progress, whereas the installation of formwork for concrete lining is started. About 220 m out of 408 m of steel lining works of penstock and vertical shaft is complete. Manifold steel lining is 90% complete with testing and concreting.

**Power House:** Concreting works is finished except for machine hall. Roofing and brick masonry wall works in powerhouse is ongoing with the installation of electro-mechanical equipment setup.

**Tunnel-2 Invert Concreting Works & EM Works at Machine Hall.**

### Electromechanical Works (Lot-2)

Andritz Hydro Private Limited (AHPL), India is the Contractor for Electro-mechanical works. All EM Equipment manufactured and supplied are stored at the storage yard. Concreting around the spiral casing in unit-1 is ongoing.

### Transmission Line Works (Lot-3)

Urja AC JV is the Contractor for transmission line works. Erection of 4 towers and foundation works of 6 towers have been completed out of 13 towers. Approval for usage of public land in three towers was received from GoN in July 2022.

## Rasuwagadhi Hydropower Company Limited

Rasuwagadhi Hydropower Company Limited (RGHPCL), promoted by Chilime Hydropower Company Limited (CHPCL) and Nepal Electricity Authority (NEA), was established to develop Rasuwagadhi Hydroelectric Project. The capital structure of the project is managed from debt and equity provision in the ratio of 50:50. The debt requirement has been managed from Employees Provident Fund (EPF), under the long-term loan agreement. The equity portion has the investment proportion of 51% promoter share and 49% public share. The equity investment has already been paid up by the promoter as well as by public group except for the issuance of 10% shares allocated to the locals of Rasuwa district.

## Rasuwagadhi Hydroelectric Project

The project is located in Thuman and Timure village (Ward No. 1 and 2 of Gosaikunda Gaupalika) of Rasuwa district. The headwork site is about 400m downstream from the confluence of Kerung and Lende Khola, which is the Boundary Rivers between Nepal and China. The key features of the project are as follows:

| | |
|---|---|
| Type of Project | Run-of-River (ROR) |
| Design Discharge | 80 m3/s |
| Gross Head: | 167.9 m |
| Headwork: | Overflow Diversion Weir with Undersluice and Side Intake |
| Desander | Underground (3 -125mx15mx23m) |
| Headrace Tunnel | 4185m, dia. - 6m~7m |
| Powerhouse | Underground, 76.3m x 15.0m, 35.0m |
| Turbine | Francis, Vertical Axis & 3 Nos. |
| Generator | 3 Phase Synchronous AC, 3x43.75 MVA |
| Installed Capacity: | 111.0 MW |
| Annual Energy Generation | 613.87GWh |
| Transmission Line | 10 km, 132 kV Double Circuit up to Chilime Hub |

The construction of the project is categorized into three different Lots. China International Water and Electric Corp. (CWE) is the Contractor for Lot 1: Civil and Hydro-Mechanical Works under Engineering, Procurement and Construction (EPC) contract model. Similarly, the contract was signed with M/S VOITH Hydro Pvt. Ltd, India for Lot 2: Electromechanical Works. The Contractor for Lot 3: Transmission Line Works is M/S Mudbhary and Joshi Construction Pvt. Limited. The project Consultant M/S SMEC International Pty. Ltd., Australia has been continuously supervising the Lot 1 & Lot 2 construction works, reviewing and approving the designs submitted by the Contractors and coordinating with the Contractors for smooth operation of construction work activities.

Because of various unforeseeable events, the project completion schedule has been revised and all efforts are being made to complete the project by March 2023. The overall progress of the project construction work is 88%. The progress summary of the major construction activities are as follows:

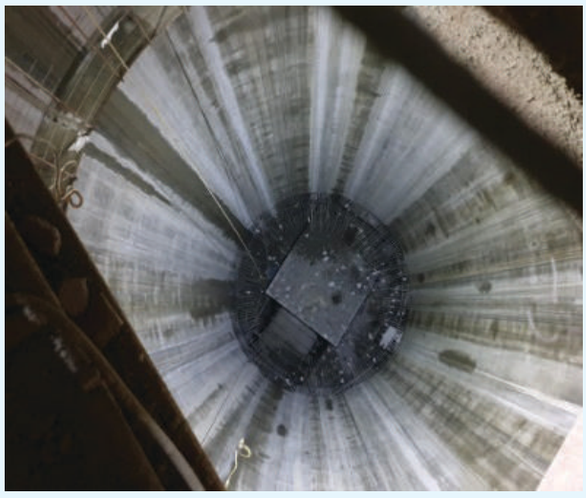
### Infrastructure Works

Due to the effect of Earthquake 2072 and the subsequent rock fall, the permanent camp and office facilities at Ghatte Khola was heavily damaged. As an alternative, temporary camp facilities on the Timure/Thuman area at the confluence of Bhotekoshi and Simlung Khola have been used thereafter. However, after completing the re-construction and maintenance, all office works have been resumed from the permanent office building at Ghatte Khola, Timure.

### Lot 1: Civil and Hydro-Mechanical Works

Civil and hydro-mechanical works at undersluice and intake have been completed. The construction of weir and stilling basin have also been completed. First stage and second stage concreting works in underground desanding basin (UDB)-1 and -2 have been completed and it is in the verge of completion in UDB -3. In addition, the concrete works at RCC pressure conduit is in progress.

After completing the excavation of 4,184.5m long headrace tunnel, all other support works have been completed except final layer of shotcrete and grouting work. Surge shaft full section lining is on the verge of completion and the work is ongoing for the construction of emergency gate adjacent to the surge shaft. Steel lining with backfill concrete of penstock vertical shaft has also been completed.



**Headworks & Surge Shaft Construction of Project**

All civil and Hydro-mechanical works of underground powerhouse & transformer cavern are completed. Excavation and invert concrete lining of tailrace tunnel with primary support have been completed, whereas the weak-zone treatment in tailrace tunnel is still ongoing.

Take- Off Yard Construction in Progress

### Lot 2: Electro-Mechanical Works

The Lot 2 Contractor has completed the detail design and manufacturing of the electro-mechanical equipment. Most of the equipment have already been delivered to the site and is in process of installation. Runner, wicket gates, head cover, and distribution ring have already installed in Unit No. 3. Stator core stacking and core magnetization test for Unit Nos. 2 and 3 have been completed. Support structure, dis-connectors, Current Transformer (CT), Capacitive Voltage Transformer (CVT) have already been installed at Take-off Yard and the remaining installation works in other areas are in progress.

### Lot 3: Transmission Line Works

The Lot 3 Contractor has completed the detail survey and design work of 132 kV transmission line. Acquisition of private land has been completed. Out of 32 towers, foundation of 26 towers has already been completed.

## Chilime Engineering & Services Company Limited

Chilime Engineering and Services Company Limited (ChesCo) is promoted by Chilime hydropower Company Limited with its 100% ownership to provide complete engineering and consulting services for the development of hydropower projects and other infrastructure works. The listing of the services and activities performed by ChesCo are as follows:

### Feasibility & EIA Study

- Budhi Gandaki Prok Hydroelectric Project
- Seti Nadi-3 Hydroelectric Project
- Chumchet Syar Khola Hydroelectric Project
- Chainpur Seti Hydroelectric Project (Review & Update of FS)

### Project Management and Construction Supervision

- Sanjen Jalavidyut Company Limited
- Tamakoshi Jal Vidhyut Company Limited

### Modernization and Rehabilitation

- Phewa Hydropower Station
- Rehabilitation of Chilime Hydropower Plant.

ChesCo has been providing services for the preparation of tender documents including technical specifications, drawings and cost estimate for civil, hydro-mechanical and electromechanical works. Assistance is also provided during the tender evaluation stage. In addition, geophysical investigations - ERT, SRT, MAM and MASW and geotechnical investigation works - drilling/boring, coring works are being provided.

## Upper Tamakoshi Hydropower Limited

Upper Tamakoshi Hydropower Limited (UTKHPL) was established on 09 March 2007 as a Subsidiary of Nepal Electricity Authority (NEA) for the construction and operation of Upper Tamakoshi Hydroelectric Project (UTKHEP). The majority shares (51%) of the company belong to Nepal Electricity Authority (NEA), Nepal Telecom (NT), Citizen Investment Trust (CIT) and Rastriya Beema Sansthan (RBS) with stakes of 41%, 6%, 2% and 2% shares respectively. The other shareholders of the company are general public (15%), residents of Dolakha district (10%), contributors in Employees' Provident Fund

(17.28%), staffs of NEA and UTKHPL (3.84%) and staffs of debtor institutions (2.88%).

### Project Features and Cost

UTKHEP, one of the national pride projects of Nepal, is located in Bigu Rural Municipality, ward No.1 of Dolakha district in Bagmati Province of Nepal. The project is a daily peaking run-of-the river project of installed capacity 456 MW with a live storage volume sufficient for four hours daily peaking operation in the driest month with average annual energy generation of 2,281 GWh.

**Headworks of UTKHEP**

The major civil components of the project are 22 m high and 60 m long diversion dam integrated with 35 m wide intake, twin settling basin, headrace tunnel having 6m x 6m size and length 8.0 km, penstock of length 1,165m, powerhouse cavern (142m x 13m x 25 m) and 3 km long Tailrace Tunnel. The electro-mechanical equipment consists of 6 nos. vertical Pelton Turbines (rated power of 79.5 MW each). The power generated from the project is evacuated to the INPS through 47 km long double circuit 220 kV transmission line from Gongar to 220/132kV New Khimti Sub-Station.

The Project Supervision Consultant is Joint Venture Norconsult AS and Lahmeyer International GmbH (JVNL). There were four international Contractors for the construction, namely, Sinohydro Corporation Ltd, China (Lot 1 Civil Works), Texmaco Rail and Engineering, India (Lot 2 Hydro-Mechanical Works), Andritz Hydro GmbH, Austria (Lot 3 Electromechanical Works) and KEC International Ltd, India (Lot 4 Transmission Line and Substation Works). However, the contract with Lot 2 Contractor was terminated on 04 July 2021 due to the Contractor's poor performances.

The revised cost of the Project is 590 MUSD excluding Interest during Construction (IDC).

### Power Purchase Agreement & Financial Arrangement

Power Purchase Agreement (PPA) for the project has been signed with NEA on 29 December 2010. As per the PPA, the average purchase rates have been fixed as NRs. 3.50 per unit for the base year (2010/11) and NRs 4.06 per unit at Commercial Operation Date (COD). After 9 years of COD with an annual escalation of 3%, the average purchase rate will remain as NRs. 5.30 per unit throughout the tenure of PPA.

For its initial total investment of NRs. 35.29 Billion excluding IDC, an equity of NRs. 10.59 Billion was made to maintain debt-equity ratio of 70:30 for project financing. Public institutions EPF and NT have invested debt of NRs. 10 Billion and NRs. 6 Billion respectively while CIT and RBS each has invested NRs 2 Billion. Government of Nepal (GoN) has added NRs. 11.08 Billion loan amounting to NRs. 31.08 Billion. Later, these institutions have provided additional long-term loan amounting to NRs 8 Billion on pro-rata and GoN has also provided additional long-term Loan amounting to NRs 2 Billion in order to meet fund deficit due to increase project costs. The costs are mainly increased due to design modifications of the headrace tunnel, effects of the devastating earthquake of 2015, subsequence border embargo, administrative expenses and substantial losses in exchanging foreign currencies.

Further, the Company has also arranged

short-term loan of NRs 2 Billion each from NEA and Nabil Bank and NRs. 1.1 Billion from hydropower Investment and Development Company Limited. Considering project delays due to COVID-19 at later stage and subsequent increase in interest expenses and additional fund requirement for execution of 20 MW Rolwaling Khola HEP, the company intends to increase its capital by issuing 1:1 right share from the shareholders.

### Commercial Operation of Project & Inauguration New Khimti Sub-Station

Following successful testing and commissioning of the project, the project started commercial operation on 22 August 2021 from four units, whereas two more units went into the commercial operation on 11 September 2021. Right Honorable Prime Minister Mr. Sher Bahadur Deuba inaugurated 220/132 kV New Khimti Substation, constructed and commissioned under UTKHEP, in the special programme organized at Sankhe, Manthali Municipality of Ramechhap District on 19 March 2022. The sub-station is the second largest sub-station of Nepal having the operational capacity of about 1,200 MW.

New Khimti Sub-station & Inauguration by the Prime Minister

### Power Generation

Upper Tamakoshi Hydropower Station has generated 1,732 GWh of electrical energy until the end of FY 2021/22. The station had supplied the peak power of maximum 456 MW in the morning and evening peak of the entire dry season of the year thereby contributing to the country's power sector by substantial reduction of the power import from India in comparison to the previous dry season.

### Rolwaling Khola Hydroelectric Project (RKHEP)

As the second stage development, UTKHPL intends to implement Rolwaling Khola Hydroelectric Project (RKHEP) having an installed capacity of 20 MW. The Company has obtained Survey License of Generation from Department of Electricity Development on 06 September 2017. Apart from 105 GWh of annual energy generated from this power plant itself, an additional 216 GWh of annual energy will be added to the generation from Upper Tamakoshi Hydropower Station as the tail water from RKHEP will be added in the UTKHEP reservoir.

Environmental Impact Assessment (EIA) study was approved by Government of Nepal on 19 June 2022. Some preliminary infrastructure works like exploratory tunnel, connecting road, one permanent bridge at Lamabagar, Mule Track

etc. are under construction. The main works of the project is planned to commence from the coming FY 2022/23 with the construction period of 5 years.

## Tanahu Hydropower Limited

Tanahu Hydropower Limited (THL) was established as a subsidiary company of Nepal Electricity Authority (NEA) on 25 March 2012 to develop Tanahu Hydropower Project (previously known as Upper Seti Hydropower Project). The project is a storage type hydropower project with the capacity of 140MW with an estimated average annual energy generation of 587.7 GWh (Years 1-10) and 489.9 GWh (Year 11 onwards).

The project is situated on Seti river of Vyas municipality near Damauli, the district headquarter of Tanahun District. The reservoir will extend about 25 km upstream inundating the low-lying lands (415 m) along the Seti River. The project area covers 2 municipalities (Vyas and Bhimad) and 2 rural municipalities (Rhising and Maygde). The estimated cost of the Project is US$ 505 million. The construction work of the project is going on in full swing through three different packages.

### Package 1: Headworks

Under the Package 1, the Contractor Song Da-Kalika JV (Vietnam-Nepal) has completed the construction of camp facilities. River diversion works and surface excavation of main dam (140m high) and access road improvement works are ongoing.

**Dam Excavation & Powerhouse Cavern**

### Package 2: Powerhouse, Waterways & Related Equipment

The Contractor Sino Hydro Corporation Limited, China has completed the excavation of tailrace and underground powerhouse of size 89m x 22m x 45m. The headrace tunnel of 1,418 m and surge tank are being constructed. Design, manufacturing and fabrication of HM and EM works are ongoing in parallel.

### Package 3: 220 KV Transmission Line

The Contractor KEC International, India has completed the construction of foundation of 46 towers out of 94 towers. Stringing of 25 towers also has been completed. Forest clearance and land acquisition works are also being carried out for construction works of remaining towers.

The construction work of project is being supervised by Tractebel GmbH, Germany as the Project Supervision Consultant, while the environment and social monitoring work is being monitored by ELC Electro-consult, Italy.

The project is expected to be completed by the end of May 2026.

### Lower Seti Hydropower Project

THL envisages to develop Lower Seti Hydropower project with an installed capacity of 126 MW with the utilization of regulated discharge of Seti River from the tailrace of Upper Seti

(Tanahu) Hydropower Project in addition to the flows of Madi River. The headwork of the project lies about 24 km downstream from Damauli and the powerhouse site is located at about 1.5km downstream from the confluence of Seti River and Trishuli River.

The Consultant JV of WAPCOS India Limited and Nippon Koei, Japan has submitted the draft detailed design report and bidding documents after completing all field investigation works. The Panel of Experts (POE) appointed for review of design works has visited the project in February 2022 for review of design reports. The Consultant is expected to complete the detailed design work incorporating the comments issued by the POE along with the EIA study report by the end of December, 2022.

## Raghuganga Hydropower Limited

Raghuganga Hydropower Limited (RGHPL) was established as a subsidiary company of NEA on 07 March 2017 to develop Rahughat Hydroelectric Project located in Myagdi district of Gandaki Province. The project is a Peaking Run of the River (PROR) scheme with 6-hour peaking time. The Project envisages to generate 40MW (2 * 20 MW) of power by diverting 16.67 cumecs of water through the headrace tunnel and pressure shaft to a surface Powerhouse located on right bank of Kaligandaki River at Galeshwor. The major components of the project lie at the left bank of Raghuganga River.

The project components consist of 25 m high barrage with 2 Nos. of spillways and an undersluice, 80 m long desander with 2 bays, 6,270 km long headrace tunnel of 3.30 m finished diameter, 53.2 m high and 10 m diameter surge tank, 1,026m long and 2.15 m diameter pressure shaft, a manifold bifurcating into two penstock, powerhouse of size 55.40 m x 24.9 m and cut & cover tailrace arrangement. The EM equipment consists of two numbers of Francis turbines.

### Power Purchase Agreement & Financial Management

PPA for the Rahughat Hydroelectric Project has been signed with Nepal Electricity Authority on 01 April 2019 with the provisions of prevailing policy of NEA. Out of total estimated project cost of 81.89 MUSD, the project is being financed by Government of Nepal and Nepal Electricity Authority along with the loan of 67 MUSD financed by Exim Bank of India under LOC-1 and LOC-2.

### Lot 1- Civil and Hydro-Mechanical Works

The contract agreement on EPC contract for Lot-1 -Civil & Hydro Mechanical Work was signed between RGHPL & M/s Jaiprakash Associates Limited, Noida, India on 21 November 2017. The Notice to Proceed (NTP) was issued to commence the work on 24 May, 2018 after getting concurrence from the EXIM Bank of India.

### Lot 2 - Electromechanical Works

The Contract Agreement for Lot2: Electro-mechanical Works was executed on 15 October, 2019 between RGHPL and M/S Bharat Heavy Electrical Limited, India under PDB Contract. After getting concurrence from the EXIM bank on the agreement of Lot-2 on 30 November 2019, the Notice to Proceed (NTP) to the Contractor has been issued for commencement of works on 04 December, 2019.

### Major Consulting Contract

The Consulting services contract had been concluded with M/S WAPCOS LIMITED, India on 16th Feb, 2012. The Consultant has been carrying out the reviews and approval of design/drawing submitted by the Contractors as well as construction supervision and project management of both major contracts.

### Project Status and Progress

Under Civil and Hydro-mechanical Works:

- Excavation of access road from powerhouse

to headworks (11km) is under progress from different locations with retaining structures, cross-drainage works and side drain works.
- Excavation and support works of all adit tunnels (Adit 1, Adit 2, Adit 3 and Adit 4) have been completed.
- Headrace tunnel excavation and rock support works are under progress from 5 different 5 faces with completion of 3,100 m out of 6,270m.
- Pressure shaft excavation and support works are under progress.
- The excavation and rock support works of 10 m diameter surge shaft with well depth 61m has been completed and the concrete lining works is under progress.
- Powerhouse excavation work, slope protection work and foundation work have been completed and RCC work of super structure is under progress.
- All foundation, super structures and steel structure installation of permanent bridge over Raghuganga River have been completed and commissioned on 23 November, 2020.
- Model studies of headworks and desander have been successfully conducted at IRI Institute at Roorkee. Design works of headworks and associated structure are in progress.
- Headworks right bank protection work has been completed, whereas the left bank excavation and protection work are under progress.

**Headworks Construction in Progress Powerhouse RCC under Progress**

### Under Lot 2: Electro-mechanical Works

- Model testing of turbine had been completed.
- Design of electro-mechanical components is in progress.
- Laying of earth mat in of powerhouse has been completed.
- Delivery of the lower pit liners, central frame work and embedment parts is under progress.

### Intended Time of Completion

The completion date of the project had been scheduled in December 2022. However, due to delay in the approval for import of explosives and supplementary master list, weak geological condition and also due to surge in the prices of commodity of copper, aluminum, nickel and steel scrap following Ukraine-Russia war, the construction works have been affected. Accordingly, the project completion schedule is extended to 19 August 2023.

## Trishuli Jal Vidhyut Company Limited

Trishuli Jal Vidhyut Company Limited (TJVCL), is a JV of Nepal Electricity Authority (NEA) and Nepal Doorsanchar Company Limited (NDCL) established in 2011 with the main objective of developing Upper Trishuli 3B Hydroelectric Project in Nuwakot and Rasuwa districts. Both

NEA and NDCL have equal (30% each) equity shareholding in the Company. Rest of the equity share has been allocated to the general public, natives of Nuwakot and Rasuwa districts, local governments of Nuwakot and Rasuwa districts, employees of NEA and NDCL among others.

Upper Trishuli 3B Hydroelectric Project (UT3BHEP) is a Run of River type cascade development project with an installed capacity of 37 MW. The project will utilize the water coming out of the tailrace tunnel of the upstream Upper Trishuli 3A Hydroelectric Project. A headpond will be constructed at the outlet of the upstream project to divert the water towards the headrace tunnel of the UT3BHEP.

Some of the major features of the project are highlighted in the table below:

| | |
|---|---|
| Headpond<br><br>Approach Pressure Conduit: | 29 m x 5.2 to 11.0 m x 7.4 to 14.8 m<br><br>243.47m (L) |
| Headrace Tunnel | 3805.48 m |
| Surge Tank | 15 m Dia. & 39.3 m High |
| Vertical Shaft | 4.2 m Dia. & 66.51 m Long |
| Powerhouse | 55.44 m×19.30 m×32.37 m |
| Tailrace | 115.06 m |
| Turbine Type/ Number | Francis (Vertical Axis)/2 |
| Generator | 22.7045 MVA/ 2 |
| Transmission Line | 3 km |

Following are the highlights of the major work completed till the end of FY 2021/22:

- About 85% concreting of the approach pressure conduit and headpond has been completed.
- About 3300 m (86.9%) of HRT excavation with temporary support has been completed.
- Excavation and final support of surge tank slope has been completed.
- About 20% of excavation and temporary support of surge tank Shaft has been completed.

**Approach Pressure Conduit**

- Excavation and temporary Support of upper and lower horizontal penstock and penstock vertical shaft have been completed.

**Penstock Vertical Shaft Excavation & Temporary Support**

- Powerhouse excavation and slope support has been completed.
- About 25% structural concreting of powerhouse has been completed.
- About 20% structural concreting of tailrace conduit has been completed.

**Powerhouse Foundation Concreting & Slope Support**

- Manufacturing and delivery of draft tube elbow and draft tube cone has been completed. Installation is under progress.
- Manufacturing of powerhouse crane, main inlet valve and speed governor has been completed. Manufacturing of spiral case, runner, and generator etc. is under progress.

After lengthy disruption of about 15 months mainly due to the Covid19 pandemic, the construction of the project has been going on smoothly since April 2021. However, the continuous encountering of poor geological condition and restricted goods movement through Rasuwagadhi border are affecting the progress of the project. As per the latest updated construction schedule, the Project would be completed in September 2023.

## Power Transmission Company Nepal Limited

Power Transmission Company Nepal Limited (PTCN), a subsidiary of Nepal Electricity Authority, (NEA) was established on 16 September, 2007 with the main objective of developing high voltage transmission interconnection system between Nepal and India for the mutual interest and benefit of both the countries. Nepal Electricity Authority (NEA), Power Grid Corporation of India Limited (PGCIL), Hydroelectricity Investment & Development Company Limited (HIDCL) and IL&FS Energy Development Company Limited (IEDCL) have subscribed 50%, 26%, 14% and 10% Shares of PTCN respectively.

Two Joint Venture Companies - one in India and other in Nepal were incorporated for implementation of 400 kV double circuit line interconnection between Muzaffarpur in India and Dhalkebar in Nepal.

- The 42.1 km long section of Dhalkebar-Mujaffarpur 400 kV double circuit TL lying within the Nepalese territory was successfully constructed by PTCN and initially charged at 132 kV voltage level under contingency arrangement on 19 February 2016, which was charged at 220 kV on 16 August 2018 and finally charged to 400 kV level with effect from 11 November 2019 and the entire line from Muzaffarpur to Dhalkebar is running satisfactorily at 100% availability till now.

India portion consisting of about 86 km line from Muzaffarpur Sub-station of POWERGRID in Bihar to India Border at Sursand/Bhittamod has been implemented by 'Cross Border Power Transmission Company Limited' (CPTC) - a Joint Venture of IL&FS Energy Development Company Limited (IEDCL), POWERGRID, SJVN Limited and NEA . The estimated cost of India portion is NRs. 3,880 million and debt funding of NRs. 3,313 million is tied through Power Finance Corporation of India Ltd.

Contracts EPC for both Nepal & India Portions were awarded to M/s TATA Projects Limited and M/s KEC International Limited respectively following the International Competitive Bidding process undertaken by POWERGRID.

Annual turnover and profit after tax of PTCN during FY 2021/22 is NRs. 316.39 million and NRs. 125.42 million respectively. PTCN has distributed 18% dividend to its shareholders and accordingly,

NEA has received NRs 40.5 million during this year.

## NEA Engineering Company Limited

Since the establishment, NEA Engineering Company Limited (NEC) is progressing towards its core vision and mission in the field of engineering consulting services. The Company is providing the complete consulting services for feasibility study, detail engineering design, review of the design and documents, project management, construction planning and supervision of hydropower and other infrastructure projects in different fields such as civil, hydro-mechanical, electro-mechanical, transmission line and distribution system, operation/maintenance and rehabilitation works etc.

A brief description of the major projects completed and under study within FY 2021/21 are as follows:

### Study Completed Projects

- Phukot Karnali PROR Hydroelectric Project (PKHEP) - 480 MW;
- Betan Karnali Hydroelectric Project (BKHEP) - 439 MW;
- Kimathanka Arun Hydroelectric Project (KAHEP) - 450 MW;
- Design Check and Construction Supervision of 400 kV Dhalkebar Substation Project;
- Detailed Engineering Design of Sitalpati 400/220kV Substation Project;
- Detail Feasibility Study of Jhurjhure 132 kV Transmission Line and Substation Project;
- Study of Problematic Tower along Gonger - Khimti 220 kV Transmission Line Project;
- Transmission Line Route Optimization of Ghorahi - Madichaur 132 kV Project;
- Route Alignment Detail Survey of Chobhar - Patan - Chapagaon 132 kV DC (underground) Transmission Line Project;
- Detailed Feasibility Study of Chandrapur - Sukdev Chowk 132 kV Transmission Line Project;
- Preparation of Design, Cost estimates and Specification for Flood Protection Wall of 400 kV Inaruwa Substation Project;
- Preparation of Detailed Design, Drawings, Cost Estimate and Bidding Documents for Power Evacuation of Upper Sanjen Project to Chilime Power Plant;
- Design Review and Finalization of Design of Surge Pond/Shaft of Sunkoshi Marin Diversion Multipurpose Project; and
- Transmission Line Study of Upper Modi Hydroelectric Project (UMHEP).

### Under Study Projects

- The contract agreement was signed in March 2022 between NEC and Modi Jalvidhyut Company Limited. The scopes of the services under this contract are to provide the consulting services for update the project cost, review and finalize bidding documents, assist the client for selection of Contractor for the execution of projects, construction supervision and contract administration for Upper Modi Hydropower A Hydropower Project and Upper Modi Hydropower Project. The review and update of the project cost and bidding documents is in the final stage.

**Contract Agreement between NEC and Modi Jalvidhyut Company Ltd.**

- The contract agreement was signed in December 2020 between NEC and Jagdulla

Hydropower Company Limited to conduct the detailed feasibility and engineering study including preparation of bidding documents of Jagdulla A Hydroelectric Project. The project work is scheduled to be completed in December 2022.

- The contract agreement was signed in Feb. 2019 between NEC and Vidhyut Utpadan Company Limited (VUCL) to conduct the detailed feasibility and engineering study including preparation of bidding documents of the Mugu Karnali Storage Hydroelectric Project. The project work is scheduled to be completed by June 2023.
- Study and recommendations for protection measures at the Camp area of Rasuwagadhi Hydroelectric Project (RGHEP) is underway.

The environmental study projects include:

- Environmental Impact Assessment (EIA) Study of Phukot Karnali, Kimathanka Arun, Betan Karnali and Jagadulla Hydroelectric Projects;
- EIA Study of Ratmate - Rasuwagadhi - Kerung 400kV Transmission Line Project; and
- Environmental and Social Studies of Distribution System Upgrade and Expansion Project (DSUEP).

The transmission line projects include:

- Hetauda - Dhalkebar - Inaruwa 400 kV Transmission Line and 220/132 kV Substation Projects;
- Design check and Construction Supervision of 400 kV Hetauda and Inaruwa Substations;
- Detail design and Environmental Study of Kimathanka Arun - Arun Hub 400kV Double Circuit Transmission Line Project;
- Site Supervision Works of Chilime Trishuli 220 kV Transmission Line Project; and
- Design and Preparation of Conductor Stringing Charts and supervision Works of Hetauda - Bharatpur 220 kV Transmission Line Project.

The contract agreement was signed between NEC and 25MWp Grid Tied Solar Project, NEA in October 2019. The main objective of the consulting services is to carry out design and documents review, supporting contract management and construction supervision. The project construction activity at site is being continued and expected to be completed by December 2022.

In addition, NEC has been carrying out construction supervision of Rehabilitation and Modernization of Trishuli HEP- 24 MW and Rehabilitation and Modernization of Gandak HEP - 15 MW and Detailed Feasibility Study of Rehabilitation of Tinau HEP-1000KW.

## Tamakoshi Jalvidhyut Company Limited

Tamakoshi Jalvidhyut Company Limited has been registered on Company Registration Office for development of Tamakoshi V HEP in a company model.

Tamakoshi V Hydroelectric Project with an installed capacity of 99.8 MW is a cascade development of Upper Tamakoshi Hydroelectric project (UTHEP) with tandem operation. The project, being a cascade development to UTHEP, does not require separate headwork. It takes necessary design discharge from the tailrace of the UTHEP through an underground inter-connection arrangement and conveys to headrace tunnel of the project. An underground powerhouse is proposed at Suri Dovan.

The Detailed Engineering Design and Tender Document Preparation work for the project has been completed by the Consultant- Tractebel Engineering GmbH (Formerly Lahmeyer International GmbH), and has submitted Final Detail Design Report and Tender Documents. Bids for Contract-1 Civil and Hydro mechanical Equipment works have been invited.

In order to finalize the financing for the

construction of Tamakoshi V HEP, discussions have been made with different financing institutions. A tripartite MoU agreement has been signed between Nepal Electricity Authority, Tamakoshi Jalvidhyut Company Limited and Employee Provident Fund (EPF) on 25 July, 2021 for financing the project. Currently, the project is being conceptualized to be developed in debt equity ratio of 70:30. As per the requirement of EPF, the project appraisal and due diligence audit report have been submitted by the Independent National Consulting Firm.

The discussions are underway between NEA, TKJVC and EPF for conclusion loan agreement for financing of the project.

## Upper Arun Hydroelectric Limited

As per the Government of Nepal (GON)'s decision of 21 September 2018, Upper Arun Hydroelectric Limited (UAHEL) was established as a subsidiary company of NEA to develop Upper Arun Hydroelectric Project having an installed capacity of 1,061 MW. UAHEL has been granted the Survey License of Upper Arun Hydroelectric Project along with Ikhuwa Khola Hydropower Project (IKHPP, 30MW). In addition, UAHEL has acquired the Survey Licenses for two transmission lines to evacuated power from UAHEP (400 KV DC) and IKHPP (132 KV) up to Sub-station at Haitar.

The GON and the World Bank (WB) entered into a financial agreement under Power Sector Reform and Sustainable Development Hydropower Projects (PSRSHDP) for the study of UAHEP & IKHPP to prepare the projects for early implementation.

Upper Arun Hydroelectric Project is a Peaking Run of River (PROR) located in the district of Sankhuawasabha about 40 km north of Khandbari, (the district headquarter) and due east of Kathmandu. UAHEP is one of five cascade HEPs planned on Arun River, a tributary of the Saptakoshi River, which originates in Tibet, China and enters Nepal from Kimathanka at the Nepal-China border. The Consultant [CSPDR (China)-Sinotech (Taiwan) JV] for Detailed Engineering Design and Preparation of Bidding Document of UAHEP has submitted the Updated Feasibility Study Report (UFSR) on 19 May, 2021.The UFSR of UAHEP has been accepted by NEA after the approval by the Dam Safety Panel of Experts (DSPOE).

The project consists of 100 m high dam, 8.4 km long headrace tunnel, sediment bypass tunnel, 20 m diameter surge tank, 484 m high and 7.3 m diameter pressure drop shaft, 39 m long penstock before bifurcation leading to 6 individual penstocks to feed 6 units of Pelton turbines in an underground powerhouse of size 230.05m x 25.7m x 59.43 m. The power from UAHEP will be evacuated to the national grid by the construction of 5.79 km long 400 KV double circuit transmission line to the substation located at Haitar, Sankhuwasabha.

The total annual eenergy generation will be 4,512 GWh and the total static project cost (CAPEX) has been estimated to be 1,377.31 MUSD. The cost per kW of the project is 1,324USD, whereas the levellized cost of energy is 3.9 USD/KWh.

The following is the present status of the main activities of the project:

- The Expression of Interest (EOI) has been called for the procurement of Engineer for tender design, bidding document preparation, construction supervision & post construction services for Upper Arun HEP. The evaluation of submitted EOI is ongoing. The Engineer will be expected to be on board by January 2023.
- The Consultant, JV of KYONG DONG Engineering Co. Ltd., Korea & Nepal consult (P) Ltd. in association Total Management Services Pvt. Ltd. for assignment of "Detailed Engineering Design, Tender Document Preparation and Construction Supervision

and Contract Management of Access Road Construction for UAHEP" has submitted the Final Design Report and Bidding Document. A Tender has been called for the "Construction of Access Road for Upper Arun Hydroelectric Project" on 23 May 2022. The pre-bid meeting was held in the project office on June 22, 2022. The access road Contractor will be on site by February 2023 and the access road for the project will be completed by November 2025.

**Site Visit by the Minister and World Bank Team and Public Hearing**

- For Environmental study of the Project, three consultants namely, Environment and Social Studies Department (ESSD) of NEA, Environmental Resources Management (ERM, USA) and NEFIN (Nepal Federation of Indigenous Nationalities) are being involved. ERM Inc., USA was assigned the task of ESIA, CIA and SPS work of hydropower component. The environmental and social studies of the project are being carried out complying with the WB and EIB requirements including Free Prior Informed Consent (FPIC) of the local indigenous community. The ES Consultant has submitted all the reports, which are being reviewed by the NEA/WB/ESPOE. EIA of the project submitted to Department of Electricity Development (DoED) recently.
- The NEFIN has submitted their 4th deliverable namely FPIC IPP Consultations and Consent Decision Preparation Report and has been approved by Panel and World-Bank. FPIC process is on the final stage.
- Soil, Rock and Concrete Laboratory (SRCL) has been assigne for the responsibility of the geotechnical investigation work including borehole drilling. The total drilling depth of 1,550 m has been completed till date. The remaining 4,125 m borehole drilling and all geotechnical investigation works are expected to be completed by November 2022.
- The notice has been published for land acquisition for the project and the Compensation Determination Committee (CDC) has begun the process with the formation of Sub-committee. The process for tree cutting permission has also been initiated. The land acquisition and tree cutting permission (forest clearance) for Access Road are expected to complete by December 2022.
- The main civil works of the project is planned to start in November, 2024 and the project is expected to commission by the end of 2030.

The Project is expected to be funded through a debt-to-equity ratio of 70:30. The debt portion will be provided by Multilateral Development banks (MDB), Development Finance Institutions (DFI) and domestic lenders (DL). The World Bank, as requested to lead the Consortium of International Lenders, is keen on financing the project. Numbers of International Lenders' conferences have been organized on the leadership of Ministry of Finance and the

World Bank to arrange the financing for the project. The equity portion will be raised from NEA, the general public, employees of qualifying institutions, and other participating institutions. HIDCL is leading the Consortium of domestic financiers for debt financing of the project. Accordingly, UAHEL is expected to sign a Memorandum of Understanding with the Consortium very soon.

The project is also a candidate for the GoN's flagship program, "Nepal ko Paani, Janta ko Lagaani Program", which is intended to ensure the participation of all citizens of Nepal in the development of hydropower.

## Modi Jalvidyut Company Limited

Modi Jalvidyut Company Limited (MJCL) is a subsidiary company of Nepal Electricity Authority established to develop two projects, Upper Modi A Hydroelectric Project (UMAHEP) of 42MW and Upper Modi Hydroelectric Project (UMHEP) of 18.2 MW. MJCL is carrying out all the project activities for both projects since September 2021. Both projects are located approximately 250 km west of Kathmandu on Modi Khola at Annapurna Rural Municipality of Kaski District, Gandaki Province of Nepal.

Detailed Engineering Design Reports and Bidding Documents of Civil, Hydro-Mechanical, Electromechanical and Transmission line were prepared by the International Consultant, AF-Consult Switzerland Limited in September 2020. Generation license for UMAHEP and UMHEP have been acquired from Department of Electricity Development. Similarly, Environmental Impact Assessment (EIA) of UMAHEP and supplementary EIA report for UMHEP have been approved from Ministry of Forest and Environment. The IEE study of transmission line is still in progress and is expected to be approved within this year.

The total private land to be acquired for UMAHEP and UMHEP is about 196 Ropani and 57 Ropani respectively. Official procedure required for the acquisition of private land for both projects has been completed and the distribution of compensation is at the final stage except for the transmission line. Likewise, for the permission to utilize government land and cutting of forest tree, verification from ACAP was completed and the request for approval has been sent to the Ministry.

**Upper Modi A Headworks Area and Under Construction Camp Facilities**

Camp Facilities Construction Works at Syauli Bazar, Ghandruk Kaski for both projects are under construction stage and till now about 27 % of the physical progress has been achieved. The camp construction work is expected to be completed within this FY.

MJCL has signed an MoU on Grid Connection Agreement with NEA in April 2022 and Draft Power Purchase Agreement with Power Trade Department, NEA in May, 2022 for UMAHEP. According to this agreement, the total annual average energy generation of UMAHEP is 243.58 GWh. Similarly, the PPA of UMHEP is with an average annual energy of 106.14 GWh is still on the process.

As a part of financial closure for the construction, operation and maintenance of UMAHEP, a Term Sheet for Facilities Agreement has been signed with NMB Bank Limited as lead bank and Hydroelectricity Investment and Development Company Limited (HIDCL) in April, 2022.

## Uttarganga Power Company Limited

Uttarganga Power Company Limited (UGPCL), established on 30 March 2017 as a subsidiary company of NEA, has undertaken study of Uttarganga Storage Hydroelectric Project. The project site is located about 400 km west of Kathmandu in Baglung district of Gandaki Province. The dam site is located at Gaba village in Uttarganga River. The surge shaft and powerhouse-1 are located at Halechaur and powerhouse-2 is located at Samja Kharka. The project site is accessible from the Baglung - Burtibang road. The access road to the powerhouse site is a part of the Puspalal Mid-hill Highway between Burtibang and Rukum. The dam site is accessible through a 48 km fair weather road from Burtibang Bazar, part of which lies on the Saljhandi-Dhorpatan road. However, upgrading and realignment of certain parts is required for the project construction.

**Geotechnical Investigation at Powerhouse site and High Level Site Visit led by the Minister**

Major components of the project are 200 m high rockfill dam, sloping type intake, 8.51 km long headrace tunnel, circular restricted orifice type surge shaft, 5.2 m diameter penstock pipe, etc. The tailrace cum construction adit of powerhouse-1 has a length of 408 m, whereas powerhouse-2 tailrace has a length of 2,334 m. Both powerhouses 1 and 2 are underground consisting of four units of vertical shaft Pelton turbines. The installed capacity of powerhouses 1 and 2 are 417 MW and 404 MW respectively. Tandem control arrangement is conceptualized between powerhouses 1 and 2 during its operation. A 65 km long 400 kV double circuit transmission line is proposed to evacuate the power to the proposed Uttarganga Hub in Rukum.

In FY 2021/22, the overall progress status is listed below:

- The contract agreement was signed with Mahab Ghodss Consulting Engineering Company, Iran as international consultant for review of feasibility study report, preparation of detailed engineering design and bidding documents.
- The final report of Environmental Impact Assessment (EIA) is under review for approval at Ministry of Forest and Environment, GoN.
- Soil, Rock and Concrete Laboratory (SRCL), as a Consultant for geological and geotechnical investigation, has completed core drilling of 330 m depth at the proposed powerhouse site.
- The geological mapping, geophysical survey and construction material survey are being carried out at the project site by SRCL under geotechnical investigation works phase III.
- The readings of the staff gauge height are being taken throughout the year at the dam site and tailrace site of the project.

