NEPAL ELECTRICITY AUTHORITY

A YEAR IN REVIEW FISCAL YEAR 2020/2021

NEPAL ELECTRICITY AUTHORITY 2042-2078 36th Anniversary

AUGUST 2021 (BHADRA 2078)

Durbarmarg, Kathmandu, Nepal

Samundratar 132/33kV Substation

Overhauling Works of Upper Trisuli-3A

COMPLIMENTARY COPY

Contents

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Front Cover Photo: Power House of Upper Tamakoshi (456MW) Hydroelectric Project

Back Cover Photo: Dhalkebar 400kV GIS Substation

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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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Message from the Minister

On the occasion of Nepal Electricity Authority (NEA)'s 36th Annual celebration, I extend my congratulations to the entire NEA family for their continuous effort towards the development of power sector in the country. I believe, this moment of celebration will be a turning point for the better future of the NEA.

The successful completion and operation of Dhalkebar- Mujaffarpur 400 kV double circuit Cross Border Transmission Line and integration of Upper Tamakoshi Hydropower Project to the national grid in this fiscal year 2077/78 has opened a new horizon of opportunities in domestic as well as in cross border electricity market. I believe this will contribute in providing reliable, quality and affordable electricity to the consumers, increase in domestic electricity consumption, and the export of the surplus electricity.

I appreciate the performance of the NEA in transmission, distribution and service delivery across the country during the Covid-19 pandemic which is a strong indication of the NEA's dedication towards its service. Despite the difficult situations, NEA has increased its sales and could maintain a satisfactory profit. NEA has yet to go a long way to provide a better service to its consumers and achieve excellent financial performance.

I expect the NEA to continue its dedication and commitment towards the services it has been providing and once again, I would like to extend my heartfelt congratulations to the entire NEA staff and wish for every success in the future.

Pampha Bhusal

Minister

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and Irrigation

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Message from the Secretary

It gives me an immense pleasure to be a part in celebrating Nepal Electricity Authority (NEA)'s 36th annual function. I would like to congratulate and extend my best of the wishes to NEA and its entire staff members for an additional year of success in providing its services to the country and the contribution in the nation's economic growth.

The NEA has been playing a significant role in achieving the goals set by the Ministry of Energy, Water Resources and Irrigation with the vision of making the country independent and prosperous in the energy sector. Looking back at the year gone by, the integration of Upper Tamakoshi Hydropower Project to the national grid and the successful completion and operation of Dhalkebar-Mujaffarpur 400 kV Cross Border Transmission Line have been some of the major landmark achievements of the NEA. With the continuous support from the Ministry accompanied by the NEA's hard work, dedication, the much awaited transmission line projects like Solu Corridor 132 kV, Koshi Corridor 220 kV, Hetauda-Bharatpur 220 kV and Bharatpur-Bardaghat 220 kV are at the final stage of completion. I believe, the completion of these projects will support domestic as well as cross border power trade and will shift the gear of the country's economy to another level. Despite the Covid-19 pandemic, the completion of 100% electrification in additional 16 districts, increase in the number of consumers served, increase in sales are some of the praiseworthy achievements by the institution.

NEA has manifested its commitment to strengthen its services further by updating its five year Corporate Development Plan (CDP). The CDP is expected to modernize NEA with ample focus on increase in production, demand side management, supply side grid strengthening and efficiency in loss management.

Once again, I would like to congratulate NEA and thank all NEA members for the dedication to their service. I believe NEA will be able to cope up with every situations and circumstances in the coming days with better efficiency, strong commitment, and mutual collaboration with all the concerned government and non-government stakeholders.

Devendra Karki

Secretary

Board of Directors

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

Mr. Devendra Karki
Secretary, Ministry of Energy,
Water Resources and Irrigation
Member

Secretary, 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

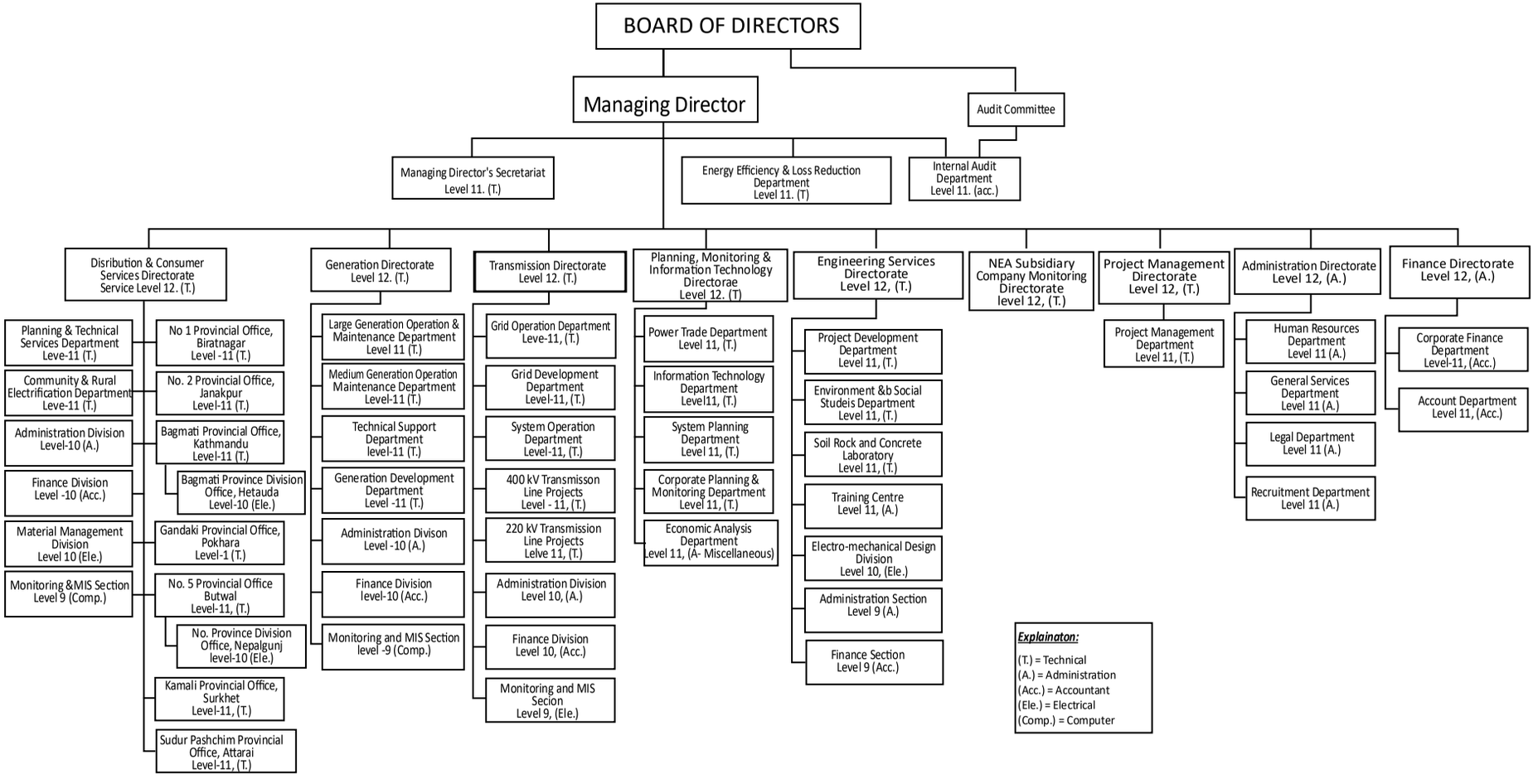
Mr. Bhakta Bahadur Pun
Member from Consumers Group

Mr. Kapil Acharya
Prominent person in power sector
Member

Mr. Kul Man Ghising
Managing Director, NEA
Member Secretary

Nepal Electricity Authority

Organisation Structure



Deputy Managing Directors

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

Mr. Lekha Nath Koirala
Deputy Managing Director
Finance Directorate

Mr. Hara Raj Neupane
Deputy Managing Director
Distribution and Consumer Services Directorate

Mr. Bigyan Prasad Shrestha
Deputy Managing Director
Deputed to Upper Tamakoshi Hydropower Limited

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

Mr. Lokhari Luintel
Deputy Managing Director
Administration Directorate

Mr. Ramji Bhandari
Deputy Managing Director
Project Management Directorate

Mr. Manoj Silwal
Deputy Managing Director
Engineering Services Directorate

Mr. Dirghayu Kumar Shrestha
Chief
Transmission Directorate

Mr. Madan Timsina
Chief
Generation Directorate

Mr. Rabindra Prasad Chaudhary
Chief
Planning, Monitoring & IT Directorate

MANAGING DIRECTOR'S REPORT

Nepal Electricity Authority (NEA) is celebrating the thirty sixth anniversary of its formation, in 1985. NEA was established with the aim of generating, transmitting and distributing reliable and efficient electrical energy to its consumers. The fulfillment of the public wish of regular and continuous power supply has helped in NEA being held in high esteem.

This Annual Report brought out on the eve of its anniversary on 1st Bhadra is a reflection of the achievements of the Organization in the year gone by and the targets to be achieved in the coming year. The past year can be considered satisfactory amidst the lockdowns due to the Covid 19 pandemic as the basic responsibility of NEA of continuous power supply to its consumers was maintained.

The major achievement of the year gone by, in the power sector, is the inauguration of first unit synchronization of the 456 MW Upper Tamakoshi HEP by the respected Prime Minister on 5th July, 2021. This pride project had been languishing due to various reasons since the devastating earthquake of 2015. I would like to congratulate every member of the Upper Tamakoshi team who have contributed in its completion in every way possible at different times.

The continued and never-ending effects of the pandemic, since March 2020, has left a bad taste in every walk of life. NEA has also not been able to keep itself free from the effects of this global catastrophe. Even during these trying times, we feel fortunate to have been able to satisfy the needs of our valued customers. At the same time urgent and necessary steps were regularly taken to ensure that the various under construction projects under the NEA umbrella as well as its subsidiary companies are able to perform at the possible optimum level.

The pandemic has affected the functioning and ultimately the growth of this organization. The continued lockdown has hampered regular meter reading as well as proper management of loss control. These have accounted for slight increase in system losses compared to last year. Conversion of dedicated tariff to normal tariff and reduction in other categories of consumer tariff as well as the increase in losses have resulted in decreased revenue. Even then NEA has been able to maintain a positive financial health with some decrease in the net profit. Similarly, the system losses, though actual figures could not be calculated due to reasons related to the pandemic, have been estimated to have increased to 17.18 % as compared to

15.27 % of last year. A significant component of loss increase is technical loss in transmission line about 0.3%. The loss target could not be achieved also because of the restriction in mobility of staffs in the loss prone areas and also due to complete shutdown of industries at certain period. These are not the figures we were anticipating, but because of the reasons described above better and satisfactory results could not be achieved.

In keeping with the worldwide trend of using Information and Communication Technology (ICT) for systematic and efficient management of a successful organization, NEA has taken necessary steps in implementing ICT tools. Enterprise Resource Planning (ERP), Geographical Mapping (GIS Mapping), Smart Metering, Substation Automation are some of the areas where ICT tools have been put in use. We also have the vision and understanding for the need to continually expand the IT infrastructure in the years ahead. IT Road map has been prepared for its systematic implementation in all its business functions. Our endeavor in this direction will lead to a "Digital NEA" which will be in line with the GoN's vision of "Digital Nepal".

All the offices under NEA will be connected under the Communication Backbone establishment program. The IT department is running various software applications for account inventory system, payroll, pension, asset management, consumption analysis system etc. Centralized e-attendance has also been in use for some time now. NEA vacancy applications, Personal Information System (PIS), loan management are presently under testing. NEA Video Conference System will be introduced very soon so that all the offices are connected through NEA's intra-net system.

Last fiscal year also unfortunately saw injuries and deaths of the employees of NEA while pursuing their duties and local individuals due to electrical accidents. 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. Covid 19 also accounted for some deaths of our employees during the past year. Vaccination and implementation of health safety measures should help in curbing the deaths due to the pandemic.

The performances and achievements of NEA in the year under review, 2020/21, are highlighted below:

OPERATIONAL PERFORMANCE

The number of electricity consumers of NEA has been increasing gradually over the years. The number of consumers increased by 7.37 % in the year gone by from 4.22 million to 4.53 million. 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 5.08 million. As has been in the past, the domestic consumer category with 4.21 million consumers remained the largest sector with 92.93% share of the entire electricity consumers. Domestic and industrial consumer category contributed 39.57 % and 38.84 % to the gross electricity sales revenue respectively. The effect of the lockdown is attributable for the lesser revenue from the industrial sector. Rest of the consumer category accounted for the remaining 21.59% of the gross sales revenue. The total population with access to electricity based on the number of consumers has reached 85% of total household in FY 2020/21. Similarly, this is calculated as 90 % on the basis of the available electrical infrastructure.

NEA's hydropower plants including small power stations generated a total of 2,810.74 GWh of electricity in FY 2020/21, a slight decrease by 6.96 % over the generation of 3021.04 GWh in FY 2019/20. This can be attributed to the lean dry season period and the very recent monsoon

flood that led to number of power plants having to shut down, long duration of power plant shutdown for maintenance and Middle-Marshyangdi power plant shutdown for 16 days due to delay in installation of Emergency Restoration System tower.

The total power purchased from Independent Power Producers (IPPs) within Nepal was 3,241 GWh, an increase by 8.36 % from the figure of 2,991 GWh in the FY 2019/20. The total energy imported from India was 2,826.21 GWh in FY 2020/21 as compared to 1,729 GWh in FY 2019/20, an increase by 63.45 %. The total energy in the system increased by 14.68 % to 8,877.95 GWh over the corresponding figure of 7,741 GWh in FY 2019/20. Out of the total available energy, NEA's own generation contributed 31.66%, whereas those imported from India and domestic IPPs accounted for 31.83 % and 36.51 % respectively.

Total energy consumption in FY 2020/21 was 7,319 GWh, a slight increase over the corresponding figure of 6,529 GWh in the FY 2019/20. The Covid-19 pandemic played a major role in limiting the anticipated consumption growth.

Metering, Billing, Revenue collection and Loss reduction activities are still being seriously affected due to Covid 19 pandemic. This has been the case since the implementation of the first lockdown in March 2020.

FINANCIAL PERFORMANCE

The net profit of NEA before tax in the FY 2020/21 is NRs 6,007.56 million, a sudden decrease from the figures of FY 2019/20 of 13,270.23 million. The primary reasons behind such decrease are the increase in system loss, restriction in the mobility in the loss prone areas, reduced NEA generation, increased import, increase in operating expenses etc.

The gross revenue generated from energy sales in the FY 2020/21 reached NRs 71,282.49 million, with a decrease of 6.59 % over the figure of NRs 76,312.31 million in the FY 2019/20. NEA's operating expenses stood at NRs 68,453.4 million, an increase by 10.96% from NRs 61,872.98 million of the previous year. Amount spent for power purchase alone was NRs 41,460.79 million in FY 2020/21. This is an increase by NRs 6,340.52 million from NRs 35,120.27 million of FY 2019/20.