# CENTRAL ACTIVITIES

## Internal Audit Department

The Internal Audit Department (IAD) is an independent organizational unit that is accountable directly to the NEA Board and is functionally and organizationally distinct from the NEA's other units. It has a role to provide independent assurance that organization's risk management, governance and internal control processes are operating effectively. The purpose, authority and responsibility of the internal audit activity is formally defined by the NEA's Financial Administrative Bye laws, 2073 and Internal Audit Guidelines. Guided by the Audit Committee and headed by the Director, IAD is responsible for planning, executing, monitoring & evaluation of audit as per the organizational guidelines as well as Nepal Auditing Standards.

### Role of the internal Audit

Internal auditing is an impartial assurance and advisory activity designed to add value and improve the organization's performance. It helps the organization to achieve its goals by systematically and methodically assessing and improving the performance of risk management, control procedures and organizational management.

### Limitations of Internal Audit

Internal control systems, no matter how well designed and operated, are affected by inherent limitations. These include the possibility of poor judgment in decision-making, human error, control processes being deliberately circumvented by employees and others, management overriding controls and the occurrence of unforeseeable circumstances.

### Audit Committee

NEA has formed a three member -Audit Committee, headed by a member of the NEA Board and two experts each from finance and energy sector. The roles, composition and necessary powers and responsibilities of the Audit Committee are set out by the Board in NEA's Financial Administrative Byelaws. The roles of the audit committee are:

- Facilitating communication between the Board of Directors and the internal and external auditors;
- Facilitating the maintenance of the independence of the external auditor;
- Providing a structured reporting line for internal audit and facilitating the independence of the internal auditor; and
- Monitoring the financial reporting process and effectiveness of the company's system of internal check, internal audit and risk management

## Divisions within Internal Audit Department

| | |
|---|---|
| **Financial Audit** | • Verification of the effectiveness and efficiency of internal control over the financial reporting process.<br>• Review of the internal processess, compliance with applicable laws, accounting standards, rules and regulations, organizational policies, propriety audit. |
| **Technical Audit** | • Audit of technical norms and standards, energy balance, preventive as well as breakdown maintenance, condition monitoring and electricity loss as per the guidelines available. |
| **Management Audit** | • Review of implementation of managerial plans, policies, procedures, and targets, procurement management, organizational structure, job analysis program, accountability and monitoring & evaluation. |
| **Risk Management Audit** | • Review of internal control with risk management point of view.<br>• To evaluate whether there is a Risk Management Framework in place which can enable the risk management process to be carried out and developed in a comprehensive manner, whereby all significant risks are identified, evaluated, controlled, monitored and reported in accordance with best practice. |

The department performs the aforesaid audits on quarterly, half yearly and annual basis and reports to the Audit Committee and Managing Director of NEA. The audit committee holds regular meeting and interactions with the Department for providing directions on matters related to audit.

## Audit Coverage

| Offices | Financial Audit | | Technical Audit | | Management Audit | |
|---|---|---|---|---|---|---|
| | FY 2021/22 | FY 2021/22 Quarterly & Half Yearly | FY 2021/22 | FY 2021/22 Quarterly & Half Yearly | FY 2021/22 | FY 2021/22 Quarterly & Half Yearly |
| Central Office | - | 2 | - | - | - | - |
| DCS Directorate | 118 | 105 | 23 | 38 | 41 | 58 |
| Transmission Directorate | 7 | 1 | 4 | 1 | 1 | 5 |
| Generation Directorate | 16 | 1 | 2 | 5 | 4 | 6 |
| Engineering Service Directorate | 6 | 2 | - | - | - | 1 |
| NEA Projects | 16 | 8 | - | - | - | 1 |
| **Total** | **163** | **119** | **29** | **44** | **46** | **71** |

## Capacity Building & Resource Strengthening

- Service of 7 Chartered Accountants (on contract basis) for improving quality of audit, professional ethics and standards among the auditors.
- Planning for conducting training on M-Power (Revenue) software IAD members to enhance their performance.
- Implementation of Database Management

System from this fiscal year for standardized, consistent system of handling audit report, document security & confidentiality and easy access of data.
- Planning for formulation and implementation of Risk Based Audit Manual for conducting audit by identification of risky areas.

### Way Forward

Apart from the existing roles, the Department has planned to bring innovative efforts to revamp the internal audit function to contribute within and outside the Department.

- Periodic certification of Financial Statements and Financial Indicators for publication/ report to Stakeholders;
- Increase number of trained and capable resources through continuous training and development activities;
- Maintain a system of stepwise review of Audit Documentation and Report of each and every audit team. Report will be forwarded only if the audit documentation and report thereon is within the Standard set;
- Conduct special assignment to resolve long pending issues and risky areas identified;
- Maintenance of audit documentation and audit reports in Database Management System for easy access of reports and management response by departments and reported units; and
- Preparation of directorate wise consolidated concise internal audit reports;

### Major Improvement Required

The Department is continuously making efforts in enhancing the level of economy, efficiency and effectiveness of the audit work performed. However, following are the major improvements required in Internal Audit Department:

- The Department should be provided with adequate skilled and competent manpower.
- Efforts shall be made for retention and development of staffs.
- Adequate training programs should be conducted to refine the knowledge of the auditors.
- The organization should introduce a system of providing incentive, as a motivational factor, to attract and retain good auditors thereby increasing the effectiveness of internal audit of NEA.

## NEA Board Matters

It is the body, which functions in policy making for the organization. The Honorable Minister of Energy, Water Resources and Irrigation, Ms. Pampha Bhusal has been presiding the NEA Board since 21 July 2021. Mr. Sushil Chandra Tiwari, Secretary, Ministry of Energy, Water Resource and Irrigation has been representing as an officio member in the NEA Board since 18 May 2022. Mr. Devendra Karki was an officio member. Similarly, Mr. Krishna Hari Pushkar, Secretary (Revenue), Ministry of Finance is representing as an officio member in the NEA Board from 27 October 2021 following the retirement of an ex-officio member Mr. Ram Sharan Pudasaini.

Mr. Kul Man Ghising has been representing as a member secretary in the Board since 12 August 2021. Earlier Hitendra Dev Shakya represented as ex-officio member secretary in the board. The rests of the board of directors remain unchanged. Mr. Vishwo Prakash Gautam, Mr. Rajendra Bahadur Chhetri, Mr. Bhakta Bahadur Pun and Mr. Kapil Acharya are the other board members.

A total of 40 board meetings were held in FY 2021/22.

## Energy Efficiency & Loss Reduction Department

Energy Efficiency and Loss Reduction Department aims to carry out various activities in order to enhance the supply side and demand

side efficiency of electricity distribution system. The Department also performs various activities for data collection, analysis and reduction of technical and non-technical losses. The Department performs its activities through two divisions.

## Energy Efficiency Division

### Capacitor Bank Installation

For reactive compensation in distribution system and power factor improvement using shunt capacitors, the Department has awarded a contract for 339 Nos. of Automatic Power Factor Correction (APFC) Panel Boards. Distribution transformers of 200 kVA and higher ratings with low power factor shall be selected throughout the country for installation of APFC. The microprocessor based pf controller technology used in this APFC project enables sensing the existing power factor and automatic switching of capacitor units to meet the target power factor thereby preventing the leading pf status. Technical data like transformer loading in kVA, reactive power in kVAR, power factor, total harmonic distortion, information about the number of steps of switched capacitors will be reported in real time to a central server using 3G/4G network. Status of power factor improvement in all the installed locations can be viewed in real time from anywhere using IoT technology. To mitigate the effect of dominant 3rd harmonics, 14% detuned reactors have also been used in series with the capacitors to build a compact modular APFC for easy installation by the side of distribution transformers.

Installation of a total of 339 Nos. of APFC panels at Biratnagar, Birgunj, Butwal, Bhairahawa, Nepalgunj, Bharatpur, Janakpur, Itahari, Hetauda, Kalaiya, Dharan, Birtamod and Rangeli have already been completed and charged. The data from those APFC panels have been continuously monitored from the central server.

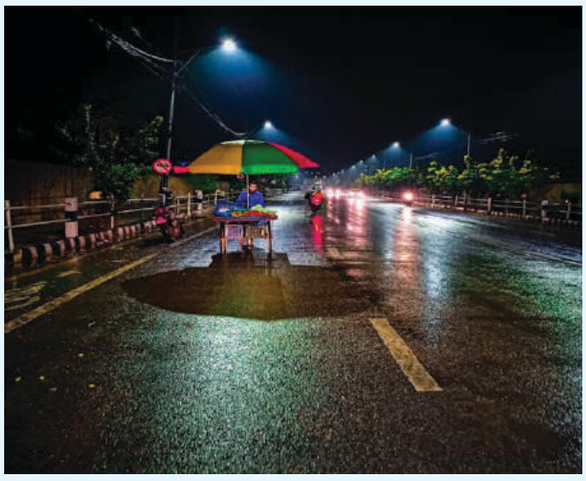
APFC and Distribution Panel Boards manufactured by Schneider Electric Co. Ltd, India have been performing quite well as per the expectation. The data related to transformer loading, capacitor switching, kVAR requirement, compensated kVAR, power factor and other required parameters can be monitored via Schneider's Cloud Service made freely available for one year post installation.

The Department has also been preparing bid documents for supply/installation of 11 kV APFC at 33/11 kV Distribution Substations for reactive power compensation and power factor improvement in FY 2022/23.

### Smart Street Light

Smart street light project at Lalitpur (Phase-I) has been already completed and the lights have been operating successfully. With the success of Smart Street Light Project in Lalitpur, several other municipalities have shown interest in collaborating with NEA, and correspondingly smart street light implementation works have been going on with joint funding of NEA and municipalities. NEA management has established a separate unit viz National Street Light Promotion Project under the Department. This project has now been conducting smart street light projects at Bharatpur, Kanakai, Belaka, Bhimeshwar, Bhimdatta, Pokhara, Lalitpur (Phase-II), Budhanilkantha, Phidim, Mahalaxmi, Siddharthanagar and Dhangadhi.

Smart technology used in these projects enable facilities listed herein but not limited to automatic switch-on of lights after sunset, auto switch-off after sunrise, full intensity of light at peak hours, dimming as required of the light luminaires at night, software billing, data storing, controlling and monitoring of individual or group of lights from central server.



Smart Street Lighting in Lalitpur

High Mast Lighting System in Bharapur

On the request of several other municipalities, the project has been preparing documents for supply/installation of smart street lights accordingly.

## Battery Energy Storage System

The Department is planning to implement Battery Energy Storage System (BESS) of 1 MW / 1 MWh capacity in the grid connected and off-grid system one each on pilot basis. Depending upon the success of the pilot project and its impact on NEA's transmission/distribution system, the energy storage system shall be later replicated for extensive use in NEA's system. Currently, the pre-feasibility study and technical analysis has been conducting in the department.

## Central Data Storage and Online Monitoring System

The Department has initiated the development of central storage of substation technical data and online data monitoring system. Actually, it is the web based data storage, processing and presenting tool which is aimed to replace the traditional practice of manual data keeping at substations by digital data system. The web based program can analyze and present these data by means of user friendly tools like graph, chart etc. These real time data continuously updated by substation personnel will save in central server of NEA. It will be useful for having an idea of power inflow and outflow, power loss, load profile, peak load of the feeders, substations etc. It will also help for future planning of distribution system expansion.

The Department has successfully completed the server installation at IT Department and software installation and testing of online data keeping and operation of data monitoring system have been successfully implemented at 25 substations outside Kathmandu Valley this year.

## EV Charging Station

As NEA, through Project Management Directorate, has already been working for installation of EV Charging Stations based on DC Fast Charging Technology at 51 prime locations throughout the country, the step forward in this direction would be to facilitate the public individual or company interested to establish charging station on their own all over the country.

Energy Efficiency and Loss Reduction Department has taken initiative in this regard to facilitate private and other public sectors for installation of EV Charging Stations. As stated in the Electricity Distribution Bye Law-2078, until other arrangements, this Department is monitoring the technical compliance of the proposed private-owned/ third party-owned EV chargers prior to the installation & grid connection of chargers. This Department has been assessing technical feasibility of the EV

chargers and after monitoring and verifying the technical specification of chargers, a recommendation to the corresponding distribution centre is provided for ensuring the required power availability for charger installation and operation.

Also, the Department has been studying and collecting the data of existing electric vehicles and charging stations in Nepal for the demand side management purpose.

### Green Hydrogen

A MOU has been signed between Global Green Growth Institute (GGGI) & NEA to implement mutually agreed technical activities for Green Hydrogen, ammonia & fertilizer production, and, in addition mobilize investment into this new sector in Nepal. The Department has been leading on behalf of NEA to collaborate with GGGI and develop preliminary assessment of green hydrogen & ammonia production in Nepal and further develop the national roadmap in this sector.

### Energy Efficiency Policies & Awareness

The Department has been actively participating, supporting, and collaborating with other government organization, NGO & INGOs in developing & implementing Energy Efficiency Policies and programs for the government.

## Loss Reduction Division

Electricity Loss Control Division has been established under Energy Efficiency and Loss Reduction Department. The division, led by a manager is entrusted with the responsibility of controlling electricity loss. It is conducting activities like random as well as planned inspection of energy meters and field raid operations coordinating with concerned distribution centers.

Electricity Theft found in Dhading DCS

Electricity Supply without Energy Meter at Melamchi

The Division also conducts the inspection of Energy Meters, CT, PT in various Substations.

The Division is dedicated towards supporting additional revenue generation by controlling electricity pilferage, tempering, demand leakage, CT/PT outage, loss due to oversize of Transformer in LT consumption, wrong MF calculation, energy meter connection as well as reverse energy.

**Electricity Theft found in Nuwakot**

In FY 2021/22, the division had set target to inspect 260 consumers with TOD meters including community consumers and 1000 meters with single and 3Ø, and whole current and digital meters installed under different provincial Offices.

Besides the annual target, the Division has also conducted loss reduction activities directed by the Managing Director as and when required.

**Inspection in Madhesh Province**

In FY 2021/22, the Division has been able to conduct inspection of 138 numbers of TOD meters, which is 103 numbers more than the inspection carried out in FY 2020/21. Similarly, the Division has inspected 487 numbers of single phase and 3Ø electromechanical/digital meters in FY 2021/22 which is 43.23 % more than in FY 2020/21. Meter inspection during FY 2021/22 is as follows:

| SN | Nos. of DCS Visited | No. of 1Ø and 3Ø Meters | TOD Meters | Amount Collected/ Billed NRs. |
|---|---|---|---|---|
| 1 | 21 | 487 | 138 | 15,71,048.73 |

# ADMINISTRATION DIRECTORATE

Administration Directorate is responsible for overall planning, organizing, directing, monitoring and evaluation of policies related to human resource management, recruitment management and general administrative and legal functions. This Directorate is also accountable for circulating and implementing of the decision of NEA board and Managing Director as well as coordination of different directorate activities. It also works as a focal point to the oversight agencies and other government agencies in relation to administrative activities of NEA. This Directorate is supported by four Departments namely Human Resource Department, Legal Department, Recruitment Department and General Services Department.

## Human Resource Department

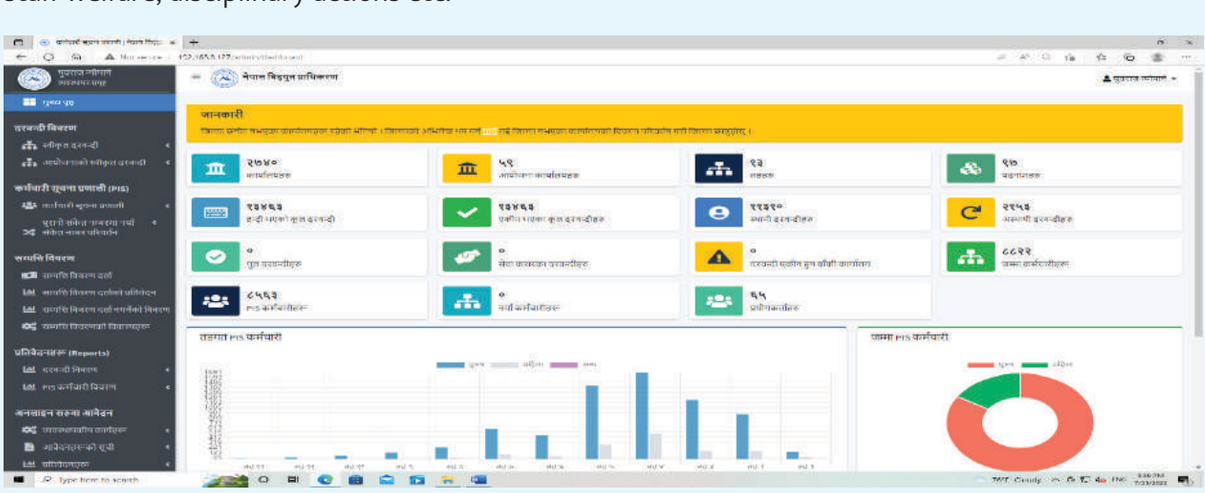
Human Resource Department is responsible for planning, organizing, directing and controlling of policies related to human resource management which consists of job analysis, placement, transfer, training and development, staff welfare, disciplinary actions etc.

During the year under review, the following major activities has been completed:

- Every employee's profile and service log has been digitized in HRIS System;
- Transfer management module has included in HRIS and will go under implementation within FY 2022/23;
- "Nepal Electricity Authority, Employee Term and Condition Bylaws 2075" has been amended its eight edition;
- "Centralized e-Attendance" has successfully tested and deployed from corporate office. Gradually, it will be extended in provincial and branch offices; and
- Organization and Management Study (O&M) has approved by BOD of NEA and endorsed to line agencies for necessary consent.

### Personnel Administration Division

A complete Human Resource Information System has been launched and in the process of implementation, that will enhance the reliability of personnel records and service log of each staff of NEA.



The status of employed human resource till the end of FY 2021/022 is given in the Table below.

| Level | Service | Approved Position | | | Existing situation | | |
|---|---|---|---|---|---|---|---|
| | | Regular | Project | Total | Permanent | Periodical/ Daily wages | Total |
| Managing Director | | 1 | 0 | 1 | 1 | 0 | 1 |
| DMD (Level-12) | Technical/ Non-Technical | 9 | 0 | 9 | 9 | 0 | 9 |
| Officer Level (Level 6-11) | Technical | 1258 | 113 | 1371 | 1187 | 0 | 1187 |
| | Non-tech | 593 | 23 | 616 | 544 | 6 | 550 |
| | Total | 1851 | 136 | 1987 | 1731 | 6 | 1737 |
| Assistant Level (Level 1-5) | Technical | 5992 | 0 | 5992 | 4250 | 72 | 4322 |
| | Non-tech | 3321 | 0 | 3321 | 2413 | 54 | 2467 |
| | Total | 9313 | 0 | 9313 | 6663 | 126 | 6789 |
| **Grand Total** | | **11173** | **136** | **11310** | **8404** | **132** | **8536** |

The total numbers of approved position in NEA stands at 11,310, whereas working staff by the end of FY 2021/022 remained 8,404. The vacant positions are in the process of recruitment via Public Service Commission. During the year under review, total 369 employees got retirement, comprising of compulsory retirement of 244, voluntary retirements of 83, resignation of 10, whereas 27 employees have deceased during their service period.

Central Personnel Administration Section has accomplished the following human resource activities in FY 2021/022:

| S. N. | Description | Nos. |
|---|---|---|
| 1. | Regular Transfer, deputation in NEA projects & NEA Subsidiary Companies | 932 |
| 2. | Promotion & Placement | 1,180 |
| 3. | Special Promotion | 89 |
| 4. | Appointment of Daily Wage Employees | 09 |

During the year under review, five employees were suspended, one employees was dismissed from the service, four employees were terminated from the service, 11 employees were resumed for suspension and 2 employees were resumed from dismissal.

Similarly, complaints received from government agencies like Criminal Investigation Abuse of Authority (CIAA), National Vigilance Center and Ministry of Energy, Water Resources and Irrigation and NEA are being addressed.

Among a total 199 complaints received from CIAA, 99 were resolved and 20 are in still in process. Similarly among 8 complaints of National Vigilance Center, 4 complaints were resolved and remaining 4 complaints are still in process. Also among 21 total number of complaints received from the Ministry of Energy, Water Resources and Irrigation, 15 were resolved and 6 are in process. Lastly, among a total of 21 complaints within NEA, 15 were resolved and 6 are still in process.

## Employee Welfare Division

Employee Welfare Division under Human Resource Department has provided facilities in the form of Grant, Medical Insurance, Group Endowment Life Insurance and Soft Loan to the employees in accordance to NEA rules and regulations.

Under the Grant, a total amount of NRs.

3,15,90,000 has been provided to 1,460 employees under different headings. The medical insurance covering facilities under accidental and medical treatments were provided to 1,217 employees with a total amount of Rs 5,64,44,607. A payment of Rs. 45,30,11,233 was made to 480 employees under Group Endowment Life Insurance. NEA also made a payment of Rs. 62,34,08,858 for renewal of life insurance of 6,524 employees. Similarly, the total amount of Rs.77,73,30,000 was provided under soft loan in the past year.

### Human Resource Planning and Development Section

Human Resource Planning and Development Section has completed the following works in FY 2021/2022:

| S.N. | Actions | Description |
|---|---|---|
| 1 | Review of Organization and Management (O&M) Survey | Reviewed report of Organization and Management (O&M) Survey has been approved by NEA board and forward to the line ministry. |
| 2 | Nomination for Post Graduates Study in NEA Scholarship Quota | 8 (Electrical-4, Civil-2, Mechanical-1, Management-1) |
| 3 | Pre-approval for Self-Financing Study | 10 |
| 4 | Leave Granted for Study in NEA Quota | 0 |
| 5 | Leave Granted for Study in Self Finance | 10 (Phd-4, Masters-4, Bachelor-2) |
| 6 | Nomination for Post Graduates Study for Nepal Government Quota | 0 |
| 7 | Nomination for Factory Acceptance Test, Inspection, Pre-Dispatch Witness, Training, Conference, Seminar in aboard | 2 Employees for Training (India)<br>2 Employee for factory Inspection (China) |
| 8 | Review on Temporary Positions of NEA Projects | 1,533 positions for 113 projects |
| 9 | Nomination of Intern (OJT) Students from various academic institutions | 1,187 |
| 10 | Nomination of Intern to individual Students | 15 |

## General Service Department

General Service Department (GSD) is responsible for vehicle management, logistic support and security management activities, record keeping, safeguarding of related documents and provides necessary support to concerned offices. It also manages the land of NEA against encroachment and misuse. The department is also responsible for events management, publishing regular magazine "Vidyut", public relation and public grievance handling.

In the year under review, the following grievances/ complaints were lodged and resolved:

| SN | Sources of Grievances | Total Complains | Nos. of Settled | Remarks |
|---|---|---|---|---|
| 1 | Hotline Number (1150) and CRM (Consumer relationship management system) | 13,579 | 13,160 | 419 grievances are in progress. |
| 2 | Hello Sarkar | 525 | 492 | 33 grievances were sent to concerned office for resolve. |

| SN | Sources of Grievances | Total Complains | Nos. of Settled | Remarks |
|---|---|---|---|---|
| 3 | Social Media (Facebook Page, Twitter) | 530 | 529 | 1 grievance was sent to concerned office for resolve. |
| 4 | Email | 58 | 58 | All were resolved. |
| 5 | Complain Box | 6 | 2 | 4 grievances were sent to concerned office for resolve. |
| | **Total** | **14,698** | **14,241** | |

Stakeholders can submit their complaints and give suggestions through the social media https://www.facebook.com/nepalelectricityauthority and https://www.twitter.com/hello_nea and through hotline number 1150 for necessary action.

NEA has 31,485-9-1-0.96 Ropani and 153-14-12-01 Bigaha land spread all over the country. Similarly, NEA has 1,302 vehicles in service throughout the country, of which 1,176 are in working condition.

## Recruitment Department

Recruitment Department recruits and promotes the employees. The major function of this Department is to prepare and update syllabus, vacancy announcement & application collection as per Public Service Commission's schedule and directions. The written exam is conducted by Public Service Commission but the interview and final result will be prepared and declared by the Recruitment Department. Similarly, it performs staff promotion as per the prevailing employees' service bylaws. During the year in review period, 842 deserving candidates for different level has recommended for permanent services after completing the selection procedure, 547 candidates are on the process of selection. Likewise, 1043 employees of different levels were recommended for promotion to higher level.

## Legal Department

Legal Department is responsible for legal matters of NEA. It defends all legal cases of NEA in different courts throughout the country and abroad too. It provides legal advice/suggestion to the concern offices of NEA. The Department has started a separate software for archiving the corresponding legal documents as well as cases related to NEA in the form of digital format.

The Legal Department also involves in arbitration, legal drafting, bid evaluation, investigation, case study and negotiations. In the same year, the Department provided 88 numbers of legal advices to the different NEA offices. During the year, 266 number of cases were registered in different courts for and against of NEA. The different courts have finalized 66 number of cases. Out of them, 62 verdicts were in favor of NEA and 4 cases were against the NEA and 6 cases are under consideration for courts judgment. Most of the legal cases filed by industrial consumers related to dedicated feeder tariff has been settled by different courts in favor of NEA.

# FINANCE DIRECTORATE

The Finance Directorate (FD), headed by the Deputy Managing Director (DMD), is responsible for NEA's overall financial and accounting functions. Revenue administration, accounting system operation, budgetary control, and treasury management are key areas of responsibilities. Finance Directorate is also responsible for financial planning, control, and monitoring at the corporate level of decision-making. It is supported by two functional departments: Accounts Department and Corporate Finance Department. This Directorate has undertaken two separate projects, namely Institutional Strengthening Project and Physical Verification and Valuation of Assets.

## Operational Performance

The total available energy of 11,064 GWh in FY 2021/22 includes NEA's own generation of 3,259 GWh, NEA subsidiaries generation of 1,976 GWh, IPP generation of 4,286 GWh and import of 1,543 GWH from India. Out of the total available energy, 8,823 GWh was utilized in Nepal and 493 GWH was exported to India. The total availability of energy has been increased by 25% in comparison to total available energy of 8,851 GWh in FY 2020/21. The percentage of energy supplied by IPPs, NEA subsidiaries & NEA own generations out of total available energy has increased significantly from 68% to 86% this year. The increase in availability of IPP's, NEA subsidiaries and NEA's generation contributed to reduce weightage of import from 32% to 14% in the year under review.

## Number of Consumers

At the end of FY 2021/22, the total number of consumer has reached to 4.77 million. NEA also sells power in bulk and provides operational and management support to various Community Rural Electrification Entities (CREEs) operating under the Community Rural Electrification Program (CREP). The consumers of such CREEs are not included in the above figures, which is approximately 0.55 million.

The domestic consumers continued to account for 92.73 % of total electricity consumers in FY 2021/22, while the industrial including commercial and other consumers accounted for 0.96% and 6.31%, respectively.

## Revenue

NEA has kept an optimal level of reliable energy supply, which has benefited its overall financial performance. In FY 2021/22, NEA earned a gross revenue of NRs. 88,016 million from electricity sales. As NRs. 977 million has been provided as rebate to consumers, who paid on time in accordance with the electricity collection by-laws, resulting in a net revenue of NRs. 87,120 million. In comparison to the previous year, the net revenue has increased by 22%.

**Following table shows the comparison of the major category wise revenue.**

| Gross Revenue | FY 2021/22 (NRs. Million) | Weightage (FY 2021/22) | FY 2020/21 (NRs .Million) | Weightage (FY 2020/21) |
|---|---|---|---|---|
| Domestic Sales | 32,457 | 37% | 28,280 | 39% |
| Non-Commercial | 3,507 | 4% | 2,907 | 4% |
| Commercial | 9,125 | 10% | 7,412 | 10% |
| Industrial | 33,025 | 38% | 28,578 | 39% |
| Other Sales | 6,018 | 7% | 4,859 | 7% |
| Export | 3,884 | 4% | 316 | - |
| **Total** | **88,016** | **100%** | **72,352** | **100%** |

Other services and finance income amounted to NRs.9,502 million and NRs.4,546 million, respectively. NEA received NRs. 264 million in dividends from NEA subsidiaries & associate companies. NEA has invested in more than 25 subsidiaries & associate companies, of which major companies are in the construction or early stages of operation.

## Cost of Sales

In FY 2021/22, NEA's total cost of sales increased from NRs. 56,285 million to NRs. 64,255 million as compared to the previous year. Sales costs include generation, transmission, distribution, power purchase, and royalty costs. A significant increase in cost of sales was observed under the heading of IPPs power purchase cost. NEA recorded NRs. 19,025 million and NRs. 32,384 million in power purchase costs from IPPs in 2020/21 and 2021/22 respectively. Furthermore, due to the availability of power within Nepal, NEA was able to reduce power purchases from import from NRs. 21,821 million to 15,466 million in FY 2021/22 as compared to FY 2020/21. Generation and transmission costs totaled NRs. 1,946 million and NRs. 2,174 million, respectively. NEA increased its investment in strengthening the country's distribution system, resulting in an increase in distribution costs from NRs. 9,956 million to NRs. 10,709 million. Other costs of sales include NRs. 1,576 million in royalty.

## Other Costs

The interest expense in FY 2021/22 has been calculated to be NRs. 5,250 million, slightly higher compared to NRs. 4,960 million in FY 2020/21. Similarly, the depreciation & amortization expenses on property, plant, and equipment & intangible assets totaled NRs. 6,998 million in FY 2021/22 against NRs. 6,326 million in FY 2020/21. Due to a significant appreciation of the USD against Nepalese rupees, NEA recorded a foreign exchange loss of NRs. 994 million in FY2021/22 as compared to a foreign exchange loss of NRs. 225 million in FY 2020/21. NEA has provided provision of NRs. 2,750 million in FY 2021/22 for long-term employee liabilities such as gratuity, pension, medical facilities, insurance, and accumulated leave under the employees' benefit plan scheme, compared to the actual expenses of NRs. 2,730 million in FY 2020/21.

## Profit & Loss

As compared to the previous FY 2020/21, NEA's operating performance improved significantly. The operating profit increased by 73% in FY 2021/22 to NRs. 18,327 (Provisional) million from NRs. 10,591 million in FY 2020/21. The net profit after tax has been substantially increased by 164% in FY 2021/22 to NRs. 16,089 million from NRs. 6,099 million in FY 2020/21.

The following are the main reasons for the increase in profit over the previous year.

- Increase in sales revenue by 23%, from NRs. 70,859 million to NRs. 87,120 million. Increases in the number of consumers and energy consumption by 5% and 27%, respectively, contributed to an increase in sales revenue. Furthermore, the export on sales has been increased by 3,568 million in the year under review.
- Increase in NEA generation by 16.22%;
- Increase in other income by 21% from NRs. 7,881 million to NRs. 9,502 million;
- Increase in finance income by 16% from NRs. 3,907 million to NRs. 4,546 million;
- Decrease in system loss by 1.80% from 17.18% to 15.38%; and
- Effective cost control as compared to the previous year.

### Other Non-Current Assets

Property, Plant & Equipment (PPE), Capital Work in Progress (CWIP), Investments, Loan & Advances measured at amortized cost are part of non-current assets. Property, plant, and equipment (PPE) is the majority assets of NEA's return-generating assets. At the end of FY 2021/22, the net carrying amount of PPE was NRs. 180,483 million. NEA completed various distribution system reinforcements, rural electrification projects, substations, transmission line, and distribution line projects during the year, adding NRs. 21,895 million in property, plant, and equipment.

NEA has invested significant resources in various projects related to generation, transmission, and distribution during the review period. In the FY 2021/22, the total investment in capital works in progress reached NRs. 159,728 million, with a net addition of NRs. 19,244 million. Government equity and loans, foreign loans and grants, and NEA's internal fund were among the sources of investment. However, due to the considerable delay in project completion, financial returns on investments are not being materialized. Most of the investment are in hydroelectricity projects, transmission line and substation projects of various voltage levels, and rural electrification projects throughout the country.

In FY 2021/22, investments in subsidiaries, associates, joint ventures, and others totaled NRs. 37,709 million. NEA increased its investment in subsidiaries and other companies by NRs. 2,794 million during the FY. The fair value increase in investments of NRs. 16,182 million as per NFRS till 2020/21 is also included in the investment of various Subsidiaries, Joint Ventures, and Associates.

### Current Assets

Inventories, trade receivables, prepaid advances and deposits, short term loan to subsidiaries, cash and cash equivalents, and current tax assets are included under current assets. In FY 2021/22, the current assets account for 22% of total assets.

The total dues by the end of FY 2021/22 is NRs. 37,372 million. Out of this, NRs. 22,541 million is from industrial consumers (including the dues of about NRs. 17,150 million on dedicated & trunk line) and NRs. 5,182 million is from streetlight consumer.

During the load shedding, energy consumption by industrial consumers through dedicated and trunk line was coined with premium tariff. When some consumers denied to pay the tariff, the court gave its verdict in favor of NEA. However, bearing the demands of industrialists in mind, Council of Ministries, GoN formed a high-level committee for the fact finding. The committee has already submitted its report to the Council of Ministries. The partly bill collection from such dedicated and trunk line customer is about Rs. 17,150 million, which is denied by the customers for the payment. Keeping in the mind of the court verdict, NEA board has given relaxation to pay on installment basis beginning from

16th July 2021. But most of such customers are not showing their willingness to pay aforesaid outstanding.

NEA has claimed Rs 4,580 Million to GON against COVID subsidy provided by GON to domestic consumers which is yet to be received.

### Non-Current Liabilities

The total long-term borrowings from the GoN, the primary source of project financing, increased to NRs. 201,283 million in FY 2021/22, from NRs. 179,283 million in FY 2020/21. NEA received a long-term loan of NRs. 6,000 million from GoN source to invest in various projects. Similarly, donor agencies provided approximately NRs. 16,000 million as long-term loans and grants through direct payment to consultants and contractors in accordance with the GON budgetary program in FY 2021/22.

### Current Liabilities & Provisions

Trade and other liabilities, as well as short-term borrowings, are different types of current liabilities. According to NFRS, the loan repayment within the next 12 months has been presented as short-term borrowing. Since NEA's internal cash generation is used to construct projects, all reflected short-term borrowings have not been paid to GON in accordance with the loan agreement. During FY 2021/22, the current liabilities cover 20% of total liabilities. NEA contributed NRs. 1,576 million in royalties and NRs. 5,000 million in interest arrears on long-term loans in FY 2021/22.

### Equity

Equity comprises share capital, retained earnings and other reserves. GON has provided additional 7,595 million in current year as share capital resulting the total share investment of NRs. 169,033 million. NEA has reinvested the retained earnings in various transmission and distribution projects to enhance the overall system. Hence, the dividend has not declared by NEA till date.

### Donor's Commitment

The Asian Infrastructure Investment Bank (AIIB) and the European Investment Bank (EIB) have committed to provide NEA with a concessional loan in the amount of USD 112.3 million and Euro 100 million, respectively, for the electrification of Provinces 5, 6, and 7, for which a subsidiary loan agreement (SLA) with GON has been signed. ADB has also committed an additional USD 156 million for the automation and modernization of the electricity grid, for which a subsidiary loan agreement (SLA) with the government is being negotiated.

### Accounts and Audit

The Accounts Department oversees maintaining accounts, preparing financial statements, conducting statutory audits, settling irregularities, dealing with tax authorities, and so on. The Large Taxpayer's Office has completed the final income tax assessment up to fiscal year 2016/17 and started to assess for FY 2017/18. Since fiscal year 1993/94, NEA expects to settle long-pending audit qualifications totaling NRs.1.05 million. The NEA Board reviews audit qualifications on a regular basis and directs management to settle by adhering to applicable rules and procedures. The management is resolving policy-related audit qualifications through the implementation of a time-bound action plan. The accounts department is collaborating with auditors and management to complete the audit within the time frame specified.

NEA is preparing consolidated financial statements based on NFRS beginning in fiscal year 2018/19. The Office of the Auditor General has appointed Fellow Chartered Accountants Mr. Narayan Bajaj, Mr. Madhu Bir Pandey and Mr. Prabin Dhoj Joshi to conduct statutory audits for the fiscal year 2021/22. The auditors are preparing to submit the audit planning memorandum and begin the audit.

In FY 2021/22, NEA received an institutional rating from ICRA Nepal Ltd and achieved an AA+ rating, indicating that NEA has a high ability to meet its financial obligations on time.

The accounts department has started the centralized payroll and pensions system from beginning of FY 2022/23, for which separate banks for payroll & pension payments have been selected. From the middle of FY 2021/22, a vehicle management system has been integrated with the accounting software to record all vehicle details and expenditures. Furthermore, the inventory system was centralized beginning in FY 2021/22 and is scheduled to integrate with the accounting system in FY 2022/23. NEA is continuously working to improve its financial accounting and management decision support systems.

### Institutional Strengthening Project (ISP)

Information Technology (IT) is evolving in every business sector and NEA is modernizing its various operational activities to increase efficiency. NEA is working to improve its financial accounting and management decision support systems. The primary goal of this project is to acquire and implement at NEA ERP-based Package 1: Integrated Financial Management Information System (IFMIS) and Package 2: Revenue Management System (RMS). The project is currently in the process of selecting a Project Management Consultant (PMC) to oversee IFMIS and RMS implementations. The Asian Development Bank (ADB) is funding this procurement through the project Electricity Grid Modernization Project - Additional Financing.

Following the invitation of bid for "Supply and Installation of RMS", 7 bidders submitted bids. The technical bids are currently being evaluated. The bid documents for "IFMIS Supply and Installation" has been finalized and submitted to the ADB for approval. The EOI and Terms of Reference (TOR) for the procurement of PMC were published and 14 firms submitted proposals. Four companies were shortlisted. The RFP for the shortlisted firms has been finalized and submitted to the ADB for review.

### Assets Verification & Valuation Project

The World Bank-funded Asset Verification and Valuation Project of Nepal Electricity Authority (AVNEA) is a part of the Power Sector Reform and Sustainable Hydropower Development Project (PSRSHDP). The main objectives include conducting physical verification of NEA assets and inventories, developing a database/ register, valuation, recommending adjustments based on valuation and developing standard operating procedures/manuals for PPE and inventories in accordance with NFRS. The database created will be synchronized with the ERP system, which will be implemented by NEA. Deloitte Touche Tomatsu, India, has signed a contract for consulting services. Physical verification work is expected to be completed by September 2022 with valuation and other parts by October 2022.

### Retirement Fund

The Retirement Fund oversees the operation and management of the Contributory Retirement Fund (RF) of NEA employees hired after July 17, 2006, as well as the Employees Security Fund (ESF) of all NEA employees. At the end of FY 2021/022, the total number of employees involved in the RF were 5,849, while the total number of employees involved in the ESF were 9,092. At the end of FY 2021/022, the total fund balance was NRs. 4,294.45 million, of which NRs. 479.45 million has been provided as loans to the contributors. Investments in fixed deposits at banks and debentures amounts to NRs. 2,504 million and NRs. 1,311 million respectively.