In FY 2020/21, total revised net revenue of NEA including other incomes stood at NRs 80,355.73 million as against the operational expenses of NRs 68,653.4 million resulting in an operational surplus of NRs 11,712.33 million, a decrease by 102.78 % over the figure of NRs 23,743.07 million in the FY 2019/20.

Energy purchase amounted to 68.34% of the total available energy and NEA paid 58.83% of the net electricity sales revenue of NRs 70,473.05 million for this purpose. The total cost of purchased power increased by 18.05% in the FY 2020/21 as compared to the figure of FY 2019/20.

Interest cost on long term borrowing increased by NRs. 508.36 million during FY 2020/21. The interest expenses in FY 2020/21 have been calculated as NRs 5,000 million as against NRs 4,491.64 million in the previous year. Similarly, depreciation expenses amounted to NRs 5,750 million, an increase of 7.7% from NRs 5,338.52 million. Foreign Exchange gain totaled NRs 177.83 million against loss of NRs 228.06 million in the previous year. Accumulated investment in Capital Works in Progress (CWIP) reached to NRs. 140,940 million with net addition of NRs. 26,641 million for the year 2020/21.

NEA estimated a provision of NRs 4,000 million towards the long-term employee liabilities in respect of gratuity, pension, medical facilities and accumulated leave facilities under employees' benefit plan scheme.

ONGOING PROJECTS

The devastating earthquake of 2015, its aftershocks and the subsequent Terai Bandh delayed the completion date of all under-construction 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, Kulekhani Sisneri Pump Storage HEP and Begnas Rupa Pump Storage HEP.

There are several transmission lines that have been completed in the year under review. The total length of transmission line of 132 kV and above constructed in FY 2020/21 is 604.74 circuit kilometer (ckt.km). Similarly, a total of 2134.2 MVA substation capacity, including up gradation of existing substations has been added to the system. This has been a dramatic increment in the substation compared to previous years. The total lengths of under-construction transmission lines at 132 kV, 220 kV and 400 kV levels are 1,031 ckt. km, 1,165 ckt. km and 756 ckt. km respectively, with the total of 2,952 ckt. km. Similarly, the total capacity of substations under construction is 9,200 MVA. These figures include for projects under both the Transmission Directorate as well as Project Management Directorate. A total of 1,340 ckt. km, 315 ckt.km and 3,010 ckt. Km of 132 kV, 220 kV and 400 kV transmission lines respectively are planned and proposed. Similarly, 7,870 MVA of additional substation capacity is also planned to be built.

NEA managed to substantially electrify 16 additional districts in the year gone by. This is in addition to the 16 already electrified in the previous years. Electrical access has reached two more districts, namely Kalikot and Jumla. This number could have been more if not for the continued effects of the pandemic. NEA commissioned 10 new distribution substations of 33/11 kV corresponding to the capacity of 226.5 MVA in the FY 2020/21 to bring the total number to 161 corresponding to the total capacity of 1,928 MVA. Likewise, the total line lengths corresponding to 33 kV, 11 kV and 0.4/0.23 kV voltage levels completed as of FY 2020/21 were 6,019 ckt. km, 41,550 ckt. km and 129,081 ckt. km respectively, whereas the line lengths commissioned in FY 2020/21 alone were 709 ckt. km, 2,827 ckt. km and 8,716 ckt. km respectively. A total of 37,163 distribution transformers with the capacity of 3,623 MVA have been installed in the system up to the fiscal year under review.

212.2 MVA capacity of 33/11 kV substation, 2066 km of 33/11 kV overhead line, 840 km of 11 kV underground distribution line, 1,894 km of 400 Volt overhead line and 1,117 km of 400-volt underground line is being constructed in different parts of the country under Project Management Directorate (PMD). One 33/11 kV substations with capacity of 8 MVA was added in FY 2020/21 under PMD. Similarly total lengths corresponding to 33 kV, 11 kV and 400 V voltage levels completed under PMD in FY 2020/2021 are 105 km, 172 km and 430 km respectively.

Following Government of Nepal's electricity roadmap, NEA's commitment to light up every household of Nepal by the year 2023 through adequate network expansion plans all over the country, still remained at 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 is already underway in different parts of Kathmandu, namely; under Ratnapark, Maharajgunj, Kuleshwor, Kirtipur and Baneshwor distribution centers. Similarly, contract has been signed in FY 2020/21 and survey works has been started for underground cable laying in Lalitpur and Bhaktapur. Furthermore, contract will be signed in first quarter of FY 2021/22 for

underground cable laying works in Pokhara and Bharatpur.

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 already begun and will be accomplished in the first quarter of FY 2021/22. Contracts will be signed within FY 2020/21 for the supply and installation of smart meters for the remaining consumers within the valley.

NEA has already initiated the use of Smart meters, Enterprise Resource Planning (ERP) and Substation Automation System. Proper implementation of these system is only possible with a Distribution Command and Control Center and Data Centre. This Distribution Command and Control Center and Data Center constructed in the Load Dispatch Center premises, Suichatar and the Contract for the construction has already been signed in FY 2020/21.

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. At present Substation Automation System (SAS) are being installed in 13 Grid Substation within the valley and these will be completed by FY 2021/22. Similarly Bid Document preparation for the automation of an additional 40 grid substations in different parts of the country is underway.

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 1900 ckt km of 400 kV transmission line and associated substations, 290 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 for the next 30 years, Consultant has been recruited.

SUBSIDIARY COMPANIES

The successful implementation of Chilime Hydropower Project as 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 and the progresses achieved so far are as follows;

1. **Chilime Hydropower Company Limited (CHCL):** CHCL was formed as a subsidiary of NEA and 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's civil construction was shaping up pretty well even though its

electromechanical contractor has not been fully mobilized after their unilateral demobilization in March 2020. The more than 1 in 100-year flood of 15th June, 2021 flooded the underground powerhouse through the tailrace tunnel as well as washed out most of the access road within the project area. This and the continued pandemic restrictions are likely to cause more delay in its completion. Upper Sanjen has also been delayed as its equipments were stuck due to the Kerung border closure because of the pandemic. These projects are part of the GoN's programme, "Nepal ko Pani Janata ko Lagani: Harek Nepali Bidyut ko Share Dhani". Madhya Bhotekoshi after the devastating flooding of 8th July, 2020, is slowly picking pace.

Similarly, CHCL has established Chilime Engineering and Services Company Ltd (ChesCo) to provide consultancy services for the development of Hydropower projects. There are three different hydropower projects in different phases of study for future development.

2. **Upper Tamakoshi Hydropower Limited (UTKHPL):** Upper Tamakoshi HEP (456 MW), a national pride project, has been constructed in the company mode under UTKHPL utilizing domestic financial resources. After facing many hindrances, especially after the devastating earthquake of 2015, the first unit synchronization was recently inaugurated.

   UTKHPL is also moving ahead for the financial closure for the construction of Rolwaling Khola HEP (22 MW) under EPC mode.

3. **Tanahu Hydropower Limited (THL):** Tanahu Hydropower Project (140 MW) is being developed under THL, a subsidiary company of NEA, under the co-financing from ADB, JICA and EIB. Following the commencement of the Works and the subsequent completion of the site establishment works, the Package 2 Contractor is currently engaged in 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 Sub-station. The Company also concluded the contract agreement for Package 1- Headworks with the Song Da- Kalika JV on 22 March 2021.

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 have submitted the draft Detail Engineering Design Report along with the bidding documents in March 2021 and is under review by the Panel of Experts.

4. **Trishuli Jal Vidhyut Company Limited (TJVCL):** This Company was established with NEA and Nepal Doorsanchar Company Limited as promoters, to develop Upper Trishuli 3B HEP (37 MW) as a cascade of Upper Trishuli 3A. GoN has included this project into its programme, "Nepal ko Pani Janata ko Lagani: Harek Nepali Bidyut ko Share Dhani". Construction works under the EPC contract with Shuifa ANHE Group Company Ltd., China started in March, 2018. The Covid-19 has had a devastating effect in its progress. The Construction which was stalled in March 2020 due to the lockdown, resumed after more than a year in April 2021. The encountered very poor geological condition than anticipated is also likely to push the completion date to March 2023.

5. **Raghuganga Hydropower Limited (RGHPL):** RGHPL was established as a subsidiary company of NEA to develop Rahughat Hydroelectric Project (40 MW). Contract Agreement, on EPC mode, for the construction of Civil and Hydro-mechanical works with Jaiprakash Associates Limited, India was approved by EXIM Bank of India and Notice to Proceed (NTP) was issued on 24th May, 2018. Similarly, after approval from EXIM Bank of India, NTP was issued for Electro-mechanical works to Bharat Heavy Electrical Limited, India under PDB mode on 4th December, 2019. Even though the ongoing pandemic has had its effects and the completion date is likely to extend beyond the planned December 2022, both Contractors have started their works.

6. **Upper Arun Hydroelectric Ltd (UAHEL):** UAHEL was formed as a subsidiary company of NEA for the development of Upper Arun Hydroelectric Project (1,040 MW) and Ikhuwa Khola Hydroelectric Project (30 MW). The Consultant (CSPDR, China and Sinotech, Taiwan JV) for Detailed Engineering Design and Preparation of Bidding Document of UAHEP and IKHPP submitted the Updated Feasibility Study (UFS) Report in May 2019 and this has been accepted by NEA after approval by Dam Safety POE. Additional investigation recommended by DSPOE has been completed by SRCL and an Inception Report was submitted in March 2021. The Consultant will submit the Final Report incorporating all the comments by July 2021. Similarly, the World Transport team has reviewed the Draft Design Report submitted by the Consultant for Detailed Engineering Design, Tender Document Preparation and Construction Supervision and Contract Management of Access Road construction and recommended additional investigation. EIA study for the Project is being carried out in parallel with the Detailed Engineering Design. GoN and NEA have taken up this Project as the priority project for development construction of the project is planned to start from February 2024.

7. **Tamakoshi Jalvidyut Company Limited:** Tamakoshi Jalvidyut Company Limited has been registered for the development of Tamakoshi V HEP (99.8 MW) which is a cascade development of the Upper Tamakoshi HEP. Tractable Engineering GmbH submitted the Detailed Design Report and Tender Documents in August 2019. Permanent Camp Facility is expected to be completed within this fiscal year. As requested by the company, Ministry of Energy, Water resources and Irrigation had made a formal request to the Ministry of Finance in managing Project Financing with Asian Infrastructure Investment Bank (AIIB) as the lead agency as they had been showing a keen interest in the debt financing of the project.

EPF recently committed for the complete debt funding for the construction of Tamakoshi –V HEP therefore a tripartite Memorandum of Understanding (MoU) was signed between Nepal Electricity Authority, Tamakoshi Jal Vidhyut Company Ltd and Employers Provident Fund.

8. **Dudhkoshi Jalvidyut Company Limited:** This Company, as a subsidiary of NEA, has been established for the implementation of Dudhkoshi Storage HEP. The Feasibility Study has recommended 635 MW to be financially viable. The Consultant has submitted the Detailed Design Report and is working on the comments/ suggestions of the Client in consultation with Panel of Experts (PoE). The Asian

Development Bank (ADB) has committed to lead the financing for Dudhkoshi Storage Hydroelectric Project with other co-partners from multi-lateral financial institutions and has allocated 550 million USD loan and 20 million grants in the Country Operation Business Plan (2021-2023). GoN has already requested ADB, European Investment Bank (EIB), Asian Infrastructure Investment Bank (AIIB) and Korean Exim Bank for financing the project. GoN has plans to start the construction of the project within this Fiscal Year. ADB conducted the Reconnaissance Mission for the project and Modality of Project Financing was discussed between the authorities of the Ministry of Finance, Ministry of Energy, Water Resources and Irrigation and Nepal Electricity Authority (NEA).

The Consultant is preparing the final detailed design report incorporating comments from the Client. The Asian Development Bank (ADB) has committed to lead the financing for this Project with other co-partners from multi-lateral financial institutions. GoN has already requested ADB, European Investment Bank (EIB), Asian Infrastructure Investment Bank (AIIB) and Korean Exim Bank for financing this project. GoN and NEA have taken up this Project as the priority project for development in the coming years.

9. **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) 19.8MW in Kaski District of Gandaki Province.

   The preparation of updated feasibility study as well as detailed project reports, pre-bid document, bidding documents of civil, hydro-mechanical, electromechanical and transmission line works for both projects were completed by an international Consultant. The construction of project is planned to be carried out under an EPC mode of Contract. Construction of camp facilities and access road has started. Power Purchase agreement (PPA) for Upper Modi A HEP has been initiated.

Financial closure for the projects is expected to be finalized this year. The process for the selection of consultant for design review and construction supervision will be initiated within this fiscal year.

10. **Utterganga Power Company Limited UGPCL):** This company was established as a subsidiary company of Nepal Electricity Authority to undertake the study and development of Uttarganga Storage Hydroelectric Project (828 MW) in Baglung district of Gandaki Province. The 200m high rockfill dam will be located at Gaba village on Uttarganga River. The surge shaft and Powerhouse-1 are located at Halechaur and Powerhouse-2 is located at Samja Kharka. The installed capacity of Powerhouses 1 and 2 is 417MW and 404 MW respectively. Tandem control arrangement is conceptualized between the two powerhouses during operation.

    In the FY 2077/78, the Company selected Mahab Ghodds Consulting Engineering Company, Iran to prepare the Detailed Engineering Design Report and Bidding Documents for project construction.

11. **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 as well as infrastructure. NEA holds majority ownership of 51% and remaining 49%

is held by VUCL, RPGCL and HIDCL Companies. 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.

12. **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 license issue pertaining to power trading is under consideration. This company should be brought into operation at the earliest by completing all the legal formalities.
13. **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 11 new projects developed by the Independent Power Producers (IPPs) with a combined installed capacity of 119.077 MW were commissioned in the FY 2020/21. This has increased the total number of IPPs-owned projects in operation to 108 with a combined installed capacity of 814.65 MW.

A total of 138 projects to be developed by IPPs, with a combined installed capacity of 3506.8 MW are under construction after financial closure. Similarly, 99 IPPs-owned projects with a combined installed capacity of 1851.3 MW are at various stages of development.

During FY 2020/21, a total of 5 new PPAs with a combined installed capacity of 183.699 MW were signed. This has increased the total number of PPAs signed with the various IPPs to 345 with the combined installed capacity of 6172.75 MW as of FY 2020/21.

CROSS BORDER POWER TRADING

Nepal was the first to participate in Indian Energy Exchange (IEX) among all other neighbors of India.

Cross Border Power trading with India started a few years back. The first 400 kV Cross Border transmission line between Nepal and India, from Dhalkebar to Mujaffarpur, was charged at 400 kV voltage level on 11 November 2020. This paved the way for power import/export from/to India through the Indian Energy Exchange (IEX).

The modality for the implementation of the second cross border transmission line from New Butwal to Gorakhpur was finalized in October 2019. Further two more 400 kV cross border transmission lines namely; New Duhabi-Purnia and Lumki-Bareilli are also under review.

A total of 2,806 GWh of electricity was imported through various transmission links including Dhalkebar-Mujaffarpur line in FY 2020/21, whereas Nepal has also been able to export 44 GWh of electricity to India.

Likewise, the Nepal-China cooperation in power sector for the construction of the Ratmate-Rasuwagadhi-Kerung 400 kV transmission line, as per the plan and policy of the Government, is under study. The optimum route for this line has been revised using GIS routing. Construction of a 400 kV GIS sub-station in Trishuli has been added to the project scope. Interaction with GoN is under way for mobilizing the necessary fund for the project.

WAY FORWARD

NEA as a power sector utility has always been moving forward to meet its main objective of satisfying its consumers with continuous, reliable and quality supply of electricity as well as maintaining a reasonable 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-sufficient in electricity generation and supply. The ongoing uncertainties due to the COVID 19 pandemic has affected, to a large extent, on the daily functioning of NEA as an organization and at the same time hampered the progress of the various projects under construction.

Organizational Restructuring of NEA shall 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 is formulated in Corporate Development Plan 2019, approved by the NEA Board. All stakeholders including employees will be engaged in consultation meetings so that restructuring and its ultimate result is owned by employees who are obviously more concerned with their service and benefit guarantees along with their post retirement pensions.

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 network shall remain our priority for facilitating the reduction of operational cost and providing better services to our valued customers. 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. We strongly feel that some policy measures are to be introduced on an urgent basis in this regard so that our journey from digitization to digitalization would prove beneficial in several ways including saving through operational efficiency and transparency across the value chain to all players in the power ecosystem.

With the continued addition of hydro plants, including the just commissioned Upper Tamakoshi in the system, sale of energy is going to pose a serious challenge to NEA in the coming years. Marketing arrangements and options will be explored for NEA's overall financial performance. Both domestic and cross-border power markets shall be explored to cope with the emerging situation of high domestic generation. Further, NEA will be focusing on increasing domestic demand through the promotion of using electrical appliances to gradually switch to electric cooking, electric vehicles by building charging station infrastructures etc. For supplying increased demand in industrial and urban areas, the strengthening and expansion of transmission and distribution infrastructures will be continuously carried out on a high priority basis.

Nationwide drive for rural household electrification and irrigation electrification will be given top priority for socio-economic development of the country. The underground

cabling work for major cities including Kathmandu valley will be completed to remove electric poles and wires from the streets. This will beautify the cities and help support to meet increasing demand. A program for lighting streets of the cities will be launched all over Nepal in coordination and cooperation with local governments.

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.

The completion of the Feasibility Report of the 400 kV transmission line from Ratamate (Nepal) to Kerung (China) will open avenues for Nepal-China power trading in the years to come. We look forward for trading power with 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.

The Corporate Development Plan (CDP) of NEA which has been formulated for improving the overall performance of the organization in terms of its businesses shall be considered as a dynamic document to ameliorate it continuously as per the need of time pursuant to the requirement of reforms.

NEA will continue its efforts in developing all types of power plants on its own and with joint venture partners, through subsidiary companies and through IPPs as per the concept of generation mix in various proportions as envisaged in the White Paper issued by Ministry of Energy, Water Resources and Irrigation. It is hoped that it will make the system operation more flexible and reliable meeting the varying demands of a single day as well as of the entire season. The development of reservoir and PROR types of hydropower projects such as Dudhkoshi storage (635 MW), Upper Arun HEP (1060 MW), Chainpur Seti (210 MW) and Tamamkoshi V (100 MW) will help meet the long-term power demand of the country.

It is high time to conduct capacity building program on a larger scale for efficient operation and implementation of NEA's activities. Training for all levels of employees within the organization will be effectively continued in the years to come. Training program will be carried out inside the country as well as abroad. Power System Protection is an area which has been identified to train our engineers further to cope with synchronous operation of Integrated Nepal Power System with the Indian grid.

The White Paper 2074 issued by Ministry of Energy, Water Resources and Irrigation (MOEWRI) has set up a roadmap for the next decade in the energy sector. It will continue to be a master document to NEA for its future action plans in power sector development of Nepal.

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 the energy sector.

I would also thank and acknowledge the support and guidance of Electricity Regulatory Commission, which helped NEA to achieve the desired goal by satisfying the consumer needs. I sincerely acknowledge the great concern shown by the parliamentary committees in our regular operation and development pursuits.

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 for us to achieve our goal of fulfilling the growing needs of energy. I sincerely appreciate the financial institutions like Employee Provident Fund, Citizens Investment Trust, Rastriya Beema Sasthan, banks, auditors, IPPs, suppliers and investors for bestowing faith on us and helping us move forward.

The role of the media in disseminating factual reports 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 acknowledge my gratitude to all my predecessors who have contributed in NEA's present status.

The entire staffs of NEA including the employee unions deserve the high degree of appreciation for their hard work, support and cooperation to the management for daily operation of activities and in implementing the formulated policies even in difficult situations like the Covid 19 pandemic. Finally, I would like to express my sincere thanks and appreciation to our valued customers 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 customers that every possible step will be taken to maintain a continuous, reliable and safe power supply in the coming days.

Thank You.

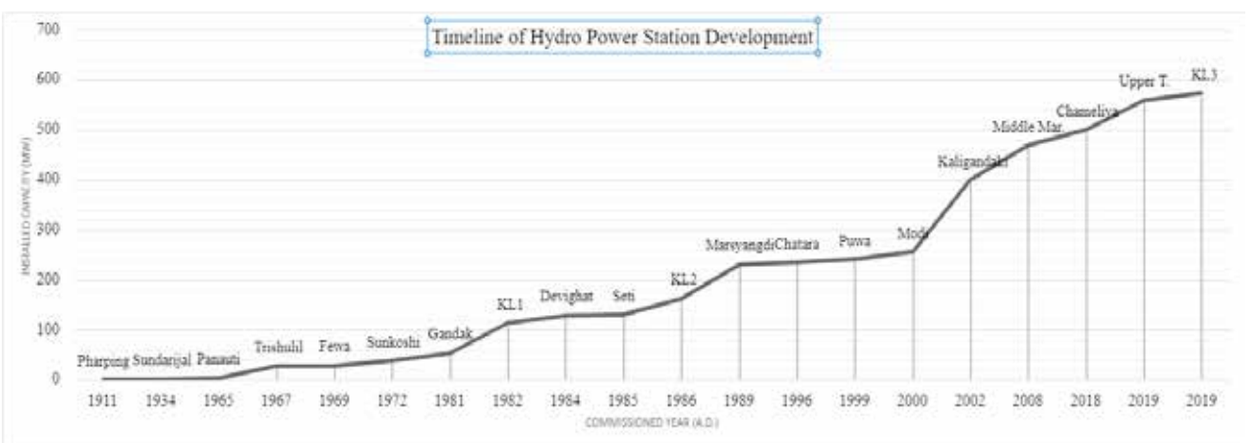
Kul Man Ghising
Managing Director

GENERATION DIRECTORATE

Generation directorate, headed by 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 626.7 MW. Hence, Generation of energy by optimally utilizing the resources available while undertaking periodic overhauling, major maintenance works and rehabilitation projects of the generating stations; that approximately describes the mission of the Generation Directorate.

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 namely, Finance, Administration and Monitoring & IT.

Recently, this directorate has undertaken the project for rehabilitation of Seti Fewa HPS, Gandak HPS and Trishuli HPS.



Timeline of Hydropower Development

Major Achievements

The successful commissioning of historically important Sundarijal Hydropower station under Tinau–Sundarijal Hydropower Station Rehabilitation Project has become one of the major achievements in this year. Though, the other works under the contract are still remaining, the capacity up gradation with SCADA system of two units from 640 kW to 970 kW has been completed. The inauguration was done by Managing Director of NEA, Mr. Hitendra Dev Shakya on July 16th, 2021 by synchronizing with system.

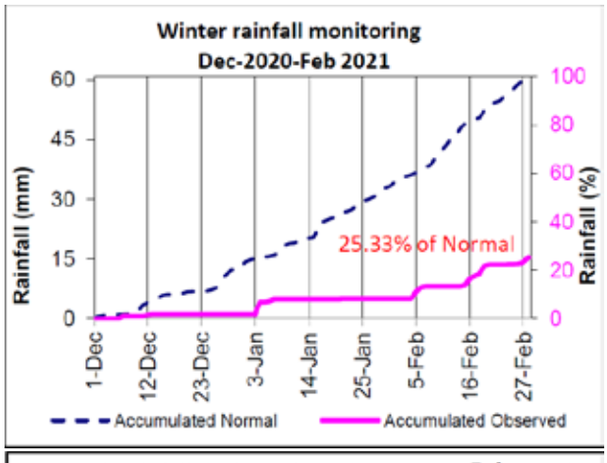
Inauguration of Sundarijal HPS after rehabilitation

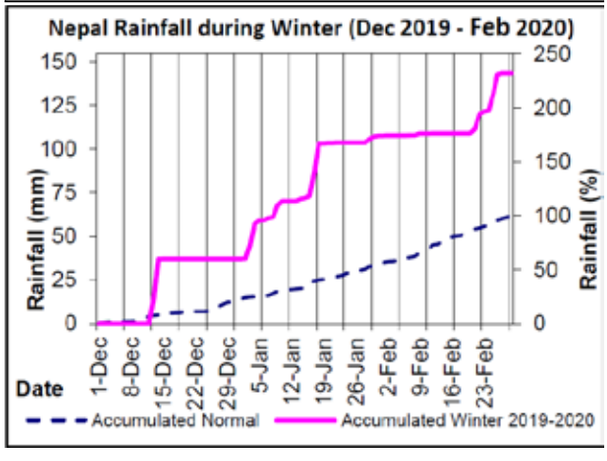
The generation of power plants running from Kulekhani Reservoir has increased by more than 23 % in comparison to last year. There is generation increment by 19.75 %, 16.87 % and 74.64 % from Kulekhani I, Kulekhani II and Kulekhani III, respectively. Hence, maximum utilization of Kulekhani reservoir water is also another remarkable achievement of this year. The generation from Chatara and Gandak HPS has increased by 84 % and 17 %, respectively the generation increase compared to last year.

Further, the actual generation of Kulekhani I, Kulekhani II, Kulekhani III, Gandak, Seti and Sundarijal HPSs has exceeded the generation target whereas Kaligandaki "A", Puwa, Panauti has achieved over 90 % of target.

Generation Summary

In this FY, total generation from all power plants under this directorate is 2800.883 GWh whereas in the FY 2019/20, the generation was 3011.43 GWh. The main reason behind the decrement of 6.9 % in annual energy generation compared to last year has been found due to reduction in rainfall which directly affected the river discharge. As per the data of Department of Meteorology and Hydrology, during winter season (December to February) of year 2019/20 the accumulated rainfall was around 240 % of normal rainfall while during the same period of year 2020/21, it was observed only around 25 % of normal.





Accumulated rainfall during winter of the year 2019/20 and 2020/21

Source: Department of Meteorology and Hydrology

During the flooding due to excessive rainfall in first week of Ashad, most of the power plants

were forced to shut down for few days due to which generation was hampered. Further, due to sweeping away of one of the towers of 132 kV transmission line from Middle Marsyangdi HPS to Markichowk substation on mid of Ashad compelled Middle Marsyangdi HPS for complete shutdown of 15 days. Similarly, generation of Upper Trishuli 3A was affected due to overhauling of both the units of Upper Trishuli 3A HPS with unit shutdown for around 3 months as it is in DLP period of contractor. All these reasons have contributed for the loss in generation this year.

The annual energy generation from hydropower stations has reached 95.25 % of target forecast.

Large Generation Operation and Maintenance Department

The operation and maintenance of seven (7) hydropower plants and one (1) multi-fuel power plant (with installed capacity 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 2020/21 is 2371.88 GWh, with a decrement of 7.8 % as compared to that of last fiscal year's generation.

All the hydropower stations under this department are continuously operating type throughout the year. Except Kulekhani HEP, which is seasonal storage type, all the remaining power stations are daily peaking ROR type plants. Hence, both scheduled/ preventive and corrective maintenance as well as special maintenance are required. General regular maintenance works are such works which can be done without plant shutdown or within few hours of plant shut down. Special maintenances are those which requires multiple days of plant shutdown. Overhauling of generating units, upgradation of control and protection system, installation of SCADA, maintenance works in headwork site are the special maintenance works. As such works require multiple days of plant shutdown; it is the normal practice as far as possible to carry out such works in the lean/dry season avoiding energy loss. This ensures that design capacity is available during wet season.

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

Kali Gandaki 'A' Hydropower Station

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

The cumulative generation of the station till F/Y 2020/21 has reached 14,608.031 GWh from the first run. The plant generated 817.712 GWh of energy this year which is 97.12 % of the annual design generation.

Major Repair and Maintenance Activities

- Overhauling of Unit No. 2 turbine and replacement of bottom ring including replacement of all the worn-out and damaged parts
- Dam Site Repair works including replacement of damaged portion of sill beam, sill plate of Diversion Gates, rubber seals; Replacement of the bronze seal strips (top, bottom and lateral sides), stainless steel guide plates (top, bottom and lateral) and Guide blocks (both side) of under sluice gates.
- Installation of angular position Transducer at Intake Gates and Diversion Gates of Damsite along with its integration

in SCADA System was done. For that, stringing of 24 core ADSS Fiber Optics Cable from Damsite to Power House for integration of Damsite Data and Gates Control system with Central SCADA system at Power House.

- Installation of Rope Length Transducer at Collector Channel Gates of Dam site along with its integration in SCADA System, Installation of Proximity Switches at Flushing Gates and Under Sluice Gates of Damsite along with its integration in SCADA System.
- Installation of Radar type Water Level Sensors at Dewatering and Drainage pits of Power House, Desander basin, Forebay and various regions of Reservoir; Installation of Electro-magnetic type Flow meters in cooling water flow lines of all 3 Units.
- Due to the flood of 1st & 2nd of Ashad, 130 meters of access road section at the Dam site was collapsed. Daily dam operation was hindered due to that. The road was cleared made ready for a vehicle movement by mobilizing two excavators for eight days continuously. The way to Surge tank above powerhouse was also not serving well because after the construction of it, it was not maintained for pretty long time. Repair and maintenance of it was done by using a new material called GEOCELL and using base material.

Surge tank road repair by using GEOCELL

- Due to ongoing Covid-19 Pandemic, works related to Installation of Vibration monitoring System for all three Units and Bushing Monitoring System in Power Transformer has been delayed. However, dispatch clearance has already been issued to manufacturer and these works will commence soon at site.

Middle Marsyangdi Hydropower Station

Middle Marsyangdi Hydropower Station (MMHPS) has been generating electricity by diverting the water of Marsyangdi River originated 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-off-the-river (PRoR) plant with daily peaking capacity of 5 hrs. at minimum discharge. The plant was commissioned in December, 2008 and commercial generation was started one month later. The cumulative generation of the station has reached 5325.47 GWh until the end of FY 2020/21. The total generation during this FY is 398.84 GWh, which is 100.21 % of the annual design generation.