## Nepal Electricity Authority

# Highlights of FY 2021/22

| Description | FY 2022* | FY 2021 | Increase/(Decrease) | |
|---|---|---|---|---|
| | | | Amount | % |
| **Revenue** | | | | |
| Net Sales Revenue -Nepal (M.NRs.) | 83,236 | 70,543 | 12,693 | 17.99 |
| Net Sales Revenue Export(M.NRs.) | 3,884 | 316 | 3,568 | 1,129.11 |
| **Total Revenue (M. NRs.)** | **87,120** | **70,859** | **16,261** | **22.95** |
| **Cost of Sales** | | | | |
| Generation Expenses (M. NRs.) | (1,946) | (1,881) | (65) | 3.45 |
| Power Purchase- Subsidaries (M. NRs.) | (8,366) | (1,124) | (7,242) | 644.31 |
| Power Purchase- IPPs (M. NRs.) | (24,018) | (17,901) | (6,117) | 34.17 |
| Power Purchase -India (M. NRs.) | (15,466) | (21,821) | 6,355 | (29.12) |
| Royalty (M. NRs.) | (1,576) | (1,608) | 32 | (1.99) |
| Transmission Expenses (M. NRs.) | (2,174) | (1,995) | (179) | 8.99 |
| Distribution Expenses (M. NRs.) | (10,709) | (9,956) | (753) | 7.56 |
| **Total Cost of Sales** | **(64,255)** | **(56,285)** | **(7,970)** | **14.16** |
| **Gross Profit** | **22,865** | **14,574** | **8,291** | **56.89** |
| Income from other Services (M.NRs.) | 9,502 | 7,881 | 1,621 | 20.57 |
| Personnel Expenses (Inc Retirement Benefits (M.NRs.) | (6,533) | (5,178) | (1,355) | 26.17 |
| General Administration & Operating Expenses (M.NRs.) | (509) | (360) | (149) | 41.39 |
| Depreciation and Amortisation Expenses (M.NRs.) | (6,998) | (6,326) | (672) | 10.62 |
| **Net Operating Expenses (M. NRs)** | **(4,538)** | **(3,983)** | **(555)** | **13.93** |
| **Operating Profit (M. NRs.)** | **18,327** | **10,591** | **7,736** | **73.04** |
| Finance Income (M. NRs.) | 4,546 | 3,907 | 639 | 16.36 |
| Finance Cost (M. NRs.) | (5,250) | (5,482) | 232 | (4.23) |
| Forex Gain/(Loss) (M. NRs.) | (994) | (225) | (769) | 341.78 |
| Impairment (Charge)/ Reversal (M.NRs.) | (500) | (2,552) | 2,052 | (80.41) |
| Other Non Operating Expenses (M.NRs.) | (5) | (6) | 1 | (16.67) |
| Share of Profit/(Losses) from JV/Associates (M.NRs) | 41 | 39 | 2 | 5.13 |
| **Net Profit/(Loss) Before Tax(M. NRs.)** | **16,165** | **6,272** | **9,893** | **157.73** |
| **Number of Consumers** | **4,766,021** | **4,529,289** | **236,732** | **5.23** |
| **Total Sales of Electricity (GWh)** | **9,363** | **7,319** | **2,044** | **27.93** |
| Internal Sold/Utilized (GWh) | 8,870 | 7,275 | 1,595 | 21.92 |
| Exported Energy (GWh) | 493 | 44 | 449 | 1,020.45 |
| **Average Sales Rate** | | | | |
| Average sales Price of Electricity Overall (NRs./kWh) | 9.30 | 9.68 | (0.38) | (3.89) |
| **Total Available Electric Energy (GWh)** | **11,064** | **8,851** | **2,213** | **25.00** |
| NEA Generation (GWh) | 3,259 | 2,804 | 455 | 16.22 |
| Purchased Energy (GWh) - Subsidaries | 1,976 | 148 | 1,828 | 1,235.14 |
| Purchased Energy (GWh) - IPPs | 4,286 | 3,093 | 1,193 | 38.57 |
| Purchased Energy (GWh) - India | 1,543 | 2,806 | (1,263) | (45.01) |
| **Average Power Power Purchase Rate** | | | | |
| Average Power Purcahse Rate- (NRs./KWh) | 6.13 | 6.75 | (0.62) | (9.24) |
| **Others** | | | | |
| Peak Load Interconnected System (GWh) | 1,747.53 | 1,482.00 | 265.53 | 17.92 |
| Self Consumption (GWh) | 38 | 34 | 4 | 11.76 |
| Net System Losses (Percentage) | 15.38% | 17.18% | (0.02) | (10.45) |

**Note:** *Provisional figures (Subject to audit)

## Nepal Electricity Authority

# Statement of Financial Position

Figures (NRs. Million)

| Particulars | 2022* | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Assets** | | | | | | | | | | |
| **Non Current Assets** | | | | | | | | | | |
| Property, Plant and Equipment | 180,483 | 165,586 | 157,384 | 125,977 | 112,985 | 90,341 | 88,521 | 86,439 | 84,239 | 83,873 |
| Capital WIP | 159,728 | 140,484 | 114,300 | 104,841 | 77,607 | 80,272 | 66,684 | 58,052 | 46,994 | 39,843 |
| Goodwill and Intangible Assets | 57 | 48 | 44 | - | - | - | - | - | - | - |
| Investment in Subsidaries & Associates | 37,709 | 34,915 | 20,768 | 20,387 | 37,793 | 33,741 | 21,755 | 17,551 | 12,288 | 6,808 |
| Deposit | 1,132 | 992 | 913 | 912 | - | - | - | - | - | - |
| Loans and Advances measured at Amortised Cost ** | 32,388 | 31,154 | 26,539 | 24,130 | 1,132 | 663 | 651 | 625 | 657 | 605 |
| **Total Non Current Assets** | **411,496** | **373,178** | **319,948** | **276,247** | **229,517** | **205,018** | **177,611** | **162,667** | **144,178** | **131,129** |
| **Current Assets** | | | | | | | | | | |
| Inventories | 10,747 | 10,421 | 11,931 | 9,483 | 7,544 | 4,218 | 3,376 | 3,170 | 2,859 | 3,043 |
| Trade and other receivables | 37,372 | 33,488 | 31,492 | 18,854 | 15,951 | 13,955 | 11,187 | 9,927 | 9,016 | 7,930 |
| Prepaid, Advances and Deposits | 14,209 | 11,610 | 6,625 | 2,127 | 3,507 | 3,700 | 3,153 | 3,158 | 2,988 | 2,696 |
| Shorterm Loan | 3,143 | 2,435 | 2,226 | - | - | - | - | - | - | - |
| Investment in Fixed deposit | 33,575 | 20,800 | 21,950 | 11,450 | - | - | - | - | - | - |
| Cash and Cash Equivalents | 12,767 | 22,767 | 19,328 | 27,097 | 34,495 | 24,824 | 15,362 | 10,622 | 6,122 | 4,715 |
| Current Tax Assets | 6,093 | 4,444 | 2,946 | 2,412 | 1,909 | 1,611 | - | - | - | - |
| **Total Current Assets** | **117,906** | **105,965** | **96,498** | **71,423** | **63,405** | **48,309** | **33,078** | **26,877** | **20,984** | **18,384** |
| **Total Assets** | **529,402** | **479,142** | **416,446** | **347,670** | **292,922** | **253,326** | **210,689** | **189,544** | **165,162** | **149,513** |

| Particulars | 2022* | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Liabilities** | | | | | | | | | | |
| **Non Current Liabilites** | | | | | | | | | | |
| Long Term borrowings | 201,283 | 179,283 | 163,737 | 133,917 | 109,550 | 100,063 | 111,304 | 98,253 | 82,692 | 75,035 |
| Deferred tax Liabilities | 7,176 | 7,176 | 3,891 | 2,244 | 2,040 | 2,598 | 693 | 693 | 693 | 693 |
| Other Non Current Liabilities | 42,224 | 40,024 | 36,353 | 26,701 | 25,945 | 23,426 | 21,359 | 19,309 | 17,259 | 13,717 |
| **Total Non Current Liabilites** | **250,682** | **226,482** | **203,981** | **162,862** | **137,535** | **126,087** | **133,356** | **118,256** | **100,644** | **89,445** |
| **Current Liabilties** | | | | | | | | | | |
| Trade and other liabilities | 54,910 | 53,536 | 52,454 | 56,823 | 59,292 | 54,484 | 51,324 | 45,743 | 37,637 | 33,019 |
| Short term Borrowings** | 3,000 | 2,658 | 2,116 | 2,087 | 10,711 | 10,619 | - | - | 700 | 1,200 |
| Other current Liabilities | 4,483 | 3,933 | 3,756 | - | - | - | | | | |
| **Total Current Liabilites** | **62,394** | **60,128** | **58,326** | **58,910** | **70,003** | **65,102** | **51,324** | **45,743** | **38,337** | **34,219** |
| **Total Liabilities** | **313,076** | **286,610** | **262,307** | **221,773** | **207,538** | **191,189** | **184,681** | **163,999** | **138,982** | **123,665** |
| **Equity** | | | | | | | | | | |
| Share Capital | 169,033 | 161,438 | 140,960 | 128,440 | 102,438 | 82,411 | 58,528 | 49,275 | 44,511 | 37,365 |
| Retained Earnings | 26,692 | 11,064 | 4,489 | (12,182) | (25,301) | (28,424) | (34,608) | (25,751) | (20,239) | 13,238) |
| Other reserves | 20,601 | 20,030 | 8,690 | 9,639 | 8,247 | 8,150 | 2,089 | 2,022 | 1,909 | 1,721 |
| **Total equity** | **216,326** | **192,532** | **154,139** | **125,897** | **85,384** | **62,137** | **26,009** | **25,546** | **26,181** | **25,848** |
| **Total Equity and Liabilites** | **529,402** | **479,142** | **416,446** | **347,670** | **292,922** | **253,326** | **210,689** | **189,544** | **165,162** | **149,513** |

* Provisional Figures (Subject to audit)

**Presented as per NFRS adjustments since 2017.

## Nepal Electricity Authority

# Statement of Profit or Loss

Figures (NRs. Million)

| Particulars | 2022* | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sales Revenue | 87,120 | 70,859 | 71,293 | 66,613 | 55,358 | 46,796 | 31,824 | 30,169 | 28,206 | 25,355 |
| **Less: Cost of Sales** | | | | | | | | | | |
| Power Purchase Cost- IPPs | (24,018) | (17,901) | (20,554) | (14,772) | (13,132) | (11,084) | (7,115) | (7,307) | (7,849) | (6,923) |
| Power Purchase Cost- NEA Subsidaries | (8,366) | (1,124) | (1,141) | (1,170) | (1,138) | (1,197) | (1,163) | (1,155) | (1,128) | (968) |
| Power Purchase Cost- India | (15,466) | (21,821) | (13,425) | (22,954) | (19,861) | (16,052) | (14,054) | (10,748) | (8,065) | (5,681) |
| Other Cost of Sales | (16,405) | (15,439) | (15,012) | (14,408) | (13,773) | (12,493) | (10,145) | (9,353) | (8,997) | (8,008) |
| Total Cost of Sales | (64,255) | (56,285) | (50,132) | (52,134) | (46,766) | (39,629) | (31,314) | (27,408) | (24,911) | (20,612) |
| **Gross Profit** | **22,865** | **14,574** | **21,161** | **14,479** | **8,592** | **7,167** | **510** | **2,761** | **3,294** | **4,742** |
| **Other Income** | **9,502** | **7,881** | **4,783** | **4,785** | **3,186** | **2,471** | **1,792** | **1,995** | **1,610** | **1,539** |
| Personnel Expenses Including retirement benefits | (6,533) | (5,178) | (6,285) | (4,944) | (4,215) | (3,374) | (3,039) | (3,189) | (4,579) | (3,198) |
| General Administration Expenses | (300) | (258) | (245) | (270) | (219) | (237) | (144) | (134) | (150) | (163) |
| Depreciation and Amortisation Expenses | (6,998) | (6,326) | (5,339) | (4,852) | (4,210) | (3,755) | (3,554) | (3,471) | (3,297) | (3,229) |
| Other Operating Expenses | (209) | (102) | (181) | (57) | (87) | (67) | (52) | (58) | (48) | (34) |
| **Operating Profit** | **18,327** | **10,591** | **13,894** | **9,141** | **3,046** | **2,205** | **(4,487)** | **(2,097)** | **(3,170)** | **(343)** |
| Finance Income | 4,546 | 3,907 | 5,337 | 4,807 | 3,522 | 2,436 | 1,458 | 1,122 | 547 | 330 |
| Finance cost | (5,250) | (5,482) | (4,537) | (3,985) | (3,283) | (3,546) | (5,080) | (4,670) | (4,235) | (4,040) |
| Other gains/(losses)/Forex | (994) | (225) | (228) | (9) | (278) | 411 | (746) | 523 | 53 | 652 |
| Impairment (Charge)/ Reversal | (500) | (2,552) | (1,139) | (172) | (30) | - | - | - | - | - |
| Other Non-operating expenses | (5) | (6) | (2) | (11) | (31) | (3) | (34) | (8) | (3) | (5) |
| Share of profit from investment in JV/Associates | 41 | 39 | 41 | 68 | 29 | - | - | - | - | - |
| **Profit before income tax** | **16,165** | **6,272** | **13,366** | **9,838** | **2,975** | **1,502** | **(8,890)** | **(5,130)** | **(6,808)** | **(3,405)** |
| Income Tax expense | (76) | (66) | (44) | (36) | (79) | - | - | - | - | - |
| Deferred Tax (Charge)/Reversal | - | (107) | (1,568) | 9 | 543 | - | - | - | - | - |
| **Profit for the period** | **16,089** | **6,099** | **11,754** | **9,811** | **3,439** | **1,502** | **(8,890)** | **(5,130)** | **(6,808)** | **(3,405)** |

* Provisional Figures (subject to Audit)

## Nepal Electricity Authority

# Ratios

| Particulars | 2022* | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 |
|---|---|---|---|---|---|---|---|---|---|---|
| Profitability Ratios | | | | | | | | | | |
| Gross Profit Ratio | 26% | 21% | 30% | 22% | 16% | 15% | 2% | 9% | 12% | 19% |
| Operating Profit Ratio | 21% | 15% | 19% | 14% | 6% | 5% | -14% | -7% | -11% | -1% |
| Net Profit Ratio | 23% | 9% | 16% | 15% | 6% | 3% | -28% | -17% | -24% | -13% |
| Liquidity & Turnover Ratio | | | | | | | | | | |
| Current Ratio | 1.89 | 1.76 | 1.65 | 1.21 | 0.91 | 0.74 | 0.64 | 0.59 | 0.55 | 0.54 |
| Quick Ratio | 1.72 | 1.59 | 1.45 | 1.05 | 0.80 | 0.68 | 0.58 | 0.52 | 0.47 | 0.45 |
| Interest Coverage Ratio | 4.82 | 3.09 | 4.24 | 3.51 | 2.21 | 1.68 | -0.18 | 0.29 | 0.03 | 0.71 |
| Total Assets Turnover Ratio | 0.16 | 0.15 | 0.17 | 0.19 | 0.19 | 0.18 | 0.15 | 0.16 | 0.17 | 0.17 |
| Efficiency | | | | | | | | | | |
| Inventory Turnover Ratio | 5.98 | 5.40 | 4.20 | 5.50 | 6.20 | 9.40 | 9.27 | 8.65 | 8.71 | 6.77 |
| Inventory Days | 61 | 68 | 87 | 66 | 59 | 39 | 39 | 42 | 42 | 54 |
| Accounts Receivable Ratio | 2 | 2 | 2 | 4 | 3 | 3 | 3 | 3 | 3 | 3 |
| Accounts Receivable Days | 157 | 172 | 161 | 103 | 105 | 109 | 128 | 120 | 117 | 114 |
| Cash Turnover | 1.88 | 1.63 | 1.73 | 1.73 | 1.60 | 1.89 | 2.07 | 2.84 | 4.61 | 5.38 |
| Leverage & Solvency | | | | | | | | | | |
| Debt to Equity | 0.94 | 0.94 | 1.08 | 1.08 | 1.41 | 1.78 | 4.28 | 3.85 | 3.19 | 2.95 |
| Debt to Capital | 0.49 | 0.49 | 0.52 | 0.52 | 0.58 | 0.64 | 0.81 | 0.79 | 0.76 | 0.75 |
| Rates of Return | | | | | | | | | | |
| Return on Equity | 7% | 3% | 8% | 8% | 4% | 2% | -34% | -20% | -26% | -13% |
| Return on Assets | 3% | 1% | 3% | 3% | 1% | 1% | -4% | -3% | -4% | -2% |

# Significant Accounting Policies and Explanatory Notes

**For the year ended Ashad 32, 2079 (July 16, 2022)**

## 1. Constitution and Ownership

Nepal Electricity Authority ('NEA') was incorporated on Bhadra 1, 2042 (16 August, 1985) under the Nepal Electricity Authority Act, 1984, through the merger of the Department of Electricity of Ministry of Water Resources, Nepal Electricity Corporation and related Development Boards. The merger was necessitated to remedy the inherent weaknesses associated with these fragmented electricity organizations with overlapping and duplication of works, and became necessary to achieve efficiency and reliable service.

The principal objectives of NEA include generation, transmission and distribution of adequate, reliable and affordable electric power by planning, constructing, operating such facilities in Nepal's power system both interconnected and isolated.

## 2. Significant Accounting Policies

### 2.1 Basis of preparation of Financial Statements

The financial statements of the NEA, which comprises Statement of Financial Position, Statement of Profit or Loss & Other Comprehensive In- come, Statement of Cash Flows and Statement of Changes in Equity have been prepared in accordance with Nepal Financial Reporting Standards ("NFRS") issued by the Accounting Standards Board Nepal, which are materially in conformity with International Financial Reporting Standards ("IFRS") issued by the International Accounting Standards Board (IASB).

a. The figures for the previous year are rearranged and reclassified wherever necessary for the purpose of comparison.
b. Appropriate disclosures are made for the effect of any change in accounting policy accounting estimate and adjustment of error.
c. The financial statements are prepared, generally, on accrual basis. However, some items are accounted on a cash basis, for practical reasons. Management has adopted such practice due to impracticability for recognizing those items on accrual basis and the impact of those items are not material.
d. Management has applied estimation while preparing and presenting financial statements. Such specific estimates are disclosed in individual section wherever they have been applied.
e. The NEA's management has made an assessment of NEA's ability to continue as a going concern and is satisfied that NEA has the resources to continue in business for the foreseeable future. Furthermore, the management is not aware of any material uncertainties that may cast significant doubt upon the NEA's ability to continue as a going concern.

### 2.2 Functional and Presentation Currency

Items included in the financial statements of the NEA are measured and presented using the currency of the primary economic environment in which NEA operates (the functional currency), which is the Nepalese Rupees (indicated as Rs. in short).

### 2.3 Property, Plant and Equipment

**Recognition**

Property, plant and equipment are tangible items that are held for use in the production or supply of services, for rental to others or for administrative purposes and are expected to be used during more than one period. Property, plant and equipment are recognized if it is probable that future economic benefits

associated with the asset will flow to the entity and the cost of the asset can be measured reliably. NEA applies the requirements of the Nepal Accounting Standard - NAS 16 (Property, Plant and Equipment) in accounting for these assets.

**Initial Measurement**

An item of property, plant and equipment that qualifies for recognition as an asset is initially measured at its cost. Cost includes expenditure that is directly attributable to the acquisition of the asset and cost incurred subsequently to add and replace part of an item of property, plant & equipment. The cost of self-constructed assets includes the cost of materials and direct labor, any other costs directly attributable to bringing the asset in working condition for its intended use and the costs of dismantling and removing the items and restoring the site on which they are located. Purchased software that is integral to the functionality of the related equipment is capitalized as part of such equipment. When parts of an item of property or equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

**Subsequent Measurement Cost Model**

Property, Plant and equipment are stated at cost less accumulated depreciation and accumulated impairment in value. Such cost includes, cost of replacing part of the equipment when that cost is incurred, if the recognition criteria are met.

**Revaluation Model**

Revaluation model is applied for class of assets instead of particular assets. On revaluation of relating to the same class asset was charged to the Statement of Profit or Loss. Any decrease in the carrying amount is recognized as an expense in the Statement of Profit or Loss or debited to the Other Comprehensive income to the extent of any credit balance existing in the capital reserve in respect of that class of asset. In the case of reversal, the increased amount is recognized as income to the extent of previous written down value.

## 2.4 Depreciation/Amortization

Depreciation is provided on property, plant and equipment, except land, on straight-line method, based on the estimated useful lives of those assets. The rates of depreciation applied 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 | 2.5% |
| (f) | Transmission lines (66 KV, 132 KV and above) | 3% |
| (g) | Transmission lines (33 KV) | 3% |
| (h) | Transmission Substations | 3% |
| (I) | Distribution system (including below11 KV Transmission lines) | 3%-4% |
| (j) | Solar Power | 3% |
| (k) | Meter & metering equipment | 10% |
| (l) | Consumer Services | 7% |
| (m) | Public lighting | 3% |
| (n) | Vehicles,toolsand instruments, furniture and fixtures. | 20% |
| (o) | Office Equipment | 15% |
| (p) | Miscellaneous properties | 50% |
| (q) | Additions during the year | Proportionate basis |

Carrying amount of property, plant and equipment is kept at minimum value of 1 Rupee and is not depreciated further an asset, any increase in the carrying amount is recognized in 'Other Comprehensive Income'and accumulated in equity, under capital reserve or used to

reverse a previous revaluation decrease.

### 2.5 Capital Work in Progress (CWIP)

All expenditures in developing property, plant and equipment not yet completed or not ready to use is categorized as CWIP. The value of capital works-in-progress includes stock of materials, equipment lying in store or in transit for the purpose of use in the construction or development. It also includes the balances with contractors and suppliers for the value yet to be received. These are capitalized upon commissioning or identified as being ready to use. Provisions are made for impairment and obsolescence, if any, in the value of such CWIP.

### 2.6 Investments and Other Financial assets

**Classification**

NEA classifies its financial assets in the following measurement categories:

- Fair value through Profit or loss (FVTPL)
- Fair value through other comprehensive income (FVTOCI).
- Amortized Cost

The classification depends on the entity's business model for managing the financial assets and contractual terms of the cash flows.

For assets measured at fair value, gains and losses will either be recorded in statement of profit or loss or other comprehensive income. For investment in debt instruments, this will depend on the business model in which investment is held.

**Measurement**

At initial recognition, NEA measures financial assets at fair value, which are classified as FVTOCI and Amortized cost. Transaction costs of financial assets carried at FVTPL are expensed in the statement of profit or loss.

**Debt Instrument**

Subsequent measurement of debt instrument depends on the NEA's business model for managing the asset and the cash flow characteristics of the asset.

**Equity Investment**

NEA subsequently measures all equity investments in subsidiaries at fair value. NEA's management has elected to present fair value gains and losses on equity. Equity investment may be classified as per business model of NEA in either FVTPL if such equities are Held for Trading or In FVTOCI if such assets are classified as Available for Sales. Changes in the fair value of financial assets at FVTPL are recognized in the statement of profit or loss whereas changes in fair value of any equity investments measured at FVTOCI are adjusted through fair value reserve.

### 2.7 Inventories

a. Inventories include goods in hand being held for use, sale or as spares.
b. Inventories are valued at lower of cost or net realizable value, using the weighted average method.
c. Net realizable value is the sale price as estimated by the management in the ordinary course of business, less estimated costs, if any, necessary to make the sale. Further, provision for losses and obsolescence are made for those inventories identified by management as obsolete or otherwise.

### 2.8 Trade Receivables

Trade receivable are stated at carrying values except for those identified by the management as being doubtful on recovery. Such estimations for doubtful recovery are reviewed by the management for impairment testing and provided as impairment allowance in case of need of impairment.

### 2.9 Cash and Cash equivalents

Cash and cash equivalents are carried at cost. They include cash-in-hand, cash-in-transit (bank transfers and cheques in collection which are collected in the subsequent period), and short-term deposits with banks in the various forms

of deposit accounts which may or may not bear interest, but which are not of the nature of investments. Provision for loss in lieu of shortage of cash and cash equivalents are made for, if any, in the value of such cash and cash equivalents.

### 2.10 Share Capital

Share capital amount received in the form of cash and cash equivalent from Government of Nepal are accounted as and when received. Such amount includes initial contribution made by Government of Nepal. Eligible amounts are capitalized as share capital such as interest during construction period, grant amount received from Government of Nepal and on behalf of Government of Nepal as per the decision of Government of Nepal (Council of Ministers). Amount reflected under share allotment suspense is also categorized as Issued and Paid up share capital. Related share issue expenses incurred, if any, are deducted from Share Capital.

### 2.11 Reserves

Non-revenue nature incomes are presented under reserves and surplus which includes capital reserve, general reserve, insurance fund, corporate social responsibility fund and accumulated profit or losses balance. Assets created by utilizing consumer contribution are recognized at gross value corresponding amount is recognized as consumer contribution as reserve.

### 2.12 Corporate Social Responsibility Fund

Corporate Social Responsibility Fund is created by setting aside one percent of net profits as per the provision of Industrial Enterprises Act.

### 2.13 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.

### 2.14 Provision for Employees' Bonus

Provision for employees' bonus is made at the rate of 2% of net profits as per the provision of Electricity Regulations, 2050.

### 2.15 Borrowings

Borrowings are subsequently carried at amortized cost and any difference between the proceeds (net of Transaction costs) & the redemption value is recognized in the statement of profit or loss over the period of the borrowings using the effective interest rate method.

Further, borrowings that are due after 12 months from the date of the financial position are classified as non-current liabilities and those less than 12 months are classified as current liabilities.

### 2.16 Foreign Currency Loans

Liabilities on foreign currency loans at the year-end are converted into Nepali Rupees by applying prevailing year-end exchange rate. The gain / losses arising there from such transactions are recognized in Statement of Profit or Loss.

### 2.17 Sundry Creditors and Other Payables

Liabilities for creditors and other payables are carried at cost which is the fair value of the consideration to be paid in the future for the goods/services received, whether or not billed to the NEA.

### 2.18 Provisions

Provisions are recognized when the NEA has a present legal or constructive obligation as a result of past events, it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and the reliable estimate of the amount can be made.

Recognition of Provisions involves substantial degree of estimation in measurement. Provisions are reviewed at the end of each

reporting date and are adjusted accordingly to reflect the current best estimate.

## 2.19 Employee Benefits

**Short-term obligations**

Liabilities for wages and salaries, including non-monetary benefits that are expected to be settled wholly within 12 months after the end of the period in which the employees render the related service are recognized in respect of employees' services up to the end of the reporting period and are measured at the amounts expected to be paid when the liabilities are settled. The liabilities are presented as current employee benefit obligations in the Statement of Financial Position.

**Other long- term employee benefit obligations**

The liabilities for earned leave and sick leave are not expected to be settled wholly within 12 months after the end of the period in which the employees render the related service. They are therefore measured as the present value of expected future payments to be made in respect of services provided by employees up to the end of the reporting period using the projected unit credit method. The benefits are discounted using the market yields at the end of the reporting period that have terms approximating to the terms of the related obligation. Re-measurements as a result of experience adjustments and changes in actuarial assumptions are recognized in statement of profit or loss.

The obligations are presented as current liabilities in the Statement of Financial Position if the entity does not have an unconditional right to defer settlement for at least twelve months after the end of reporting period, regardless of when the actual settlement is expected to occur.

**Post-employment obligations**

NEA operates the following post-employment schemes:

- Defined benefit plans such as gratuity, pension, insurance, leave, medical facilities etc.
- Defined contribution plans such as provident fund, retirement fund etc.

**Defined Benefit Plan Obligation**

The liability or asset recognized in the Statement of Financial Position in respect of defined benefit plans are the present value of the defined benefit obligation at the end of the reporting period less the fair value of plan assets. The defined benefit obligation is calculated annually by actuaries using the projected unit credit method.

Re-measurement gains and losses arising from experience adjustments and changes in actuarial assumptions are recognized in the period in which they occur, directly in other comprehensive income. They are included in retained earnings in the consolidated statement of changes in equity and in the Statement of Financial Position.

**Defined contribution Plan**

NEA pays defined contributions to publicly administered provident funds established as per prevailing laws in force. In addition to contribution to provident fund, for staff joining NEA from Shrawan 1st 2063 B.S., NEA has established equal contributory based approved retirement fund. NEA has no further payment obligations once the contributions have been paid. The contributions are accounted for as defined contribution plans and the contributions are recognized as employee benefit expense when they are due.

## 2.20 Grant–in-Aid and Contribution from Customer/ Local Authority

Grants-in-Aid received from the GoN or other agencies 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.

### 2.21 Contingent Assets and Liabilities

Contingent assets and 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. A contingent asset is disclosed, where an inflow of economic benefit is probable.

### 2.22 Revenue from Sale of Electricity

Revenue from sale of electricity is recognized at the time of raising bills to the customers as per the billing cycle on accrual basis. Revenue from the billing cycle date up to Ashad End (Mid-July) has been recognized and is shown at gross amount.

### 2.23 Rebate

NEA allows rebate in order to motivate consumers to pay their electricity bills earlier than given credit period and accounted for on cash basis.

### 2.24 Other Income

a. Interest on loan investments and rental income are recognized on accrual basis.
b. Dividend on investment in shares is recognized when right to receive has been established.
c. Revenue from other services, including services provided for Engineering Services, is recognized on cash basis.
d. Penalty chargeable on late commercial operation date (COD) under power purchase agreement (PPA) are accounted for on cash basis.
e. Surcharge on delayed payment etc. are accounted for on cash basis.

### 2.25 Cost of Sales

Cost of Sales includes cost of generation, power purchase, royalties to Government of Nepal, transmission and transmission service charges. Cost of generation includes cost directly attributable to generation of electricity of NEA's power plants including distribution expenses. Power purchase cost comprises power purchase from independent power producers and power imports. Royalties to Government of Nepal accounted as per the provisions of Electricity Act and Regulations. Transmission and transmission service charge involves costs that are directly attributable to transmission of power within NEA transmission networks and transmission service charges for cross boarder power transmission.

### 2.26 Distribution Expenses

Distribution expenses includes cost that are directly attributable to distribution of power &expenses relating consumer services and expenses of community rural electrification expenses. Distribution expenses also includes maintenance of low voltage transmission lines and system operation costs also.

### 2.27 Taxes

**a. Current tax**

Current Tax is determined as the amount of tax payable in respect of taxable income for the year considering the applicable provisions of Income Tax Act.

**b. Deferred tax**

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 assets 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.

### 2.28 Finance Cost

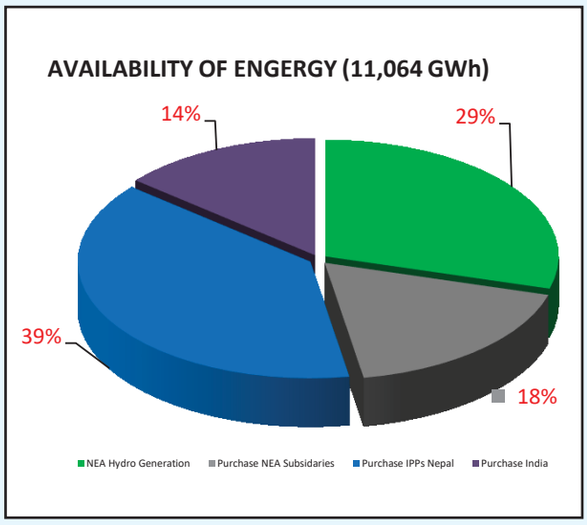
Finance costs includes borrowing cost and other interest expenses & charges on borrowings. Borrowing costs that are directly attributable

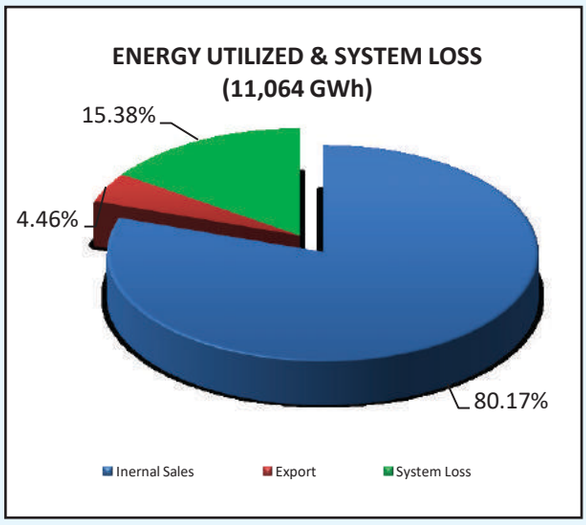
to the construction of a qualifying asset are included in the cost of that asset. Other interest & charges on borrowing are treated as an expense in the period in which it occurs.

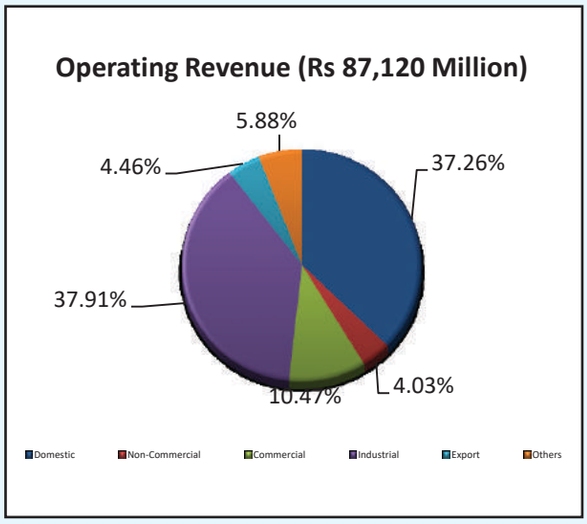
### 2.29 Foreign Currency Transactions

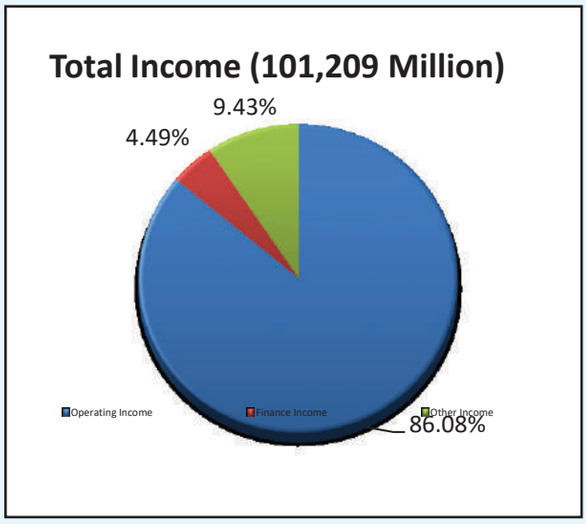
The transactions in foreign currency were recognized at the prevailing rate on transaction date. The balances of monetary assets and liabilities in foreign currencies are translated at closing rate. The resulting gain or loss due to the translation is taken to Statement of Profit or Loss.

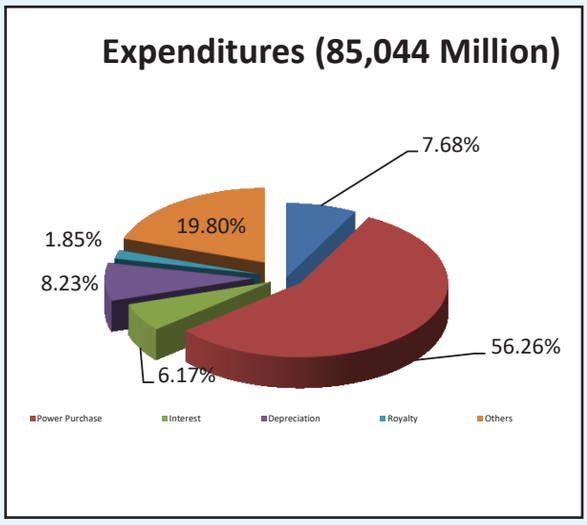
# STATISTIC AND SCHEMATICS

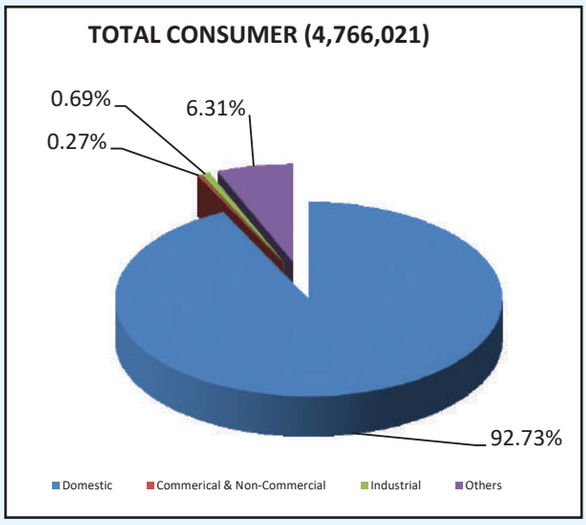


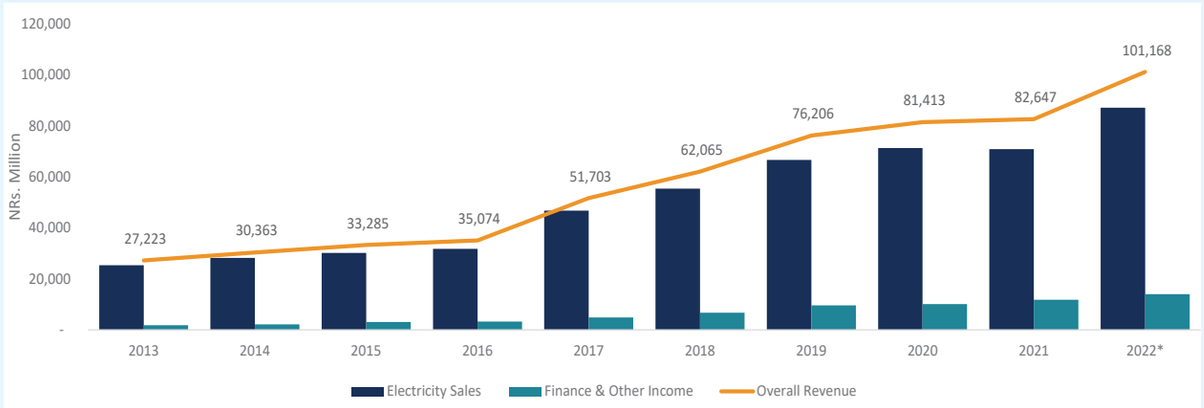



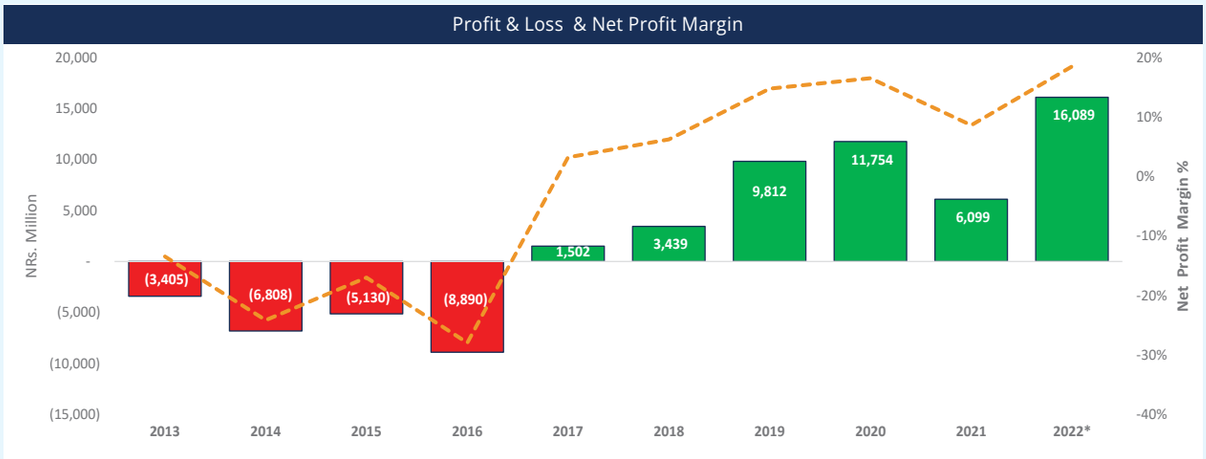



# Financial Dashboard

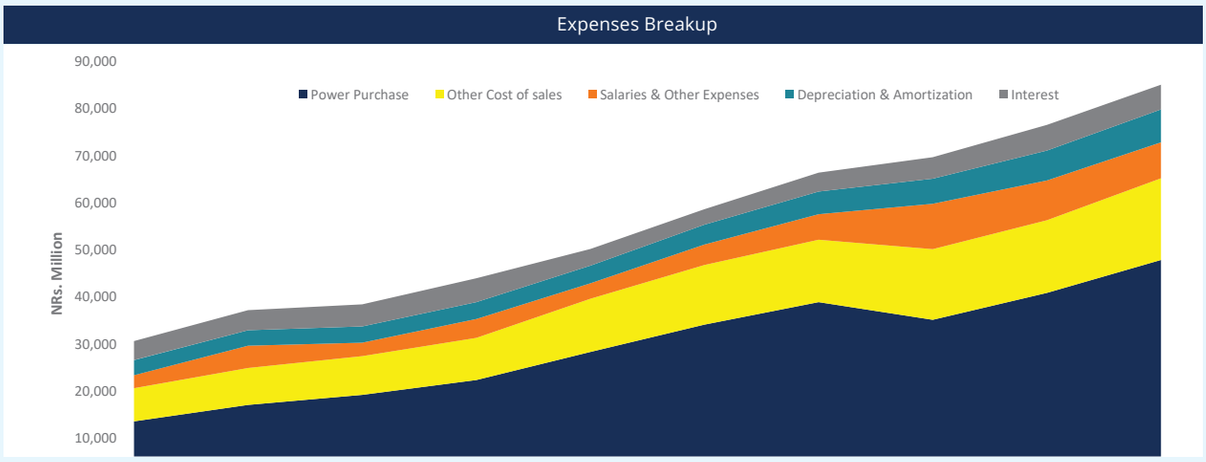
## Overall Revenue Including Other Income



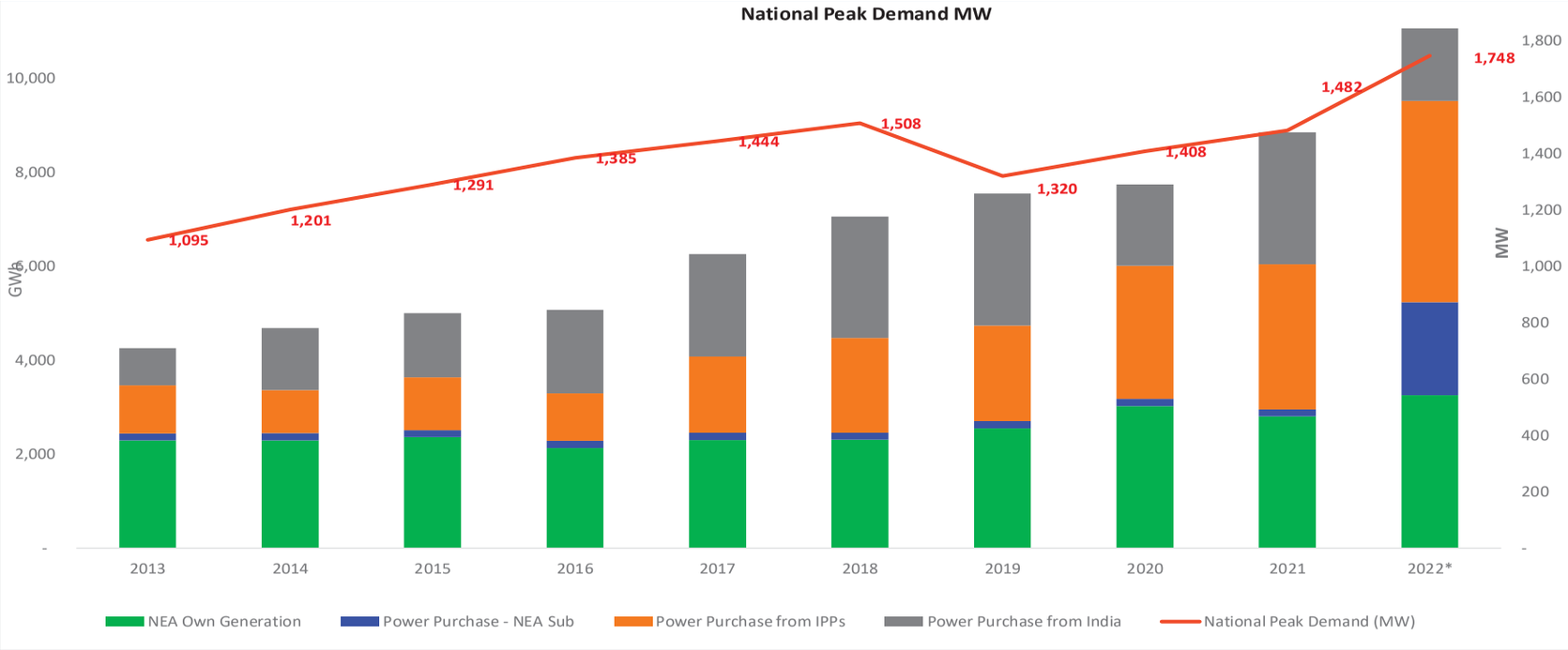

## Profit & Loss & Net Profit Margin




## Expenses Breakup

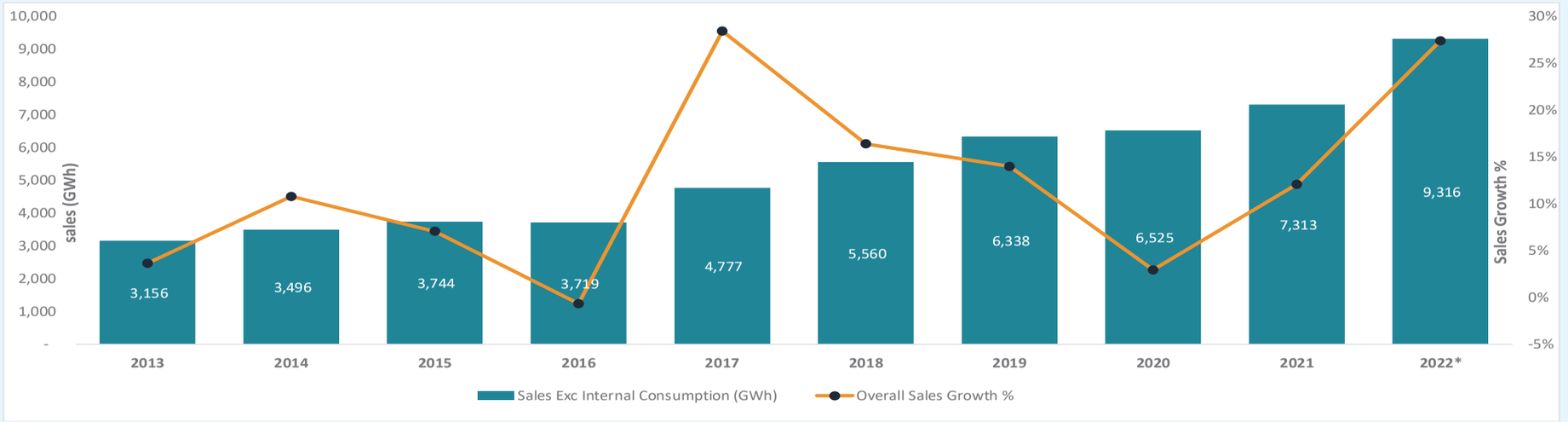


## Total Energy Available & Peak Demand



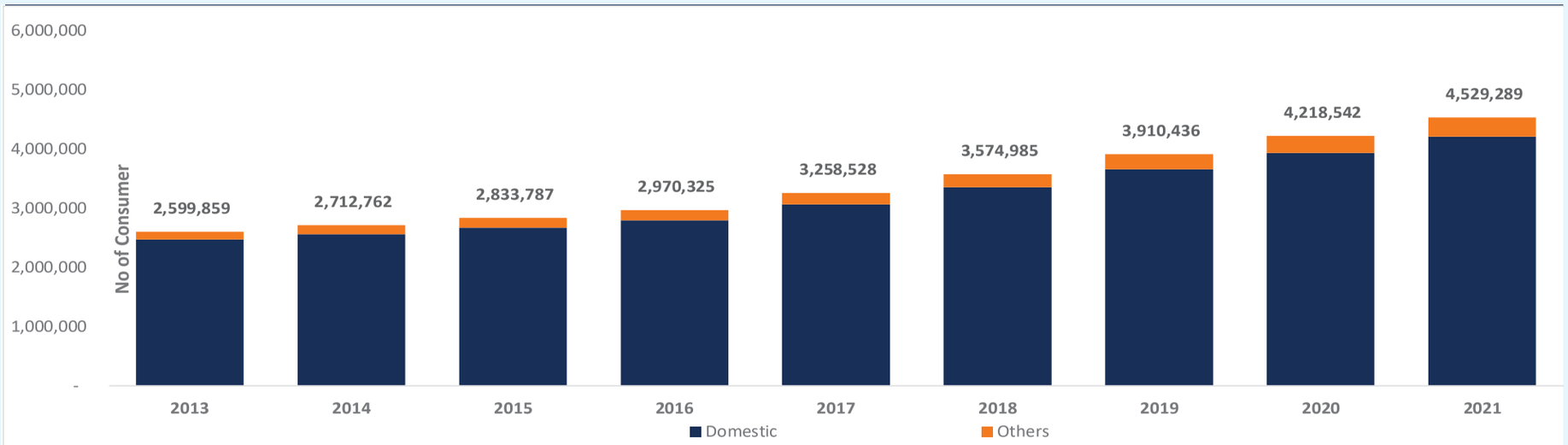

| Particulars | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022* |
|---|---|---|---|---|---|---|---|---|---|---|
| Availability (GWh) | | | | | | | | | | |
| NEA Own Generation | 2,292 | 2,298 | 2,368 | 2,133 | 2,305 | 2,308 | 2,548 | 3,021 | 2,804 | 3,259 |
| Power Purchase - NEA Sub | 154 | 151 | 147 | 154 | 155 | 149 | 157 | 155 | 148 | 1,976 |
| Power Purchase from IPPs | 1,022 | 919 | 1,122 | 1,012 | 1,623 | 2,019 | 2,033 | 2,836 | 3,093 | 4,286 |
| Power Purchase from India | 790 | 1,319 | 1,370 | 1,778 | 2,175 | 2,582 | 2,813 | 1,729 | 2,806 | 1,543 |
| Total Availability (GWh) | 4,258 | 4,687 | 5,007 | 5,077 | 6,258 | 7,058 | 7,551 | 7,741 | 8,851 | 11,064 |
| National Peak Demand (MW) | 1,095 | 1,201 | 1,291 | 1,385 | 1,444 | 1,508 | 1,320 | 1,408 | 1,482 | 1,748 |
| System Peak Demand Including Export (MW) | | | | | | | | | | 1,964 |
| * Provisional Figures (Subject to audit) | | | | | | | | | | |

## Electricity Sales with Growth




| Particulars | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022* |
|---|---|---|---|---|---|---|---|---|---|---|
| Sales Exc Internal Consumption (GWh) | 3,156 | 3,496 | 3,744 | 3,719 | 4,777 | 5,560 | 6,338 | 6,525 | 7,313 | 9,316 |
| Sales Growth % | 3% | 11% | 7% | 0% | 28% | 16.4% | 14% | 3% | 12% | 27% |
| Sales Category (GWh) | | | | | | | | | | |
| Domestic | 1,402 | 1,571 | 1,679 | 1,797 | 2,164 | 2,442 | 2,666 | 2,852 | 3,138 | 3,719 |
| Non Commerical | 115 | 127 | 131 | 134 | 161 | 172 | 186 | 190 | 204 | 260 |
| Commercial | 257 | 285 | 300 | 286 | 351 | 408 | 466 | 487 | 511 | 655 |
| Industrial | 1,141 | 1,252 | 1,352 | 1,206 | 1,719 | 2,074 | 2,422 | 2,301 | 2,816 | 3,443 |
| Water Supply & Irrigation | 73 | 83 | 87 | 100 | 116 | 138 | 176 | 182 | 211 | 242 |
| Street Light | 76 | 76 | 76 | 74 | 76 | 77 | 79 | 84 | 88 | 98 |
| Temporary Supply | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 |
| Transport | 6 | 6 | 6 | 6 | 6 | 5 | 5 | 3 | 2 | 4 |
| Temple | 4 | 5 | 5 | 6 | 7 | 8 | 8 | 8 | 8 | 11 |
| Non Domestic | - | - | - | - | 54 | 103 | 148 | 151 | 116 | 187 |
| Entertainment | - | - | - | - | 1 | 3 | 6 | 5 | 4 | 8 |
| Community Sales | 77 | 86 | 103 | 104 | 116 | 125 | 140 | 151 | 173 | 193 |
| Total Internal Sales (GWh) | 3,152 | 3,493 | 3,741 | 3,716 | 4,774 | 5,557 | 6,303 | 6,418 | 7,275 | 8,823 |
| Export Sales (GWh) | 4 | 3 | 3 | 3 | 3 | 3 | 35 | 107 | 38 | 493 |
| Internal Sales Growth % | 4% | 11% | 7% | -1% | 28% | 16% | 13% | 2% | 13% | 21% |
| Export Sales Growth % | - | - | - | - | - | - | 1082% | 207% | -64% | 1197% |
| Overall Sales Growth % | 4% | 11% | 7% | -1% | 28% | 16% | 14% | 3% | 12% | 27% |
| * Provisional Figures (Subject to Final Audit) | | | | | | | | | | |

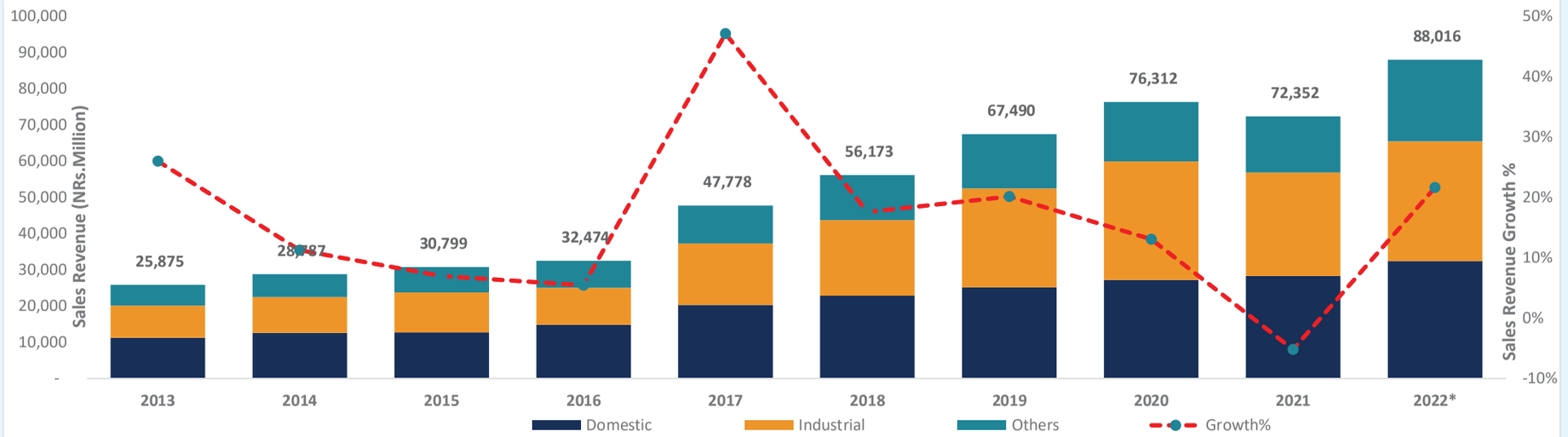
## Growth of Consumers




| Category | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022* |
|---|---|---|---|---|---|---|---|---|---|---|
| Domestic | 2,472,264 | 2,558,726 | 2,671,039 | 2,796,621 | 3,061,709 | 3,355,830 | 3,657,887 | 3,933,574 | 4,208,208 | 4,418,593 |
| Non Commerical | 15,179 | 16,155 | 16,717 | 17,732 | 19,257 | 21,094 | 23,493 | 26,011 | 29,010 | 31,756 |
| Commercial | 13,096 | 14,955 | 15,899 | 17,191 | 18,860 | 21,716 | 25,746 | 29,522 | 32,321 | 35,648 |
| Industrial | 37,498 | 40,265 | 41,825 | 43,639 | 46,345 | 48,800 | 52,697 | 55,888 | 60,782 | 64,626 |
| Water Supply | 834 | 1,141 | 1,266 | 1,426 | 1,675 | 2,063 | 2,460 | 2,960 | 3,494 | 4,035 |
| Irrigation | 51,520 | 71,845 | 77,066 | 83,283 | 98,626 | 111,493 | 131,935 | 152,485 | 174,917 | 189,193 |
| Street Light | 2,878 | 2,774 | 2,813 | 2,829 | 2,935 | 3,010 | 3,266 | 3,726 | 4,577 | 5,184 |
| Temporary Supply | 768 | 726 | 733 | 883 | 1,070 | 1,520 | 1,682 | 1,577 | 1,817 | 1,804 |
| Transport | 51 | 1 | 44 | 43 | 44 | 44 | 40 | 43 | 51 | 70 |
| Temple | 3,857 | 4,048 | 4,181 | 4,391 | 4,673 | 5,182 | 5,890 | 6,611 | 7,481 | 8,171 |
| Non Domestic | - | - | - | - | 977 | 1,735 | 2,735 | 3,260 | 3,678 | 3,955 |
| Entertainment | - | - | - | - | 45 | 107 | 150 | 170 | 192 | 212 |
| Community Sales | 1,207 | 1,377 | 1,459 | 1,537 | 1,597 | 1,631 | 1,659 | 1,882 | 1,882 | 1,901 |
| Internal Consumption | 703 | 747 | 744 | 749 | 714 | 759 | 795 | 832 | 878 | 872 |
| Bulk Supply to India | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Total Consumers | 2,599,859 | 2,712,762 | 2,833,787 | 2,970,325 | 3,258,528 | 3,574,985 | 3,910,436 | 4,218,542 | 4,529,289 | 4,766,021 |
| Growth% | 12% | 4% | 4% | 5% | 10% | 10% | 9% | 8% | 7% | 5% |

* Provisional Figures (Subject to Audit)

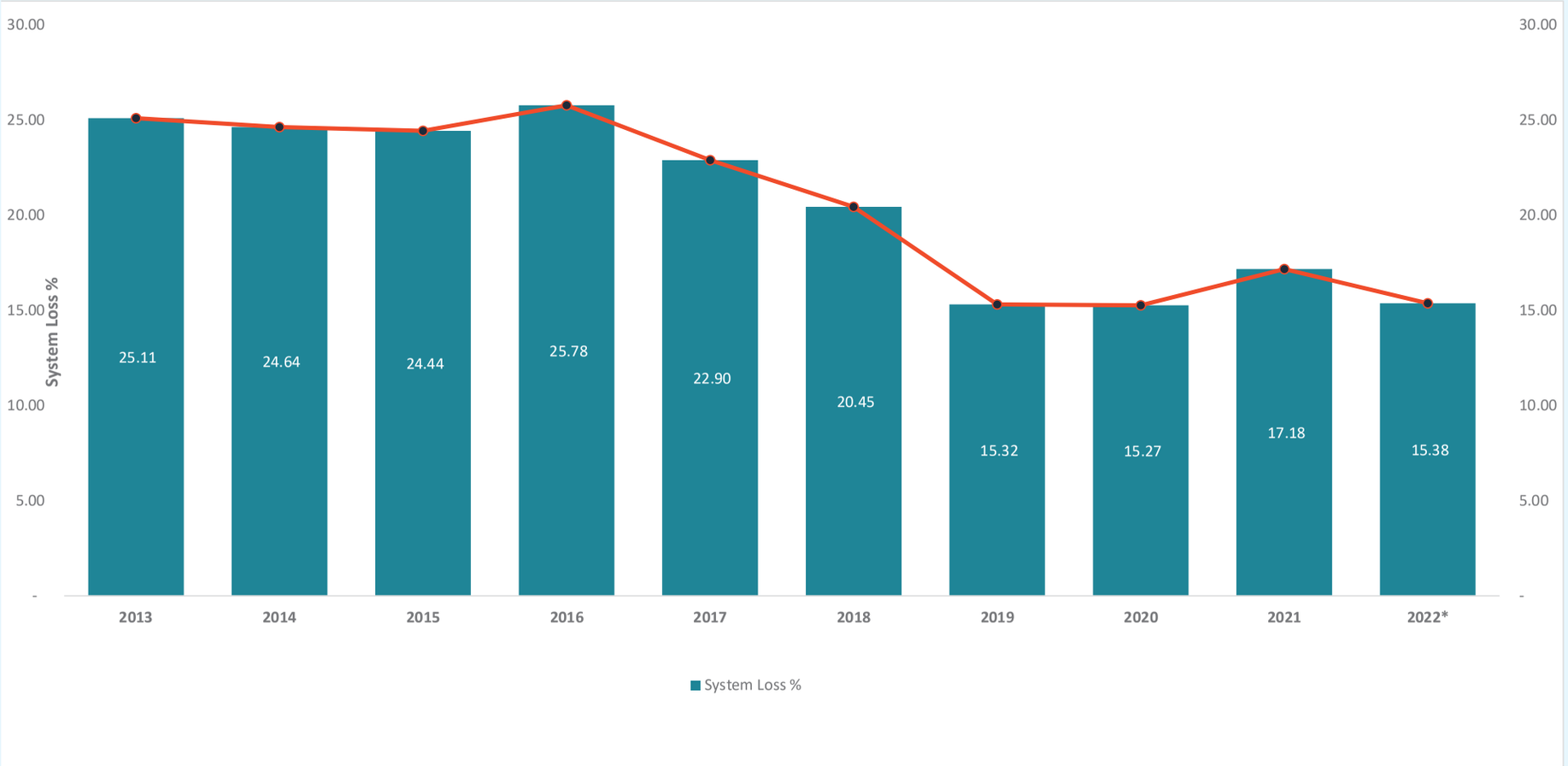
## Category wise Electricity Sales Revenue




| Particulars | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022* |
|---|---|---|---|---|---|---|---|---|---|---|
| Domestic | 11,248 | 12,622 | 12,707 | 14,834 | 20,330 | 22,868 | 25,197 | 27,239 | 28,280 | 32,457 |
| Non Commerical | 1,355 | 1,487 | 1,644 | 1,995 | 2,479 | 2,594 | 2,831 | 2,923 | 2,907 | 3,507 |
| Commercial | 2,994 | 3,360 | 3,735 | 3,789 | 5,114 | 5,883 | 6,745 | 7,222 | 7,412 | 9,125 |
| Industrial | 8,885 | 9,844 | 11,065 | 10,182 | 16,977 | 20,897 | 27,283 | 32,717 | 28,578 | 33,025 |
| Water Supply & Irrigation | 389 | 418 | 481 | 525 | 728 | 865 | 1,092 | 1,165 | 1,089 | 1,097 |
| Street Light | 583 | 602 | 630 | 602 | 666 | 702 | 683 | 765 | 801 | 841 |
| Temporary Supply | 24 | 23 | 27 | 29 | 53 | 61 | 67 | 64 | 67 | 76 |
| Transport | 40 | 39 | 41 | 40 | 44 | 38 | 33 | 24 | 19 | 31 |
| Temple | 24 | 26 | 29 | 34 | 39 | 51 | 52 | 52 | 56 | 73 |
| Non Domestic | - | - | - | - | 655 | 1,419 | 2,278 | 2,321 | 1,922 | 2,888 |
| Entertainment | - | - | - | - | 17 | 50 | 84 | 94 | 81 | 133 |
| Community &Cooperative | 301 | 335 | 400 | 412 | 631 | 716 | 734 | 743 | 824 | 879 |
| Bulk Supply India | 32 | 31 | 39 | 32 | 46 | 29 | 413 | 983 | 316 | 3,884 |
| Total Gross Revenue | 25,875 | 28,787 | 30,799 | 32,474 | 47,778 | 56,173 | 67,490 | 76,312 | 72,352 | 88,016 |
| Growth% | 26% | 11% | 7% | 5% | 47% | 18% | 20% | 13% | -5% | 22% |

* Provisional Figures (Subject to Audit)

## System Loss with Changes

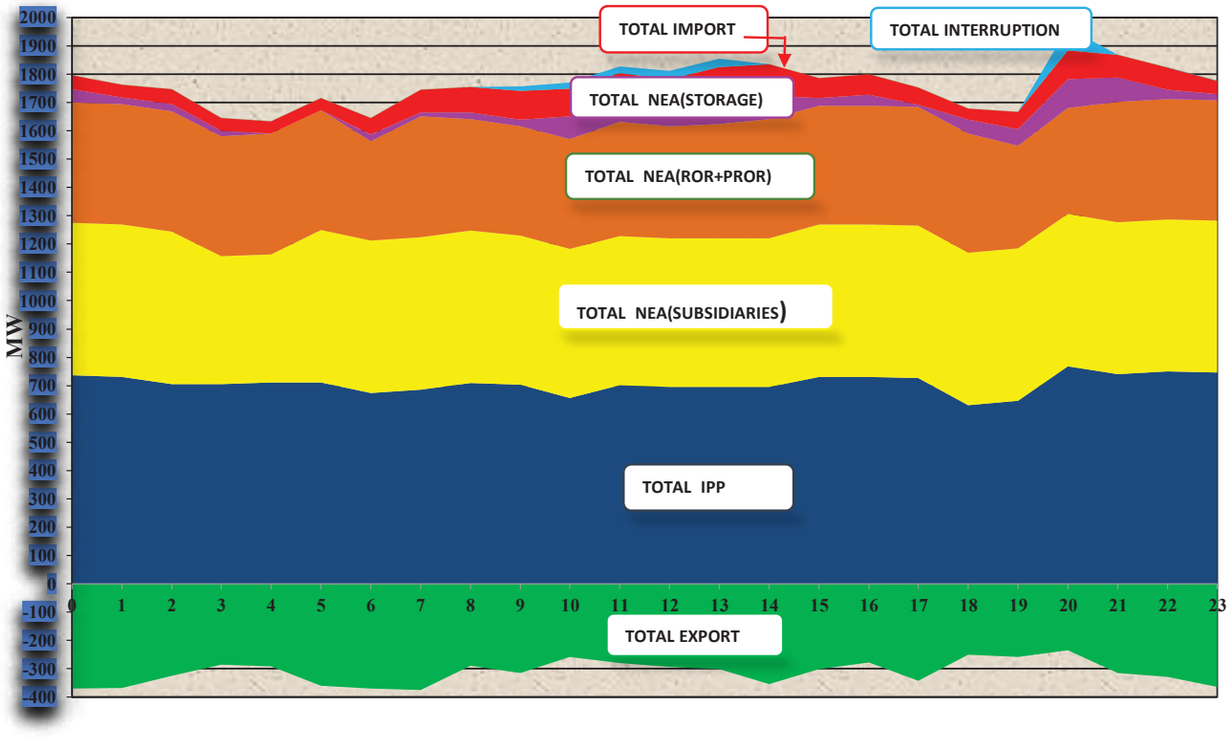



| Particulars | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022* |
|---|---|---|---|---|---|---|---|---|---|---|
| System Loss % | 25.11 | 24.64 | 24.44 | 25.78 | 22.90 | 20.45 | 15.32 | 15.27 | 17.18 | 15.38 |

* Provisional Figures (Subject to Final Audit)

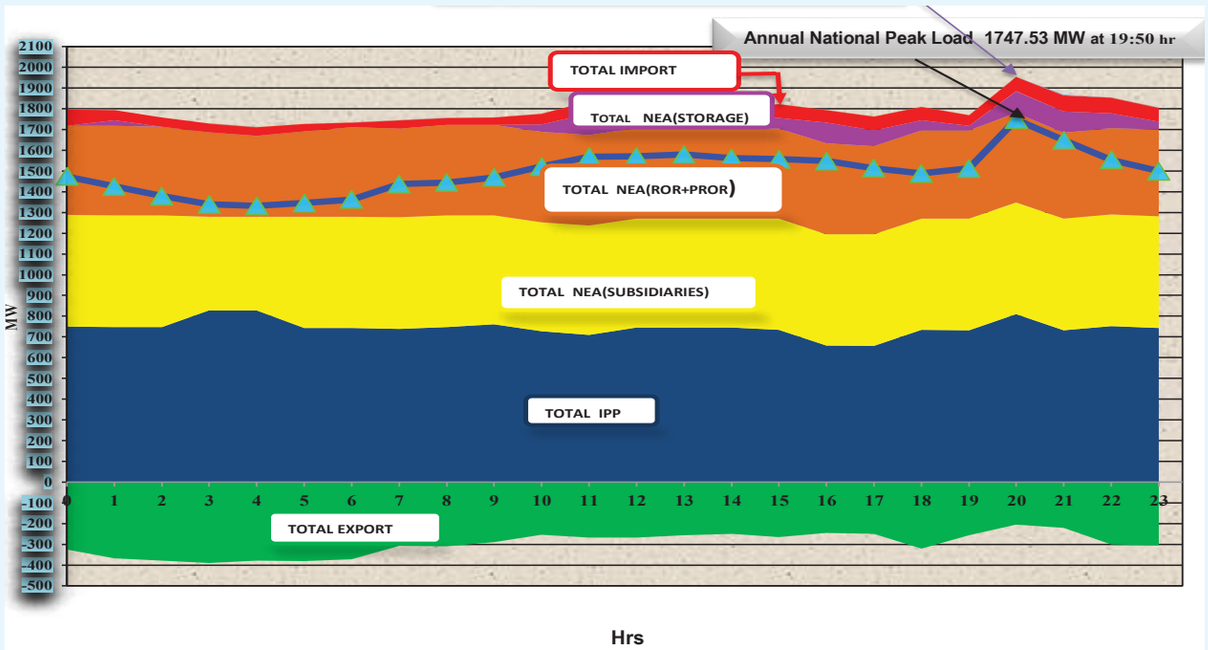
## System Load Curve (Maximum Demand) Asar 22, 2079 (July 6, 2022) Wednesday

**Annual System Peak Load 1963.98 MW at 19:50 hr**

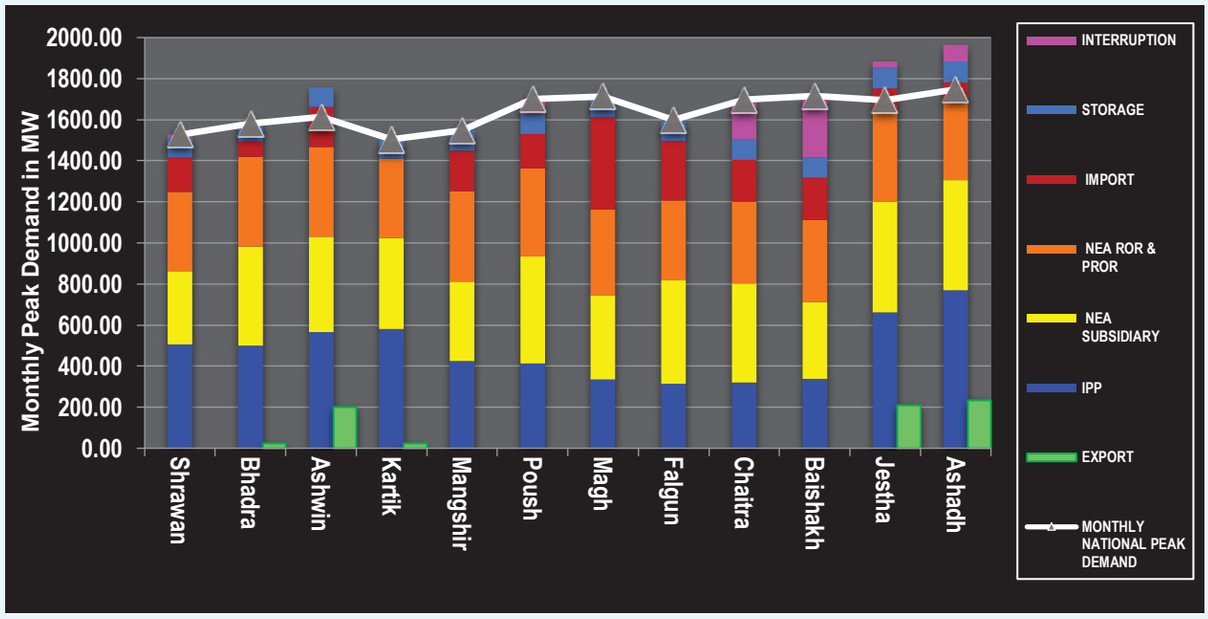



## Annual System Peak Load Curve Asar 28, 2079 (July 12, 2022) Tuesday

**Daily System Peak Load 1953.53 MW at 19:50 hr**

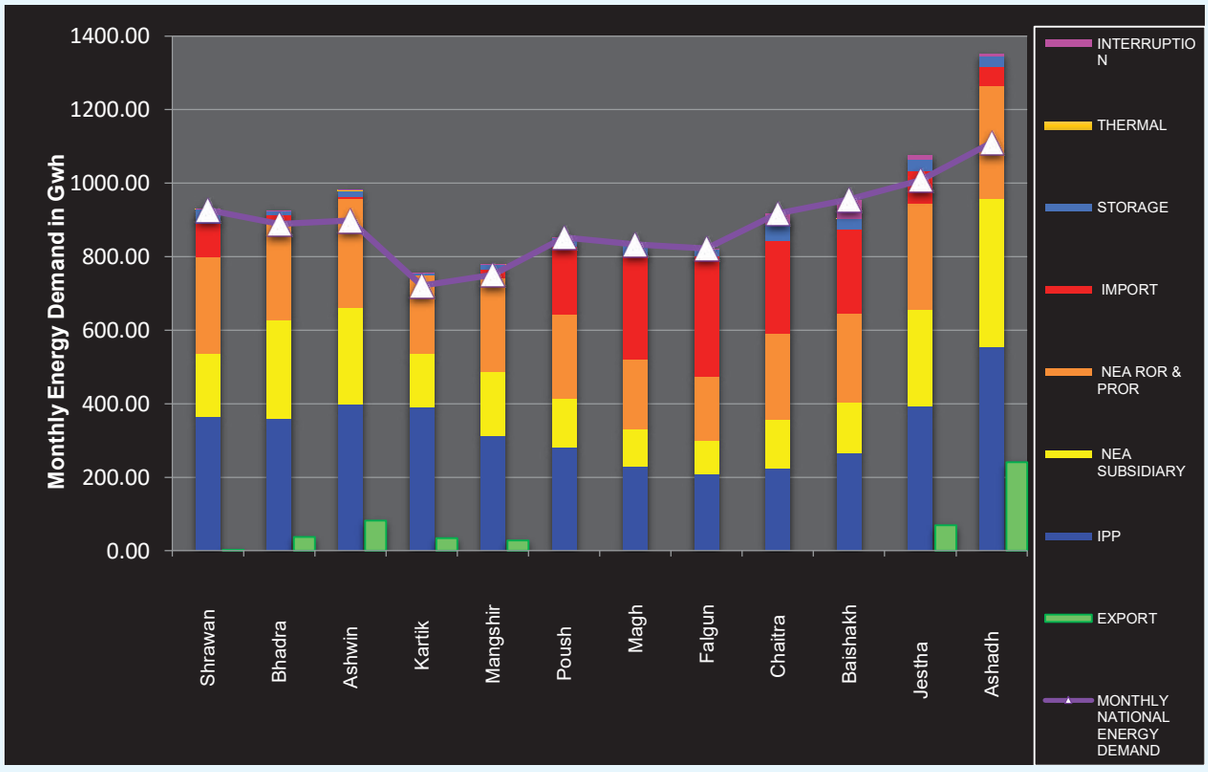


## Capacity Balance (MW) in FY 2078/79(2021/22)



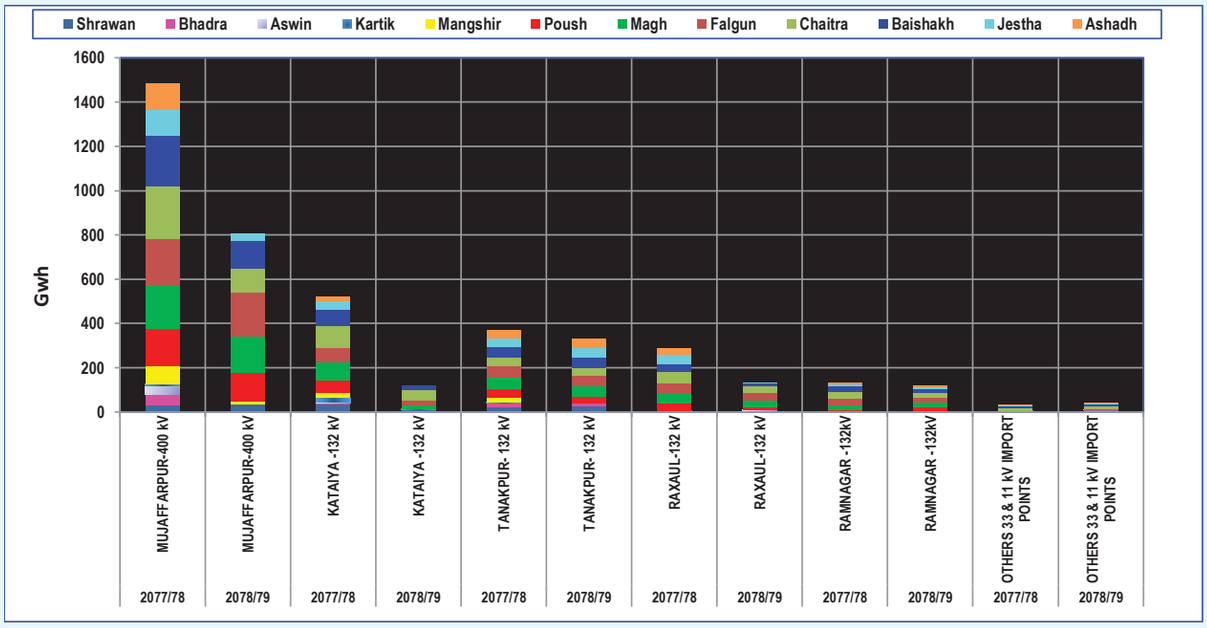

| Source\Month | Shrawan | Bhadra | Ashwin | Kartik | Mangshir | Poush | Magh | Falgun | Chaitra | Baishakh | Jestha | Ashadh | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IPP | 506.17 | 500.75 | 567 | 581.24 | 425.45 | 411.76 | 335.97 | 313.96 | 318.99 | 337.05 | 660.85 | 768.6 | 477.31 |
| NEA SUBSIDIARY | 356.3 | 482 | 462 | 444 | 387 | 521.7 | 410.3 | 504.3 | 483 | 376.5 | 539.9 | 538 | 458.75 |
| NEA ROR & PROR | 386.7 | 435.11 | 439.56 | 384.39 | 438.8 | 427.99 | 414.24 | 387.97 | 398.86 | 395.94 | 441.13 | 374.19 | 410.41 |
| IMPORT | 165.82 | 75.6 | 192 | 0 | 198 | 168.9 | 453.3 | 291.76 | 202.71 | 207.62 | 110.8 | 100.9 | 180.62 |
| STORAGE | 97.5 | 93 | 98.2 | 101 | 99.8 | 96.9 | 100.1 | 100.6 | 99.7 | 99.7 | 101 | 102.3 | 99.15 |
| INTERRUPTION | 15 | 0 | 0 | 0 | 0 | 75 | 0 | 0 | 195 | 300 | 30 | 80 | 57.92 |
| MONTHLY SYSTEM PEAK DEMAND | 1527.49 | 1586.46 | 1758.76 | 1510.63 | 1549.05 | 1702.25 | 1713.91 | 1598.59 | 1698.26 | 1716.8 | 1883.68 | 1963.98 | 1684.15 |
| EXPORT | 0 | 23.2 | 201 | 24.2 | 0 | 0 | 0 | 0 | 0 | 0 | 210 | 233.9 | 57.69 |
| MONTHLY NATIONAL PEAK DEMAND | 1527.49 | 1579.95 | 1614.85 | 1504.38 | 1549.05 | 1702.25 | 1713.91 | 1598.59 | 1698.26 | 1716.8 | 1695.93 | 1747.53 | 1637.41 |

# Energy Balance (GWh) in FY 2078/79 (2021/22)




| | Shrawan | Bhadra | Ashwin | Kartik | Mangshir | Poush | Magh | Falgun | Chaitra | Baishakh | Jestha | Ashadh | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IPP | 409.15 | 402.10 | 442.06 | 426.54 | 350.17 | 312.38 | 228.71 | 207.79 | 223.70 | 264.53 | 392.98 | 554.82 | 4214.92 |
| NEA SUBSIDIARY | 126.92 | 225.00 | 218.22 | 109.55 | 137.72 | 101.76 | 102.60 | 91.49 | 131.85 | 139.43 | 262.11 | 404.05 | 2050.70 |
| NEA ROR & PROR | 262.78 | 270.94 | 297.65 | 213.14 | 255.53 | 230.07 | 189.64 | 175.24 | 236.37 | 240.98 | 289.29 | 305.93 | 2967.55 |
| IMPORT | 92.00 | 14.32 | 5.37 | 0.39 | 20.82 | 182.76 | 281.34 | 327.19 | 250.85 | 230.16 | 87.23 | 50.87 | 1543.28 |
| STORAGE | 38.31 | 12.11 | 16.40 | 4.46 | 13.59 | 23.53 | 27.54 | 18.49 | 45.56 | 28.29 | 33.24 | 29.82 | 291.33 |
| THERMAL | 0.0042 | 0.0000 | 0.0032 | 0.0023 | 0.0010 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0027 | 0.0000 | 0.0000 | 0.0135 |
| INTERRUPTION | 1.34 | 2.34 | 0.78 | 0.47 | 1.26 | 1.25 | 3.25 | 1.57 | 29.74 | 51.95 | 12.82 | 5.22 | 111.97 |
| MONTHLY SYSTEM ENERGY DEMAND | 930.50 | 926.80 | 980.48 | 754.55 | 779.10 | 851.74 | 833.07 | 821.77 | 918.06 | 955.32 | 1077.66 | 1350.72 | 11179.77 |
| EXPORT | -3.02 | -37.67 | -81.23 | -33.38 | -28.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | -69.66 | -240.47 | -493.61 |
| MONTHLY NATIONAL ENERGY DEMAND | 927.48 | 889.13 | 899.25 | 721.17 | 750.92 | 851.74 | 833.07 | 821.77 | 918.06 | 955.32 | 1008.00 | 1110.24 | 10686.17 |