Major Repair and Maintenance Activities

- Due to load crisis, the Unit-1 could not be overhauled in time as planned and hence the damages to the turbine underwater components have been increased significantly and the unit is facing several issues in this monsoon.
- The heavy rain in the region and high flood in Marsyangdi river occured from Ashadh 1 onwards have caused severe damages to the civil structures at Left bank U/S as well as both the Left and Right banks D/S which need major repair;
- Due to this heavy rain and high flood, the

plant had to go under complete shutdown for three days. Further, a heavy rain on Ashadh 19, caused a severe landslide due to which one of the 132 kV Transmission Towers (No. 9) had fallen down which had stopped complete power evacuation from MMHPS for about 15 Days. The power evacuation was restored after erection of ERS Tower;

- During the months of Baisakh/Jestha, about 9 Plant Shift operators were tested COVID positive and the plant was operated by 6 maintenance crews round the clock in two shifts each of three.
- The units are running with zero stock of Turbine Governor PLC spares, the PLC model being obsolete and currently production stopped. The plant has initiated the process for procurement of latest version of PLC with complete upgradation;
- Fault of both HMI of Desander#2 and #3 and Unit #1 VCB was identified and was rectified;
- Fault in Communication system between Excitation Control Panel and Main Controller of Unit#2 was identified and was rectified; Parameter of Unit #2 Governor PLC cards was changed and problem in opening of Guide Vane was resolved;
- Sill Beam repair and rubber seal replacement in all 3 Spillway Radial Gates at Dam Site;
- Weld repair of sliding & fixed plates of Desander Bieri System and weld repair of sill beams of all six Flushing Gates and replacement of rubber seals, bronze plates and SS plates in Desander at Dam Site;
- Completion of Spillway No. 3 Maintenance and Rehab Works including Roller Bucket Area; Right Bank Protection Works of Diversion Tunnel and Flushing Channel Exit at D/S of Dam by RCC Shear Wall with Plum Concrete;
- Application of High-Performance Abrasion Resistant Epoxy Compounds at Spillway Chutes and Flushing Channel;

Rehabilitation Work of Spillway No. 3 of Dam

Marsyangdi Hydropower Station

Marsyangdi Hydropower station is peaking run-off-river type power station, located at Aabookhaireni, Tanahun in the Gandaki province with 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 has reached 13,250.12 GWh until the end of FY 2020/21. In FY 2020/21, it generated 398.92 GWh of energy which is 86.25 % of annual design generation.

Major Repair and Maintenance Activities

- Overhauling of unit no. 1 turbine;
- The unit no. 1 suffered recurring tripping producing abnormal sound and high turbine guide bearing temperature on Jestha 30th. The worn-out Babbit material was revealed after dismantling of turbine guide bearing. Hence, the bearing was repaired by re-Babbiting and after performing the necessary alignment checking works, the unit was restored for normal operation.

- The heavy flooding on first week of Ashad, 2078 further damaged the reservoir right bank at weir site which was under planning for protection. Due to unavailability of plant shutdown schedule (required minimum of 15 days during dry season), the protection work couldn't materialize though the contract agreement was already done for the purpose. Apart from that, on the same week, during flushing of heavy floating debris and highest sediment deposition on very short period at desander basin due to continuous flood, more than 100 m in length, previously damaged rip-rap portion of left and right bank of desander basin was swept away. Hence, emergency repair and maintenance work of that portion was accomplished after continuous working for 4 days including nights with plant remaining incomplete shut down during that period.

Repair and Maintenance work of Rip Rap of Desander Basin

- Repair and maintenance of two Diversion Weir Gates including sill beam repairing, bottom rubber seal replacement, gate face plate repair.
- Replacement of Electro Hydraulic Eldro Thruster operated brakes on Spillway gantry Crane, De-sander Gantry Crane and Tailrace Gantry Crane and installation and testing of Radio Remote Control System on Spillway gantry Crane, De-sander Gantry Crane and Tailrace Gantry Crane
- Installation of 24 V battery charger, 220 V, 15 kVA Inverter, 110 V Battery Bank, 34 kW Dewatering Pump, DG controller in Dam Site Diesel Generator.
- Application of high-performance abrasion resistant Epoxy compounds for Ogee Weir and Divider Wall surface, Gate no.4 U/S damaged weir surface High Strength Concrete work and Epoxy application.
- Protection and upgradation of Ruwa Khola cooling water supply intake.
- Inspection to assess the damage on dam weir spillway chute and stilling basin if gate no. 4 and 5.

Upper Trishuli 3A Hydropower Station

Upper Trishuli 3A (UT3A) Hydro Power Station, located at Rasuwa and Nuwakot districts of Bagmati Province in Nepal, is the second largest hydropower station of NEA in terms of energy generation after Kaligandaki 'A' Hydropower Station with 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 on July, 2019. This plant is under Defect Liability Period (DLP) of the Contractor until September 30, 2021.

In this Fiscal Year 2020/21, the Power Station generated 314.767 GWh, which is 89.73 % of the annual generation target 350.795 GWh and 64.27% of design annual generation with total running hours of 12613.7hrs (7315.8 hrs. Running of Unit No 1. & 5297.9 hrs of Running of Unit No.2). While the cumulative generation of the station till F/Y 2020/21 has reached 738.5GWh from the first run of plant. The annual generation during this fiscal year

is 29.05% less than previous fiscal year annual generation. This is due to falling of draft tube maintenance gate of Unit#1 and also Over-hauling of Unit#2.

During Unit#1 Draft tube gate fall, both Units were inspected and found most of the water-way components seriously abraded due to the excessive sediment content in river water. Contractor was then instructed to perform an overhauling of whole plant with renew of whole Under Water Components including Runner, Guide vanes, Bottom ring, Head Cover and other auxiliaries and also replace the draft tube gate of Unit#1 with redesigned Gate hoisting mechanism.

Major Repair and Maintenance Activities

- In both units Turbine abraded components were treated with ceramic filled epoxy coating with shutdown of Unit#2 for 10 days and during additional 1 month shutdown of Unit#1 for Replacement of Butterfly Valve PLC of Unit no. 1 for the safely running of both Units till overhauling to be completed.
- Over-hauling of Unit No. 2 completed with erection of New set of Turbine equipment (Runner, Guide vane, Bottom Ring with Wearing Ring, Head cover with Facing Plate and other accessories) by contractor with total 3.2 month (2 April to 10 July 2021)
- Shutdown. All Four gated weir spillway Apron/chute were repaired with Metal (I-Beam) and application of Special Epoxy mixed Concrete C 60
- Tailrace Pond protection is under progress with completion of four no. of Stone Cabined Spur till this F/Y out of estimated total 11 Number of spur.

Dismantling of Runner for its Replacement.

- Contractor CGGC completed 72% of Punch list Defect removal work of Electro-mechanical section, 70% of Hydro-mechanical section and 90% of civil section, in the Supervision of Consultant NWH and NEA for the wrap-up of Project within extended DLP till September 30, 2021.
- Modification and arrangement of protection settings of 132 kV Circuit-II transmission line protection relay and charging of the 132 kV transmission line from Matatirth to Samundratar substation via UT3A GIS Substation was done on24th June 2021.

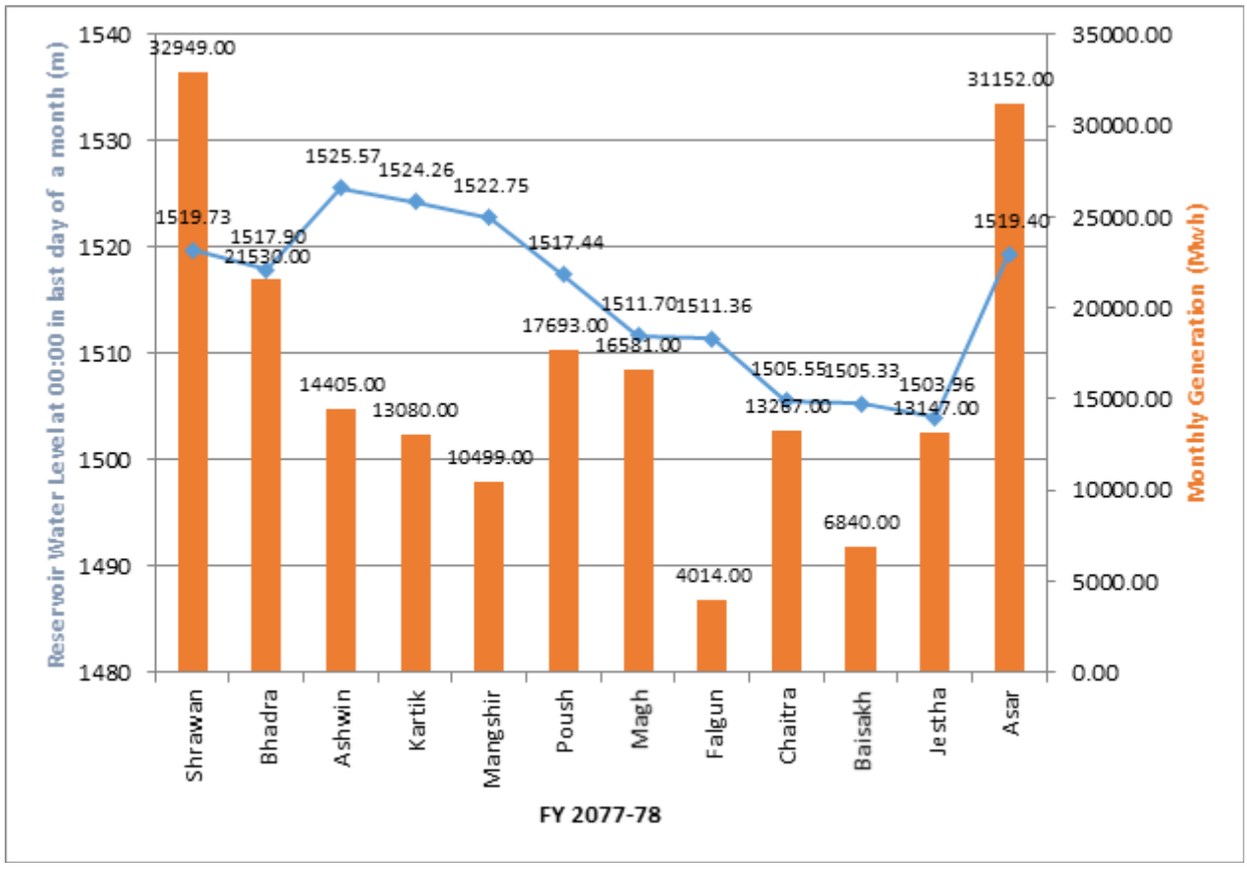
Kulekhani I Hydropower Station

Kulekhani –I, located at Dhorsing, Makwanpur 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 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.

The cumulative generation of Kulekhani-I HPS has reached 5211.15 GWh. The plant generated 195.157 GWh of energy in FY 2077/078.

The daily reservoir water level pattern recorded in this year shown in the given plot. The maximum and minimum level was recorded on Oct 10, 2020 as 1526.74 masl. and June 25, 2021 as 1502.85 respectively.



Response of reservoir water level with corresponding monthly generation

Major Repair and Maintenance Activities

- Maintenance of 11 kV Bus bar and Vacuum Circuit Breakers of colony feeder.
- Servicing and cleaning works of Heat Exchanger cooling tube of 35MVA Generator Step- Up Transformers.
- Extension of 11kV line to Sim Khola and Chakhel Intake
- Testing Dissolved Gas Analysis (DGA) of 3 MVA and 5 MVA transformers
- Installation of Motorized gate operation system on Intakes of Chakel and Simkhola
- Repair and Maintenance of Jet Braking System of Unit No.2
- Installation and testing of new Generator Air Cooler on Unit No.1 and Unit No.2, Testing of new Thrust Bearing oil Cooler of Unit No.1
- Replacing 66kV power fuse of Station Service feeder (3 MVA Transformer) with new SF6 circuit breaker.
- Application Epoxy Mortar on Dam Weir of Sim Khola.

Application Epoxy Mortar on Dam Weir of Sim Khola

- Construction of Gabion Check wall at different Sources (Chakhel Intake, Thado Khola, Dam Toe, Army Barrack Area, Discharge Measurement Area, Shera Khola etc.) of Indra Sarovar.
- Debris Removal Works on Shera Check Dam.
- Installation, testing and commissioning of new 11 kV VCBs on local distribution feeders.

Kulekhani II Hydropower Station

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

The plant is designed to develop power 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 to the intake pond. Likewise, Rapti Pumping Station is operated as per requirement in dry season by doing effective maintenance works to generate power.

The cumulative generation of Kulekhani-II HPS has reached 2170.582 GWh in this F/Y 2077/078 after generating 95.228 GWh of energy this year. Since, the station is 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.

Furthermore, to control the water leakage, since the parts related to Seat ring and Seal ring of Main Inlet Valve of Unit No. 2 has already been delivered at the site, necessary repair and maintenance works will be carried by suitable experts (NEA's as well as Voith Fuji Hydro K.K team) in the beginning phase of Fiscal year 2078/79.

Major Repair and Maintenance Activities

- Construction of Temporary Reservoir on Rapti Intake which played the major role in increment of the Generation.
- Maintenance of Tunnel gate at Mandu Intake.
- Installation of gantry structure at Rapti Intake.
- Procurement of new 55 kW Pump for Rapti Intake, Spare parts for MIV repair for unit no.2.
- Repair of Control Valve for operating downstream seat ring.
- Mandu Dam Protection & Check Wall Maintenance Works.

Chameliya Hydropower Station

Chameliya Hydropower Station, a daily peaking run-off-river (PROR) scheme with an installed capacity of 30 MW is located 95 km west of Kathmandu on Chameliya river, a tributary of Mahakali river, in Shailya-Shikhar Municipality-1, Balanch, Darchula. Electricity generation is being done by diverting water of Chameliya River which is originated from Mount Api and flows from Himalaya towards south crossing major part of Darchula District finally joining into Mahakali River at Lali,

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

In this FY, the plant has generated 151.24 GWh energy which is 82.11% of annual design generation and 89.49 % of annual set target. The cumulative energy generation till date is 525.906 GWh energy.