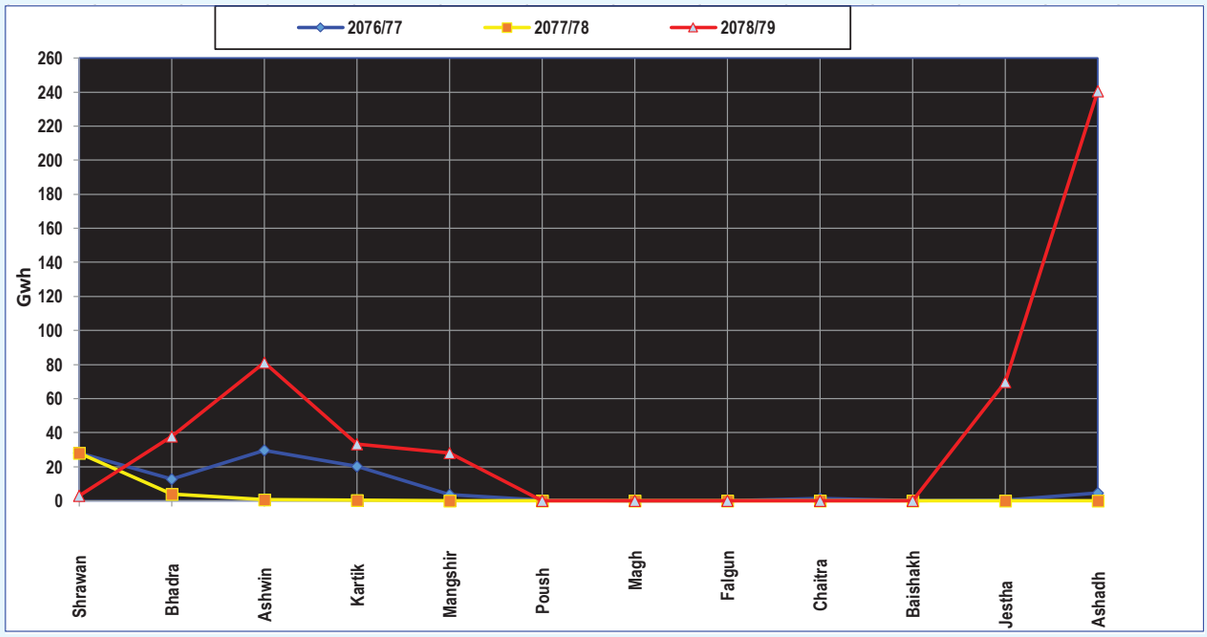
## Imported Energy from different lines in FY 2077/78 (2020/21) and FY 2078/79 (2021/22)




## Imported Energy in Gwh, comparision between two Fiscal Year.

| FY | 2077/78 | 2078/79 | 2077/78 | 2078/79 | 2077/78 | 2078/79 | 2077/78 | 2078/79 | 2077/78 | 2078/79 | 2077/78 | 2078/79 | 2077/78 | 2078/79 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | MUJAFFARPUR -400 kV | MUJAFFARPUR-400 kV | KATAIYA -132 kV | KATAIYA -132 kV | TANAKPUR - 132 kV | TANAKPUR - 132 kV | RAXAUL -132 kV | RAXAUL -132 kV | RAMNAGAR -132kV | RAMNAGAR -132kV | OTHERS 33 & 11 kV IMPORT POINTS | OTHERS 33 & 11 kV IMPORT POINTS | Total | Total |
| Shrawan | 33.51 | 36.88 | 33.54 | 10.24 | 23.23 | 28.64 | 0.01 | 7.26 | 0.12 | 3.17 | 0.71 | 5.79 | 91.1 | 92 |
| Bhadra | 47.55 | 0 | 5.85 | 0.08 | 16.72 | 9.62 | 0 | 0.51 | 0.06 | 0.91 | 0.96 | 3.2 | 71.15 | 14.32 |
| Aswin | 35.09 | 0.1 | 5.48 | 1 | | 2.31 | 0 | 0.16 | 0 | 0 | 0.14 | 1.79 | 40.7 | 5.37 |
| Kartik | 9.92 | 0 | 18.12 | 0.04 | 4.39 | 0.35 | 3.92 | 0 | 0 | 0 | 0.02 | 0 | 36.38 | 0.39 |
| Mangshir | 80.4 | 13.67 | 21.34 | 1.6 | 21.46 | 0.28 | 1.83 | 2.84 | 0.4 | 2.42 | 0 | 0 | 125.45 | 20.82 |
| Poush | 170.81 | 125.65 | 59.66 | 1 | 39.59 | 28.13 | 33.2 | 13.22 | 9 | 14.41 | 0.8 | 0.36 | 313.06 | 182.76 |
| Magh | 194.31 | 165.8 | 81.88 | 18.51 | 51.13 | 47.38 | 45.84 | 28.36 | 21.84 | 20.74 | 1.78 | 0.55 | 396.77 | 281.34 |
| Falgun | 211.26 | 200.8 | 64.66 | 18.72 | 49.91 | 47.35 | 45.95 | 35.15 | 28.35 | 24.55 | 2.66 | 0.63 | 402.79 | 327.19 |
| Chaitra | 235.49 | 103.76 | 97.79 | 47.22 | 40.07 | 36.94 | 53.1 | 28.14 | 32.78 | 22.51 | 9.39 | 12.28 | 468.61 | 250.85 |
| Baishakh | 230.74 | 129.49 | 74.45 | 18.23 | 49.47 | 44.48 | 35.37 | 12.28 | 23.85 | 15.59 | 9.1 | 10.09 | 422.99 | 230.16 |
| Jestha | 115.69 | 30.29 | 36.5 | 0 | 36.5 | 42.81 | 39.66 | 0.15 | 10.81 | 9.93 | 4.95 | 4.05 | 244.1 | 87.23 |
| Ashadh | 120.37 | 0 | 20.46 | 0 | 36.29 | 40.76 | 30 | 0 | 7.53 | 6.21 | 2.99 | 3.9 | 217.64 | 50.87 |
| Total | 1485.15 | 806.44 | 519.73 | 116.64 | 368.76 | 329.07 | 288.88 | 128.06 | 134.74 | 120.44 | 33.49 | 42.63 | 2830.74 | 1543.28 |

## Comparision of Exported Energy(Gwh) to India in different FY.




| FY | Shrawan | Bhadra | Ashwin | Kartik | Mangshir | Poush | Magh | Falgun | Chaitra | Baishakh | Jestha | Ashadh | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2076/77 | 28.05 | 12.7 | 29.57 | 20.19 | 3.59 | 0.37 | 0.17 | 0.11 | 1.21 | 0.1 | 0.24 | 4.7 | 101 |
| 2077/78 | 27.9797 | 3.8994 | 0.8146 | 0.4934 | 0.0145 | 0.004 | 0 | 0 | 0 | 0 | 0 | 0.1027 | 33.3083 |
| 2078/79 | 3.0211 | 37.6702 | 81.2278 | 33.3808 | 28.175 | 0 | 0 | 0 | 0 | 0 | 69.6589 | 240.4725 | 493.6063 |

# ELECTRICITY TARIFF

## TARIFF RATES

### 1. Domestic Consumers

#### 1.1 Single Phase Low Voltage (203 Voltage)

| kWh (Monthly) | 5 Ampere | | 15 Ampere | | 30 Ampere | | 60 Ampere | |
|---|---|---|---|---|---|---|---|---|
| | Monthly Minimum Charge (Nrs.) | Energy Charge (Nrs./kWh) | Monthly Minimum Charge (Nrs.) | Energy Charge (Nrs./kWh) | Monthly Minimum Charge (Nrs.) | Energy Charge (Nrs./kWh) | Monthly Minimum Charge (Nrs.) | Energy Charge (Nrs./kWh) |
| 0-20 | 30.00 | 0.00 | 50.00 | 4.00 | 75.00 | 5.00 | 125.00 | 6.00 |
| 21-30 | 50.00 | 6.50 | 75.00 | 6.50 | 100.00 | 6.50 | 125.00 | 6.50 |
| 31-50 | 50.00 | 8.00 | 75.00 | 8.00 | 100.00 | 8.00 | 125.00 | 8.00 |
| 51-100 | 75.00 | 9.50 | 100.00 | 9.50 | 125.00 | 9.50 | 150.00 | 9.50 |
| 101-250 | 100.00 | 9.50 | 125.00 | 9.50 | 150.00 | 9.50 | 200.00 | 9.50 |
| Above 251 | 150.00 | 11.00 | 175.00 | 11.00 | 200.00 | 11.00 | 250.00 | 11.00 |

**Note:** If 5 Ampere consumer use more than 20 units, they have to pay NRs. 3.00 per unit

#### 1.2 Three Phase Low Voltage (400 Volt)

| kWh (Monthly) | Up to 10 KVA | | | Above 10 KVA | | |
|---|---|---|---|---|---|---|
| | Monthly Minimum Charge (Nrs.) | Month | Energy Charge (Nrs./kWh) | Monthly Minimum Charge (Nrs.) | Month | Energy Charge (Nrs./kWh) |
| All Consumers | 1100.00 | Ashad -Kartik | 10.50 | 1800.00 | Ashad -Kartik | 10.50 |
| | | Marg-Jestha | 11.50 | | Marg-Jestha | 11.50 |

#### 1.3 Three Phase Medium Voltage (33/11 KV)

| kWh (Monthly) | Monthly Minimum Charge (Nrs.) | Month | Energy Charge (Nrs/kWh) |
|---|---|---|---|
| All Consumers | 10,000.00 | Ashad-Kartik | 10.50 |
| | | Marg-Jestha | 11.00 |

## Billing Method (For Single Phase 5 Ampere)

| S. No. | kWh (Monthly) | Energy Charge (Nrs./kWh) | Billing Method |
|---|---|---|---|
| 1 | Up to 20 units | 0.00 | Monthly Minimum Charge Rs. 30.00 for up to 20 units and Energy Charge Rs. 0.00 per unit |
| 2 | 21 to 30 units | 6.50 | Monthly Minimum Charge Rs. 50.00 and Energy Charge per unit Rs. 3.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units |
| 3 | 31 to 50 units | 8.00 | Monthly Minimum Charge Rs. 50.00 and Energy Charge per unit Rs. 3.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units and Rs. 8.00 per unit for 31 units to 50 units |
| 4 | 51 to 100 units | 9.50 | Monthly Minimum Charge Rs. 75.00 and Energy Charge per unit Rs. 3.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units and Rs. 8.00 per unit for 31 units to 50 units and Rs. 9.50 per unit for 51 units to 100 units |
| 5 | 101 to 250 units | 9.50 | Monthly Minimum Charge Rs. 100.00 and Energy Charge per unit Rs. 3.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units and Rs. 8.00 per unit for 31 units to 50 units and Rs. 9.50 per unit for 51 units to 250 units |
| 6 | Above 251 units | 11.00 | Monthly Minimum Charge Rs. 150.00 and Energy Charge per unit Rs. 3.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units and Rs. 8.00 per unit for 31 units to 50 units and Rs. 9.50 per unit for 51 units to 250 units and Rs. 11.00 per unit for above 251 units |

## Billing Method (For Single Phase 15 Ampere)

| S. No. | kWh (Monthly) | Energy Charge (Nrs./kWh) | Billing Method |
|---|---|---|---|
| 1 | Up to 20 units | 4.00 | Monthly Minimum Charge Rs. 50.00 for up to 20 units and Energy Charge Rs. 4.00 per unit (e.g.: 5 unit: Rs. 50 + 5 × 4 = Rs. 70.00) |
| 2 | 21 to 30 units | 6.50 | Monthly Minimum Charge Rs. 75.00 and Energy Charge per unit Rs. 4.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units (e.g.: 25 unit: Rs. 75 + 20 × 4 + 5 × 6.5 = Rs. 187.50) |

| | | | |
|---|---|---|---|
| 3 | 31 to 50 units | 8.00 | Monthly Minimum Charge Rs. 75.00 and Energy Charge per unit Rs. 4.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units and Rs. 8.00 per unit for 31 units to 50 units (e.g.: 35 unit: Rs. 75 + 20 × 4 + 10 × 6.5 + 5 × 8 = Rs. 260.00) |
| 4 | 51 to 100 units | 9.50 | Monthly Minimum Charge Rs. 100.00 and Energy Charge per unit Rs. 4.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units and Rs. 8.00 per unit for 31 units to 50 units and Rs. 9.50 per unit for 51 units to 100 units (e.g.: 55 unit: Rs. 100 + 20 × 4 + 10 × 6.5 + 20 × 8 + 5 × 9.5 = Rs. 452.50) |
| 5 | 101 to 250 units | 9.50 | Monthly Minimum Charge Rs. 125.00 and Energy Charge per unit Rs. 4.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units and Rs. 8.00 per unit for 31 units to 50 units and Rs. 9.50 per unit for 51 units to 250 units (e.g.: 105 unit: Rs. 125 + 20 × 4 + 10 × 6.5 + 20 × 8 + (50 + 5) × 9.5 = Rs. 952.50) |
| 6 | Above 251 units | 11.00 | Monthly Minimum Charge Rs. 175.00 and Energy Charge per unit Rs. 4.00 for per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units and Rs. 8.00 per unit for 31 units to 50 units and Rs. 9.50 per unit for 51 units to 150 units and Rs. 10.00 per unit for 151 units to above 250 units and Rs. 11.00 per unit for 251 units to 400 units. (e.g.: 255 unit: Rs. 175 + 20 × 4 + 10 × 6.5 + 20 × 8 + (50 + 150) × 9.5 + 5 × 11 = Rs. 2435.00) |

Billing Methods will be similar for Single Phase 30 and 60 Ampere.

## 2. Other Consumers

### 2.1 Low Voltage (230/400 V)

| Consumer Category | Demand Charge Nrs./KVA/ month | Energy Charge (Nrs./kWh) |
|---|---|---|
| 1. Industrial | | |
| a) Rural and Domestic | 60.00 | 7.80 |
| b) Small Industry | 110.00 | 9.60 |
| 2. Commercial | 325.00 | 11.20 |
| 3. Non-Commercial | 215.00 | 12.00 |
| 4. Irrigation | - | 2.25 |
| 5. Water Supply | | |
| a) Community Water Supply | - | 4.20 |
| b) Other Water Supply | 160.00 | 7.20 |
| 6. Transportation | | |
| α) Public Transportation (Charging Station) | 200.00 | 5.75 |
| β) Other Transportation | 220.00 | 8.90 |
| 7. Religious Place | - | 6.10 |
| 8. Street Light | | |

| | | |
|---|---|---|
| a) Metered | - | 7.30 |
| b) Non-Metered | 2475.00 | - |
| 9. Temporary Connection | - | 19.80 |
| 10. Non-Domestic | 350.00 | 13.00 |
| 11. Entertainment Business | 350.00 | 14.00 |

## 2.2 High Voltage

| Consumer Category | Demand Charge Nrs./KVA/month | Energy Charge Nrs./kWh |
|---|---|---|
| **A. High Voltage** | | |
| 1. Industrial (132 kV) | 230.00 | 8.20 |
| 2. Industrial (66 kV) | 240.00 | 8.30 |
| **B. Medium Voltage (33 KV)** | | |
| 1. Industrial | 255.00 | 8.40 |
| 2. Commercial | 315.00 | 10.80 |
| 3. Non-commercial | 240.00 | 11.40 |
| 4. Irrigation | - | 2.50 |
| 5. Water Supply | | |
| a) Community Water Supply | - | 4.60 |
| b) Other Water Supply | 160.00 | 6.60 |
| 6. Transportation | | |
| a) Public Transportation (Charging Station) | 230.00 | 5.60 |
| b) Other Transportation | 255.00 | 8.60 |
| 7. Non-Domestic | 350.00 | 12.55 |
| 8. Entertainment Business | 350.00 | 13.50 |
| **C. Medium Voltage (11 KV)** | | |
| 1. Industrial | 255.00 | 8.60 |
| 2. Commercial | 315.00 | 11.10 |
| 3. Non-commercial | 240.00 | 11.50 |
| 4. Irrigation | - | 2.60 |
| 5. Water Supply | | |
| a) Community Water Supply | - | 4.80 |
| b) Other Water Supply | 150.00 | 6.80 |
| 6. Transportation | | |
| a) Public Transportation (Charging Station) | 230.00 | 5.60 |
| b) Other Transportation | 255.00 | 8.80 |

| | | |
|---|---|---|
| 7. Religious Place | 220.00 | 9.90 |
| 8. Temporary Connection | 330.00 | 12.00 |
| 9. Non-Domestic | 350.00 | 12.90 |
| 10. Entertainment Business | 350.00 | 13.90 |

## 3. Time of Day (ToD) Tariff Rate

### 3.1 Tariff Rate from Baishakh to Mangsir

| Consumer Category | Demand Charge Nrs./ KVA/ month | Peak Time (17.00-23.00) | Off Peak Time (23.00-5.00) | Normal time (5.00-17.00) |
|---|---|---|---|---|
| **A. High Voltage** | | | | |
| 1. Industrial (132 kV) | 230.00 | 10.00 | 4.65 | 8.20 |
| 2. Industrial (66 kV) | 240.00 | 10.10 | 4.75 | 8.30 |
| **B. Medium Voltage (33 KV)** | | | | |
| 1. Industrial | 250.00 | 10.20 | 5.25 | 8.40 |
| 2. Commercial | 315.00 | 12.30 | 6.75 | 10.80 |
| 3. Non-Commercial | 240.00 | 13.20 | 7.00 | 12.00 |
| 4. Irrigation | - | 6.30 | 2.00 | 3.00 |
| 5. Water Supply | | | | |
| a) Community Water Supply | - | 6.20 | 3.10 | 4.60 |
| b) Other Water Supply | 150.00 | 10.20 | 5.25 | 8.40 |
| 6. Transportation | | | | |
| a) Public Transportation (Charging Station) | 230.00 | 7.00 | 3.70 | 5.50 |
| b) Other Transportation | 255.00 | 9.35 | 3.70 | 8.40 |
| 7. Street Light | 80.00 | 8.40 | 3.50 | 4.20 |
| **C. Medium Voltage (11 KV)** | | | | |
| 1. Industrial | 250.00 | 10.50 | 5.40 | 8.55 |
| 2. Commercial | 315.00 | 12.60 | 6.90 | 11.10 |
| 3. Non-commercial | 240.00 | 13.50 | 7.15 | 12.25 |
| 4. Irrigation | - | 6.40 | 2.00 | 3.10 |
| 5. Water Supply | | | | |
| a) Community Water Supply | - | 6.30 | 3.40 | 4.70 |
| b) Other Water Supply | 150.00 | 10.50 | 5.40 | 8.50 |
| 6. Transportation | | | | |
| a) Public Transportation (Charging Station) | 230.00 | 7.15 | 4.20 | 5.60 |
| b) Other Transportation | 255.00 | 9.65 | 4.20 | 8.50 |

| | | | | |
|---|---|---|---|---|
| 7. Street Light | 80.00 | 8.80 | 3.75 | 4.40 |
| 8. Religious Place | 220.00 | 11.30 | 5.15 | 9.10 |
| 9. Temporary Connection | 330.00 | 14.40 | 6.60 | 11.75 |
| **D. Low Voltage (230/400 V)** | | | | |
| Transportation | | | | |
| a) Public Transportation (Charging Station) | 200.00 | 7.25 | 4.30 | 5.75 |
| b) Other Transportation | 220.00 | 9.75 | 4.30 | 8.60 |

## 3.2 Tariff Rate from Paush to Chaitra

| Consumer Category | Demand Charge Nrs. /KVA/ month | Peak Time (17.00 - 23.00) | Normal Time (23.00 - 17.00) |
|---|---|---|---|
| **A. High Voltage** | | | |
| 1. Industrial (132 kV) | 230.00 | 10.00 | 8.20 |
| 2. Industrial (66 kV) | 240.00 | 10.10 | 8.30 |
| **B. Medium Voltage (33 KV)** | | | |
| 1. Industrial | 250.00 | 10.20 | 8.40 |
| 2. Commercial | 315.00 | 12.30 | 10.80 |
| 3. Non-Commercial | 240.00 | 13.20 | 12.00 |
| 4. Irrigation | - | 6.30 | 3.00 |
| 5. Water Supply | | | |
| a) Community Water Supply | - | 6.20 | 4.60 |
| b) Other Water Supply | 150.00 | 10.20 | 8.40 |
| 6. Transportation | | | |
| a) Public Transportation (Charging Station) | 230.00 | 7.00 | 5.50 |
| b) Other Transportation | 255.00 | 9.35 | 8.40 |
| 7. Street Light | 80.00 | 8.40 | 4.20 |
| **C. Medium Voltage (11 KV)** | | | |
| 1. Industrial | 250.00 | 10.50 | 8.55 |
| 2. Commercial | 315.00 | 12.60 | 11.10 |
| 3. Non-commercial | 240.00 | 13.50 | 12.25 |
| 4. Irrigation | - | 6.40 | 3.10 |
| 5. Water Supply | | | |
| a) Community Water Supply | - | 6.30 | 4.70 |
| b) Other Water Supply | 150.00 | 10.50 | 8.50 |

| | | | |
|---|---|---|---|
| 6. Transportation | | | |
| a) Public Transportation (Charging Station) | 230.00 | 7.15 | 5.60 |
| b) Other Transportation | 255.00 | 9.65 | 8.50 |
| 7. Street Light | 80.00 | 8.80 | 4.40 |
| 8. Religious Place | 220.00 | 11.30 | 9.10 |
| 9. Temporary Connection | 330.00 | 14.40 | 11.75 |
| **D. Low Voltage (230/400 V)** | | | |
| Transportation | | | |
| a) Public Transportation (Charging Station) | 200.00 | 7.25 | 5.75 |
| b) Other Transportation | 220.00 | 9.75 | 8.60 |

### 3.3 Transportation for Automatic Swap Card Users without Demand Charge

#### 3.3.1 Public Transportation (Charging Station)

| Description | Energy Charge Nrs./kWh | | |
|---|---|---|---|
| | Peak Time (17.00-23.00) | Off Peak Time (23.00-5.00) | Normal Time (5.00-17.00) |
| **Tariff Rate from Baisakh to Mangsir** | | | |
| Medium Voltage (33 kV) | 8.40 | 4.45 | 6.60 |
| Medium Voltage (11 kV) | 8.60 | 5.05 | 6.70 |
| Low Voltage (230/400 V) | 8.70 | 5.05 | 6.90 |
| **Tariff Rate from Paush to Chaitra** | | | |
| **Description** | **Peak Time (17.00-23.00)** | **Normal Time (23.00-17.00)** | |
| Medium Voltage (33 kV) | 8.40 | 6.60 | |
| Medium Voltage (11 kV) | 8.60 | 6.70 | |
| Low Voltage (230/400 V) | 8.70 | 6.90 | |

#### 3.3.2 Other Transportation

| Description | Energy Charge Nrs./kWh | | |
|---|---|---|---|
| | Peak Time (17.00-23.00) | Off Peak Time (23.00-5.00) | Normal Time (5.00-17.00) |
| **Tariff Rate from Baisakh to Mangsir** | | | |
| Medium Voltage (33 kV) | 11.20 | 4.45 | 10.10 |
| Medium Voltage (11 kV) | 11.60 | 5.05 | 10.20 |
| Low Voltage (230/400 V) | 11.70 | 5.15 | 10.30 |

| Tariff Rate from Paush to Chaitra | | |
|---|---|---|
| **Description** | **Peak Time (17.00-23.00)** | **Normal Time (23.00-17.00)** |
| Medium Voltage (33 kV) | 11.20 | 10.10 |
| Medium Voltage (11 kV) | 11.60 | 10.20 |
| Low Voltage (230/400 V) | 11.70 | 10.20 |

Note: Charging Station Operators will be able to get maximum 20 percent additional charge in given tariff proving charging service to electric vehicles.

## 4. Community Wholesale Consumer:

| Consumer Category | Minimum Charge (Nrs.) | Energy Charge (Nrs./kWh) |
|---|---|---|
| **1. Medium Voltage (11KV/33KV)** | | |
| Upto (N x 20) units, monthly | N × 30.00 | 0.00 |
| Above (N x 20) units, monthly | | 6.00 |
| **2. Lower Voltage Level (230/400 Volt)** | | |
| Upto (N x 20) units, monthly | N × 30.00 | 0.00 |
| Above (N x 20) units, monthly | | 6.25 |

N= Total Number of Consumers of a Community Group

# Electricity Generation Power Plants and Projects

## Major Hydropower Stations

| S.No | Power Plants | Capacity(KW) |
|---|---|---|
| 1 | Kaligandaki A | 144,000 |
| 2 | Middle Marsyandi | 70,000 |
| 3 | Marsyandi | 69,000 |
| 4 | Kulekhani I | 60,000 |
| 5 | Upper Trishuli 3A HEP | 60,000 |
| 6 | Kulekhani II | 32,000 |
| 7 | Chameliya | 30,000 |
| 8 | Trishuli | 24,000 |
| 9 | Gandak | 15,000 |
| 10 | Devighat | 15,000 |
| 11 | Modi Khola | 14,800 |
| 12 | Kulekhani III HEP | 14,000 |
| 13 | Sunkoshi | 10,050 |
| 14 | Puwa Khola | 6,200 |
| | **Sub Total** | **564,050** |

### Small Hydropower Plants

| S.No | Power Plants | Capacity(KW) |
|---|---|---|
| 1 | Chatara | 3,200 |
| 2 | Panauti | 2,400 |
| 3 | Tatopani | 2,000 |
| 4 | Seti (Pokhara) | 1,500 |
| 5 | Tinau | 1,024 |
| 6 | Fewa | 1,000 |
| 7 | Sundarijal | 970 |
| 8 | Pharping*** | 500 |
| 9 | Gamgad | 400 |
| 10 | Khandbari** | 250 |
| 11 | Jomsom** | 240 |
| 12 | Phidim** | 240 |
| 13 | Baglung*** | 200 |
| 14 | Surnaiyagad | 200 |
| 15 | Doti*** | 200 |
| 16 | Ramechhap | 150 |
| 17 | Terhathum** | 100 |
| | Sub Total | 14,574 |
| | **Total** | **578,624** |

### Small Hydropower Plants (Isolated)

| S.No | Power Plants | Capacity(KW) |
|---|---|---|
| 1 | Kalikot | 500 |
| 2 | Heldung(Humla) | 500 |
| 3 | Achham | 400 |
| 4 | Jhupra(Surkhet)*** | 345 |
| 5 | Darchula** | 300 |
| 6 | Bhojpur** | 250 |
| 7 | Dhankuta*** | 240 |
| 8 | Jumla** | 200 |
| 9 | Syaprudaha(Rukum)** | 200 |
| 10 | Bajura** | 200 |
| 11 | Bajhang** | 200 |
| 12 | Dolpa | 200 |
| 13 | Chaurjhari(Rukum)** | 150 |
| 14 | Arughat(Gorkha) | 150 |
| 15 | Taplejung** | 125 |
| 16 | Okhaldhunga | 125 |
| 17 | Rupalgad(Dadeldhura) | 100 |
| 18 | Syangja*** | 80 |
| 19 | Manag** | 80 |
| 20 | Gorkhe(Ilam)*** | 64 |
| 21 | Helambu | 50 |
| 22 | Chame** | 45 |
| 23 | Dhanding*** | 32 |
| | **Total** | **4,536** |

### Thermal Power Plants Capacity(KW)

| | | |
|---|---|---|
| 1 | Duhabi Multifuel | 39,000 |
| 2 | Hetauda Diesel | 14,410 |
| | **Total** | **53,410** |
| | **Total Major Hydro(NEA)-Grid Connected** | **578,624** |
| | Total Small Hydro(NEA)-Isolated | 4,536 |
| | **Total Hydro(NEA)** | **583,160** |
| | **Total Hydro NEA Subsidiary** | **478,100** |
| | **Total Hydro(IPP)** | **1,020,528** |
| | **Total Hydro(Nepal)** | **2,081,788** |
| | Total Thermal(NEA) | 53,410 |
| | Total Solar(NEA) | 21,580 |
| | Total Solar(IPP) | 33,140 |
| | **Total Installed Capacity(NEA & IPP)-Grid** | **2,185,382** |
| | **Total Installed Capacity** | **2,189,918** |

### Under Construction Capacity(KW)

| S.No | Power Plants | Capacity(KW) |
|---|---|---|
| 1 | Tanahu Hydropower Project | 140,000 |
| 2 | Rasuwagadi | 111,000 |
| 3 | Madhya Bhotekoshi | 102,000 |
| 4 | Sanjen | 42,500 |
| 5 | Rahuganga HEP | 40,000 |
| 6 | Upper Trishuli 3B | 37,000 |
| 7 | Upper Sanjen | 14,600 |
| | Total | 487,100 |

### Planned and Proposed Capacity(KW)

| S.No | Power Plants | Capacity(KW) |
|---|---|---|
| 1 | Upper Arun HEP | 1,061,000 |
| 2 | Uttar Ganga Storage HEP | 828,000 |
| 3 | Dudhkoshi Storage HEP | 635,000 |
| 4 | Chainpur Seti HEP | 210,000 |
| 5 | Aadhikhola Storage HEP | 180,000 |
| 6 | Begnas Rupa Pump Storage HEP | 150,000 |
| 7 | Tamakoshi V HEP | 95,000 |
| 8 | Upper Modi A HEP | 42,000 |
| 9 | Upper Modi HEP | 18,200 |
| | **Total** | **3,219,200** |

** Leased to Private Sector

***Not in Normal Operation

# Nepal Electricity Authority

## Generation Directorate

### Generation Related Statistics and Performance Factors of FY 2078/79 (FY 2021/2022)

| S. No. | Power Stations | Total Installed Capacity | Design Generation (MWh) | Actual Generation (MWh) | | | Percentage generation change from last year (%) | Max. generation in a year till date (MWh) | Generation Target in FY 2078/79 (MWh) | Import to Powerstation Bus Bar (MWh) | Power Station Available Energy (MWh) | Energy Transmission to Grid (MWh) | Net Energy Transmission to Grid (MWh) | Local Distribution (MWh) | Station/ Internal Consumption (MWh) | Total Power Utilization (MWh) | Energy Loss (MWh) | Power Station Loss (%) | Loss/ Energy generation | Plant Factor (%) | Actual Generation/ Design Generation ratio (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | FY 2076/77 | FY 2077/78 | FY 2078/79 | | | | | | | | | | | | | | | |
| | | P | a | | | A | | | b | B | C=A+B | D | D-B | E | F | G=D+E+F | L=C-G | (C-G)/C | L/A*100 | A/ (Installed capacity *365 *24) *100 | (A/a)*100 |
| 1 | Kaligandaki 'A' | 144 | 842,000.00 | 871,466.00 | 817,712.86 | 974,831.97 | 19.21% | 974,831.97 (2078/79) | 896,479.27 | 433,066.06 | 1,407,898.03 | 1,399,082.17 | 966,016.11 | 1,134.57 | 2,172.39 | 1,402,389.13 | 5,508.90 | 0.39% | 0.57 | 77.28 | 115.78 |
| 2 | Mid-Marsyangdi | 70 | 398,000.00 | 446,624.75 | 398,846.30 | 468,270.00 | 17.41% | 471,322.51 (2075/76) | 452,301.10 | 268,827.47 | 737,097.47 | 725,093.39 | 456,265.92 | 244.80 | 563.91 | 725,902.10 | 11,195.37 | 1.52% | 2.39 | 76.36 | 117.66 |
| 3 | Marsyandi | 69 | 462,500.00 | 443,852.10 | 398,920.10 | 464,271.50 | 16.38% | 483,928.20 (2052/53) | 465,220.39 | 490,449.00 | 954,720.50 | 939,781.80 | 449,332.80 | 0.00 | 1,830.67 | 941,612.47 | 13,108.03 | 1.37% | 2.82 | 76.81 | 100.38 |
| 4 | Upper Trishuli 3A | 60 | 489,760.00 | 407,551.15 | 314,767.50 | 432,832.50 | 37.51% | 432,832.5 (2078/79) | 489,760.00 | 6,128.80 | 438,961.30 | 434,692.80 | 428,564.00 | 0.00 | 870.25 | 435,563.05 | 3,398.25 | 0.77% | 0.79 | 82.35 | 88.38 |
| 5 | Kulekhani I | 60 | 211,000.00 | 162,972.00 | 195,157.00 | 172,753.00 | -11.48% | 249,680.00 (2056/57) | 108,569.33 | 174,376.13 | 347,129.13 | 336,206.13 | 161,830.00 | 10,341.14 | 1,234.93 | 347,782.20 | - | - | - | 32.87 | 81.87 |
| 6 | Kulekhani II | 32 | 104,600.00 | 81,483.40 | 95,228.87 | 82,691.46 | -13.17% | 122,757.00 (2056/57) | 57,903.64 | 324.97 | 83,016.43 | 82,072.25 | 81,747.28 | 0.00 | 290.57 | 82,362.82 | 653.61 | 0.79% | 0.79 | 29.50 | 79.05 |
| 7 | Chameliya | 30 | 184,200.00 | 160,811.64 | 151,247.41 | 153,981.04 | 1.81% | 161,395.54(2075/76) | 170,578.97 | 83,689.32 | 237,670.36 | 232,674.86 | 148,985.54 | 2,440.56 | 377.74 | 235,493.16 | 2,177.20 | 0.92% | 1.41 | 58.59 | 83.59 |
| 8 | Trishuli | 24 | 163,000.00 | 128,973.11 | 121,211.30 | 137,113.27 | 13.12% | 154,423.75 (2053/54) | 140,960.16 | 189,028.08 | 326,141.35 | 291,349.19 | 102,321.11 | 30,466.30 | 271.59 | 322,087.08 | 4,054.27 | 1.24% | 2.96 | 65.22 | 84.12 |
| 9 | Gandak | 15 | 106,380.00 | 10,337.60 | 12,123.40 | 15,181.70 | 25.23% | 52,272.70 (2043/44) | 30,953.78 | 177,221.19 | 192,402.89 | 90,561.45 | -86,659.74 | 90,443.44 | 595.63 | 181,600.52 | 10,802.37 | - | - | 11.55 | 14.27 |
| 10 | Modi | 14.8 | 92,500.00 | 66,913.20 | 60,470.50 | 79,601.90 | 31.64% | 79,601.9 (2078/79) | 72,541.40 | 361,586.72 | 441,188.62 | 438,116.44 | 76,529.72 | 2,883.30 | 333.06 | 441,332.80 | - | - | - | 61.40 | 86.06 |
| 11 | Devighat | 15 | 114,000.00 | 92,053.14 | 85,429.11 | 98,389.60 | 15.17% | 106,277.70 (2056/57) | 99,857.62 | 62,629.98 | 161,019.58 | 146,013.08 | 83,383.10 | 14,094.87 | 209.00 | 160,316.95 | 702.63 | 0.44% | 0.71 | 74.88 | 86.31 |
| 12 | Kulekhani III | 14 | 40,850.00 | 20,365.20 | 35,565.40 | 36,243.80 | 1.91% | 36,243.8 (2078/79) | 25,332.84 | 57.60 | 36301.40 | 35,640.00 | 35,582.40 | 0.00 | 340.85 | 35,980.85 | 320.55 | 0.88% | 0.88 | 29.55 | 88.72 |
| 13 | Sunkoshi | 10.05 | 70,000.00 | 62,245.94 | 55,916.73 | 63,524.08 | 13.60% | 66,383.10 (2068/69) | 63,706.80 | 374.39 | 63,898.47 | 58,617.48 | 58,243.09 | 4,872.62 | 261.49 | 63,751.59 | 146.88 | 0.23% | 0.23 | 72.16 | 90.75 |
| 14 | Puwa | 6.2 | 48,000.00 | 34,914.55 | 34,477.31 | 37,715.20 | 9.39% | 37,715 (2078/79) | 37,447.34 | 14.00 | 37729.20 | 37164.44 | 37,150.44 | 0.00 | 105.46 | 37,269.90 | 459.30 | 1.22% | 1.22 | 69.44 | 78.57 |
| 15 | Chatara | 3.2 | 6,000.00 | 1,822.00 | 3,351.80 | 2,878.58 | -14.12% | 5,219.75 (2063/64) | 4,360.16 | 291.05 | 3,169.62 | 1,308.86 | 1,017.81 | 240.89 | 10.38 | 1,560.12 | 1,609.50 | - | - | 10.27 | 47.98 |
| 16 | Panauti | 2.4 | 6,970.00 | 2,886.76 | 2,947.96 | 3,251.28 | 10.29% | 4,654.80 (2058/59) | 3,185.67 | 22.80 | 3274.08 | 3186.70 | 3,163.90 | 0.00 | 21.28 | 3,207.98 | 66.10 | 2.02% | 2.03 | 15.46 | 46.65 |
| 17 | Seti | 1.5 | 9,800.00 | 11,158.29 | 11,682.18 | 10,954.65 | -6.23% | 11,682.18 (2077/78) | 11,366.64 | 2.96 | 10,957.61 | 10,557.47 | 10,554.51 | 0.00 | 47.43 | 10,604.90 | 352.71 | 3.22% | 3.22 | 83.37 | 111.78 |
| 18 | Fewa | 1 | 6,500.00 | 2,126.54 | 1,850.94 | 1,863.37 | 0.67% | 3,919.47 (2034/35) | 3,319.41 | 8.33 | 1871.70 | 1812.69 | 1,804.36 | 0.00 | 7.50 | 1,820.19 | 51.51 | 2.75% | 2.76 | 21.27 | 28.67 |
| 19 | Sundarijal | 0.97 | 4,770.00 | 2,814.76 | 3,922.39 | 6,101.62 | 55.56% | 6,101.62 (2078/79) | 7,092.65 | 0.00 | 6,101.62 | 6,092.82 | 6,092.82 | 0.00 | 8.80 | 6,101.62 | - | - | - | 71.81 | 127.92 |
| 20 | Pharping | 0.5 | - | - | - | - | - | 48.65(2064/65) | | | | - | 0.00 | - | - | - | - | - | - | - | - |
| | Total (Hydro) | 573.29 | 3,360,830.00 | 3,011,372.13 | 2,800,829.06 | 3,242,450.52 | 15.77% | - | 3,140,937.18 | 2,248,098.84 | 5,490,549.36 | 5,270,024.01 | 3,021,925.16 | 157,162.49 | 9,552.92 | 5,436,739.42 | 54,607.19 | 0.98% | 1.68 | 64.56 | 96.48 |
| 21 | Multifuel | 39 | - | 2.52 | 0.00 | 0.00 | - | 86,215.07 (2055/56) | - | - | - | - | 0.00 | - | - | - | - | - | - | 0.00 | - |
| 22 | Hetauda Diesel | 14.41 | - | 57.09 | 54.36 | 32.51 | -40.19% | 24,203.64 (2055/56) | - | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.96 | 9.96 | - | - | - | 0.03 | - |
| | Total (Thermal) | 53.41 | - | 59.61 | 54.36 | 32.51 | -40.19% | - | - | 0.00 | 32.51 | 22.55 | 22.55 | 0.00 | 9.96 | 32.51 | 0.00 | 0.00% | 0.00 | 0.01 | - |
| | Grand Total | 626.7 | 3,360,830.00 | 3,011,431.74 | 2,800,883.41 | 3,242,483.03 | 15.77% | - | 3,140,937.18 | 2,248,098.84 | 5,490,581.87 | 5,270,046.56 | 3,021,947.72 | 157,162.49 | 9,562.88 | 5,436,771.93 | 53,809.94 | 0.98% | 1.66 | 59.06 | 96.48 |

# Nepal Electricity Authority
## Generation Directorate
## Subject: Actual Monthly Generation of FY 2078/79 (FY 2021/2022)