Major Repair and Maintenance Activities

- Due to trapping of gases in pressurized oil system, governor system had experienced problems like inability to synchronize, inability to increase load etc. due to which generating hours were lost. In this FY, Air-Gas relief valves were added in Unit #1 pressurized oil system to bleed trapped gases.
- Modification of purging line of main water-cooling filters and shaft seal water filter
- Due to frequent breaking of balancing pipe, head cover-balancing pipe coupling was also modified, which has been working satisfactorily and breakdown time has been reduced.
- Servomotor-operating ring coupling of both units were also modified as governor was becoming less responsive due to lose coupling. With this modification the problem of delayed in synchronization, reverse power problem, load increment problem has been solved.
- Replacement of existing VRLA DC system with the new set of VRPT DC system at powerhouse.
- Fencing works (Installation of new fence) of reservoir and stilling basin.
- Making of vehicle ramp, construction of drainages at powerhouse area was also completed in this FY.
- Upgradation and clearing of Gokuleshwor-Balanch-Bitule road are being done on regular basis.
- Also, as part of social responsibility, Latinath Aadharbhut Bidhyalaya is constructed at Baril, Darchula.
- Protection works of 132kV Transmission Line Tower no. 110 at Satbaajh is completed.

132 kV 110 no. tower protection work

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 fiscal year 1990/91 and additional 13 MW capacity was put into service in fiscal year 1997/98. Multifuel Power Plant has 6 (Six) Wartsila Diesel engines which use furnace oil (FO) as a source of energy. There are two units, each of 7.5 MVA from Leroy Somer France and four units, each of 8.144 MVA from Alsthom, France. Major overhauling of engines of all the six units were concluded in 2013. In FY 2074/75, it generated a total of 15.78 MWh and was operated only at emergency and power crisis situation to maintain the stable power system (INPS).

Major works carried out during FY 2077/78 at this center includes repair & maintenance of Synchronizing panel for unit no. 5. Installation, testing and commissioning of protection relay for station transformer no. 1&2 and 3 nos. of Porcelain type outdoor 33 kV lightning arrestor for protection of 24 MVA, 33/11 kV Power transformer against lightning at switchyard. Beside these major works, repair & maintenance of distribution lines and repair of various isolators' mechanism were carried out.

Also, civil related works such as repair and maintenance of isolation building for the NEA's employees of province no. 1, infected from COVID-19 disease. Painting work of HFO storage tank, PCC work in front of main gate of office and staff-quarter area, repair & maintenance of staff-quarter's bathroom and theirs pipelines were also carried out.

Medium Generation Operation and Maintenance Department

Medium Generation Operation and Maintenance Department (MGO&MD), headed by Director, is responsible for the operation and maintenance of thirteen (13) hydropower stations and one (1) diesel power plants 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 with installed capacity below 30 MW is 122.7 MW. The actual generation from the hydropower generating stations under this department on FY 2020/21 is 429.003 GWh, a decrement of 1.7 % in generation as compared to previous fiscal year. 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).

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

Trishuli Hydropower Station

Trishuli Hydropower Station is constructed on the banks 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 million 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 3 MW. It is a peaking run-of-river plant with peaking capacity of 21 MWh and annual design generation of 163 GWh. The annual generation in FY 2020/21 is 121.21which is 86.42 % of target and the cumulative energy generated till date is 5556.841 GWh.

The Electro-Mechanical Renovation and Modernization works of Trishuli Hydropower Station is in progress. Recently, the contract has been awarded at price in Euro. 3,367,424.46 and NRs. 9,63,26,000.00 on 26th May, 2020 AD (BS 2077/02/13) and contract effective date started from 26th June,2020 AD with 30 months of completion period.

Major Repair and Maintenance Activities

- Overhauling of unit no.6 and MIV

Assembling of MIV in Unit No. 2

- Installation and testing of Hooper at forebay
- Erection of gantry structure and testing commissioning of 6-ton monorail at headgate.
- Repair of runner and guide vane of Unit No. 6
- Replacement of 66 kV SF6 breaker of Chilime Line.
- Installation of new distribution panels in power house and substation, numerical relays in Unit No. 6, Chilime and Devighat line.
- Repair and Maintenance of field poles in Unit No. 7, CT and power Transformers
- Line stringing works at colony area and installation of street lights
- Headgate under sluice maintenance
- Maintenance of canal slabs between aqueduct I and aqueduct II.
- Fencing works from intake to desander.

Devighat Hydropower Station

Devighat Hydropower Plant is a cascade development of Trishuli Hydropower Plant with installed capacity of 14.1 MW and annual design generation of 114 GWh. It is located at Devighat, Nuwakot and was commissioned in 1984 AD. The capacity of the units was improved and upgraded to 15MW. The actual generation of year 2020/21 is 85.43 GWh which is 84.13 % of annual target generation. Till date, the plant has generated 3145.605 GWh energy.

Major Repair and Maintenance Activities

- Replacement of Nut Guard in Unit no 1 and Unit no 2 with the adjustment of guide bearing shaft clearance, Checking, monitoring and adjustment of shaft bearing clearance and shaft vibration, repairing of Driven Shaft, Bearing Block, Drive Gear and Coupling Spindle of Spillway gate, replacement of seal of Escape Gate and Tailrace Gate.

Unit no 2 Nut Guard Repalcement Job

- Repairing of Spare Turbine Nut Guard, repairing and installation of Inlet By-Pass valve,
- Complete replacement of whole set of Thrust Bearing of Unit 1,
- Completion of assist works for dismantling of 10 MVA 66/33kv Transformer and Installing of New 30 MVA 66/33 kV Transformer in Devighat Switchyard
- Installation of new 66 KV CVT for Devighat Chapali and Devighat- Trishuli Transmission Line, new 66kV SF6 breaker for 10 MVA 66/33 kV Transformer, new 11 kV VCB breaker
- Line Restoration and replacement of 33 kV current Transformer was done for 33 KV Dhading Feeder after the damaging of CT
- Installation of Digital temperature monitoring system was for all 3 Units. Maintenance of Isolator and Breaker were done.
- Repair and maintenance of Protection wall. Syphon protection works was done

Kulekhani III Hydropower Station

Kulekhani third Hydro Power Station (14 MW), established by the decision of NEA Board, started officially from 1st Magh, 2078, under Medium Generation, Operation and Maintenance Department. In part, even though, few scope of work of the Contractor is remaining, regular generation and maintenance activities are been carried. Kulekhani Third Hydro Power Station is the cascade project of Kulekhani II Hydroelectric Plant which utilizes regulated flow of Kulekhani reservoir. After completion of gate installation works at Khani-Khola intake, the Plant is being operated at full capacity.

The Project is located southwest of Kathmandu in Makawanpur district, Narayani zone, Bagmati Province. Based on operational pattern and availability of discharge from Khani-Khola annual design generation of KLIII is 40.85 GWh. The headworks site is located on the left bank of Khani Khola at Bhainse, about 11 km north of Hetauda. The Powerhouse is located about 5 km north of Hetauda at Sanutar village adjacent to the Tribhuwan Highway.

As a fully funded project by the Government of Nepal and Nepal Electricity Authority (NEA), the plant started generation from 15th Ashoj 2017 and 24th Ashoj 2076 from its Unit-1 and Unit-2, respectively. The total generation of F/Y 2077/78 is 35,565.60 MWh, which is 87.06% of design generation, and cumulative generation is 55,930.80 MWh, till 2078 Asadh, from the date of operation.

After plant started generation, breakout of the global pandemic of Covid-19, derailed the remaining works to be completed by EM/HM Contractor (KL3 Project). As a result, final test including characteristics and efficiency test of both units remains due.

Major Repair and Maintenance Activities

- Complete installation, testing and commissioning of Khani-Khola Intake Stop-log gate, Desander flushing gate and Desander Outlet gate, which were remaining to be done by the Contractor.
- Repair works of guide vane and facing plates.
- Repair and modification of Excitation Panel Circuit of Unit 2, made more reliable.
- Cable extension work in Bhainse for supply in Head-Pond
- Repair of left bank and spillway downstream.
- Regular maintenance works of Water Supply, Sewerage and Sanitation system around Head-pond, Powerhouse and colony areas.

Troubleshooting of excitation system

Gandak Hydropower Station

Gandak Hydro Power Station is located at Pratappur Gaun Palika ward no.-7, Nawalparasi, Nepal about 235 kms from Kathmandu and about 5 kms North from Indian boarder point called Jhulenipur, Mahrajgunj, Uttar Pradesh. The power house is a part of irrigation cum power generation scheme on Gandak River. A barrage has been constructed on the river Narayani at Bhainsalotan (Balmikinager, Bihar) on Indo-Nepal boarder. From the barrage, two canals take off namely Gandak Main Eastern Canal (MEC) and Gandak Main Western Canal (MWC). This Power Station is located on the Gandak Main Western Canal approximately 18 Km downstream of barrage at Surajpura, Nepal. As the canal is mainly meant to meet the irrigation needs for Uttar Pradesh, India, the discharge through canal is regulated by Water Resource Department Balmikinagar, Bihar, India

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

The generation is disrupted mostly due to long canal shutdown (i.e., more than three months canal shutdown) of Main Western Canal for inspection and maintenance by Irrigation Department, Bihar, India. Sometimes due to local issues causes disturbance in canal, high sediment & choking of trash rack, system changing, high water level in tailrace controlled by Irrigation Dept, UP and also sometimes due to low voltage from Indian grid disrupted power generation. At current situation, technical study of equipment and components of the plant is in progress for the rehabilitation of the plant.

The actual generation of this year is 12.123 GWh which is 104.5 percent of its target. With this generation, the cumulative generation of this plant has reached 10349.726 GWh. The generation has increased by about 17 % compared to last year due to less frequent system tripping followed by reduction in public issues, disturbances in canal, etc. in this year. Previously, the machine was required to be put into shutdown for Nepal –India system changing. But, now after the adjustment of phase sequence at Bardaghat substation, there is no need for machine shut down for the purpose. Also, the reduction of tailrace level due to the efficient operation of gate at Balmikinagar with sound coordination between plant management and Irrigation Dept, UP, has contributed for the boost up of energy generation this year.

Major Repair and Maintenance Activities

- Replacement of the most damaged upper and lower guide vane bush, turnbuckle, shear pin and guide vane bush seal, carbon seal (shaft seal) of unit no. 2
- Installation of new turbine oil filtration machine
- Repair of damaged portion of gate side sill plate in unit no. 2
- Repair and maintenance of panel of overhead crane 5 Ton, VCB, isolators at 132 kV switchyard.

132 kV ISOLATOR REPAIR WORK

Modi Khola Hydropower Station

Modikhola Hydropower Station 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, 7.4 MW each and annual design generation of 92.5 GWh.

The cumulative generation of this plant since its first run has reached 1137.17 GWh. It has generated 60.47 GWh in the fiscal year 2020/21 which is 82.63 % of target forecast. Apart from reduced rainfall in dry season, the increased forced shutdown and repeating problems in different bearings of units were the main reasons for reduced generation of this plant.

Major Repair and Maintenance Activities

- Turbine and Generator Overhauling of Unit no. 2.

Overhauling of unit no. 2

- During 2077/10/01 to 2077/10/05, the plant remained shut down for the repairing of diversion weir under civil tender as there was huge damage in downstream part of diversion weir where all the steel liner and gate slots were worn out. The required civil and mechanical maintenance was done by constructing a coffer dam in front of diversion weir. Repairing and replacement of flushing gate motor, guide side roller and seal, etc. were done in mechanical part whereas, application of epoxy-based compounds, concreting, steel liner repairing done as civil maintenance.
- Both the units of this plant suffered unit shutdown due to fluctuation of rotating speed causing excessive vibration and failure of turbine guide bearing, labyrinth ring, cracking of runner blade, etc. Unit no. 2 remained ideal for more than 2 months during that period. The units were restored by checking shaft alignment, replacing runners, turbine guide bearings, thrust bearing and Generator upper guide bearing; speed, temperature sensors, position Transducer, bottom rings, and other worn-out parts as requirement.
- Maintenance of Excitation system, replacement of Diodes, voltage suppressor at unit no. 2.
- Repair and maintenance of Hydraulic unit, hydraulic pump, adjustment of valves and refill of Nitrogen gas.
- Repair and maintenance of diversion and under sluice at intake area, trash rack.

Sunkoshi Hydropower Station

Sunkoshi Hydropower Station, 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 and Government of Nepal. Cost of the project was approximately

NRs. 109.4 million including transmission line up to Kathmandu.

It has generated 55.916 GWh in FY 2020/21 which is 87.24 % of generation target. The cumulative generation till date is 2496.264 GWh. The reduction in generation with respect to last year is also due to low rain and less snowfall& thus less discharge in river during winter season.

Major Repair and Maintenance Activities

- Replacement of shaft seals and accessories of different units, rubber seal in highly damaged gates at barrage, arm and seal of radial gate- no.6 at barrage site

Shaft seal replacement

- Maintenance of 66/11 KV power Transformer, Breaker of 6.3 MVA, 6.3/66KV, SCADA system of Forebay and Damsite.
- Installation of 11KV CRP of 6MVA 66/11KV Transformer, 66 KV SF6 circuit breaker and CRP panel.
- Changing of LT busing and cable heads and oil filtration of 6 MVA, 66/11 kV transformer.
- Civil Repair and Maintenance works including epoxy application at highly damaged gates of Barrage, Debris removal works at downstream of barrage gate and in front of gallery outlet at barrage, Construction and maintenance of catch drain and also cleaning of blocked drain at SHPS.
- Site clearance work at colony premises, power house including deposited sand removal from draft tube floor.

Illam (Puwa Khola) Hydropower Station

The Ilam (Puwakhola) hydropower station (IHPS) with an installed capacity of 6.2 MW is a run-off-the-river type hydro power plant operating with the flow of Puwakhola River located in Ilam district of Province 1 in the far eastern side of Nepal. The plant was constructed with a funding of 15.7 million USD coming from the Government of Nepal and Nepal Electricity Authority (NEA) and under the in-house management of NEA. The plant was commissioned in 1999 AD. The total generation of the current fiscal year has been 34.47 GWh. The energy generated from the plant is fed to the Godak substation in Ilam through a 1km long 33 kV transmission line.

Major Repair and Maintenance Activities

- Installation, Testing & Commissioning of Digital Governors in both units
- Installation of SCADA in both units
- Alignment Rectification of Penstock with red mud packing along cracked areas

Penstock Rectification Works

- Replacement of operating motors with

control panels, repair of Gates and re-electrification works inside intake tunnel

- Repair of Turbine Unit # 1 including Replacement of Spherical MIV and oil seals of Nozzle-needle assembly.
- Replacement of Generator Neutral Current Transformer of both Units
- Installation of Programmed TOD Meters in both units and Power/Station Transformer
- Panel Shifting works inside control room for safety and space management
- Repair of Spherical MIV of unit # 2, cooling system pipeline/valves, leaking areas of Penstock and leaking areas of forebay tank
- Sediment Excavation works inside forebay tank

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 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 this FY is 3351.802 MWh and cumulative generation till now is 58881.05 MWh. Out of two units installed, only single unit is in operation. The major repair and maintenance works carried out this year is the overhauling of the unit 2 during the canal shutdown period of Sunsari Morang Irrigation Project. The Pinion gear of the unit was broken which has been replaced with that of another unit. The Runner, Wicket Gates, Dome etc. were coated with corrosion resistance efficiency metallic paint. The 33 kV Dharan-Chatara transmission line was restrengthened by replacing damaged poles.