Unit: MWh

| S.No. | Power Stations/ Month | | Shrawan | Bhadra | Ashwin | Kartik | Mangsir | Poush | Magh | Falgun | Chaitra | Baishakh | Jestha | Ashad | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Kaligandaki 'A' | KGA | 102,717.39 | 96,438.35 | 96,645.99 | 73,031.92 | 86,182.68 | 67,937.00 | 53,749.61 | 50,141.29 | 72,517.24 | 72,515.82 | 100,629.87 | 102,324.81 | 974,831.97 |
| 2 | Mid-Marsyangdi | MMHPS | 49,252.80 | 48,406.70 | 47,251.70 | 27,534.50 | 40,301.30 | 33,226.70 | 25,802.10 | 23,924.90 | 37,104.60 | 38,176.70 | 44,715.00 | 52,573.00 | 468,270.00 |
| 3 | Marsyandi | MHPS | 41,520.10 | 43,040.90 | 45,901.40 | 30,864.90 | 40,156.40 | 37,797.10 | 29,985.80 | 27,527.10 | 37,028.60 | 38,896.60 | 46,104.80 | 45,447.80 | 464,271.50 |
| 4 | Kulekhani I | KLI | 22,943.00 | 6,909.00 | 9,559.00 | 2,343.00 | 7,987.00 | 14,015.00 | 16,484.00 | 11,129.00 | 27,473.00 | 16,993.00 | 19,627.00 | 17,291.00 | 172,753.00 |
| 5 | Kulekhani II | KLII | 10,683.27 | 3,087.10 | 4,300.08 | 1,130.78 | 3,932.19 | 6,723.42 | 7,865.23 | 5,209.44 | 13,182.80 | 8,208.50 | 9,737.29 | 8,631.36 | 82,691.46 |
| 6 | Upper Trishuli 3A | UT3A | 13,512.50 | 25,485.00 | 40,542.50 | 28,287.50 | 37,805.00 | 42,722.50 | 36,565.00 | 33,470.00 | 42,465.00 | 44,602.50 | 43,287.50 | 44,087.50 | 432,832.50 |
| 7 | Chameliya | CHEPS | 13,984.77 | 15,498.62 | 20,871.20 | 13,944.06 | 12,867.30 | 10,032.36 | 7,278.80 | 6,058.00 | 11,351.02 | 10,680.31 | 13,121.67 | 18,292.93 | 153,981.04 |
| 8 | Trishuli | THPS | 12,052.88 | 11,537.28 | 11,955.46 | 10,969.38 | 11,264.59 | 12,399.60 | 11,095.71 | 10,190.56 | 11,793.18 | 11,927.67 | 11,304.07 | 10,622.89 | 137,113.27 |
| 9 | Gandak | GHPS | 1,621.40 | 797.20 | 1,849.40 | 482.40 | - | 1,702.10 | 2,942.20 | 2,942.20 | 825.70 | - | 608.80 | 1,410.30 | 15,181.70 |
| 10 | Modi | MKHPS | 8,899.40 | 8,570.20 | 9,355.50 | 7,854.90 | 6,372.80 | 4,040.40 | 3,613.70 | 3,740.60 | 5,129.50 | 4,394.00 | 8,313.40 | 9,317.50 | 79,601.90 |
| 11 | Devighat | DHPS | 8,034.38 | 8,120.24 | 8,753.21 | 7,976.88 | 8,342.69 | 9,235.00 | 8,331.66 | 7,437.04 | 8,449.07 | 8,248.71 | 8,031.24 | 7,429.48 | 98,389.60 |
| 12 | Kulekhani III | KLIII | 4,693.80 | 2,041.80 | 2,560.80 | 988.60 | 1,747.40 | 2,820.00 | 3,195.00 | 2,150.00 | 5,161.80 | 3,243.00 | 3,890.40 | 3,751.20 | 36,243.80 |
| 13 | Sunkoshi | SKHPS | 5,973.68 | 6,146.94 | 7,033.92 | 6,681.44 | 6,063.42 | 4,524.01 | 3,784.94 | 3,447.52 | 4,220.31 | 4,279.73 | 5,760.49 | 5,607.68 | 63,524.08 |
| 14 | Puwa | PKHPS | 4,199.95 | 4,119.40 | 4,170.04 | 3,546.95 | 3,837.58 | 2,953.11 | 2,208.62 | 1,686.33 | 1,625.53 | 2,318.55 | 2,581.49 | 4,467.65 | 37,715.20 |
| 15 | Chatara | CHPS | 141.30 | 556.95 | 453.43 | 129.98 | - | 337.95 | 324.41 | 409.06 | 362.29 | 163.21 | - | - | 2,878.58 |
| 16 | Panauti | PHPS | 381.10 | 398.79 | 379.79 | 364.16 | 314.21 | 291.44 | 180.11 | 146.79 | 118.25 | 201.97 | 189.92 | 284.75 | 3,251.28 |
| 17 | Seti | SHPS | 995.49 | 999.99 | 839.52 | 664.10 | 851.01 | 976.84 | 981.79 | 994.92 | 961.72 | 982.86 | 963.67 | 742.74 | 10,954.65 |
| 18 | Fewa | FHPS | 375.32 | 371.63 | 293.36 | 33.43 | 186.46 | 212.65 | 157.13 | - | - | - | 46.01 | 187.38 | 1,863.37 |
| 19 | Sundarijal | SJHPS | 634.76 | 319.17 | 689.85 | 594.12 | 543.48 | 578.08 | 502.55 | 430.50 | 300.35 | 327.01 | 505.97 | 675.78 | 6,101.62 |
| | Total (Hydro) | | 302,617.30 | 282,845.26 | 313,406.15 | 217,423.00 | 268,755.51 | 252,525.26 | 215,048.36 | 191,035.25 | 280,069.96 | 266,160.14 | 319,418.60 | 333,145.75 | 3,242,450.52 |
| 20 | Multifuel | MFPS | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 21 | Hetauda Diesel | HDPS | 4.32 | 3.25 | 3.25 | 2.47 | 1.01 | 4.08 | 3.43 | 2.80 | 0.95 | 2.35 | 2.23 | 2.36 | 32.51 |
| | Total (Thermal) | | 4.32 | 3.25 | 3.25 | 2.47 | 1.01 | 4.08 | 3.43 | 2.80 | 0.95 | 2.35 | 2.23 | 2.36 | 32.51 |
| | Grand Total | | 302,621.62 | 282,848.51 | 313,409.40 | 217,425.47 | 268,756.52 | 252,529.34 | 215,051.78 | 91,038.05 | 280,070.92 | 266,162.49 | 319,420.82 | 333,148.11 | 3,242,483.03 |

# NEPAL ELECTRICITY AUTHORITY
## POWER TRADE DEPARTMENT
## Status of IPP'S and NEA Subsidiary Company Projects
## Power Projects (Operation) as of FY 2078/79

| S.N. | Developer | Projects | Location | Capacity (kW) | PPA Date | Commercial Operation Date |
|---|---|---|---|---|---|---|
| **NEA Subsidiary Hydropower Projects** | | | | | | |
| 1 | Chilime Hydro Power Company Ltd. | Chilime | Rasuwa | 22100 | 2054.03.11 | 2060.05.08 |
| 2 | Upper Tamakoshi Hydropower Ltd. | Upper Tamakoshi | Dolkha | 456000 | 2067.09.14 | 2078.05.04 |
| | | | **SUB TOTAL** | **478100** | | |
| **IPP Hydropower Projects** | | | | | | |
| 1 | Himal Power Ltd. | Khimti Khola | Dolakha | 60000 | 2052.10.01 | 2057.03.27 |
| 2 | Bhotekoshi Power Company Ltd. | Upper Bhotekoshi Khola | Sindhupalchowk | 45000 | 2053.04.06 | 2057.10.11 |
| 3 | Syange Electricity Company Limited | Syange Khola | Lamjung | 183 | 2058.10.03 | 2058.10.10 |
| 4 | National Hydro Power Company Ltd. | Indrawati - III | Sindhupalchowk | 7500 | 2054.09.15 | 2059.06.21 |
| 5 | Butwal Power Company Ltd. | Jhimruk Khola | Pyuthan | 12000 | 2058.03.29 | 1994 |
| 6 | Butwal Power Company Ltd. | Andhi Khola | Syangza | 9400 | 2058.03.29 | 2071.12.22 |
| 7 | Arun Valley Hydropower Dev. Co. (P.) Ltd. | Piluwa Khola Small | Sankhuwasabha | 3000 | 2056.10.09 | 2060.06.01 |
| 8 | Rairang Hydro Power Development Co. (P) Ltd. | Rairang Khola | Dhading | 500 | 2059.08.27 | 2061.08.01 |
| 9 | Sanima Hydropower (Pvt.) Ltd. | Sunkoshi Small | Sindhupalchowk | 2500 | 2058.07.28 | 2061.12.11 |
| 10 | Alliance Power Nepal Pvt. Ltd. | Chaku Khola | Sindhupalchowk | 3000 | 2056.11.03 | 2062.03.01 |
| 11 | Khudi Hydropower Ltd. | Khudi Khola | Lamjung | 4000 | 2058.03.04 | 2063.09.15 |
| 12 | Unique Hydel Co. Pvt.Ltd. | Baramchi Khola | Sindhupalchowk | 4200 | 2058.12.14 | 2063.09.27 |
| 13 | Thoppal Khola Hydro Power Co. Pvt. Ltd. | Thoppal Khola | Dhading | 1650 | 2059.11.23 | 2064.07.13 |
| 14 | Gautam Buddha Hydropower (Pvt.) Ltd. | Sisne Khola Small | Palpa | 750 | 2061.04.29 | 2064.06.01 |
| 15 | Kathmandu Small Hydropower Systems Pvt. Ltd. | Sali Nadi | Kathmandu | 250 | 2062.04.24 | 2064.08.01 |
| 16 | Khoranga Khola Hydropower Dev. Co. Pvt. Ltd. | Pheme Khola | Panchthar | 995 | 2057.12.31 | 2064.08.05 |
| 17 | Unified Hydropower (P.) Ltd. | Pati Khola Small | Parbat | 996 | 2062.10.28 | 2065.10.27 |
| 18 | Task Hydropower Company (P.) Ltd. | Seti-II | Kaski | 979 | 2063.06.08 | 2065.11.14 |
| 19 | Ridi Hydropower Development Co. (P.) Ltd. | Ridi Khola | Gulmi | 2400 | 2063.05.08 | 2066.07.10 |
| 20 | Centre for Power Dev. And Services (P.) Ltd. | Upper Hadi Khola | Sindhupalchowk | 991 | 2064.04.07 | 2066.07.22 |
| 21 | Gandaki Hydro Power Co. Pvt. Ltd. | Mardi Khola | Kaski | 4800 | 2060.07.07 | 2066.10.08 |
| 22 | Himal Dolkha Hydropower Company Ltd. | Mai Khola | Ilam | 4500 | 2063.11.19 | 2067.10.14 |

| S.N. | Developer | Projects | Location | Capacity (kW) | PPA Date | Commercial Operation Date |
|---|---|---|---|---|---|---|
| 23 | Baneswor Hydropower Pvt. Ltd. | Lower Piluwa Small | Sankhuwasabha | 990 | 2064.07.21 | 2068.04.01 |
| 24 | Barun Hydropower Development Co. (P.) Ltd. | Hewa Khola | Sankhuwasabha | 4455 | 2061.04.02 | 2068.04.17 |
| 25 | Bhagawati Hydropower Development Co. (P.) Ltd. | Bijayapur-1 | Kaski | 4410 | 2066.03.30 | 2069.05.04 |
| 26 | Nyadi Group (P.) Ltd. | Siuri Khola | Lamjung | 4950 | 2064.04.17 | 2069.07.30 |
| 27 | United Modi Hydropwer Pvt. Ltd. | Lower Modi 1 | Parbat | 10000 | 2065.10.20 | 2069.08.10 |
| 28 | Synergy Power Development (P.) Ltd. | Sipring Khola | Dolakha | 9658 | 2065.10.20 | 2069.10.03 |
| 29 | Laughing Buddha Power Nepal (P.) Ltd. | Middle Chaku | Sindhupalchowk | 1800 | 2066.11.03 | 2069.11.15 |
| 30 | Aadishakti Power Dev. Company (P.) Ltd. | Tadi Khola (Thaprek) | Nuwakot | 5000 | 2061.12.15 | 2069.12.14 |
| 31 | Ankhu Khola Jal Bidhyut Co. (P.) Ltd. | Ankhu Khola - 1 | Dhading | 8400 | 2066.02.22 | 2070.05.05 |
| 32 | Nepal Hydro Developer Pvt. Ltd. | Charanawati Khola | Dolakha | 3520 | 2067.01.13 | 2070.02.24 |
| 33 | Laughing Buddha Power Nepal Pvt. Ltd. | Lower Chaku Khola | Sindhupalchowk | 1800 | 2063.07.02 | 2070.04.24 |
| 34 | Bhairabkunda Hydropower Pvt. Ltd. | Bhairab Kunda | Sindhupalchowk | 3000 | 2065.08.02 | 2071.02.22 |
| 35 | Radhi Bidyut Company Ltd. | Radhi Khola | Lamjung | 4400 | 2066.10.18 | 2071.02.31 |
| 36 | Pashupati Environmental Eng. Power Co. Pvt. Ltd. | Chhote Khola | Gorkha | 993 | 2067.11.09 | 2071.03.09 |
| 37 | Mailung Khola Hydro Power Company (P.) Ltd. | Mailung Khola | Rasuwa | 5000 | 2058.04.09 | 2071.03.19 |
| 38 | Joshi Hydropower Dev. Co. Ltd. | Upper Puwa -1 | Ilam | 3000 | 2066.01.23 | 2071.10.01 |
| 39 | Sanima Mai Hydropower Limited | Mai Khola | Ilam | 22000 | 2067.01.08 | 2071.10.14 |
| 40 | Bojini Company Private Limited | Jiri Khola Small | Dolakha | 2200 | 2065.10.23 | 2071.11.01 |
| 41 | Ruru Hydropower Project (P) Ltd. | Upper Hugdi Khola | Gulmi | 5000 | 2066.04.04 | 2071.12.09 |
| 42 | Prime Hydropower Co. Pvt. Ltd. | Belkhu | Dhading | 518 | 2064.04.04 | 2071.12.30 |
| 43 | Api Power Company Pvt. Ltd. | Naugadh gad Khola | Darchula | 8500 | 2067.01.19 | 2072.05.02 |
| 44 | Kutheli Bukhari Small Hydropower (P).Ltd | Suspa Bukhari | Dolakha | 998 | 2069.04.32 | 2072.06.03 |
| 45 | Sanima Mai Hydropower Ltd. | Mai Cascade | Ilam | 7000 | 2069.10.12 | 2072.10.29 |
| 46 | Chhyangdi Hydropower Limited | Chhandi | Lamjung | 2000 | 2068.12.23 | 2072.12.13 |
| 47 | Panchakanya Mai Hydropower Ltd. (Previously Mai Valley and prior to that East Nepal) | Upper Mai Khola | Ilam | 9980 | 2061.12.19 | 2073.03.09 |
| 48 | Sayapatri Hydropower Private Limited | Daram Khola A | Baglung | 2500 | 2068.12.19 | 2073.03.12 |
| 49 | Electro-com and Research Centre Pvt. Ltd. | Jhyadi Khola | Sindhupalchowk | 2000 | 2067.01.30 | 2073.05.31 |

| S.N. | Developer | Projects | Location | Capacity (kW) | PPA Date | Commercial Operation Date |
|---|---|---|---|---|---|---|
| 50 | Khani Khola Hydropower Company Pvt. Ltd. | Tungun-Thosne | Lalitpur | 4360 | 2069.04.05 | 2073.07.09 |
| 51 | Daraudi Kalika Hydro Pvt. Ltd. | Daraudi Khola A | Gorkha | 6000 | 2068.05.19 | 2073.08.13 |
| 52 | Khani Khola Hydropower Company Pvt. Ltd. | Khani Khola | Lalitpur | 2000 | 2069.04.05 | 2073.08.20 |
| 53 | Sapsu Kalika Hydropower Co. Pvt. Ltd. | Miya Khola | Khotang | 996 | 2069.08.10 | 2073.09.03 |
| 54 | Sinohydro-Sagarmatha Power Company (P) Ltd. | Upper Marsyangdi "A" | Lamjung | 50000 | 2067.09.14 | 2073.09.17 |
| 55 | Madi Power Pvt. Ltd. | Upper Madi | Kaski | 25000 | 2066.05.21 | 2073.09.25 |
| 56 | Panchthar Power Company Pvt. Ltd. | Hewa Khola A | Panchthar | 14900 | 2068.05.30 | 2073.10.22 |
| 57 | Sanvi Energy pvt. Ltd. | Jogmai | Ilam | 7600 | 2069.08.07 | 2074.01.18 |
| 58 | Bhugol Energy Dev Compay (P). Ltd | Dwari Khola | Dailekh | 3750 | 2069.12.30 | 2074.01.23 |
| 59 | Mai Valley Hydropower Private Limited | Upper Mai C | Ilam | 5100 | 2068.12.23 | 2074.04.09 |
| 60 | Dronanchal Hydropower Co.Pvt.Ltd | Dhunge-Jiri | Dolakha | 600 | 2068.09.25 | 2074.06.01 |
| 61 | Dibyaswari Hydropower Limited | Sabha Khola | Sankhuwasabha | 4000 | 2068.11.17 | 2074.06.02 |
| 62 | Puwa Khola-1 Hydropower P. Ltd. | Puwa Khola -1 | Ilam | 4000 | 2070.10.09 | 2074.06.23 |
| 63 | Shibani Hydropower Co. Pvt. Ltd. | Phawa Khola | Taplejung | 4950 | 2063.12.01 | 2074.07.14 |
| 64 | Mount Kailash Energy Pvt. Ltd. | Thapa Khola | Myagdi | 13600 | 2067.10.11 | 2074.08.22 |
| 65 | Mandakini Hydropower Limited | Sardi Khola | Kaski | 4000 | 2068.11.11 | 2074.08.23 |
| 66 | Garjang Upatyaka Hydropower (P.) Ltd. | Chake Khola | Ramechhap | 2830 | 2065.11.06 | 2074.08.28 |
| 67 | Union Hydropower Pvt Ltd. | Midim Karapu | Lamjung | 3000 | 2069.10.28 | 2074.10.15 |
| 68 | Syauri Bhumey Microhydro Project | Syauri Bhumey | Nuwakot | 23 | 2072.11.16 | 2074.10.18 |
| 69 | Molung Hydropower Company Pvt. Ltd. | Molung Khola | Okhaldhunga | 7000 | 2069.11.21 | 2074.12.12 |
| 70 | Sikles Hydropower Pvt. Ltd. | Madkyu Khola | Kaski | 13000 | 2066.08.03 | 2074.12.19 |
| 71 | Himal Dolkha Hydropower Company Ltd. | Mai sana Cascade | Ilam | 8000 | 2069.11.14 | 2074.12.26 |
| 72 | Barahi Hydropower Pvt. ltd | Theule Khola | Baglung | 1500 | 2066.12.16 | 2075.03.24 |
| 73 | Leguwa Khola Laghu Jalbidhyut Sahakari Sastha Ltd. | Leguwa Khola | Dhankuta | 40 | 2072.11.21 | 2075.03.28 |
| 74 | Super Mai Hydropower Pvt. Ltd. | Super Mai | Ilam | 7800 | 2073.12.06 | 2075.07.11 |
| 75 | Chimal Gramin Bidhyut Sahakari Sanstha Ltd. | Sobuwa Khola-2 MHP | Taplejung | 90 | 2074.11.15 | 2075.07.14 |
| 76 | Deurali Bahuudesiya Sahakari Sanstha Ltd. | Midim Khola | Lamjung | 100 | 2070.02.20 | 2075.09.04 |
| 77 | Bindhyabasini Hydropower Dev. Co. (P.) Ltd. | Rudi Khola A | Lamjung & Kaski | 8800 | 2069.10.28 | 2075.12.04 |

| S.N. | Developer | Projects | Location | Capacity (kW) | PPA Date | Commercial Operation Date |
|---|---|---|---|---|---|---|
| 78 | Mandu Hydropower Ltd. | Bagmati Khola Small | Makawanpur/ Lalitpur | 22000 | 2069.10.07 | 2075.12.19 |
| 79 | Salmanidevi Hydropower (P). Ltd | Kapadi Gad | Doti | 3330 | 2069.12.11 | 2076.02.25 |
| 80 | Eastern Hydropower Pvt. Ltd. | Pikhuwa Khola | Bhojpur | 5000 | 2066.07.24 | 2076.02.27 |
| 81 | Mountain Hydro Nepal Pvt. Ltd. | Tallo Hewa Khola | Panchthar | 22100 | 2071.04.09 | 2076.04.21 |
| 82 | Pashupati Environmental Power Co. Pvt. Ltd. | Lower Chhote Khola | Gorkha | 997 | 2072.08.04 | 2076.05.20 |
| 83 | United Idi Mardi and R.B. Hydropower Pvt. Ltd. | Upper Mardi | Kaski | 7000 | 2073.02.25 | 2076.06.20 |
| 84 | Rairang Hydropower Development Company Ltd. | Iwa Khola | Taplejung | 9900 | 2070.01.29 | 2076.06.20 |
| 85 | Api Power Company Pvt. Ltd. | Upper Naugad Gad | Darchula | 8000 | 2073.07.12 | 2076.07.13 |
| 86 | Arun Kabeli Power Ltd. | Kabeli B-1 | Taplejung, Panchthar | 25000 | 2069.03.29 | 2076.07.23 |
| 87 | Rangoon Khola Hydropower Pvt. Ltd. | Jeuligad | Bajhang | 996 | 2071.10.20 | 2076.08.27 |
| 88 | Dolti Power Company Pvt. Ltd. | Padam Khola | Dailekh | 4800 | 2074.08.01 | 2076.09.08 |
| 89 | Bindhyabasini Hydropower Dev. Co. (P.) Ltd. | Rudi Khola B | Lamjung & Kaski | 6600 | 2071.4.20 | 2076.11.05 |
| 90 | Ghalemdi Hydro Limited (Previously, Cemat Power Dev Company (P). Ltd.) | Ghalemdi Khola | Myagdi | 5000 | 2069.12.30 | 2076.11.05 |
| 91 | Terhathum Power Company Pvt. Ltd. | Upper Khorunga | Terhathum | 7500 | 2073.07.29 | 2076.11.17 |
| 92 | Upper Solu Hydroelectric Company Pvt. Ltd | Solu Khola | Solukhumbu | 23500 | 2070.07.24 | 2076.12.10 (Transactional Operation Date-TOD) |
| 93 | Sagarmatha Jalabidhyut Company Pvt. Ltd. | Super Mai 'A' | Ilam | 9600 | 2074.11.14 | 2077.02.32 |
| 94 | Mai Khola Hydropower Pvt. Ltd. | Super Mai Cascade | Ilam | 3800 | 2074.12.07 | 2077.03.31 |
| 95 | Century Energy Pvt. Ltd. | Hadi Khola Sunkoshi A | Sindhupalchowk | 997 | 2074.05.05 | 2077.05.12 |
| 96 | Rawa Energy Development Pvt. Ltd. | Upper Rawa | Khotang | 3000 | 2073.04.24 | 2077.06.04 |
| 97 | Himalayan Hydropower Pvt. Ltd. | Namarjun Madi | Kaski | 11880 | 2066.05.30 | 2077.06.12 |
| 98 | Manakamana Engineering Hydropower Pvt. Ltd. | Ghatte Khola | Dolakha | 5000 | 2070.04.28 | 2077.07.23 |
| 99 | Everest Sugar and Chemical Industries Ltd. | Everest Sugar and Chemical Industries Ltd. | Mahottari | 3000 | 2075.06.17 | 2077.10.26 |
| 100 | Civil Hydropower Pvt. Ltd. | Bijayapur 2 Khola Small | Kaski | 4500 | 2072.09.12 | 2077.11.18 |
| 101 | Taksar-Pikhuwa Hydropower Pvt. Ltd. | Taksar Pikhuwa | Bhojpur | 8000 | 2073.09.01 | 2078.01.01 |
| 102 | Shiva Shree Hydropower (P.) Ltd. | Upper Chaku A | Sindhupalchowk | 22200 | 2067.05.22 | 2078.02.01 |

| S.N. | Developer | Projects | Location | Capacity (kW) | PPA Date | Commercial Operation Date |
|---|---|---|---|---|---|---|
| 103 | Robust Energy Ltd. | Mistri Khola | Myagdi | 42000 | 2067.10.20 | 2078.03.03 |
| 104 | Singati Hydro Energy Pvt. Ltd. | Singati Khola | Dolakha | 25000 | 2070.07.27 | 2078.04.17 |
| 105 | Richet Jalbidhyut Company Pvt. Ltd. | Richet Khola | Gorkha | 4980 | 2073.02.23 | 2078.04.28 |
| 106 | Samling Power Company Pvt. Ltd. | Mai Beni | Ilam | 9510 | 2073.07.26 | 2078.06.01 |
| 107 | Manang Trade Link Pvt. Ltd. | Lower Modi | Parbat | 20000 | 2068.05.20 | 2078.06.14 |
| 108 | Asian Hydropower Pvt. Ltd. | Lower Jogmai | Ilam | 6200 | 2074.12.07 | 2078.07.15 |
| 109 | Green Ventures Pvt. Ltd. | Likhu-IV | Ramechhap | 52400 | 2067.10.19 | 2078.07.21 |
| 110 | Chhyangdi Hydropower Limited | Upper Chhyangdi Khola | Lamjung | 4000 | 2074.03.22 | 2078.08.24 |
| 111 | Universal Power Company Ltd. | Lower Khare | Dolakha | 11000 | 2069.10.22 | 2078.09.06 |
| 112 | Three Star Hydropower Company Ltd. | Sapsup Khola | Khotang | 6600 | 2075.03.25 | 2078.09.23 |
| 113 | Numbur Himalaya Hydropower Pvt. Ltd. | Likhu Khola A | Solukhumbu & Ramechap | 24200 | 2071.11.22 | 2078.10.25 |
| 114 | Indushankar Chini Udhyog Ltd. | Indushankar Chini Udhyog Ltd. | Sarlahi | 3000 | 2075.06.10 | 2078.11.01 |
| 115 | Upper Syange Hydropower P. Ltd. | Upper Syange Khola | Lamjung | 2400 | 2072.06.14 | 2078.11.15 |
| 116 | Buddha Bhumi Nepal Hydro Power Co. Pvt. Ltd. | Lower Tadi | Nuwakot | 4993 | 2070.12.10 | 2078.12.10 |
| 117 | Arun Valley Hydropower Dev. Co. Ltd. | Kabeli B-1 Cascade | Panchthar | 9940 | 2075.08.09 | 2078.12.12 |
| 118 | Upper Hewa Khola Hydropower Co. Pvt. Ltd. | Upper Hewa Khola Small | Sankhuwasabha | 8500 | 2072.09.23 | 2078.12.19 |
| 119 | Suri Khola Hydropower Pvt. Ltd. | Suri Khola | Dolakha | 6400 | 2072.02.20 | 2079.01.18 |
| 120 | Nyadi Hydropower Limited | Nyadi | Lamjung | 30000 | 2072.02.12 | 2079.01.27 |
| 121 | Himalaya Urja Bikas Co. Pvt. Ltd. | Upper Khimti | Ramechhap | 12000 | 2067.10.09 | 2079.02.04 |
| 122 | Himalaya Urja Bikas Co. Ltd. | Upper Khimti II | Ramechhap | 7000 | 2069.12.09 | 2079.02.17 |
| | | | **SUB TOTAL** | **1,020,528** | | |
| | | | **IPP Solar Power Projects** | | | |
| 1 | Kathmandu Upatyaka Khanepani Bewasthapan Board | Solar | Lalitpur | 680.4 | 2069.06.12 | 2069.07.15 |
| 2 | Surya Power Company Pvt. Ltd. | Bishnu Priya Solar Farm Project | Nawalparasi | 960 | 2074.04.08 | 2075.08.13 |
| 3 | Ridi Hydropower Development Co. Ltd. | Butwal Solar Project | Rupandehi | 8500 | 2075.06.09 | 2077.07.15 |
| 4 | Eco Power Development Company Pvt. Ltd | Mithila Solar PV Electric Project | Dhanusha | 10000 | 2075.09.16 | 2077.11.22 |
| 5 | Api Power Company Ltd. | Chandranigahpur Solar Project | Rautahat | 4000 | 2075.04.27 | 2078.05.06 |
| 6 | Solar Farm Pvt. Ltd. | Belchautara Solar Project | Tanahun | 5000 | 2075.04.23 | 2078.07.01 |
| 7 | Api Power Company Ltd. | Dhalkebar Solar Project | Dhanusha | 1000 | 2075.05.03 | 2078.10.02 |
| 8 | Sagarmatha Energy and Construction Pvt. Ltd. | Dhalkebar Solar Project | Dhanusha | 3000 | 2075.06.24 | 2078.11.21 |
| | | | **SUB TOTAL** | **33140.4** | | |
| | | | **TOTAL** | **1,531,768** | | |

# NEPAL ELECTRICITY AUTHORITY
# POWER TRADE DEPARTMENT
## Power Projects (Under Construction) as of FY 2078/79
## (Financial Closure Concluded Projects)

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | Required Commercial Operation Date |
|---|---|---|---|---|---|---|
| **NEA Subsidiary Hydropower Projects** | | | | | | |
| 1 | Sanjen Hydropower Co.Limited | Upper Sanjen | Rasuwa | 14800 | 2068.06.23 | 2076.09.15 |
| 2 | Middle Bhotekoshi Jalbidhyut Company Ltd. | Middle Bhotekoshi | Sindhupalchowk | 102000 | 2068.07.28 | 2076.12.28 |
| 3 | Chilime Hydro Power Company Ltd. | Rasuwagadhi | Rasuwa | 111000 | 2068.07.28 | 2076.09.15 |
| 4 | Sanjen Hydropower Company Limited | Sanjen | Rasuwa | 42500 | 2068.08.19 | 2076.09.15 |
| 5 | Trishuli Jal Vidhyut Company Ltd. | Upper Trishuli 3B | Rasuwa | 37000 | 2074.05.06 | 2078.11.17 |
| 6 | Tanahun Hydropower Ltd. | Tanahun | Tanahun | 140000 | 2075.03.15 | 2080.12.30 |
| | | | **Sub Total** | **447300** | | |
| **IPP Hydropower Projects** | | | | | | |
| 1 | Nama Buddha Hydropower Pvt. Ltd. | Tinau Khola Small | Palpa | 1665 | 2065.03.31 | "2066.11.01 (0.99 MW) 2077.09.15 (0.675 MW)" |
| 2 | Jumdi Hydropower Pvt. Ltd. | Jumdi Khola | Gulmi | 1750 | 2066.10.21 | 2069.10.11 |
| 3 | Hira Ratna Hydropower P.ltd | Tadi Khola | Nuwakot | 5000 | 2067.01.09 | 2075.10.01 |
| 4 | Energy Engineering Pvt. Ltd. | Upper Mailung A | Rasuwa | 6420 | 2067.03.25 | 2075.10.01 |
| 5 | Greenlife Energy Pvt. Ltd. | Khani khola-1 | Dolakha | 40000 | "2067.06.24 (25 MW) 2074.02.21 (15 MW)" | " 2074.12.17 (25MW) 2076.09.03 (15MW)" |
| 6 | Mathillo Mailung Khola Jalbidhyut Ltd. (Prv. Molnia Power Ltd.) | Upper Mailun | Rasuwa | 14300 | 2068.05.23 | 2075.10.01 |
| 7 | Water and Energy Nepal Pvt. Ltd. | Badi Gad | Baglung | 6600 | 2068.08.13 | 2072.2.14 |
| 8 | Gelun Hydropower Co.Pvt.Ltd | Gelun | Sindhupalchowk | 3200 | 2068.09.25 | 2074.06.14 |
| 9 | Dariyal Small Hydropower Pvt.Ltd | Upper Belkhu | Dhading | 996 | 2068.11.28 | 2071.7.16 |
| 10 | Suryakunda Hydroelectric Pvt. Ltd. | Upper Tadi | Nuwakot | 11000 | 2068.12.03 | 2075.10.01 |
| 11 | Himalayan Power Partner Pvt. Ltd. | Dordi Khola | Lamjung | 27000 | 2069.03.01 | 2076.05.14 |
| 12 | Sasha Engingeering Hydropower (P). Ltd | Khani Khola(Dolakha) | Dolakha | 30000 | 2069.03.25 | 2074.12.17 |

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | Required Commercial Operation Date |
|---|---|---|---|---|---|---|
| 13 | Rising Hydropower Compnay Ltd. | Selang Khola | Sindhupalchowk | 990 | 2069.03.31 | 2071.6.15 |
| 14 | Liberty Hydropower Pvt. Ltd. | Upper Dordi A | Lamjung | 25000 | 2069.06.02 | 2076.05.14 |
| 15 | Hydro Innovation Pvt. Ltd. | Tinekhu Khola | Dolakha | 990 | 2069.06.08 | 2074.12.30 |
| 16 | Salankhu Khola Hydropower Pvt. Ltd. | Salankhu Khola | Nuwakot | 2500 | 2069.06.14 | 2071.11.30 |
| 17 | Moonlight Hydropower Pvt. Ltd. | Balephi A | Sindhupalchowk | 22140 | 2069.07.14 | 2076.12.28 |
| 18 | Middle Modi Hydropower Ltd. | Middle Modi | Parbat | 15100 | 2069.08.21 | 2077.03.31 |
| 19 | Reliable Hydropower Co. Pvt. Ltd. | Khorunga Khola | Terhathum | 4800 | 2069.08.26 | 2077.08.16 |
| 20 | Rara Hydropower Development Co. Pvt. Ltd. | Upper Parajuli Khola | Dailekh | 2150 | 2069.08.28 | 2071.12.17 |
| 21 | Lohore Khola Hydropower Co. Pvt. Ltd. | Lohore Khola | Dailekh | 4200 | 2069.09.08 | 2073.06.20 |
| 22 | Beni Hydropower Project Pvt. Ltd. | Upper Solu | Solukhumbu | 18000 | "2069.09.16 2073.07.25 (PPA Revived)" | 2074.10.01 |
| 23 | Dudhkoshi Power Company Pvt. Ltd. | Rawa Khola | Khotang | 6500 | 2069.09.26 | 2073.05.31 |
| 24 | Madhya Midim Jalbidhyut Company P. Ltd. | Middle Midim | Lamjung | 3100 | 2069.10.23 | 2072.5.1 |
| 25 | Volcano Hydropower Pvt. Ltd. | Teliya Khola | Dhankuta | 996 | 2069.10.25 | 2071.7.24 |
| 26 | Betrawoti Hydropower Company (P).Ltd | Phalankhu Khola | Rasuwa | 13700 | 2069.12.06 | 2075.10.01 |
| 27 | Dovan Hydropower Company Pvt. Ltd. | Junbesi Khola | Solukhumbu | 5200 | 2069.12.29 | 2076.08.30 |
| 28 | Tallo Midim Jalbidhut Company Pvt. Ltd. | Lower Midim | Lamjung | 996 | 2070.01.19 | 2071.8.1 |
| 29 | Tangchhar Hydro Pvt. Ltd | Tangchhahara | Mustang | 2200 | 2070.02.20 | 2073.7.1 |
| 30 | Abiral Hydropower Co. Pvt. Ltd. | Upper Khadam | Morang | 990 | 2070.02.21 | 2071.08.01 |
| 31 | Essel-Clean Solu Hydropower Pvt. Ltd. | Lower Solu | Solukhumbu | 82000 | 2070.07.15 | 2076.8.30 |
| 32 | Consortium Power Developers Pvt. Ltd. | Khare Khola | Dolakha | 24100 | 2070.07.15 | 2075.08.15 |
| 33 | Maya Khola Hydropower Co. Pvt. Ltd. | Maya Khola | Sankhuwasabha | 14900 | 2070.08.30 | 2076.9.1 |
| 34 | Idi Hydropower Co. P. Ltd. | Idi Khola | Kaski | 975 | 2070.09.01 | 2074.09.16 |
| 35 | Dordi Khola Jal Bidyut Company Ltd. | Dordi-1 Khola | Lamjung | 12000 | "2071.07.19 (10.3 MW) 2075.11.21 (1.7 MW)" | 2076.08.16 (10.3 MW) 2077.04.02 (1.7 MW) |
| 36 | River Falls Hydropower Development Pvt. Ltd. | Down Piluwa | Sankhuwasabha | 9500 | 2071.10.18 | 2076.09.01 |
| 37 | Peoples' Hydropower Company Pvt. Ltd. | Super Dordi 'Kha' | Lamjung | 54000 | 2071.11.13 | 2077.03.29 |

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | Required Commercial Operation Date |
|---|---|---|---|---|---|---|
| 38 | Hydro Venture Private Limited | Solu Khola (Dudhkoshi) | Solukhumbu | 86000 | 2071.11.13 | 2077.06.10 |
| 39 | Global Hydropower Associate Pvt. Ltd. | Likhu-2 | Solukhumbu/ Ramechap | 33400 | 2071.11.19 | 2077.04.01 |
| 40 | Paan Himalaya Energy Private Limited | Likhu-1 | Solukhumbu/ Ramechap | 51400 | 2071.11.19 | 2077.04.01 |
| 41 | Dipsabha Hydropower Pvt. Ltd. | Sabha Khola A | Sankhuwasabha | 9990 | 2071.12.02 | 2076.07.15 |
| 42 | Research and Development Group Pvt. Ltd. | Rupse Khola | Myagdi | 4000 | 2071.12.17 | 2076.08.02 |
| 43 | Hydro Empire Pvt. Ltd. | Upper Myagdi | Myagdi | 20000 | 2071.12.17 | 2077.05.30 |
| 44 | Chandeshwori Mahadev Khola MH. Co. Pvt. Ltd. | Chulepu Khola | Ramechhap | 8520 | 2071.12.23 | 2075.04.15 |
| 45 | Bungal Hydro Pvt. Ltd. (Previously Sanigad Hydro Pvt. Ltd.) | Upper Sanigad | Bajhang | 10700 | 2072.03.15 | 2076.05.29 |
| 46 | Kalanga Hydro Pvt. Ltd. | Kalangagad | Bajhang | 15330 | 2072.03.15 | 2076.05.29 |
| 47 | Sanigad Hydro Pvt. Ltd. | Upper Kalangagad | Bajhang | 38460 | 2072.03.15 | 2077.04.15 |
| 48 | Dhaulagiri Kalika Hydro Pvt. Ltd. | Darbang-Myagdi | Myagdi | 25000 | 2072.04.28 | 2075.12.25 |
| 49 | Menchhiyam Hydropower Pvt. Ltd. | Upper Piluwa Khola 2 | Sankhuwasabha | 4720 | 2072.05.11 | 2076.04.01 |
| 50 | Kabeli Energy Limited | Kabeli-A | Panchthar and Taplejung | 37600 | 2072.06.07 | 2076.11.03 |
| 51 | Peoples Energy Ltd. (Previously Peoples Hydro Co-operative Ltd.) | Khimti-2 | Dolakha and Ramechhap | 48800 | 2072.06.14 | 2078.04.01 |
| 52 | Chauri Hydropower (P.) Ltd. | Chauri Khola | Kavrepalanchowk, Ramechhap, Sindhupalchowk, Dolakha | 6000 | 2072.06.14 (5 MW) 2076.01.06 (1 MW) | 2075.12.30 (5 MW) 2078.08.03 (1 MW) |
| 53 | Huaning Development Pvt. Ltd. | Upper Balephi A | Sindhupalchowk | 36000 | 2072.08.29 | 2075.10.06 |
| 54 | Multi Energy Development Pvt. Ltd. | Langtang Khola | Rasuwa | 20000 | 2072.09.29 | "2076.12.30 (10MW) 2078.04.03 (10MW)" |
| 55 | Ankhu Hydropower (P.) Ltd. | Ankhu Khola | Dhading | 34000 | 2073.01.30 | 2076.12.30 |
| 56 | Myagdi Hydropower Pvt. Ltd. | Ghar Khola | Myagdi | 14000 | 2073.02.11 | "2076.08.30 (8.3 MW) 2078.10.17 (5.7 MW)" |
| 57 | Rapti Hydro and General Construction Pvt. Ltd. | Rukumgad | Rukum | 5000 | 2073.03.07 | 2076.09.01 |
| 58 | Siddhi Hydropower Company Pvt. Ltd. | Siddhi Khola | Ilam | 10000 | 2074.05.29 | 2077.03.31 |
| 59 | Nilgiri Khola Hydropower Co. Ltd. | Nilgiri Khola | Myagdi | 38000 | 2073.11.30 | 2080.08.30 |
| 60 | Siuri Nyadi Power Pvt. Ltd. | Super Nyadi | Lamjung | 40270 | 2074.02.19 | 2079.04.01 |
| 61 | Swet-Ganga Hydropower and Construction Ltd. | Lower Likhu | Ramechhap | 28100 | 2073.09.14 | 2078.08.15 |
| 62 | Nilgiri Khola Hydropower Co. Ltd. | Nilgiri Khola-2 | Myagdi | 71000 | 2074.03.05 | 2081.08.30 |