Coating of Epoxy Paint on Guide vane & Draft Tube of Unit No. 2

- Dismantling of Unit no. 2 for Overhauling.
- Replacement of Damaged pinion Shaft, Crown Gear of Unit no. 2
- Replacement of all RTDs of Generator with new.
- Coating of The Runner, Wicket Gates, Dome etc. with corrosion resistance efficiency metallic paint.
- Fitting Work of Generator Cooling Air duct.
- Repair and Maintenance work of 24 V DC supply system of TACP Panel, 11 kV VCB, 33 kV Dharan Chatara 33 kV line, 11 kV distribution line.

Dismantling of Generator of Unit No. 2 for Overhauling

- Dewatering and desanding work of headrace and Tailrace of unit 2.

Panauti Hydropower Station

Panauti Hydropower Station is third oldest Hydropower Station of Nepal. It is run of river scheme hydropower plant with intake on right bank of Roshi Khola and Power House is located at Khopasi, Kavre, nearly 35 km east of Kathmandu.

The plant is with install capacity of 2.4 MW and 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 purposes as well.

The water of the river now mainly used for drinking purpose. The water users along the canal are having the same irrigation facilities as earlier days. Recently the power station control, monitoring, substation and protection system has been upgraded.

The cumulative generation of the station has reached 141.013 GWh till F.Y. 2020/21 from its first run. The station has generated 2.947 GWh in FY 2020/21.

Peaking pond with fishing cage

Major Repair and Maintenance Activities

- Unit no 2 Overhauling Works
- Installation and Commissioning of 6.3kV/33kV,1.55MVA Power Transformer at Panauti sub-station.
- Repair and maintenance of Francis Runner and its components of unit 1.
- Upgrading distribution lines of Office and Forebay Areas.

Seti Hydropower Station

Seti Hydropower Station is a run of river type with installed capacity of 1.5 MW and design generation of 9.8 GWh consisting of 3 units each of 0.5 MW. It is located at Nadipur, Pokhara,03 and was commissioned in 1985 AD with assistance from Government of People's Republic of China and Government of Nepal. The canal for this power station is primary used for irrigation purposes, looked after by Irrigation Division Office, Pokhara and hence, the operation of this power station is affected by irrigation as well.

The cumulative generation of Seti HPS has reached 348.494 GWh till 2020/21 from its first run. The station has generated 11.68 GWh in FY 2020/21.

Major Repair and Maintenance Activities

- Replacement of Slip ring of Unit#1.
- Penstock Pipe painting works at Seti HPS.

Penstock Pipe Painting at Seti HPS

- Installation of New Motor control panels of Forebay Gates.
- Insulation and Resistance testing of Power Transformers

New Digital Governor with Oil Pressure Unit and Unit Control system has been delivered to the site but due to the Covid-19 and lockdown, technical experts from India were unable to access to the site. In the next fiscal year generator and line protection system as well as Electrical protection System and LV AC/DC distribution systems is going to be installed.

Fewa Hydropower Station

Phewa hydropower station is a canal drop type power station having an installed capacity of 1.0 MW and 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 power house is a concern for normal operation regardless of the availability of generating units.

The cumulative generation of the station has reached 99.527 GWh till 2020/21 from its first run. The station has generated 1.85 GWh in FY 2020/21.

Major Repair and Maintenance Activities

- Repair and Maintenance of Main Inlet Valve of Unit #2 & Unit #3 with new penstock draining pipe
- Installation of 415V,800A Synchronizing Breaker of unit no-3.
- Changed Current transformer (500/5) of unit no-1.
- Repairing of plant AC distribution system with new Under/Overvoltage protection system,
- Repair and maintenance of power canal.

Repair and maintenance of power canal with protection mesh wire.

The Electromechanical rehabilitation and modernization of Phewa hydropower station is in progress by assigning Chilime Engineering Company as a consultant.

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's were supplied by The English Electric Company Ltd., England. It was commissioned in 1934 AD, and is the second oldest hydropower plant constructed in Nepal. The actual generation from this plant in this year is 3.922 GWh and cumulative generation till now is 131.679 GWh. The plant has achieved generation of 108.54 % of generation target.

In this year, the commissioning of Hydropower station under Tinau–Sundarijal Hydropower Station Rehabilitation Project has been done. Though, the other works under the contract are still remaining, the capacity upgradation

with SCADA system of two units from 640 kW to 970 kW has been completed. Besides this, repairing of Nagmati intake has been completed due to which additional amount of water is being added to Sundarijal intake contributing both power generation and addition drinking water for KUKL. Due to these improvements, the generation has increased by 39 % compared to that of last year.

Recently synchronized Unit

Pharping Hydropower Station

Pharping Hydropower Station is the first Power Station built in Nepal, and it has held 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).

It was erected with a grant from British Government at a cost of NRs. 0.713 million. It is in Pharping of Kathmandu district, nearly 12 km south from the city. 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.

Hetauda Diesel Powerhouse

Hetauda Diesel Power Plant, with 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 in assistance from British Government and Government of Nepal.

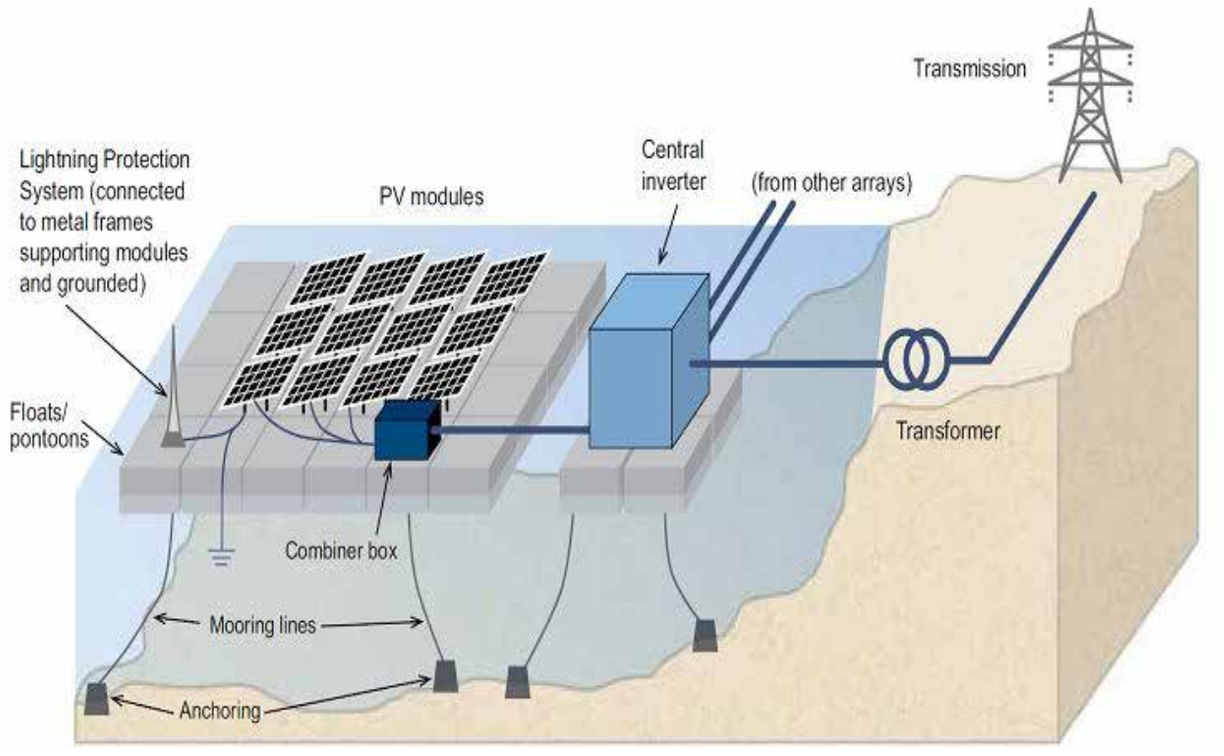
The plant operates during peak; however, the soaring fuel price has made its operation costlier compared to that of hydropower stations. Presently, the plant has been operating at capacity of 10 MW in need of system peak load and for regular testing purposes.

The cumulative generation of the plant has now reached 155.50 GWh from its first run. The station has generated 57 MWh in FY 2019/20 and 54.36 MWh in FY 2020/21.

Generation Development Department

Generation Development Department (GDD) has the main objective of performing regular monitoring, inspection and resource management of under-construction projects of Generation Directorate. After the successful completion and handover of Kulekhani III hydropower project (14 MW), a cascade project of the only storage power plant, Kulekhani I, in Nepal and Upper Trishuli-3A HEP, a run-of-river project of 60 MW, recently, 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 develop a format to get the progress reports on a regular monthly basis.

The department is exploring the possible generation construction projects that can be initiated by NEA. A desk study report on Floating Photovoltaic Solar Plant in Indrasharowar, Kulekhani submitted to NEA by its subsidiary company NEA Engineering Company has been reviewed by this department. Upon understanding the advantages of Floating PV system, the department has made all the arrangements to carry out the feasibility and detailed study of Floating Solar Photovoltaic Power Plant to construct a project for up to 10 MW in Indrasharowar at Kulekhani. The department is proceeding to apply for the generation construction survey license to carry out this study. Initially, the survey license will be applied for a period of one year.



Components of Floating Solar PV Plant

After the careful analysis of advantages and disadvantages of Floating Photovoltaic system, the department has recommended to carry out the feasibility and detailed study for the Construction of "Floating Solar PhotoVoltaic Power Plant up to 10 MW" at Indrasharowar in Kulekhani owing to the merits such as easy installation and maintenance, increased power production, minimization of evaporation and water saving, and hassle free landmass acquisition quickly pays off the relatively higher cost of it as compared to that of terrestrial project. It is a reliable, environment friendly, and cost-effective source of application of renewable energy in the areas where there is shortage of land and is seen as perfect amalgamation to reservoir-based projects.

Technical Support Department

Technical Support Department, headed by Director, provides expert advice for the under-construction projects and existing generating power plants. Deputy Managing Director (directorate chief) co-ordinates between the

Technical Support Department and Projects/ Operation and Maintenance Department. This year, the agreement has been done with Soil, Rock and Concrete Laboratory to submit the geotechnical investigation of report of landslide prone area of left bank of damsite of Sunkoshi Hydropower station.

Landslide prone area

Nepal Electricity Authority

Generation Directorate

Generation Related Statistics and Performance Factors of FY 2077/78 (FY 2020/2021)

S. No.	Power Stations	Total Installed Capacity	Design Generation (MWh)	Actual Generation (MWh)			Max. generation in a year till date (MWh)	Generation Target in FY 2077/78 (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 (%)	Actual Generation/ Target Ratio (%)	Plant weightage (%)
				FY 2075/76	FY 2076/77	FY 2077/78																
		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	(A/b)*100	(Plant generation/ Grand total generation)*100
1	Kaligandaki 'A'	144	842,000.00	871,914.00	871,466.00	817,712.86	929,983.00 (2071/72)	884,508.07	319,973.88	1,137,686.74	1,129,731.70	809,757.82	1,383.17	2,158.14	1,133,273.01	4,413.73	0.39%	0.54	64.82	97.12	92.45	27.15%
2	Mid-Marsyangdi	70	398,000.00	471,322.51	446,624.75	398,846.30	471,322.51 (2075/76)	456,789.01	329,419.16	728,265.46	711,020.70	381,601.54	723.60	1,310.02	713,054.32	15,211.14	2.09%	3.81	65.04	100.21	87.32	13.24%
3	Marsyandi	69	462,500.00	475,176.00	443,852.10	398,920.10	483,928.20 (2052/53)	468,429.08	404,710.00	803,630.10	784,410.80	379,700.80	0.00	1,104.41	785,515.21	18,114.89	2.25%	4.54	66.00	86.25	85.16	13.25%
4	Upper Trishuli 3A	60	489,760.00	16,185.60	407,551.15	314,767.50	407,551(2076/77)	372,207.39	144.09	314,911.59	310,658.40	310,514.31	0.00	1,028.29	311,686.69	3,224.90	1.02%	1.02	59.89	64.27	84.57	10.45%
5	Kulekhani I	60	211,000.00	91,184.00	162,972.00	195,157.00	249,680.00 (2056/57)	78,210.80	146,239.36	341,396.36	331,401.97	185,162.61	9,039.79	596.78	341,038.54	357.82	0.10%	0.18	37.13	92.49	249.53	6.48%
6	Kulekhani II	32	104,600.00	44,676.70	81,483.40	95,228.87	122,757.00 (2056/57)	41,712.43	214.07	95,442.93	94,355.90	94,141.83	0.00	252.97	94,608.87	834.07	0.87%	0.88	33.97	91.04	228.30	3.16%
7	Chameliya	30	184,200.00	161,395.54	160,811.64	151,247.41	161395.54(2075/76)	169,006.30	73,239.52	224,486.93	220,772.42	147,532.90	1,700.62	358.97	222,832.01	1,654.92	0.74%	1.09	57.55	82.11	89.49	5.02%
8	Trishuli	24	163,000.00	123,741.10	128,973.11	121,211.30	154,423.75 (2053/54)	140,253.19	157,265.58	278,476.88	250,885.16	93,619.58	23,407.76	161.48	274,454.40	4,022.48	1.44%	3.32	57.65	74.36	86.42	4.03%
9	Gandak	15	106,380.00	11,950.80	10,337.60	12,123.40	52,272.70 (2043/44)	11,602.57	196,250.57	208,373.97	99,557.55	-96,693.02	103,038.00	1,065.46	203,661.01	4,712.95	2.26%	38.87	9.23	11.40	104.49	0.40%
10	Modi	14.8	92,500.00	69,400.50	66,913.20	60,470.50	69,556.40 (2073/74)	73,182.76	122,256.55	182,727.05	176,296.95	54,040.40	6,984.00	632.47	183,913.42	-	-	-	46.64	65.37	82.63	2.01%
11	Devighat	15	114,000.00	86,851.14	92,053.14	85,429.11	106,277.70 (2056/57)	101,549.02	50,193.14	135,622.25	97,495.00	47,301.86	37,480.09	133.00	135,108.09	514.16	0.38%	0.60	65.01	74.94	84.13	2.84%
12	Kulekhani III	14	40,850.00	0.00	20,365.20	35,565.40	35,565.4 (2077/78)	18,249.19	0.00	35565.40	34,941.60	34,941.60	0.00	337.45	35,279.05	286.35	0.81%	0.81	29.00	87.06	194.89	1.18%
13	Sunkoshi	10.05	70,000.00	62,156.70	62,245.94	55,916.73	66,383.10 (2068/69)	64,093.17	185.25	56,101.98	53,819.20	53,633.96	1,886.34	271.28	55,976.82	125.16	0.22%	0.22	63.51	79.88	87.24	1.86%
14	Puwa	6.2	48,000.00	34,192.81	34,914.55	34,477.31	36,414.24 (2073/74)	36,002.88	2.81	34480.12	34245.40	34,242.59	0.00	56.77	34,302.17	177.95	0.52%	0.52	63.48	71.83	95.76	1.14%
15	Chatara	3.2	6,000.00	2,698.25	1,822.00	3,351.80	5,219.75 (2063/64)	4,489.45	206.82	3,558.62	2,464.50	2,257.69	431.80	11.54	2,907.84	650.78	-	19.42	11.96	55.86	74.66	0.11%
16	Panauti	2.4	6,970.00	3,005.84	2,886.76	2,947.96	4,654.80 (2058/59)	3,179.07	36.90	2984.86	2864.50	2,827.60	0.00	19.51	2,884.01	100.85	3.38%	3.42	14.02	42.29	92.73	0.10%
17	Seti	1.5	9,800.00	10,030.00	11,158.29	11,682.18	11,682.18 (2077/78)	10,763.41	2.19	11,684.37	10,855.84	10,853.65	0.00	49.74	10,905.58	778.79	6.67%	6.67	88.91	119.21	108.54	0.39%
18	Fewa	1	6,500.00	1,531.68	2,126.54	1,850.94	3,919.47 (2034/35)	2,493.52	13.00	1863.94	1791.80	1,778.80	0.00	5.76	1,797.56	66.38	3.56%	3.59	21.13	28.48	74.23	0.06%
19	Sundarijal	0.64	4,770.00	3,587.30	2,814.76	3,922.39	4,530.26 (2071/72)	3,710.47	0.00	3,922.39	3,912.69	3,912.69	0.00	3.83	3,916.52	5.88	0.00%	0.15	69.96	82.23	105.71	0.13%
20	Pharping	0.5	-	-	-	-	48.65(2064/65)				-	-	-	-	-	-	-	-	-	-	-	-
	Total (Hydro)	573.29	3,360,830.00	2,541,000.47	3,011,372.13	2,800,829.06	-	2,940,431.77	1,800,352.88	4,601,181.93	4,351,482.08	2,551,129.21	186,075.17	9,557.86	4,547,115.11	55,253.18	1.18%	1.97	55.77	83.34	95.25	93.01%
21	Multifuel	39	-	-	2.52	0.00	86,215.07 (2055/56)	-	-	-	-	0.00	-	-	-	-	-	-	0.00	-	-	0.00%
22	Hetauda Diesel	14.41	-	115.74	57.09	54.36	24,203.64 (2055/56)	-	0.00	0.00	0.00	0.00	0.00	6.35	6.35	-	-	-	0.04	-	-	0.00%
	Total (Thermal)	53.41	-	115.74	59.61	54.36	-	-	0.00	54.36	40.80	40.80	0.00	6.35	47.15	7.21	13.26%	13.26	0.01	-	-	0.00%
	Grand Total	626.7	3,360,830.00	2,541,116.21	3,011,431.74	2,800,883.41	-	-	1,800,352.88	4,601,236.29	4,351,522.88	2,551,170.01	186,075.17	9,564.21	4,547,162.27	54,074.02	1.18%	1.93	51.02	83.34	-	93.01%