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | Required Commercial Operation Date |
|---|---|---|---|---|---|---|
| 63 | Sano Milti Khola Hydropower Ltd. | Sano Milti | Ramechhap and Dolakha | 3000 | 2073.01.13 | 2075.08.01 |
| 64 | Diamond Hydropower Pvt. Ltd. | Upper Daraudi-1 | Gorkha | 10000 | 2072.08.14 | 2075.09.17 |
| 65 | Rasuwa Hydropower Pvt. Ltd | Phalanku Khola | Rasuwa | 5000 | 2071.08.24 | 2076.8.01 |
| 66 | Makari Gad Hydropower Pvt. Ltd. | Makarigad | Darchula | 10000 | 2072.08.29 | 2076.02.32 |
| 67 | Super Madi Hydropower Ltd. (Previously Himal Hydro and General Construction Ltd.) | Super Madi | Kaski | 44000 | 2073.10.27 | 2078.02.28 |
| 68 | Mount Nilgiri Hydropower Company Pvt. Ltd. | Rurubanchu-1 | Kalikot | 13500 | 2074.05.08 | 2077.11.03 |
| 69 | Sindhujwala Hydropower Ltd. | Upper Nyasem | Sindhupalchowk | 41400 | 2073.07.24 | 2077.03.30 |
| 70 | Energy Venture Pvt. Ltd. | Upper Lapche | Dolakha | 52000 | 2073.04.20 | 2078.12.30 |
| 71 | Orbit Energy Pvt. Ltd. (Previously Pokhari Hydropower Company Pvt. Ltd.) | Sabha Khola B | Sankhuwasabha | 15100 | 2074.03.26 | 2078.2.31 |
| 72 | Daram Khola Hydro Energy Ltd. | Daram Khola | Baglung and Gulmi | 9600 | 2073.10.09 | 2076.09.08 |
| 73 | Him River Power Pvt. Ltd. | Liping Khola | Sindhupalchowk | 16260 | 2073.02.28 | 2077.01.22 |
| 74 | Madhya Tara Khola Hydropower P. Ltd. (Prv. Pahadi Hydro Power Company (P.) Ltd.) | Madhya Tara Khola Small | Baglung | 2200 | 2073.10.26 | 2075.08.29 |
| 75 | Nepal Water and Energy Development Company Pvt. Ltd. | Upper Trishuli - 1 | Rasuwa | 216000 | 2074.10.14 | 2080.12.18 |
| 76 | Mewa Developers Pvt. Ltd. | Middle Mewa | Taplejung | 49000 | 2075.05.04 | 2080.06.06 |
| 77 | Him Star Urja Co. Pvt. Ltd. | Buku Kapati | Okhaldhunga and Solukhumbu | 5000 | 2074.10.11 | 2077.04.15 |
| 78 | Aashutosh Energy Pvt. Ltd. | Chepe Khola Small | Lamjung | 8630 | 2075.02.15 | 2078.11.09 |
| 79 | Sanvi Energy Pvt. Ltd. | Jogmai Cascade | Ilam | 6000 | 2075.05.07 | 2078.04.07 |
| 80 | Jhyamolongma Hydropower Development Company Pvt. Ltd. | Karuwa Seti | Kaski | 32000 | 2074.04.20 | 2079.01.12 |
| 81 | Nasa Hydropower Pvt. Ltd. | Lapche Khola | Dolakha | 99400 | 2074.07.29 | 2079.04.14 |
| 82 | Sanima Middle Tamor Hydropower Ltd. (Prv. Tamor Sanima Energy Pvt. Ltd.) | Middle Tamor | Taplejung | 73000 | 2073.09.26 | 2078.05.28 |
| 83 | Vision Energy and Power Pvt. Ltd. | Nupche Likhu | Ramechhap | 57500 | 2074.11.28 | 2080.05.02 |
| 84 | Dolakha Nirman Company Pvt. Ltd. | Isuwa Khola | Sankhuwasabha | 97200 | 2075.06.26 | 2080.04.01 |
| 85 | People's Power Limited | Puwa - 2 | Ilam | 4960 | 2074.05.05 | 2078.06.11 |

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | Required Commercial Operation Date |
|---|---|---|---|---|---|---|
| 86 | Tundi Power Pvt.Ltd | Rahughat Mangale | Myagdi | 35500 | 2075.03.29 | 2079.08.29 |
| 87 | Him Consult Pvt. Ltd. | Rele Khola | Myagdi | 6000 | 2074.01.28 | 2077.02.19 |
| 88 | Parbat Paiyun Khola Hydropower Company Pvt. Ltd. | Seti Khola | Parbat | 3500 | 2074.02.22 | 2076.12.30 |
| 89 | Chirkhwa Hydropower Pvt. Ltd. | Upper Chirkhwa | Bhojpur | 4700 | 2073.03.01 | 2077.04.01 |
| 90 | Yambling Hydropower Pvt. Ltd. | Yambling Khola | Sindhupalchowk | 7270 | 2072.09.29 | 2077.03.17 |
| 91 | Gaurishankar Power Development Pvt. Ltd. | Middle Hyongu Khola B | Solukhumbu | 22900 | 2074.12.08 | 2079.04.01 |
| 92 | Upper Lohore Khola Hydropower Co. Pvt. Ltd. | Upper Lohore | Dailekh | 4000 | 2074.12.08 | 2077.04.11 |
| 93 | Unitech Hydropower Co. Pvt. Ltd. | Upper Phawa | Taplejung | 5800 | 2074.11.11 | 2078.04.16 |
| 94 | Omega Energy Developer Pvt. Ltd. | Sunigad | Bajhang | 11050 | 2074.11.30 | 2080.02.07 |
| 95 | Gorakshya Hydropower Pvt. Ltd. | Super Ankhu Khola | Dhading | 23500 | 2074.03.15 | 2080.09.15 |
| 96 | Api Power Company Ltd. | Upper Chameliya | Darchula | 40000 | 2075.11.15 | 2079.11.13 |
| 97 | Vision Lumbini Ltd. | Seti Nadi | Kaski | 25000 | 2075.08.06 | 2079.04.05 |
| 98 | Kasuwa Khola Hydropower Ltd. | Kasuwa Khola | Sankhuwasabha | 45000 | 2075.08.13 | 2082.04.06 |
| 99 | Lower Irkhuwa Hydropower Co. Pvt. Ltd. | Lower Irkhuwa | Bhojpur | 13040 | 2075.02.16 | 2079.04.03 |
| 100 | Apex Makalu Hydro Power Pvt. Ltd. | Middle Hongu Khola A | Solukhumbu | 22000 | 2075.05.14 | 2079.04.01 |
| 101 | Tundi Power Pvt.Ltd | Upper Rahughat | Myagdi | 48500 | 2075.03.29 | 2080.08.29 |
| 102 | Mabilung Energy (P.) Ltd | Upper Piluwa Khola -3 | Sankhuwasabha | 4950 | 2075.12.12 | 2078.11.16 |
| 103 | Blue Energy Pvt. Ltd. | Super Trishuli | Gorkha and Chitwan | 70000 | 2075.07.11 | 2080.11.17 |
| 104 | Samyukta Urja Pvt. Ltd. (Prv. Sungava Foundation Pvt. Ltd.) | Thulo Khola | Myagdi | 21300 | 2075.02.17 | 2079.04.15 |
| 105 | Bhujung Hydropower Pvt. Ltd. | Upper Midim | Lamjung | 7500 | 2074.05.29 | 2078.04.01 |
| 106 | Shaileshwari Power Nepal Pvt. Ltd. | Upper Gaddigad | Doti | 1550 | 2075.04.06 | 2077.12.19 |
| 107 | Ridge Line Energy Pvt. Ltd. | Super Chepe | Gorkha Lamjung | 9050 | 2075.12.19 | 2079.05.20 |
| 108 | Makar Jitumaya Hydropower Pvt. Ltd. | Upper Suri | Dolakha | 7000 | 2075.04.10 | 2079.12.30 |
| 109 | Mount Rasuwa Hydropower Pvt. Ltd. | Midim 1 Khola | Lamjung | 13424 | 2075.10.07 | 2080.04.04 |
| 110 | Sewa Hydro Ltd. | Lower Selang | Sindhupalchowk | 1500 | 2074.02.22 | 2075.12.30 |
| 111 | Himalayan Water Resources and Energy Development Co. Pvt. Ltd. | Upper Chauri | Kavrepalanchowk | 6000 | 2074.07.27 | 2078.04.04 |
| 112 | Hilton Hydro Energy Pvt. Ltd. | Super Kabeli | Taplejung | 12000 | 2075.11.02 | 2079.10.04 |
| 113 | Snow Rivers Pvt. Ltd. | Super Kabeli A | Taplejung | 13500 | 2075.11.02 | 2080.01.01 |

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | Required Commercial Operation Date |
|---|---|---|---|---|---|---|
| 114 | Dhading Ankhu Khola Hydro Pvt. Ltd. | Upper Ankhu | Dhading | 38000 | 2075.06.14 | 2079.09.15 |
| 115 | Isuwa Energy Pvt. Ltd. | Lower Isuwa Cascade | Sankhuwasabha | 37700 | 2077.09.27 | 2080.12.30 |
| 116 | North Summit Hydro Pvt. Ltd. | Hidi Khola | Lamjung | 6820 | 2075.10.04 | 2080.05.15 |
| 117 | Sailung Power Company Pvt. Ltd. | Bhotekoshi-1 | Sindhupalchowk | 40000 | 2075.03.15 | 2079.07.01 |
| 118 | Orbit Energy Pvt. Ltd. | Sabha Khola C | Sankhuwasabha | 4196 | 2075.12.10 | 2079.04.02 |
| 119 | River Side Hydro Energy Pvt. Ltd. | Tamor Khola-5 | Taplejung | 37520 | 2075.12.04 | 2080.04.10 |
| 120 | Palun Khola Hydropower Pvt. Ltd. | Palun Khola | Taplejung | 21000 | 2075.04.06 | 2080.06.21 |
| 121 | Perfect Energy Development Pvt. Ltd | Middle Trishuli Ganga | Nuwakot | 19410 | 2075.09.03 | 2080.02.17 |
| 122 | Silk Power (Prv. Maa Shakti Engineering & hydropower Pvt. Ltd.) | Luja Khola | Solukhumbu | 23550 | 2075.10.16 | 2080.11.14 |
| 123 | Chirkhwa Hydropower Pvt. Ltd. | Lower Chirkhwa | Bhojpur | 4060 | 2074.01.20 | 2078.04.01 |
| 124 | Apolo Hydropower Pvt. Ltd. | Buku Khola | Solukhumbu | 6000 | "2070.02.02 2075.04.22 (PPA Revived)" | 2074.04.01 |
| 125 | Barpak Daruadi Hydropower Pvt. Ltd. | Middle Super Daraudi | Gorkha | 10000 | 2075.11.23 | 2080.03.01 |
| | | **SUB TOTAL** | | **2,775,788** | | |
| | | | **IPP Solar Power Projects** | | | |
| 1 | Gorkha Congenial Energy and Investment Pvt. Ltd. | Lamahi Solar Project | Dang | 3000 | 2075.06.24 | 2076.12.23 |
| 2 | Global Energy and Construction Pvt. Ltd. | Duhabi Solar Project | Sunsari | 8000 | 2075.06.25 | 2076.12.24 |
| 3 | National Solar Power Co. Pvt. Ltd. | Grid Connected Solar PV Project (VGF) | Nawalparasi | 5000 | 2076.11.23 | 2077.08.22 |
| 4 | Api Power Company Ltd. | Parwanipur Solar Project | Parsa | 8000 | 2075.04.27 | 2076.02.26 |
| 5 | Api Power Company Ltd. | Simara Solar Project | Bara | 1000 | 2075.05.03 | 2076.03.02 |
| 6 | Nepal Solar Farm Pvt. Ltd. | Som RadhaKrishna Solar Farm Project (VGF) | Kaski | 4000 | 2076.11.23 | 2077.03.16 |
| 7 | Saurya Bidhyut Power Pvt. Ltd. | Grid Connected Solar Project, Nawalparasi | Nawalparasi | 2000 | 2077.12.20 | 2078.06.17 |
| 8 | Pure Energy Pvt. Ltd. | Solar PV Project (1032), Nainapur, Banke, Block-1 | Banke | 10000 | 2078.08.12 | 2080.02.11 |
| 9 | Pure Energy Pvt. Ltd. | Solar PV Project (1033), Nainapur, Banke, Block-2 | Banke | 10000 | 2078.08.12 | 2080.02.11 |
| 10 | G.I. Solar Pvt. Ltd. | Grid Connected Solar Project, Morang | Morang | 6800 | 2078.08.27 | 2079.08.26 |
| | | **SUB TOTAL** | | **57800** | | |
| | | **TOTAL** | | **3,280,888** | | |

# NEPAL ELECTRICITY AUTHORITY
# POWER TRADE DEPARTMENT
## Power Projects in Different Stages of Development as of FY 2078/79
## (Without Financial Closure)

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | RCOD |
|---|---|---|---|---|---|---|
| **NEA Subsidiary Hydropower Projects** | | | | | | |
| 1 | Raghuganga Hydropower Ltd. | Rahughat | Myagdi | 40000 | 2075.12.18 | 2079.10.17 |
| | | | **Sub Total** | **40000** | | |
| **IPP Hydropower Projects** | | | | | | |
| 1 | Balephi Jalbidhyut Co. Ltd. | Balephi | Sindhupalchowk | 23520 | 2067.09.08 | 2077.06.30 |
| 2 | Ingwa Hydro Power Pvt. Ltd | Upper Ingwa khola | Taplejung | 9700 | 2068.03.10 | 2073.04.01 |
| 3 | United Modi Hydropwer Ltd. | Lower Modi 2 | Parbat | 10500 | 2072.11.14 | 2076.03.17 |
| 4 | Salasungi Power Limited | Sanjen Khola | Rasuwa | 78000 | 2072.12.02 | 2077.03.08 |
| 5 | Sisa Hydro Electric Company Pvt. Ltd. | Sisa Khola A | Solukhumbu | 2800 | 2073.10.28 | 2077.12.12 |
| 6 | Himali Rural Electric Co-operative Ltd. | Leguwa Khola Small | Dhankuta | 640 | 2074.02.08 | 2075.12.28 |
| 7 | Sabha Pokhari Hydro Power (P.) Ltd. | Lankhuwa Khola | Sankhuwasabha | 5000 | 2074.02.21 | 2077.09.14 |
| 8 | United Mewa Khola Hydropower Pvt. Ltd. | Mewa Khola | Taplejung | 50000 | 2074.02.21 | 2078.04.01 |
| 9 | Nyam Nyam Hydropower Company Pvt. Ltd. | Nyam Nyam Khola | Rasuwa | 6000 | 2074.03.27 | 2077.12.31 |
| 10 | Saptang Hydro Power Pvt. Ltd. | Saptang Khola | Nuwakot | 2500 | 2074.04.08 | 2076.04.12 |
| 11 | IDS Energy Pvt. Ltd. | Lower Khorunga | Terhathum | 5400 | 2074.08.24 | 2078.04.01 |
| 12 | Langtang Bhotekoshi Hydropower Company Pvt. Ltd. | Rasuwa Bhotekoshi | Rasuwa | 120000 | 2074.09.07 | 2078.09.07 |
| 13 | Upper Richet Hydropower Pvt. Ltd. | Upper Richet | Gorkha | 2000 | 2074.09.20 | 2077.04.01 |
| 14 | Khechereswor Jal Vidhyut Pvt. Ltd. | Jadari Gad Small | Bajhang | 1000 | 2074.10.12 | 2077.07.30 |
| 15 | Khechereswor Jal Vidhyut Pvt. Ltd. | Salubyani Gad Small | Bajhang | 233 | 2074.10.12 | 2077.09.29 |
| 16 | Gaughar Ujjyalo Sana Hydropower Co. Pvt. Ltd. | Ghatte Khola Small | Sindhupalchowk | 970 | 2074.11.11 | 2077.03.01 |

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | RCOD |
|---|---|---|---|---|---|---|
| 17 | Seti Khola Hydropower Pvt. Ltd. | Seti Khola | Kaski | 22000 | 2074.11.11 | 2079.04.15 |
| 18 | Super Hewa Power Company Pvt. Ltd. | Super Hewa | Sankhuwasabha | 5000 | 2074.12.27 | 2078.04.01 |
| 19 | Baraha Multipower Pvt. Ltd. | Irkhuwa Khola B | Bhojpur | 15524 | 2075.02.14 | 2079.04.15 |
| 20 | Jhilimili Hydropower Co. Pvt. Ltd. | Gulangdi Khola | Gulmi | 980 | 2075.02.24 | 2078.01.14 |
| 21 | North Summit Hydro Pvt. Ltd. | Nyadi Phidi | Lamjung | 21400 | 2075.02.24 | 2079.12.15 |
| 22 | Himali Hydro Fund Pvt. Ltd. | Sona Khola | Taplejung | 9000 | 2075.03.14 | 2080.07.30 |
| 23 | Jalshakti Hydro Company Pvt. Ltd. | Ilep (Tatopani) | Dhading | 23675 | 2075.03.25 | 2081.08.25 |
| 24 | Arati Power Company Ltd. | Upper Irkhuwa | Bhojpur | 14500 | 2075.04.01 | 2079.08.01 |
| 25 | Mount Everest Power Development Pvt. Ltd. | Dudhkunda Khola | Solukhumbu | 12000 | 2075.04.01 | 2079.06.30 |
| 26 | Him Parbat Hydropower Pvt. Ltd. | Sagu Khola-1 | Dolakha | 5500 | 2075.04.10 | 2079.12.30 |
| 27 | Him Parbat Hydropower Pvt. Ltd. | Sagu Khola | Dolakha | 20000 | 2075.04.10 | 2079.12.30 |
| 28 | Annapurna Bidhyut Bikas Co. Pvt. Ltd. | Landruk Modi | Kaski | 86590 | 2075.04.13 | 2081.09.15 |
| 29 | Madame Khola Hydropower Pvt. Ltd. | Madame Khola | Kaski | 24000 | 2075.04.15 | 2080.12.30 |
| 30 | Mid Solu Hydropower Company Pvt. Ltd. | Mid Solu Khola | Solukhumbu | 9500 | 2075.04.21 | 2079.05.14 |
| 31 | Thulo Khola Hydropower Pvt. Ltd. | Upper thulo Khola-A | Myagdi | 15000 | 2075.04.24 | 2080.06.30 |
| 32 | Kalika Energy Ltd. | Bhotekoshi-5 | Sindhupalchowk | 62000 | 2075.04.25 | 2080.09.15 |
| 33 | Super Ghalemdi Hydropower Pvt. Ltd. | Super Ghalemdi | Myagdi | 9140 | 2075.05.05 | 2080.12.12 |
| 34 | Dibyajyoti Hydropower Pvt. Ltd. | Marsyangdi Besi | Lamjung | 50000 | 2075.05.10 | 2079.06.06 |
| 35 | Amar Jyoti Hydro Power Pvt. Ltd. | Istul Khola | Gorkha | 1506 | 2075.05.13 | 2079.10.25 |
| 36 | Ichowk Hydropower Pvt. Ltd. | Gohare Khola | Sindhupalchowk | 950 | 2075.05.25 | 2076.07.29 |
| 37 | Pike Hydropower Pvt. Ltd. | Likhu Khola | Ramechhap and Okhaldhunga | 30000 | 2075.05.26 | 2082.02.17 |
| 38 | Sita Hydro Power Co. Pvt. Ltd. | Nyasim Khola | Sindhupalchowk | 35000 | 2075.05.26 | 2080.03.15 |
| 39 | Sushmit Energy Pvt. Ltd. | Kunaban Khola | Myagdi | 20000 | 2075.05.29 | 2080.11.03 |

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | RCOD |
|---|---|---|---|---|---|---|
| 40 | Masina Paryatan Sahakari Sanstha Ltd. | Masina | Kaski and Tanahu | 891 | 2075.06.02 | 2076.10.29 |
| 41 | Hydro Village Pvt. Ltd. | Myagdi Khola | Myagdi | 57300 | 2075.06.04 | 2080.05.29 |
| 42 | Shikhar Power Development Pvt. Ltd. | Bhim Khola | Baglung | 4960 | 2075.06.10 | 2078.06.05 |
| 43 | Phedi Khola Hydropower Company Pvt. Ltd. | Phedi Khola (Thumlung) | Bhojpur | 3520 | 2075.06.21 | 2079.12.01 |
| 44 | Bikash Hydropower Company Pvt. Ltd. | Upper Machha Khola | Gorkha | 4550 | 2075.07.11 | 2080.03.30 |
| 45 | Sita Hydropower Co. Pvt. Ltd. | Dudh Khola | Manang | 65000 | 2075.07.11 | 2080.03.15 |
| 46 | Kalinchowk Hydropower Ltd. | Sangu (Sorun) | Dolakha | 5000 | 2075.08.09 | 2079.12.30 |
| 47 | Ruru Hydroelectric Company Pvt. Ltd. | Rurubanchu Khola-2 | Kalikot | 12000 | 2075.08.20 | 2079.05.25 |
| 48 | Gumu Khola Bhyakure Hydropower Pvt. Ltd. | Gumu Khola | Dolakha | 950 | 2075.08.21 | 2078.05.30 |
| 49 | Alliance Energy Solutions Pvt.Ltd. | Upper Sit Khola | Argakhanchi | 905 | 2075.08.23 | 2077.05.04 |
| 50 | Ekikrit Byapar Company Pvt. Ltd. | Brahamayani | Sindhupalchowk | 35470 | 2075.08.24 | 2080.04.13 |
| 51 | Integrated Hydro Fund Nepal Pvt. Ltd. | Upper Brahamayani | Sindhupalchowk | 15150 | 2075.08.24 | 2080.04.13 |
| 52 | Kabeli Hydropower Company Pvt.Ltd. | Kabeli-3 | Taplejung | 21930 | 2075.10.03 | 2079.09.01 |
| 53 | Union Mewa Hydro Ltd. | Mewa Khola | Taplejung | 23000 | 2075.10.04 | 2080.09.15 |
| 54 | Sajha Power Development Pvt. Ltd. | Lower Balephi | Sindhupalchowk | 20000 | 2075.10.06 | 2080.07.18 |
| 55 | Sindhujwala Hydropower Ltd. | Upper Nyasem Khola A | Sindhupalchowk | 21000 | 2075.10.06 | 2079.03.30 |
| 56 | Habitat Power Company Pvt. Ltd | Hewa Khola “A” | Panchthar | 5000 | 2075.10.07 | 2078.04.01 |
| 57 | Ruby Valley Hydropower Company Ltd | Menchet Khola | Dhading | 7000 | 2075.10.15 | 2080.02.13 |
| 58 | Dudhpokhari Chepe Hydropower Pvt. Ltd. | Dudhpokhari Chepe | Gorkha | 8800 | 2075.10.15 | 2080.01.28 |
| 59 | Sankhuwasabha Power Dev. Pvt. Ltd. | Super Sabha Khola | Sankhuwasabha | 4100 | 2075.10.23 | 2080.06.03 |
| 60 | Jal Urja Pvt. Ltd. | Nuagad | Darchula | 1000 | 2075.11.03 | 2078.10.22 |
| 61 | Champawati Hydropower Pvt. Ltd | Chepe khola A | Lamjung | 7000 | 2075.11.07 | 2079.04.04 |

| S.N. | Developers | Projects | Location | Installed Capacity (kW) | PPA Date | RCOD |
|---|---|---|---|---|---|---|
| 62 | Helambu Construction Pvt. Ltd | Ksumti khola | Sindhupalchowk | 683 | 2075.11.29 | 2078.03.04 |
| 63 | Hydro Connection Pvt. Ltd. | Rauje Khola | Solukhumbu | 17712 | 2075.12.04 | 2080.10.15 |
| 64 | Milke Jaljale Hydropower Pvt. Ltd. | Upper Piluwa Hills | Sankhuwasabha | 4990 | 2075.12.04 | 2081.04.04 |
| 65 | Ambe Hydropower Pvt. Ltd. | Upper Bhurundi | Parbat | 3750 | 2075.12.10 | 2079.04.16 |
| 66 | Dhaulagiri Civil Electrical and Mechanical Engineering Pvt. Ltd. | Madhya Daram Khola A | Baglung | 3000 | 2075.12.26 | 2077.12.31 |
| 67 | Dhaulagiri Civil Electrical and Mechanical Engineering Pvt. Ltd. | Madhya Daram Khola B | Baglung | 4500 | 2075.12.26 | 2078.02.31 |
| 68 | Bhalaudi Khola Hydropower Pvt. Ltd. | Bhalaudi Khola | Kaski | 2645 | 2076.01.06 | 2080.04.16 |
| 69 | Kalika Construction Pvt. Ltd. | Upper Daraudi B | Gorkha | 8300 | 2076.01.09 | 2080.09.15 |
| 70 | Kalika Construction Pvt. Ltd. | Upper Daraudi C | Gorkha | 9820 | 2076.01.09 | 2080.09.15 |
| 71 | Super Khudi Hydropower Pvt. Ltd. | Upper Khudi | Lamjung | 21210 | 2076.01.11 | 2080.10.09 |
| 72 | Saidi Power Co. (Pvt.) Ltd. | Saiti Khola | Kaski | 999 | 2077.06.13 | 2078.02.20 |
| 73 | Manang Marsyangdi Hydropower Company Pvt. Ltd. | Manang Marsyangdi | Manang | 135000 | 2077.12.09 | 2081.12.18 |
| 74 | Syarpu Power Company Limited | Syarpu Khola | Rukum | 3236 | 2078.04.11 | 2083.05.06 |
| 75 | Dudh koshi Hydropower Private Ltd | Dudhkoshi 2 - Jaleshwor | Solokhumbhu | 70000 | 2078.08.06 | 2083.04.14 |
| 76 | Sani Bheri Hydropower Co. Pvt. Ltd | Sani Bheri 3 | Rukum | 46720 | 2078.08.06 | 2082.09.17 |
| 77 | Dipjyoti Hydropower Pvt. Ltd. | Khani Khola | Dolakha | 550 | 2078.08.10 | 2080.04.32 |
| 78 | Melamchi Hydro Pvt.Ltd. | Ribal khola | Sindhupalchowk | 998 | 2078.08.10 | 2080.06.05 |
| 79 | Jhapa Energy Limited | Saurya Bidyut Project, Shivasakti | Jhapa | 10000 | 2078.08.12 | 2080.02.11 |
| 80 | Puwa Khola-1 Hydropower Pvt. Ltd. | Aayu Malun khola | Okhaldhunga | 21000 | 2078.11.01 | 2081.04.19 |
| 81 | Bigu Hydro Venture Pvt. Ltd. | Pegu Khola | Dolakha | 3000 | 2079.03.30 | 2082.05.09 |
| | | **SUB TOTAL** | | **1,504,167** | | |
| | | | **IPP Solar Power Projects** | | | |
| 1 | First Solar Developers Nepal Pvt. Ltd. | Bhrikuti Grid-tied Solar | Kapilvastu | 8000 | 2077.12.20 | 2078.12.17 |
| 2 | G.C. Solar Energy Group Pvt. Ltd. | Solar PV Project, Surkhet | Surkhet | 1200 | 2078.09.19 | 2079.03.18 |
| | | **SUB TOTAL** | | **9200** | | |
| | | **TOTAL** | | **1,553,367** | | |

## Status of High Voltage Transmission Line Projects

## Existing High Voltage Transmission Lines

| SN | Description | "Type of Ckts" | "Length Circuit km " | "Conductor Type" | Nominal Aluminium Cross Section Area (Sq.mm) |
|---|---|---|---|---|---|
| **A** | **132 kV Transmission Line** | | | | |
| 1 | Anarmani-Duhabi | Single | 75.76 | BEAR | 250 |
| 2 | Kushaha (Nepal)-Kataiya(India) | Single | 15.00 | BEAR | 250 |
| 3 | Duhabi-Lahan-Chandranigahapur-Pathalaiya-Parwanipur/ Pathalaiya-Hetauda | Double | 608.00 | BEAR | 250 |
| 4 | Hetauda-KL2 P/S | Double | 16.00 | BEAR | 250 |
| 5 | Bharatpur-Marsyangdi P/S | Single | 25.00 | DUCK | 300 |
| 6 | Hetauda-Bharatpur | Single | 70.00 | PANTHER | 200 |
| 7 | Marsyangdi P/S-Suichatar | Single | 84.00 | DUCK | 300 |
| 8 | Suichatar-Matatirtha- KL2 P/S | Double | 72.00 | BEAR | 250 |
| 9 | Suichatar-Balaju | Single | 5.00 | BEAR | 250 |
| 10 | Balaju-Chapali-New Bhaktapur | Double | 36.00 | BEAR | 250 |
| 11 | New Bhaktapur-Lamosangu | Double | 96.00 | BEAR | 250 |
| 12 | Lamosangu-Khimti P/S | Single | 46.00 | BEAR | 250 |
| 13 | Lamosangu-Bhotekoshi P/S | Single | 31.00 | BEAR | 250 |
| 14 | Bharatpur-Damauli | Single | 39.00 | WOLF | 150 |
| 15 | Bharatpur-Kawasoti-Bardghat | Single | 70.00 | PANTHER | 200 |
| 16 | Bardghat-Gandak P/S | Double | 28.00 | PANTHER | 200 |
| 17 | Bardghat-Butwal | Double | 86.00 | BEAR | 250 |
| 18 | Butwal-KGA P/S | Double | 116.00 | DUCK | 300 |
| 19 | KGA P/S-Lekhnath | Double | 96.00 | DUCK | 300 |
| 20 | Lekhnath-Damauli | Single | 45.00 | WOLF | 150 |
| 21 | Lekhnath-Pokhara | Single | 7.00 | DOG | 100 |
| 22 | Pokhara-Modikhola P/S | Single | 37.00 | BEAR | 250 |
| 23 | Butwal-Shivapur-Lamahi-Kohalpur | Double | 430.00 | BEAR | 250 |
| 24 | Lamahi-Jhimruk P/S | Single | 50.00 | DOG | 100 |
| 25 | Kohalpur-Bhurigaun-Lumki | Single | 88.33 | BEAR | 250 |
| 26 | "Lamki-Pahalwanpur-Attariya-Mahendranagar (Lalpur)" | Double | 203.12 | BEAR | 250 |
| 27 | Mahendranagar-Gaddachauki | Single | 12.00 | BEAR | 250 |
| 28 | Marsyangdi -M. Marsyangdi | Double | 80.00 | CARDINAL | 420 |
| 29 | Damak-Godak | Double | 70.00 | BEAR | 250 |
| 30 | Kusum-Hapure | Single | 22.00 | BEAR | 250 |
| 31 | Bhulbhule- Middle Marsyangdi P/S | Single | 22.00 | BEAR | 250 |
| 32 | Chameliya- Syaule- Attaria | Single | 131.00 | BEAR | 250 |
| 33 | Raxual-Parwanipur (Cross Border-Nepal Portion) | Single | 16.00 | BEAR | 250 |
| 34 | Kusaha-Kataiya (Cross Border-Nepal Portion) | Single | 13.00 | BEAR | 250 |
| 35 | Dumre Damauli | Double | 46.00 | BEAR | 250 |
| 36 | Lamahi Ghorahi | Double | 25.00 | BEAR | 250 |
| 37 | Kushma -Lower Modi | Single | 6.20 | BEAR | 250 |
| 38 | Godak- Phidim-Amarpur (Kabeli II & III) | Double | 113.13 | BEAR | 250 |

| SN | Description | "Type of Ckts" | "Length Circuit km " | "Conductor Type" | Nominal Aluminium Cross Section Area (Sq.mm) |
|---|---|---|---|---|---|
| 39 | Trishuli 3A-Trishuli 3B Hub | Double | 6.00 | BISON | 350 |
| 40 | Samundratar - Trishuli 3B Hub | Double | 52.00 | AAAC Upas | 300 |
| 41 | Singati-Lamosangu | Single | 40.00 | BEAR | 250 |
| 42 | Solu Corridor (Tingla-Mirchaiya) | Double | 180.00 | CARDINAL | 420 |
| 43 | New Modi -Lahachwok | Double | 40.00 | BEAR | 250 |
| 44 | Motipur-Sandhikharka | Double | 74.00 | BEAR | 250 |
| 45 | Butwal-Lumbini | Double | 32.00 | BEAR | 250 |
| | | Double UG | 4.00 | 1C, XLPE Cu Cable | 500 |
| **Total (132 kV)** | | | **3459.54** | | |
| **B** | **400/220 kV Transmission Line** | | | | |
| 1 | Dhalkebar-Muzzaffarpur 400 kV Cross Border Line | Double | 78.00 | MOOSE | 500 |
| 2 | Khimti- Dhalkebar 220 kV Transmission Line | Double | 150.00 | BISON | 350 |
| 3 | Trishuli 3B Hub-Matatirtha 220 kV Transmission Line | Double | 98.00 | BISON | 350 |
| 4 | Marsyandi (Markichwok)-Matatirtha 220 kV Transmission Line | Double | 164.00 | MOOSE | 500 |
| 5 | Matatirtha- Matatirtha Substation 220 kV Transmission Line | Double Ckt, Underground | 2.50 | 1C, XLPE Cu Cable | 1200 |
| | | Double Ckt, Underground | 2.50 | 1C, XLPE Cu Cable | 1600 |
| 6 | Dana-Kushma 220 kV Line | Double | 79.6 | MOOSE | 500 |
| 7 | Koshi Corridor (Inaruwa-Basantapur-Baneshwor-Tumlingtar) | Single | 106 | MOOSE | 500 |
| **Total (220 kV)** | | | **602.60** | | |
| **C** | **66 kV Transmission Line** | | | | |
| 1 | Chilime P/S-Trishuli P/S | Single | 39.00 | WOLF | 150 |
| 2 | Trisuli P/S-Balaju | Double | 58.00 | DOG | 100 |
| 3 | Trisuli P/S-Devighat P/S | Single | 4.56 | WOLF | 150 |
| 4 | Devighat P/S-Okhaltar | Double | 53.00 | DOG | 100 |
| 5 | Okhaltar-Chapali | Double | 5.60 | XLPE Cable | 500 |
| 6 | Chapali-New Chabel | Double | 10.00 | ACCC Silvasa | 100 |
| 7 | New Chabel-Lainchaur | Single | 7.00 | XLPE Cable | 500 |
| 8 | Balaju-Lainchor | Single | 2.00 | PANTHER | 200 |
| 9 | Balaju-Siuchatar-KL1 P/S | Double | 72.00 | WOLF | 150 |
| 10 | KL 1 P/S-Hetauda-Simara | Double | 104.00 | WOLF | 150 |
| 11 | Simara-Parwanipur-Birgunj | Double | 40.00 | HTLS INVAR | 150 |
| 12 | Suichatar-Teku | Double | 8.20 | BEAR | 250 |
| 13 | Suichatar-New Patan | Double | 13.00 | ACCC Copenhegan | 220 |
| 14 | Teku-K3 (underground) | "Double, Single Core" | 5.60 | XLPE Cable | 400/500 |
| 15 | Bhaktapur- Baneshwor-Patan | Single | 16.50 | ACCC Silvasa | 123 |
| 16 | Bhaktapur-Banepa-Panchkhal-Sunkoshi P/S | Single | 48.00 | LGJ 120 | 120 |
| 17 | Indrawati- Panchkhal | Single | 28.00 | PANTHER | 200 |
| **Total (66 kV)** | | | **514.46** | | |

## Under Construction High Voltage Transmission Lines

| S.N. | Transmission Line | Type of Ckts | Length (Circuit km) | | | Conductor Type | Nominal Aluminium Cross Section Area (Sq.mm) | "Expected Completion Year (FY)" |
|---|---|---|---|---|---|---|---|---|
| | | | Total | "Constructed till FY 78-79" | "Constructed in FY 78-79 only" | | | |
| **I** | **Transmission Directorate** | | | | | | | |
| **A** | **132 kV Transmission Line** | | | | | | | |
| 1 | Dordi Corridor | Double | 20 | 17 | 0 | CARDINAL | 420 | 2022/23 |
| 2 | Singati-Lamosangu 2nd Circuit | Single | 40 | 35 | 10 | BEAR | 250 | 2022/23 |
| 3 | Lahachwok-Lekhnath | Double | 44 | 41 | 11 | BEAR | 250 | 2022/23 |
| 4 | Bardaghat-Sardi | Double | 40 | 28 | 15 | BEAR | 250 | 2022/23 |
| 5 | "Kusaha-Kataiya Second Circuit (Cross Border-Nepal Portion)" | Single | 13 | 13 | 2 | BEAR | 250 | 2022/23 |
| 6 | Chameliya- Syaule-Attaria 2nd Circuit | Single | 131 | 124.5 | 0 | BEAR | 250 | 2022/23 |
| 7 | Ramechap-Garjyang-Khimti | Double | 62 | 54.5 | 53 | BEAR | 250 | 2022/23 |
| 8 | Thankot-Chapagaon | Double | 56 | 16 | | BEAR | 250 | |
| 9 | "Raxual-Parwanipur Second Circuit (Cross Border-Nepal Portion)" | Single | 16 | 16 | 16 | BEAR | 250 | 2022/23 |
| 10 | Burtibang-Paudi Amarai-Tamghas-Sandhikharka | Double | 96 | | | BEAR | 250 | 2022/23 |
| 11 | Mainahiya Sampatiya | Double | 56 | 12 | 12 | BEAR | 250 | 2022/23 |
| 12 | Kushaha- Biratnagar | Double | 46 | | | BEAR | 250 | 2022/23 |
| 13 | Dhalkebar-Loharpatti | Double | 40 | | | CARDINAL | 420 | 2022/23 |
| 14 | Kohalpur-Surkhet | Double | 104 | | | BEAR | 250 | 2022/23 |
| 15 | Balefi Corridor | Double | 40 | | | CARDINAL | 420 | 2022/23 |
| 16 | Dhalkebar- Balganga | Double | 48 | | | CARDINAL | 420 | 2022/23 |
| 17 | Kaligandaki- Ridi | Double | 44 | | | BEAR | 250 | 2023/24 |
| 18 | Nawalpur (Lalbandi) Salimpur | Double | 40 | | | BEAR | 250 | 2023/24 |
| 19 | Bhumahi-Hakui | Double | 32 | | | BEAR | 250 | 2023/24 |
| 20 | Kabeli (Amarpur) Dhungesangu | Double | 40 | | | BEAR | 250 | 2023/24 |
| 21 | Bafikot-Madichaur (Khungri) | Double | 150 | | | BEAR | 250 | 2024/25 |
| | | **Total** | **1,158.0** | **357.0** | **119.0** | | | |
| **B** | **220 kV Transmission Line** | | | | | | | |
| 1 | Bharatpur-Bardghat | Double | 148 | 138 | 0 | BISON | 350 | 2022/23 |

| S.N. | Transmission Line | Type of Ckts | Length (Circuit km) | | | Conductor Type | Nominal Aluminium Cross Section Area (Sq.mm) | "Expected Completion Year (FY)" |
|---|---|---|---|---|---|---|---|---|
| | | | Total | "Constructed till FY 78-79" | "Constructed in FY 78-79 only" | | | |
| 2 | Hetauda-Bharatpur | Double | 148 | 76 | 66 | BISON | 350 | 2022/23 |
| 3 | Chilime-Trishuli | Double | 72 | | | BISON | 350 | 2022/23 |
| 4 | Koshi Corridor (Basantapur-Dhungesangu) | Double | 70 | 14 | 14 | MOOSE | 500 | 2022/23 |
| 5 | Tumlingtar-Sitalpati | Double | 36 | | | MOOSE | 500 | 2023/24 |
| | | **Total** | **438** | **228** | **80** | | | |
| **C** | **400 kV Transmission Line** | | | | | | | |
| 1 | Hetauda-Dhalkebar-Inaruwa | Double | 576 | | | MOOSE | 500 | 2020/21 |
| | | **Total** | **576** | | | | | |
| **II** | **Project Management Directorate** | | | | | | | |
| **A** | **132 kV Transmission Line** | | | | | | | |
| 1 | Lapsifedi - Changunarayan - Duwakot | Double | 28 | 0 | 0 | BEAR | 250 | 2022/23 |
| 2 | Parwanipur - Pokhariya ** | Double | 42 | 0 | 0 | ACCC Amsterdam | 376 | 2023/24 |
| 3 | Bhaktapur - Thimi - Koteswar** | Double | 24 | 0 | 0 | Single Core XLPE | 800 sq. MM Cu | 2022/23 |
| 5 | Dandakhet - Rahughat ** | Double | 50 | 0 | 0 | CARDINAL | 420 | 2023/24 |
| 6 | Ghorahi - Madichaur** | Double | 80 | 0 | 0 | CARDINAL | 420 | 2023/24 |
| 7 | Borang - Lapang** | Double | 48 | 0 | 0 | BEAR | 250 | 2023/24 |
| | | **Total:** | **272** | | | | | |
| **B** | **220 kV Transmission Line** | | | | | | | |
| 1 | Kushma - New Butwal TL | Double | 176 | 60 | 50 | ACCC Drake | 519.7 | 2022/23 |
| 2 | New Butwal - Bardaghat TL | Double | 42 | 0 | 0 | BISON | 350 | 2022/23 |
| 3 | Dharapani - Khudi TL | Double | 56 | 0 | 0 | Moose | 500 | 2022/23 |
| 4 | Khudi - Udipur TL | Double | 36 | 0 | 0 | ACCC Drake | 519.7 | 2022/23 |
| 5 | Udipur - Bharatpur TL | Double | 134 | 6 | 6 | ACCC Drake | 519.7 | 2022/23 |
| 6 | Lapang - Ratmate TL** | Double | 48 | 0 | 0 | Twin Moose | 500 | 2024/25 |
| | | **Total** | **492** | **66.0** | **56.0** | | | |
| **C** | **400 kV Transmission Line** | | | | | | | |
| 1 | New Khimti - Barhabise | Double | 85.76 | 12 | 12 | MOOSE | 500 | 2022/23 |
| 2 | Barhabise - Kathmandu | Double | 92 | 12 | 12 | MOOSE | 500 | 2022/23 |
| | | **Total** | **178** | **24** | **24** | | | |

(Note : ** - In the process of Procurement)

## Planned and proposed High Voltage Transmission Lines

| S.N. | Description | Type of Ckts | "Length Circuit km" | Conductor Type | Nominal Aluminium Cross Section Area (Sq.mm) |
|---|---|---|---|---|---|
| **I** | **Transmission Directorate** | | | | |
| **A** | **400 kV Transmission Line** | | | | |
| 1 | Kerung-Chilime Hub-Ratmate | Double | 140.00 | MOOSE | 500 |
| 2 | Bheri Corridor | Double | 50.00 | MOOSE | 500 |
| 3 | Arun Inaruwa Anarmani | Double | 460.00 | MOOSE | 500 |
| 4 | Arun-Dudhkoshi-Tingla | Double | 230.00 | MOOSE | 500 |
| 5 | Dudhkoshi-Dhalkebar | Double | 170.00 | MOOSE | 500 |
| 6 | New Butwal Gorakhpur | Double | 40.00 | MOOSE | 500 |
| | | **Total** | **1090.00** | | |
| **B** | **220 kV Transmission Line** | | | | |
| 1 | Koshi Corridor (Inaruwa-Basantapur-Baneshwor-Tumlingtar) | Single | 106 | MOOSE | 500 |
| 2 | Galchhi - Ratmate | Double | 34.00 | MOOSE | 500 |
| 3 | Lekhnath-Damauli | Double | 90.00 | MOOSE | 500 |
| 4 | Dhaubadi Iron Mine | Double | 21.00 | BISON | 350 |
| | | **Total** | **251.00** | | |
| **C** | **132 kV Transmission Line** | | | | |
| 1 | Pathlaiya -Harniya | Double | 70.00 | BEAR | 250 |
| 2 | Bajhang-Deepayal-Attariya | Double | 260.00 | BEAR | 250 |
| 3 | Surkhet-Dailekh | Double | 64.00 | BEAR | 250 |
| 4 | Godak -Anarmani | Double | 70.00 | BEAR | 250 |
| 5 | Godak Soyak | Double | 16.00 | BEAR | 250 |
| 6 | Rupani-Bodebarsain | Double | 36.00 | BEAR | 250 |
| 7 | Lahan Sukhipur | Double | 34.00 | BEAR | 250 |
| 8 | "Chandrapur-Sukhdevchaur (Rajpur)" | Double | 70.00 | BEAR | 250 |
| 9 | Kamane-Faparbari (Jhurjhure) | Double | 90.00 | BEAR | 250 |
| 10 | Shyaule-Safebagar | Double | 160.00 | BEAR | 250 |
| 11 | Kushma -Lower Modi -Modi | Double | 30.00 | BEAR | 250 |
| 12 | Surkhet-Chaukune | Double | 60.00 | BEAR | 250 |
| 13 | Birgunj-Parsauni UG | Double | 14.00 | 1C, XLPE Cu Cable | 1200 |

| S.N. | Description | Type of Ckts | "Length Circuit km" | Conductor Type | Nominal Aluminium Cross Section Area (Sq.mm) |
|---|---|---|---|---|---|
| 14 | "Barhabise Lamosaghu 2nd Circuit (Sunkoshi 132 kV SS)" | Single | 12.00 | BEAR | 250 |
| 15 | Damak-Keraun | Double | 50.00 | BEAR | 250 |
| 16 | Keraun-Biratnagar | Double | 80.00 | BEAR | 250 |
| 17 | Simra SEZ | Double | 10.00 | BEAR | 250 |
| 18 | Dhaubadi Meghauli | Double | 24.00 | BEAR | 250 |
| | | **Total** | **1150.00** | | |
| **II** | **Project Management Directorate** | | | | |
| **A** | **400 kV Transmission Line** | | | | |
| 1 | Nijgadh - Hetaunda | Double | 150.00 | MOOSE | 500 |
| 2 | New Butwal-Lamahi | Double | 300.00 | MOOSE | 500 |
| 3 | Lamahi-New Kohalpur | Double | 180.00 | MOOSE | 500 |
| 4 | New Kohalpur-Dododhara | Double | 190.00 | MOOSE | 500 |
| 5 | Dododhara(New Lamki)-New Attariya (Daiji) | Double | 180.00 | MOOSE | 500 |
| 6 | Tingla Hub-Likhu Hub- New Khimti | Double | 110.00 | MOOSE | 500 |
| 7 | New Khimti-Tamakoshi 3-Sunkoshi Hub-Dhalkebar | Double | 220.00 | MOOSE | 500 |
| 8 | Budhigandaki Corridor (Philim-Gumda-Ratamate) | Double | 190.00 | MOOSE | 500 |
| 9 | Damauli-Kusma-Burtibang-Bafikot | Double | 400.00 | MOOSE | 500 |
| | | **Total:** | **1920.00** | | |
| **B** | **132 kV Transmission Line** | | | | |
| 1 | Chhinchu - Surkhet | Double | 50.00 | BEAR | 250 |
| 2 | Dailekh - Kalikot - Jumla | Double | 160.00 | BEAR | 250 |
| 3 | Lamosangu - Kavre/Ramechhap | Double | 80.00 | BEAR | 250 |
| 4 | Chobhar - Lagankhel (UG) | Double | 10.00 | Single Core XLPE | 500 |
| 5 | Kohalpur - Nepalgunj | Double | 20.00 | BEAR | 250 |
| | | **Total** | **320.00** | | |

## Status of High Voltage Grid Substations

## Existing High Voltage Grid Substations

| S.No | Substation | Voltage Ratio | " Capacity FY 077-78" | " Capacity FY 078-79" | "Total Increment in FY 078-79" |
|---|---|---|---|---|---|
| | | kV | MVA | MVA | (MVA) |
| A | **Kathmandu Grid Division** | | | | |
| 1 | Balaju | 132/66 | 45 | 45 | 0 |
| | | 66/11 | 22.5 | 22.5 | 0 |
| | | 66/11 | 22.5 | 22.5 | 0 |
| | | 66/11 | 22.5 | 22.5 | 0 |
| 2 | Chapali | 132/11 | 30 | 45 | 15 |
| | | 132/66 | 49.5 | 49.5 | 0 |
| | | 132/66 | 49.5 | 49.5 | 0 |
| 3 | Siuchatar | 132/66 | 37.8 | 37.8 | 0 |
| | | 132/66 | 37.8 | 37.8 | 0 |
| | | 132/66 | 37.8 | 37.8 | 0 |
| | | 132/11 | 30 | 30 | 0 |
| | | 66/11 | 18 | 18 | 0 |
| | | 66/11 | 18 | 18 | 0 |
| 4 | New Chabel | 66/11 | 22.5 | 22.5 | 0 |
| | | 66/11 | 22.5 | 22.5 | 0 |
| | | 66/11 | 22.5 | 22.5 | 0 |
| 5 | Lainchour | 66/11 | 22.5 | 22.5 | 0 |
| | | 66/11 | 22.5 | 22.5 | 0 |
| 6 | New Patan | 66/11 | 18 | 18 | 0 |
| | | 66/11 | 18 | 18 | 0 |
| | | 66/11 | 18 | 18 | 0 |
| | | 66/11 | 22.5 | 22.5 | 0 |
| 7 | Teku | 66/11 | 22.5 | 22.5 | 0 |
| | | 66/11 | 22.5 | 22.5 | 0 |
| 8 | K3 | 66/11 | 22.5 | 22.5 | 0 |
| | | 66/11 | 22.5 | 22.5 | 0 |
| 9 | Baneshwor | 66/11 | 30 | 30 | 0 |
| | | 66/11 | 18 | 30 | 12 |
| 10 | Bhaktapur | 132/66 | 49.5 | 49.5 | 0 |
| | | 132/66 | 49.5 | 49.5 | 0 |
| | | 132/11 | 22.5 | 22.5 | 0 |
| | | 132/11 | 22.5 | 22.5 | 0 |
| | | 132/11 | 22.5 | 22.5 | 0 |

| S.No | Substation | Voltage Ratio | " Capacity FY 077-78" | " Capacity FY 078-79" | "Total Increment in FY 078-79" |
|---|---|---|---|---|---|
| | | kV | MVA | MVA | (MVA) |
| 11 | Banepa | 66/11 | 22.5 | 22.5 | 0 |
| | | 66/11 | | | 0 |
| 12 | Panchkhal | 66/11 | 10 | 10 | 0 |
| 13 | Lamosanghu | 132/33 | 30 | 30 | 0 |
| 14 | Matatirtha | 132/33 | 30 | 30 | 0 |
| | | 132/11 | 22.5 | 22.5 | 0 |
| 15 | Indrawati | 66/11 | 10 | 10 | 0 |
| 16 | Bagmati | 66/33 | | 10 | 10 |
| | | 66/11 | 6 | 6 | 0 |
| 17 | Samundratar | 132/33 | 30 | 30 | 0 |
| | | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 8 | 8 | 0 |
| | | 33/11 | 8 | 8 | 0 |
| 18 | Singati | 132/33 | | 30 | 30 |
| 19 | Garjyang | 132/33 | | 30 | 30 |
| **B** | **Hetauda Grid Division** | | | | |
| 20 | Hetauda | 132/66 | 45 | 45 | 0 |
| | | 132/66 | 45 | 20 | -25 |
| | | 66/11 | 10 | 10 | 0 |
| | | 66/11 | 10 | 10 | 0 |
| 21 | Kamane | 132/33 | 63 | 63 | 0 |
| | | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 22 | Bharatpur | 132/33 | 30 | 30 | 0 |
| | | 132/33 | 30 | 30 | 0 |
| | | 132/11 | 30 | 22.5 | -7.5 |
| | | 132/11 | 30 | 22.5 | -7.5 |
| 23 | New Bharatpur | 132/11 | | 30.0 | 30 |
| 24 | Birgunj | 66/33 | 30 | 30 | 0 |
| | | 66/33 | 12.5 | 12.5 | 0 |
| | | 66/11 | 30 | 30 | 0 |
| | | 66/11 | 30 | 30 | 0 |

| S.No | Substation | Voltage Ratio | " Capacity FY 077-78" | " Capacity FY 078-79" | "Total Increment in FY 078-79" |
|---|---|---|---|---|---|
| | | kV | MVA | MVA | (MVA) |
| 25 | Parwanipur | 132/11 | 22.5 | 22.5 | 0 |
| | | 132/11 | 22.5 | 22.5 | 0 |
| | | 132/11 | 22.5 | 22.5 | 0 |
| | | 132/66 | 63 | 63 | 0 |
| | | 132/66 | 63 | 63 | 0 |
| | | 132/66 | 63 | 63 | 0 |
| 26 | Simra | 66/11 | 15 | 15 | 0 |
| | | 66/11 | 15 | 15 | 0 |
| 27 | Amlekhgunj | 66/11 | 7.5 | 7.5 | 0 |
| 28 | Pathlaiya | 132/11 | 22.5 | 22.5 | 0 |
| | | 132/33 | | 30 | 30 |
| 29 | Purbi Chitwan | 132/33 | 30 | 30 | 0 |
| | | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| **C** | **Dhalkebar Grid Branch** | | | | |
| 30 | Lahan | 132/33 | | | 0 |
| | | 132/33 | 63 | 63 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 31 | Chapur | 132/33 | 30 | 30 | 0 |
| | | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 32 | Dhalkebar | 400/220 | 315 | 315 | 0 |
| | | 400/220 | 315 | 315 | 0 |
| | | 400/220 | 315 | 315 | 0 |
| | | 220/132 | 315 | 315 | 0 |
| | | 220/132 | 315 | 315 | 0 |
| | | 220/132 | 160 | 160 | 0 |
| | | 220/132 | 160 | 160 | 0 |
| | | 132/33 | 30 | 63 | 33 |
| | | 132/33 | 63 | 63 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |

| S.No | Substation | Voltage Ratio | " Capacity FY 077-78" | " Capacity FY 078-79" | "Total Increment in FY 078-79" |
|---|---|---|---|---|---|
| | | kV | MVA | MVA | (MVA) |
| 33 | Mirchaiya | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 34 | Nawalpur | 132/33 | | 63 | 63 |
| | | 33/11 | | 16 | 16 |
| 35 | Rupani | 132/33 | 63 | 63 | 0 |
| 36 | Tingla | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 8 | 8 | 0 |
| 37 | New Khimti | 220/132 | | 100 | 100 |
| **D** | **Duhabi Grid Branch** | | | | |
| 38 | Duhabi | 132/33 | | 63 | 63 |
| | | 132/33 | 63 | 63 | 0 |
| | | 132/33 | 63 | 63 | 0 |
| | | 132/33 | 63 | 63 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 39 | Anarmani | 132/33 | 30 | 30 | 0 |
| | | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 40 | Damak | 132/33 | 63 | 63 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 41 | Godak | 132/33 | 63 | 63 | 0 |
| | | 33/11 | 8 | 8 | 0 |
| 42 | Phidim | 132/33 | 20 | 20 | 0 |
| | | 33/11 | 3 | 3 | 0 |
| 43 | Amarpur (Kabeli) | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 3 | 3 | 0 |
| **E** | **Butwal Grid Division** | | | | |
| 44 | Butwal | 132/33 | 63 | 63 | 0 |
| | | 132/33 | 63 | 63 | 0 |
| | | 132/33 | 63 | 63 | 0 |
| | | 33/11 | 16.6 | 24.0 | 7.4 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |

| S.No | Substation | Voltage Ratio | " Capacity FY 077-78" | " Capacity FY 078-79" | "Total Increment in FY 078-79" |
|---|---|---|---|---|---|
| | | kV | MVA | MVA | (MVA) |
| 45 | Bardghat | 132/11 | 22.5 | 22.5 | 0 |
| | | 132/11 | 22.5 | 22.5 | 0 |
| 46 | Chanauta | 132/33 | 30 | 30 | 0 |
| | | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 8 | 16.6 | 8.6 |
| | | 33/11 | 8 | 8 | 0 |
| 47 | Lamahi | 132/33 | 63 | 63 | 0 |
| | | 132/33 | 30 | | -30 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| | | 33/11 | 8 | 8 | 0 |
| 48 | Ghorahi | 132/33 | | 63 | 63 |
| | | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 49 | Kawasoti | 132/33 | 30 | 30 | 0 |
| | | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 50 | Gandak | 132/33 | 30 | 30 | 0 |
| | | 33/11 | | 16.6 | 16.6 |
| | | 33/11 | | 16.6 | 16.6 |
| 51 | Motipur | 132/33 | | 30 | 30 |
| | | 33/11 | | 16 | 16 |
| 52 | Sandhikharka | 132/33 | | 30 | 30 |
| | | 33/11 | | 16 | 16 |
| 53 | Mainahiya | 132/33 | | 45 | 45 |
| 54 | New Butwal | 220/132 | | 100 | 100 |
| **F** | **Pokhara Grid Branch** | | | | |
| 55 | Damauli | 132/33 | 30 | | -30 |
| | | 132/33 | 30 | 15 | -15 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| | | 33/11 | 3 | 3 | 0 |
| 56 | Pokhara | 132/11 | 30 | 30 | 0 |
| | | 132/11 | 30 | 30 | 0 |
| 57 | Lekhnath | 132/33 | 30 | 30 | 0 |
| | | 132/11 | 22.5 | 22.5 | 0 |
| | | 132/11 | 22.5 | | -22.5 |

| S.No | Substation | Voltage Ratio | " Capacity FY 077-78" | " Capacity FY 078-79" | "Total Increment in FY 078-79" |
|---|---|---|---|---|---|
| | | kV | MVA | MVA | (MVA) |
| 58 | Markichowk | 132/33 | 30 | 30 | 0 |
| 59 | Syangja | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 8 | 8 | 0 |
| 60 | Dana | 220/132 | 100 | 100 | 0 |
| | | 132/33 | 25 | 25 | 0 |
| 61 | Kushma | 220/132 | 100 | 100 | 0 |
| 62 | Lahachowk | 132/33 | | 30 | 30 |
| | | 33/11 | | 8 | 8 |
| **G** | **Attaria Grid Branch** | | | | |
| 63 | Kusum | 132/11 | 12.5 | 12.5 | 0 |
| 64 | Hapure | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 8 | 8 | 0 |
| 65 | Attaria | 132/33 | 30.0 | 30.0 | 0 |
| | | 132/33 | 30.0 | 30.0 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 66 | Kohalpur | 132/33 | 63 | 63 | 0 |
| | | 132/33 | 30 | 63 | 33 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 67 | Lamki | 132/33 | 15 | 15 | 0 |
| | | 132/33 | 15 | 15 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 68 | Mahendranagar | 132/33 | 30 | 30 | 0 |
| | | 132/33 | 15 | 15 | 0 |
| | | 33/11 | 16.6 | 16.6 | 0 |
| 69 | Bhurigaon | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 8 | 8 | 0 |
| 70 | Pahalmanpur | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 8 | 8 | 0 |
| 71 | Syaule | 132/33 | 30 | 30 | 0 |
| | | 33/11 | 8 | 8 | 0 |

| S.No | Voltage Rating (kV) | "Transformer No. " | "Total Capacity FY 077-78 (MVA)" | "Total Capacity FY 078-79 (MVA)" | "Total Increment (MVA)" |
|---|---|---|---|---|---|
| 1 | 400/220 | 3 | 945 | 945 | 0 |
| 2 | 220/132 | 8 | 1150 | 1350 | 200 |
| 3 | 132/66 | 13 | 635.40 | 610.40 | -25 |
| 4 | 132/33 | 65 | 2082.00 | 2487.00 | 405 |
| 5 | 132/11 | 19 | 462.50 | 470.00 | 7.5 |
| 6 | 66/33 | 3 | 42.50 | 52.50 | 10 |
| 7 | 66/11 | 31 | 596.50 | 608.50 | 12 |
| 8 | 33/11 | 45 | 520.0 | 625.2 | 105.2 |
| | **Total** | **187** | **6433.90** | **7148.60** | **714.7** |

## Under Construction High Voltage Grid Substations

| S.No | Name of Project | Substation | Voltage Level (Ratio) | Capacity | Total Capacity | Expected Completion Year |
|---|---|---|---|---|---|---|
| | | | kV | MVA | MVA | AD |
| I | Transmission Directorate | | | | | |
| 1 | Chilime Trishuli 220 kV Transmission Line | Chilime | 220/132<br>132/33 | 1 Ø, 7x53.33 Bank<br>3 Ø, 50 | 370 | 2022/23 |
| 2 | Trishuli 3B Hub Substation | Trishuli 3 B Hub | 220/132<br>132/33 | 1 Ø, 7x53.33 Bank<br>3 Ø, 50 | 370 | 2022/23 |
| 3 | Ramechhap Garjyang Khimti 132 kV Transmission Line | New Khimti | 220/132 | 1 Ø, 4x66.67 Bank | 200 | 2022/23 |
| 4 | Kushaha Kataiya 132 kV Second Circuit Transmission Line | Kushaha | 132/11 | 3 Ø, 22.5 | 22.5 | 2022/23 |
| 5 | Dordi Corridor132 kV Transmission Line | Kritipur | 132/11 | 3 Ø, 10 | 10 | 2022/23 |
| 6 | Butwal Lumbini132 kV Transmission Line | Mainahiya | 132/33<br>33/11 | 3 Ø, 1x45<br>3 Ø, 16 | 61 | 2022/23 |
| 7 | Koshi Corridor 220 kV Transmission Line | Tumlingtar | 220/132<br>132/33 | 1 Ø, 7x33.33 Bank<br>3 Ø, 2x30 | 260 | 2022/23 |
| | | Baneshwor | 220/33 | 3 Ø, 2x30 | 60 | 2022/23 |
| | | Basantapur | 220/132<br>132/33 | 1 Ø 7x33.33 Bank<br>3 Ø, 30 | 230 | 2022/23 |
| 8 | Burtibang Paudi Amarai Tamghas Sandhikharka Gorusinghe 132 kV Transmission Line | Burtibang | 132/33<br>33/11 | 3 Ø, 30<br>16 | 46 | 2022/23 |

| S.No | Name of Project | Substation | Voltage Level (Ratio) | Capacity | Total Capacity | Expected Completion Year |
|---|---|---|---|---|---|---|
| | | Paudi Amarai | 132/33<br>33/11 | 3 Ø, 30<br>16 | 46 | 2022/23 |
| | | Tamghas | 132/33<br>33/11 | 3 Ø, 30<br>16 | 46 | 2022/23 |
| 9 | Kushaha Biratnagar 132 kV Transmission Line | Biratnagar | 132/33<br>33/11 | 3 Ø, 2x63<br>3 Ø, 16 | 142 | 2022/23 |
| 10 | Sunwal 132 kV Substation | Sunwal | 132/33<br>132/11 | 3 Ø, 2x63<br>3 Ø, 22.5 | 148.5 | 2022/23 |
| 11 | Hetauda- Dhalkebar-Inaruwa 400 kV Substation Expansion Project | Hetauda | 400/220 | 1 Ø, 4x167 Bank | 500 | 2022/23 |
| | | Inaruwa | 400/220 | 3 Ø, 3x315 | 945 | 2022/23 |
| 12 | Nepal India Electricity Transmission and Trade Project<br>( Hetauda-Dhalkebar-Inaruwa 400 kV Transmission Line) | Hetauda | 220/132<br>132/11 | 3 Ø, 2x160<br>3 Ø, 10 | 330 | 2022/23 |
| | | Inaruwa | 220/132<br>220/33 | 3 Ø, 2x160<br>3 Ø, 2x63 | 446 | 2022/23 |
| 13 | Koshi Corridor 220 kV Transmission Line | Dhungesanghu | 132/33 | 1 Ø, 7x5 Bank | 30 | 2021/22 |
| 14 | Dhalkebar Loharpati 132 kV Transmission Line | Loharpatti | 132/33<br>132/11<br>33/11 | 3 Ø, 2x30<br>3 Ø, 22.5<br>3 Ø, 16 | 98.5 | 2022/23 |
| 15 | Tumlingtar Sitalpati 220 kV Transmission Line | Sitalpati | 220/132<br>132/33 | 1 Ø, 7x33.33 Bank<br>1 Ø, 4x8 Bank | 224 | 2023/24 |
| 16 | Dharan 220/33 kV substation | Dharan | 220/33<br>33/11 | 3 Ø, 63<br>3 Ø, 10 | 73 | 2023/24 |
| 17 | Kaligandaki Ridi132 kV Transmission Line | Ridi | 132/33<br>33/11 | 3 Ø, 30<br>3 Ø, 8 | 38 | 2023/24 |
| 18 | Lalbandi Salimpur 132 kV Transmission Line | Salimpur | 132/33<br>33/11 | 3 Ø, 2x30<br>3 Ø, 1x24 | 84 | 2023/24 |
| 19 | Dhalkebar Balganga 132 kV Transmission Line | Balganga | 132/33 | 3 Ø, 2x63 | 126 | 2023/24 |
| 20 | Bhumahi Hakui132 kV Transmission Line | Hakui | 132/33 | 3 Ø, 2x100 | 200 | 2023/24 |
| 21 | Malekhu 132 kV Substation Expansion | Malekhu | 132/33 | 3 Ø, 2x30 | 60 | 2023/24 |
| Total | | | | | 5,166.50 | |
| II | Under Project Management Directorate | | | | | |

| S.No | Name of Project | Substation | Voltage Level (Ratio) | Capacity | Total Capacity | Expected Completion Year |
|---|---|---|---|---|---|---|
| 1 | 220 kV Bahrabise Substation | Barhabise | 220/132 | 1 Ø, 4x53.33 | 165 | 2022/23 |
| | | | 132/11 | 3 Ø, 1x5 | | |
| 2 | Kathmandu Valley Transmission Capacity Reinforcement Project | Chobhar | 132/11 | 3 Ø, 2x45 | 90 | 2022/23 |
| | | Futung | 132/11 | 3 Ø, 2x45 | 90 | 2022/23 |
| | | Thimi | 132/11 | 3 Ø, 2x45 | 90 | 2022/23 |
| 3 | Marsyangdi-Kathmandu 220 kV TL Project | Markichowk | 220/132 | 1 Ø, 7x53.33 | 320 | 2022/23 |
| | | Matatirtha | 220/132 | 1 Ø, 7x53.33 | 320 | 2022/23 |
| 4 | Marsyangdi Corridor 220 kV TL Project | Bharatpur | 220/132 | 3 Ø, 2x160 | 320 | 2022/23 |
| | | Udipur | 220/132 | 1 Ø, 4x53.33 | 210 | 2022/23 |
| | | | 132/33 | 3 Ø, 1x50 | | |
| | | Khudi | 220/132 | 1 Ø, 4x53.33 | 210 | 2022/23 |
| | | | 132/33 | 3 Ø, 1x50 | | |
| | | Dharapani | 132/33 | 1 Ø, 4x33.33 | 130 | 2022/23 |
| | | | 132/33 | 3 Ø, 1x30 | | |
| 5 | Lapsiphedi and Changunarayan SS Project | Lapsiphedi | 220/132 | 1 Ø, 4x53.33 | 182.5 | 2022/23 |
| | | | 132/11 | 3 Ø, 1x22.5 | | |
| | | Changunarayan | 132/11 | 3 Ø, 1x45 | 45 | |
| 6 | New Khimti - Barhabise - Lapsiphedi 400 kV SS Project | New Khimti | 400/220 | 1 Ø, 7x105 | 630 | 2022/23 |
| | | Barhabise | 400/220 | 1 Ø, 7x53.33 | 320 | 2022/23 |
| | | Lapsiphedi | 400/220 | 1 Ø, 4x105 | 315 | 2022/23 |
| 7 | Parwanipur - Pokhariya 132 kV TL Project** | Pokhariya | 132/33 | 3 Ø, 2x63 | 171 | 2023/24 |
| | | | 132/11 | 3 Ø, 1x45 | | |
| 8 | Kathmandu Valley Transmission Capacity Reinforcement Project (Phase II)** | Balkumari | 132/66 | 3 Ø, 2x63 | 216 | 2023/24 |
| | | | 132/11 | 3 Ø, 2x45 | | |
| 9 | Borang-Lapang 132 kV and Lapang-Ratmate 220 kV Transmission Line and Substation project ** | Borang | 132/33 | 3 Ø, 30 | 30 | 2023/24 |

| S.No | Name of Project | Substation | Voltage Level (Ratio) | Capacity | Total Capacity | Expected Completion Year |
|---|---|---|---|---|---|---|
| | | Lapang | 220/132<br>132/33 | 1 Ø, 7x33.33<br>3 Ø, 30 | 230 | |
| 10 | Ghorahi Madichaur 132 kV Transmission Line ** | Madichaur | 132/33 | 3 Ø, 30 | 30 | 2023/24 |
| 11 | Dadakhet Rahughat132 kV Transmission Line ** | Dadakhet | 132/33 | 3 Ø, 30 | 30 | 2023/24 |
| | | Rahughat | 220/132<br>132/33 | 1 Ø, 7x33.33<br>3 Ø, 30 | 230 | |
| 12 | 132 kV Pangtang Substation ** | Pangtang | 132/33 | 3 Ø, 30 | 30 | 2023/24 |
| 13 | 132 kV Keraun substation ** | Keraun | 132/33 | 3 Ø, 2x63 | 148.5 | 2023/24 |
| | | | 132/11 | 3 Ø, 22.5 | | |
| | | | | **Total** | **4553** | |

**** Under procurement process**

## Planned and Proposed High Voltage Grid Substations

| S.No | Name of Project | Substation | "Voltage Level (Ratio)" | " Capacity " | Total Capacity |
|---|---|---|---|---|---|
| | | | KV | MVA | MVA |
| I | **Transmission Directorate** | | | | |
| 1 | Bheri Corridor 400 kV Transmission Line | Bafikot | 400/132 | 1 Ø, 7x33.33 Bank | 200 |
| 2 | Lekhnath Damauli 220 kV Transmission Line | Lekhnath | 220/132 | 1 Ø, 7x100 Bank | 600 |
| | | Damauli | 220/132 | 3 Ø, 63 | 63 |
| | | | 132/11 | 3 Ø, 20 | 20 |
| 3 | Dhaubadi Iron Mine 220 kV Transmission Line | Dhaubadi | 220/132 | 3 Ø, 2x 100 | 200 |
| 4 | Palpa 220 kV Substation | Palpa | "220/132 132/33" | "1 Ø,7x63 3 Ø,2x50" | 478 |
| 5 | Godak Anarmani 132 kV Transmission Line | Anarmani | 132/33 | 3 Ø, 63 | 63 |
| 6 | Pathalaiya Harniya 132 kV Transmission Line | Harniya | 132/33 | 3 Ø, 63 | 63 |
| 7 | Lahan - Sukhipur 132 kV Transmission Line | Sukhipur | 132/33 | 3 Ø,2x30 | 60 |
| 8 | Rupani - Bodebarsain 132 kV Transmission Line | Bodebarsain | 132/33 | 3 Ø,2x30 | 60 |
| 9 | Chandrapur - Sukhdevchaur 132 kV Transmission Line | Sukhdevchaur | 132/33 | "3 Ø,2x63 3 Ø,25" | 151 |
| 10 | Birauta 132 kV Substation | Birauta | 132/11 | 3 Ø,2x30 | 60 |
| 11 | Birgunj Parsauni 132 kV UG Transmission Line | Parsauni | 132/33 | 3 Ø,2x63 | 126 |
| 12 | Syaule-Safebagar 132 kV Transmission Line | Safebagar | "132/33 33/11" | "3 Ø,1x30 3 Ø,1x16" | 46 |
| 13 | Khimti- Rakathung (Ramechhap) 132 kV Transmission Line | Rakathung | "132/33 33/11" | "3 Ø,1x30 3 Ø,1x16" | 46 |
| 14 | Jhurjhure 132 kV Transmission Line | Faparbari | "132/33 33/11" | "3 Ø,1x63 3 Ø,1x16" | 79 |
| 15 | Bafikot-Khungri (Madichaur) 132 kV Transmission Line | Ghartigaun | "132/33 33/11" | "3 Ø,1x30 3 Ø,1x16" | 46 |
| 16 | Kathmandu Valley System Reinforcement | Thapathali | 132/11 | 3 Ø,2x45 | 90 |
| | | Raj Durbar | 132/11 | 3 Ø,2x45 | 90 |
| | | Maharajgunj | 132/11 | 3 Ø,2x45 | 90 |
| | | Sirutar | 132/11 | 3 Ø,2x30 | 60 |
| | | | | **Total** | **2691** |
| I | **Project Managment Directorate** | | | | |
| 1 | Kohalpur - Nepalgunj 132 kV Transmission Line | Nepalgunj | 132/33 | 3 Ø, 2x63 | 126 |
| 2 | Arun Khola (Dumkibas) 132 kV Substation | Dumkibas | 132/33/11 | 3 Ø, 2x30 | 60 |

| S.No | Name of Project | Substation | "Voltage Level (Ratio)" | " Capacity " | Total Capacity |
|---|---|---|---|---|---|
| | | | KV | MVA | MVA |
| 3 | Mulpani Substation | Mulpani | 132/11 | 3 Ø, 2x45 | 90 |
| 4 | New Butwal - Lamahi - Kohalpur - New Lamki - New Attariya 400 kV Transmission Line | Lamahi | 400/220/132 | 630 | 720 |
| | | | 132/11 | 90 | |
| | | New Kohalpur | 400/220/132 | 630 | 720 |
| | | | 132/11 | 90 | |
| | | New Attariya | 400/220/132 | 630 | 720 |
| | | | 132/11 | 90 | |
| 5 | Tingla Hub-Likhu Hub- New Khimti 400 kV Transmission Line | Likhu Hub | 400/220/132 | 630 | 630 |
| 6 | New Khimti-Tamakoshi 3-Sunkoshi Hub-Dhalkebar 400 kV Transmission Line | Sunkoshi Hub | 400/220/132 | 630 | 630 |
| 7 | Budhigandaki corridor 400 kV Transmission Line | Philim / Gumda | 400/220/132 | 630 | |
| 8 | Dailekh - Kalikot - Jumla 132 kV Transmission Line | Kalikot | 132/33 | 63 | 108 |
| | | | 132/11 | 45 | |
| | | Jumla | 132/33 | 63 | 108 |
| | | | 132/11 | 45 | |
| 9 | Damauli - Kushma - Burtibang - Banfikot 400 kV Transmission Line | Kushma | 400/220/132 | 630 | 630 |
| | | Burtibang | 400/220/132 | 630 | 630 |
| | | Banfikot | 400/220/132 | 630 | 630 |
| 10 | Lamosangu - Kavre / Ramechhap 132 kV Transmission Line | Kavre/ Ramechhap | 132/33 | 63 | 108 |
| | | | 132/11 | 45 | |
| | | | | **Total** | **5910** |

## Distribution System Data for FY 2078/079

| S.No. | Provincial Office | Number of 33/11 kV Substations | Substation Capacity (MVA) | Line Length (km) | | | Distribution Transformers | |
|---|---|---|---|---|---|---|---|---|
| | | | | 33 kV | 11 kV | 0.4/0.23 kV | Quantity | Capacity (MVA) |
| 1 | Province 1 PO | 33 | 501.80 | 1,081 | 9,279 | 25,049 | 7,582 | 740.00 |
| 2 | Madesh Pradesh PO | 26 | 418.70 | 880 | 6,504 | 21,782 | 6,330 | 620.00 |
| 3 | Bagmati PO | 16 | 119.60 | 442 | 7,059 | 24,426 | 7,812 | 760.00 |
| 4 | Bagmati DO | 8 | 84.20 | 161 | 3,030 | 8,053 | 2,611 | 255.00 |
| 5 | Gandaki PO | 20 | 183.50 | 681 | 5,236 | 13,442 | 3,660 | 355.00 |
| 6 | Lumbini PO | 23 | 331.80 | 1,252 | 4,051 | 13,361 | 3,977 | 390.00 |
| 7 | Lumbini DO | 13 | 176.60 | 1,089 | 3,312 | 10,907 | 2,995 | 295.00 |
| 8 | Karnali PO | 11 | 49.50 | 386 | 2,387 | 5,140 | 1,441 | 140.00 |
| 9 | Sudurpaschim PO | 22 | 198.00 | 647 | 3,983 | 14,435 | 2,953 | 290.00 |
| | **F/Y 2078/079 Total** | **172** | **2,064** | **6,620** | **44,840** | **136,595** | **39,361** | **3,845.00** |

# POWER DEVELOPMENT MAP OF NEPAL

## EXISTING / UNDER CONSTRUCTION TRANSMISSION LINES / SUBSTATIONS

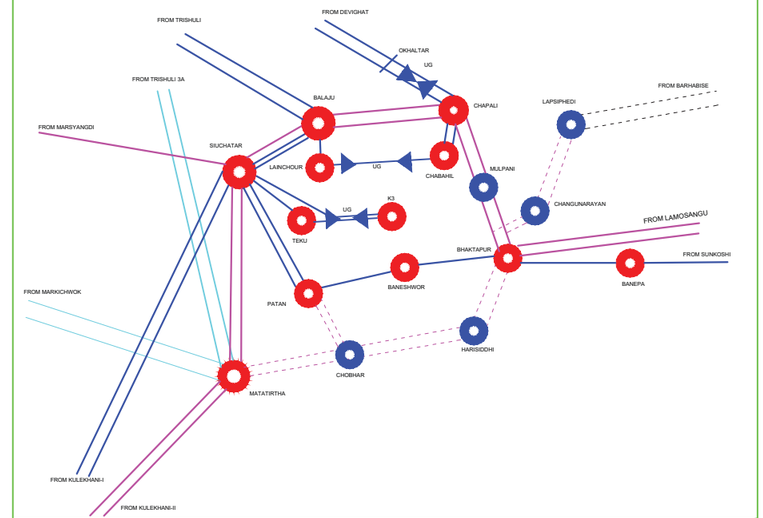
(NOT TO SCALE)

N

CHINA

INDIA

### 220,132 and 66 kV Network Feeding Kathmandu Valley




## LEGENDS

| EXISTING | UNDER-CONST. | PLANNED | |
|---|---|---|---|
| ——— | - - - - - - | ~~~~~~ | 400 kV TRANSMISSION LINE |
| ——— | - - - - - - | ~~~~~~ | 220 kV TRANSMISSION LINE |
| ——— | - - - - - - | ~~~~~~ | 132 kV TRANSMISSION LINE |
| ——— | | | 66 kV TRANSMISSION LINE |
| ● | ● | ● | GRID SUB-STATION |

| EXISTING | UNDER CONSTRUCTION | |
|---|---|---|
| ▶ | ▶ | POWER PLANTS |
| ▶ | | LOAD |


NEPAL ELECTRICITY AUTHORITY
TRANSMISSION DIRECTORATE
GRID DEVELOPMENT DEPARTMENT
(Revised Date: AUGUST 2022)

# INTEGRATED NEPAL POWER SYSTEM

## (Existing & Under Construction Transmission Line Projects)

### (Last Revision: July 2022)

**Legend:**

| Existing | Under Construction | |
|---|---|---|
| | | Voltage Level 400kV |
| | | 220kV |
| | | 132kV |
| | | 66kV |
| | | 33kV |
| | | 11kV |
| 4.56km, 0.15 sq in | 4.56km, 0.15 sq in | Length,Conductor Size |
| | | 132kV Substation |
| | | 220kV Substation |
| | | 400kV Substation |
| | | NEA's Power Plant |
| | | IPP's Power Plant |

Chilime HEP
Chilime
Trishuli 3A
Samundratar
Trishuli 3B HUB
Trishuli HEP
Devighat HEP
Okhaltar
Chapali
Chabahil
Lainchour
Balaju
Dharapani
Kritipur
Kudi
Udipur
Dana
Dada Khet
Rahughat
Lower Modi HEP
Modi HEP
New Modi
Lahachwok
Upper Marsangdi-A HEP
Kusma
Pokhara
Mid. Marsyangdi HEP
Birauta
Lekhnath
Syangja
Ridi
Damauli
KG-A HEP
Marsyangdi HEP
Matatirtha
KL-II HEP
KL-III HEP
KL-I HEP
Bagmati
Siuchatar
Patan
Teku
K-3
Baneshwor
Bhaktapur
Changunarayan
Lapsiphedi
Barhabise
Lamosangu
Bhotekoshi HEP
Singati
Khimti HEP
Balefi
Indrawati HEP
Indrawati
Banepa
Panchkhal
Sunkoshi HEP
New Khimti
Upper Tamakoshi
Garjyang
From Tanakpur
Mahendranagar
Attariya
Chameliya HEP
Syaule
Nalsing Gadh
Bafikot
Madichaur
Jhimruk HEP
Burtibang
Paudi Amrai
Tamghash
Sandikharka
Jumla
Dailekh
Pahalmanpur
Lamk
Surkhet
Hapure
Ghorahi
Lamahi
Kusum
Bhurigaon
Kohalpur
Nepalgunj
Nanpara (India)
Shivapur
Motipur
Butwal
Sunawal
Hakkui
Mainahiya
Sampatiya (India)
Gorakhpur
New Bharatpur
Dumkibas
Kawasoti
Bardghat
Gandak HEP
From Balmikinagar
Dhaubadi
Bharatpur
Purbi Chitawan
Amlekhgunj
Simra
Parwanipur
Birgunj
From Raxual
Kamane
Pathlaiya
Cha-pur
Nawalpur
Sukhdevchauk
Harniya
Salimpur
Dhalkebar
From Muzzaffarpur
Tingla
Mirchaiya
Balganga
Sukhipur
Loharpatti
Sitalpati
Tumlingtar
Dhungesangu
Kabeli
Kabeli HEP
Phidim
Basantapur
Baneshwor
Mai Khola
Puwa HEP
Mai Cascade
Godak
Dharan
Damak
Keraun
Anarmani
Rupani
Kushaha
Bodebarsain
Biratnagar
Duhabi
Multifuel DP
From Kataiya

**NEPAL ELECTRICITY AUTHORITY**
TRANSMISSION DIRECTORATE
GRID DEVELOPMENT DEVELOPMENT
(Revised Date: JULY 2022)

**Tumlingtar 220/132 kV (200 MVA) Substation**

**Headwork's of Rasuwagadhi Hydroelectric Project**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