Total system energy	8960.31	GWh
Total loss in Powerhouse	54.07	GWh
Loss on system energy	0.60	%

Nepal Electricity Authority

Generation Directorate

Subject: Actual Monthly Generation of FY 2077/078 (FY 2020/2021)

S.No.	Power Stations/Month		Shrawan	Bhadra	Ashwin	Kartik	Mangsir	Poush	Magh	Falgun	Chaitra	Baisakh	Jestha	Ashar	Total
1	Kaligandaki 'A'	KGA	95,485.75	98,693.73	95,119.54	79,714.63	68,992.20	48,966.06	43,232.14	37,208.29	39,310.20	46,411.98	71,334.32	93,244.02	817,712.86
2	Mid-Marsyangdi	MMHPS	51,170.75	51,005.75	47,169.30	41,435.80	36,093.70	25,513.00	21,924.20	18,665.80	19,593.80	22,460.70	41,620.80	22,192.70	398,846.30
3	Marsyandi	MHPS	46,353.30	43,771.00	42,395.70	34,768.50	38,793.30	29,089.80	25,085.40	21,465.80	22,484.50	25,910.90	36,870.00	31,931.90	398,920.10
4	Upper Trishuli 3A	KLI	32,949.00	21,530.00	14,405.00	13,080.00	10,499.00	17,693.00	16,581.00	4,014.00	13,267.00	6,840.00	13,147.00	31,152.00	195,157.00
5	Kulekhani I	KLII	16,096.12	10,504.62	6,885.20	6,368.84	5,146.25	8,499.59	8,169.87	2,012.45	6,530.39	3,327.67	6,550.38	15,137.49	95,228.87
6	Kulekhani II	UT3A	22,892.50	14,620.00	35,497.50	30,372.50	39,952.50	35,157.50	29,547.50	24,247.50	22,890.00	20,555.00	20,715.00	18,320.00	314,767.50
7	Chameliya	CHEPS	19,305.51	18,066.43	19,942.71	13,120.85	8,731.17	7,750.64	6,785.47	5,665.95	5,723.91	9,674.21	18,037.24	18,443.32	151,247.41
8	Trishuli	THPS	9,435.43	10,076.55	11,677.63	11,681.63	12,113.86	9,403.31	9,635.50	9,142.92	9,072.34	9,260.36	11,626.36	8,085.41	121,211.30
9	Gandak	GHPS	898.90	1,268.40	1,504.60	344.10	-	1,370.00	1,905.40	2,000.60	1,143.10	-	594.90	1,093.40	12,123.40
10	Modi	MKHPS	6,845.20	7,334.20	7,049.00	6,131.30	4,817.20	3,107.40	1,999.90	2,399.10	2,785.00	3,871.30	6,978.00	7,152.90	60,470.50
11	Devighat	DHPS	6,800.32	7,328.80	7,085.20	6,602.14	8,714.67	6,831.33	7,064.05	6,855.08	6,875.22	6,942.99	8,449.15	5,880.16	85,429.11
12	Kulekhani III	KLIII	5,730.60	3,831.00	2,533.20	2,321.40	1,892.40	3,147.00	3,051.00	751.20	2,501.40	1,307.20	2,547.00	5,952.00	35,565.40
13	Sunkoshi	SKHPS	5,331.96	6,108.04	6,560.14	6,747.13	5,552.32	3,897.16	3,162.92	2,578.72	2,557.61	2,722.39	5,324.81	5,373.54	55,916.73
14	Puwa	PKHPS	4,561.07	4,464.08	4,048.03	4,213.00	2,880.16	1,594.54	1,622.38	1,324.14	1,349.20	1,600.96	2,580.51	4,239.24	34,477.31
15	Chatara	CHPS	601.93	632.77	499.31	366.72	26.91	-	150.06	269.45	101.56	-	144.01	559.07	3,351.80
16	Panauti	PHPS	208.37	346.19	445.55	429.76	363.23	265.55	168.51	117.13	68.16	133.37	130.20	271.94	2,947.96
17	Seti	SHPS	999.36	1,027.98	939.24	991.35	1,013.67	997.83	994.32	898.29	962.19	945.36	1,066.95	845.64	11,682.18
18	Fewa	FHPS	338.81	370.64	366.26	97.29	191.48	72.09	96.69	-	-	-	33.89	283.79	1,850.94
19	Sundarijal	SJHPS	361.12	365.42	357.70	361.35	304.00	348.14	357.83	287.45	250.03	268.57	304.07	356.71	3,922.39
	Total (Hydro)		326,366.00	301,345.60	304,480.81	259,148.29	246,078.02	203,703.94	181,534.13	139,903.87	157,465.62	162,232.95	248,054.58	270,515.23	2,800,829.06
20	Multifuel	MFPS	-	-	-	-	-	-	-	-	-	-	-	-	-
21	Hetauda Diesel	HDPS	4.90	1.11	4.54	6.61	5.09	4.23	7.45	4.24	2.04	4.70	5.86	3.58	54.36
	Total (Thermal)		4.90	1.11	4.54	6.61	5.09	4.23	7.45	4.24	2.04	4.70	5.86	3.58	54.36
	Grand Total		326,370.90	301,346.72	304,485.35	259,154.90	246,083.11	203,708.17	181,541.58	139,908.11	157,467.66	162,237.65	248,060.44	270,518.81	2,800,883.41

- Indicates metering problem or data unavailability

TRANSMISSION DIRECTORATE

Transmission Directorate is one of the nine directorates in the overall organizational structure of NEA, headed presently by the Chief Mr. Dirghayu Kumar Shrestha. The directorate is fully devoted to its responsibility of planning, developing, operating and maintaining high-voltage transmission lines and substations from 66 kV to 400 kV voltage level.

The transmission system imparts an important link between the power generated from various power plants being owned by NEA, IPP's and distribution networks ensuring the reliable and quality power to be supplied to the consumers. This directorate leads to develop and construct the new transmission lines and associated substations along with the work of 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.
- To reinforce/ up-grade the existing transmission lines and substations capacity.

Now the INPS system has been energized to a maximum of 400 kV voltage level. Dhalkebar substation has been energized to its full capacity allowing Dhalkebar-Muzaffarpur line to put into operation at 400 kV on November 11, 2020. Being the major hub for power exchange between Nepal and India, the substation assist in the process of importing power and help to meet the increasing demand for electricity in Nepal. Furthermore, it is facilitating the export of electricity to India when Nepal's capacity generated is surplus to demand. Now onwards all the new substations will be equipped with a state-of-the-art control, protection and automation system based on IEC 61850 protocol.

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, this directorate 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 are in progress.

Recently Completed Projects

1. Kabeli Corridor132 kV Transmission Line

The project was started with the objective of evacuating power generated from Kabeli, Hewa, Mai and other river basin HEPs of eastern region. Cost of the project was approximately US$ 31 Million and funded by WB, GoN, NEA.

The first section comprising of 35 km transmission line from Damak to Godak and associated substations at Damak and Godak was commissioned long back on 19thAshoj, 2072 and has been very useful to evacuate power from Sanima Mai Khola cascade (29 MW), Mai Cascade (18.0 MW), Himal Dolkha cascade (12.0MW) and more projects to INPS. The second section comprising of 42.659 km of transmission line from Godak to Phidim (Thapatar) substation was completed and charged on 24thBaishak 2076 (7th May 2019) and has been useful evacuating power from Upper Hewa Khola A (14.9MW) and Lower Hewa Khola (22.5MW).The third section comprising of 13.334 km of transmission line from Phidim (thapatar) to Amarpur (Kabeli) substation had been commissioned on 20th Shrawan 2076(6th August 2019) and has been useful evacuating power from Kabeli B (25MW), Iwa Khola (10MW) and Phawa Khola (5.2MW).

Finally, the remaining second 132 kV line bay extension works at Amarpur substation has been competed this year and charged on 5th Ashadh 2078.

Construction of transmission line from Damak to Kabeli and associated substations has helped to cater the increasing electricity demand of Damak area, evacuate power from IPP projects in the eastern region, relieve Anarmani substation and improve quality of power supply situation in the eastern part of the country.

2. Singati-Lamosangu 132 kV Transmission Corridor

Objective of this project was to evacuate power from hydropower projects being developed by IPP's in the Tamakoshi and Singati basin. The project was started in FY 2065/66 (2008/09). The total cost of the project is about US$ 13.0 million and funded by GoN.

The overall scope of the project includes construction of 40 km double circuit Singati-Lamosangu 132 kV transmission line with ACSR Bear conductor, 132/33kV, 30 MVA substation at Singati and 132 kV bay extension works at Lamosangu substation.

The entire 126 tower foundations, tower erections and 1st circuit conductor stringing works have been completed. One circuit has been charged on Ashadh 31, 2078 (July 15, 2021). About 25 km conductor stringing in the 2nd circuit and major civil, equipment installation works at Singati have also been completed. Second circuit line and Singati substation will be commissioned soon.

3. Kusma-Lower Modi 132 kV Transmission Line

Objective of this project was to evacuate power from IPP projects and provide N-1 contingency to power the plants in Modi river basin. The project started in FY 2070/071 (2013/014). Cost of this project is estimated to US$ 3.5 Million and funded by GoN.

The Project has completed the construction of 6.2 km 132 kV single circuit transmission line from Kusma to Lower Modi HEP and 132 kV bay extension works at Lower Modi. The transmission line has been successfully charged on February 4, 2021 and put into operation.

4. Khimti – Dhalkebar 220 kV Transmission Line

The Khimti-Dhalkebar 220 kV transmission line is essential in evacuating the power generated from the Upper Tamakoshi Hydropower Project as well as evacuating power from IPPs projects of Likhu corridor. This line directly links the northern Tamakoshi region to southern load centre of Nepal. Objective of this project is to enhance the transmission capacity, improve supply reliability, reduce loss and improve voltage profile in the national grid.

The project scope of works include construction of 74 km long double circuit transmission line with twin Bison conductor. The project was jointly funded by World Bank, GoN, and NEA. The estimated cost was US$ 22 Million.

The construction of all the double circuit towers along with the first circuit stringing had already been completed and charged (initially at 132 kV) back on January 17, 2017. The stringing of second circuit was started in year 2013 with the estimated cost of US$ 2.5 million. Although, the project has been much delayed due to the strong protest from the local people, still the second circuit has been successfully charged at 220 kV on June 30, 2021 and this line has been very useful for evacuating power from Upper Tamakoshi HEP to Dhalkebar substation from July 05, 2021.

Comparison of Transmission Line Length in last Seven 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

Comparison of Substation Capacity in last Seven 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
Total			4302

Comparison of Capacitor Bank Capacity in last Seven 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
Total			200

I. Grid Development Department

This department is headed by a 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 are presented below:

Projects under Construction

1. 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 US$ 23 million and project was jointly funded by ADB and OPEC, GoN and NEA.

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.

2. Hetauda-Birgunj 66 kV Transmission Line Upgradation

At present, Hetauda-Birgunj 66 kV double circuit transmission line with ACSR Wolf conductor is supplying power to small and medium scaled industries like Hetauda Cement, Hulas Steel, Jagadamba steel, Surya Nepal, Ashok Steel. The quantum of power

required by these industries and associated substations is 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 is US$ 3 Million and funded by GoN. Project started in FY 2072/073 (2015/016) and as per the revised schedule, it is expected to commission on December, 2021.

Project scope of works includes replacing 20.20 km Wolf conductor with HTLS conductor and associated hardware from Simara tower no 276 to Birgunj substation via Parwanipur substation.

Detail survey of the existing 66 kV transmission line from Simara (tower no 276) to Birgunj substation (tower no 353) has been completed. It is estimated that 43 tower insertions are required to achieve minimum ground clearance at maximum operating temperature of HTLS conductor. As of July 2021, 27 number of foundation works from Simara to Parwanipur section have been completed and 43 number of Tower parts including HTLS INVAR Conductor and its fittings have already reached at site. Re-conductoring works of HTLS conductor shall be started from August 2021.

3. Ramechap Garjyang Khimti 132 kV Transmission Line

Objective of this project is to evacuate the power generated by IPP projects in Khimti and Likhu Corridor. The Garjyang-New Khimti transmission line, Garjyang substation and line bays at New Khimti started in FY 2067/068 and the 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 2078/079. The estimated total project cost is US$ 20 Million, which is funded by the GoN.

The scope of works 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 3Φ power transformer and 33/11kV 3Φ 6/8 MVA 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 1Φ) bank of autotransformers 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 2021, 104 tower foundations and 87 tower erections out of 105 have been completed, transmission line materials (conductors, insulators, tower parts) have been reached at site, 1.5 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. Power transformers have already reached at site. Preparation of land details for Right of Way has been started by the Dolakha and Ramechhap District Survey Department respectively after which the RoW compensation shall be decided from District Administration office and distributed.

In New Khimti substation, Upper Tamakoshi Hydropower Project has already installed 220/132 kV, 100 MVA power transformer to evacuate power from IPP's of Likhu Corridor. However, its 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 Augmentation as part of Ramechhap, Garjyang,Khimti 132 kV Transmission Line Project.

Under construction substation at New Khimti

Tower erection at AP 38

4. New Modi-Lekhnath 132 kV Transmission Line

The project is initiated with the objective of improving power supply situation in Dhaulagiri zone and evacuating power from hydropower projects in Modi river basin of Parbat and Seti-Mardi-Sardi river of Kaski district. Cost of the project is about US$ 21.0 Million and jointly funded by EXIM Bank of India and GoN.

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. It will also construct 132 kV Switching substation at Korunga (New Modi) and132/33kV, 30MVA substation at Lahachowk.

The substation contract has been awarded to M/S ABB India Ltd on 21st June 2018. The contractor has completed almost 99% of the substation works. The equipment testing and commissioning work from contractor side has been completed but due to delay in transmission line, the substation couldn't be charged.

The transmission line contract has been awarded to M/S Kalpataru Power Transmission Limited on 21st June 2018. As of July 2021 check survey of 42.5 km line, land profiling,tower schedule,cadastral land survey have been completed. About 89 nos of stub foundation works has been completed and stub foundation works are ongoing in 6 nos of location. 78 nos of Tower has been erected and 17.746 km of line stringing has been completed. On supply part, almost all equipment except aviation lights has been delivered in site store. Land acquisition for transmission line is one of the most challenging work in this project. People's resistance to works, demand for shifting of line from the existing route, demand of very high compensation for RoW has severely delayed the project. As a whole, about 53.7 percent of transmission line construction work has been completed.

Lahachowk Substation

5. Solu Corridor 132 kV Transmission Line

Objective of this project is to evacuate power from IPP's Projects of Solu river basin and commence rural electrification in Solukhumbu and Okhaldunga Districts. The estimated cost of the project is US$ 44 Million and jointly funded by GoN and EXIM Bank of India. Project is initiated in FY 2067/068 (2010/11) and expected to be completed by December 2021.

Scope of this project includes construction of 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 construct 132/33kV, 30 MVA and 33/11kV, 8 MVA Tingla substation at Dudhkunda Municipality of Solukhumbu district.

All the works at 132/33/11 kV Tingla substation has been completed and substation is charged. Further, construction of 2x4.5 km, 33 kV line from Belidada, Solukhumbu to Tingla substation has been completed. Regarding 132 kV transmission line construction, out of 302 towers, 299 towers foundation work and 291 tower erection works have been completed and 84 km line has been completed. In spite of strong protest for rerouting of transmission line at Maruwa, Katari municipality and RoW issues at various locations, with the support of Administration and security forces, construction works has been started at Maruwa.

6. Burtibang- Paudi Amrai- Tamghas- Sandhikharka- Gorusinghe 132 kV Transmission Line

Objective of this project is to construct the transmission line from Kapilvastu to Arghakhachi, Gulmi and Banglung districts to improve the power supply situation, reduce faults in distribution system, evacuate power from IPP plants, and decrease the technical loss. The estimated cost of the project is around US$ 30 Million and funded by GoN. This project was initiated in FY 2065/066 (2008/09) and is expected to be completed by 2021/22.

Scope of the project includes construction of 84 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).

NEA has signed contract agreement for all the works and for all contracts, Contractor has mobilized to the site. As of July 2021, civil construction works of office building, control building, guard house and store building in Motipur & Sandhikharka substation has been completed. Construction works of Tamghas, Paudi-Amarai, Burtibang substation have been started. Regarding Motipur-Sandhikharka 132 kV transmission line, all the 114 tower foundation works and 55 tower erection works have been completed and for Sandhikharka-Tamghas Paudi-Amarai Burtibang 132 kV transmission line, check survey, geotechnical investigation, tree counting and 2 tower foundation have been completed.

7. Dordi Corridor 132 kV Transmission Line

Objective 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 US$ 8.4 million and funded by GoN.

Scope of the project includes 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 2021, all major works of Kirtipur 132/11kV substation has been completed, but due to unavailability of 132 kV voltage level supply, the substation is yet to be commissioned. Regarding Kirtipur-Udipur 132kV transmission line, foundation works as well as tower erection and stringing works of conductor and OPGW were completed except in one span (from AP0 to AP0A) since it requires shutdown of Bhulbhule – Middle Marsyangdi 132kV Transmission Line. However, due to heavy rainfall and devastating flood at Dordi river in Asadh 2078, total 4 (four) nos. of transmission tower has been collapsed affecting the completion schedule of project. Survey works for reconstruction of collapsed tower has been completed and after acquisition of land for tower foundation, reconstruction works shall be started soon.

Kirtipur – Udipur 132kV Transmission Line

Collapsed Tower

8. Kushaha (Inaruwa) - Biratnagar 132 kV Transmission Line

The objective of this project is to reinforce the power supply system of Morang and Sunsari district 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 US$ 19 Million and is funded by GoN. The project is expected to be completed by April 2022.

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

As of July 2021, regarding Biratnagar substation, 90% of control buildings construction works, 50% of switchyard foundation works and 80% of staff quarter construction works have been completed. Switchyard equipment such as disconnecting switches, CRP SAS Panels, Communication equipment have been delivered to site.

Regarding transmission line, check survey of 22.504 km line, land profiling, tower scheduling, soil investigation work and cadastral land survey have been completed. The notice for land acquisition of tower pad has been published. Structural design and drawings of all tower types as well as foundation design and drawings of all tower types have been approved.

9. Butwal-Lumbini 132 kV Transmission Line

The project has been initiated with the objective of enhancing transmission capacity,

improving power quality, and reducing line loss in Rupandehi district. The cost of project is estimated to be USD 9.5 Million and funded by GoN. The project is initiated in FY 2070/071(2013/14) and is expected to be completed by the end of year 2021.

The scope of project includes the construction of 18 km double circuit 132 kV transmission line from Jogikuti (Butwal) substation to Mainahiya with ACSR Bear conductor including 2 km 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 2021, in substation all the civil construction works including staff quarter, control building, erection of steel structures has been completed. All substation equipment except power transformers have been delivered to site. Regarding transmission line, construction of 56 out of 57 tower foundation works has been completed, land acquisition process for tower Pad has been completed, RoW compensation work is in progress. ACSR Bear conductor, XLPE cable and accessories for underground have been delivered to site.

10. Chameliya- Syaule- Attariya 132 kV Second Circuit Transmission Line Project

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

As of July 2021, 124.5 km of stringing works has been completed. Bay extension work at Chameliya s/s has been completed. And bay Extension works at Attariya and Syaule substations has progress of around 80%. Steel lattice structure has been delivered to the site and laying of foundation work is in progress.

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.

Bay Extension work at Attariya 132 sub-station

11. Bardghat - Sardi 132 kV Transmission Line

Objective of this project is to provide power supply to Hongshi - Shivam Cement Industry. 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 USD 4.0 Million 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 year 2021.

As of July 2021, in substation all the civil construction works including staff quarter, control building and foundation works has been completed. Major substation equipment have been delivered to site. Regarding transmission line construction of 65 out of 67 tower foundation, 50 tower erection and around 13 circuit km of stringing works has been completed, land acquisition process for tower pad has been completed, RoW compensation distribution work is in progress and major equipment including tower materials, conductor, Insulators and hardware & fittings except OPGW has been delivered to site. Multiple gangs for tower erection and conductor stringing are working at the site to complete the project at the earliest.

12. Kushaha- Kataiya 132 kV Second circuit Transmission Line

Considering surplus power in Nepal and high demand in India during wet season and vice versa 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 trade. The estimated cost of the project is US$ 5.5 Million and funded by GoN.

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 full phase 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.

NEA has signed contract agreement with Sigma Con - Narendra Nirman JV on September 19, 2019 (18 month Contract) for all the works and Contractor has mobilized to the site.

As of July 2021, all the civil and electrical design drawings and equipment drawings have been approved except CRP and SAS. Transformer and gantry foundation have been completed and switchyard construction work at Kushaha substation is ongoing. Moreover, control building foundation has been completed and the works up to plinth beam is ongoing. The 22.5 MVA 132/11 kV transformer, Instrument transformer, tower structures/parts & stubs, conductors, insulators and hardware fittings for LILO works have been delivered at site and LA and DS shall be delivered to site soon as they are in the custom. Other equipment such as CB, battery and battery charger are ready for dispatch from manufacturer premises. Furthermore, stringing of 12 km second circuit line with ACSR Panther conductor has been completed out of total 12.5 km line. Land acquisition has been completed for LILO towers and foundation of tower started at location AP 03. The project is expected to be completed in February 2022.

13. Nawalpur 132/33 kV Substation

Objective of this project is to strengthen the power supply system and improve power transfer capacity to meet increasing demand of Sarlahi district. The estimated cost of the project is US$ 6.9 Million and funded by GoN. The project is initiated in FY 2074/75 (2017/18) and expected to be completed by the end of year 2021.

Scope of the project includes construction of Nawalpur Substation with power transformer capacity of 132/33kV, 63MVA and 33/11kV, 16 MVA. It will also construct 10 km double circuit 33 kV sub transmission line from Nawalpur substation to existing Haripur 33/11 kV substation to supply power to that substation.

As of July 2021, construction of the substation works have almost been completed. All the equipment have been installed. Relay setting and testing of Control and Relay Panel is in progress. Erection of 132 kV dead end LILO towers is in progress.

Nawalpur 132 kV substation

14. Sunwal 132 kV Substation

The objective of this project is to supply power to Palpa cement, Laxmi Steel and local industries around Nawalparasi district and improve the reliability, voltage profile as well as power shortage in both Nawalparasi and Rupandehi 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 690 million. The contract agreement has been signed on September 2019 with Energy Pac and Sigma Con JV on September 2019. This project contract work was effective from November 10, 2019 and to be completed on 10 August 2021. As a consequence of Covid pandemic, there has been delay in work completion date. The project is expected to be completed by the end of March 2022.

The scope of work under this project include construction of 132/33 kV, 2*63.5 MVA and 132/11 kV, 1*22.5 MVA substation. There will be 7 numbers of 33 kV feeders and 3 numbers of 11 kV feeder for distribution.

As of July 2021, construction of boundary wall and store cum guard house have been accomplished. Construction of control building, switchyard foundation and staff quarter are under progress, whereas electrical designs are under review and most of them have been approved.

15. Balefi-Barhabise Corridor 132 kV Transmission Line

This project has been initiated with the aim to evacuate power from different IPP projects at Balefi Corridor. 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 on May 2020 and the project is expected to be completed by July 2022.

As of July 2021, check survey, detail engineering, resistivity measurement and soil test works are in progress.

16. Kohalpur-Surkhet-Dailekh 132 kV Transmission Line

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.

Scope of project includes 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 Bear conductor, 132 kV bay extension works at Kohalpur and 132/33 kV substation at Dailekh. Estimated project cost is US$ 23 Million 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 Ashad 2079.

As of July 2021, in Kohalpur-Surkhet 132 kV section; detail/check survey, soil Investigation works and tree counting on RoW have been completed. Tower design, foundation design, tower schedule works have also been completed and Notice for acquiring private lands on Banke and Surkhet district for tower pads have been published. EIA implementation and approval for tree cutting is under process. Similarly, in Surkhet-Dailekh 132 kV TL section; land acquisition for Dailekh substation has been completed and IEE is in final stage of approval. In addition, for 132 kV bay extension at Kohalpur, bid document is ready for floating the tender.

17. Bhaktapur-Baneshwor-Patan 66kV Transmission Line Up-gradation

The project has been initiated to upgrade the existing power supply system of Lalitpur and Kathmandu districts through up gradation of the existing conductor of 66 kV transmission lines in Kathmandu Valley. The scope of project includes replacement of 20 km existing ACSR LGJ 120 sq. mm Chinese conductor and ACSR Wolf conductor from Bhaktapur to Suichatar substation via Baneshwor and Patan substations and 5 km existing ACSR Dog conductor between Chapali and Chabahil substations with High Temperature Low Sag (HTLS) conductor. Estimated cost of the project is US$ 2.5 Million and funded by GoN. This project is satrted on FY 2074/075 (2017/18) and expected to be completed by 2021/22.

As of July 2021, HTLS conductor stringing in Bhaktapur- Baneshwor 66 kV line (around 11 km) is under progress and expected to be completed by August 2021 . After completion of Bhaktapur-Baneshwor section, stringing works for remaining section i.e. Baneshwor-Patan and Patan-Suichatar 66 kV line will be started. Supply of HTLS Conductor and Hardware Fittings for Chapali- Chabahil 66 kV line is ongoing.

New Conductor Stringing Works

18. Mainahiya - Sampatiya 132 kV Transmission Line

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 24th 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 US$ 8 million and funded by GoN. The project is initiated in FY 2075/076(2017/18) and is expected to be completed by the year 2022/023.

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.

As of July, 2021 IEE has been approved and the construction license has been issued. Construction of 14 out of 95 tower foundation works has been completed. Land acquisition process for tower Pad is in progress.

19. Lamahi Ghorahi 132 kV Substation Expansion

Objective of this project is to supply adequate power to east and mid region of Dang Valley. With completion of this project, it will be possible to meet present and future load demand in this region within permissible voltage profile.

For this project the fund has been allocated by the GoN and the cost of Project is NRs 259 million. The contract agreement has been signed on June 2020 with M/S Hightension Switchgears Pvt. Ltd, Kathmandu Nepal. This project is initiated in FY 2076/77 (2019/20) and expected to be completed on Feburary 2022.

Scope of the project include 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 bay and bus bar arrangement, control and protection works at existing Ghorahi substation and bay expansion works at Lamahi 132 kV substation.

As of July 2021, construction of civil foundation are almost finished and approval of design of all major electrical equipment have been completed. Major equipment like 132 kV circuit breaker, 132 kV and 33 kV disconnecting switches are delivered at site. Online inspection of 33 kV circuit breaker and 33 kV, 12.5 and 20 MVAR capacitor bank has been completed.

20. Dhalkebar- Loharpatti 132 kV Transmission Line

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

Scope of project includes 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 on February, 2021 and expected to be completed in 2023.

As of July 2021, construction of boundary wall is in final stage. Detail survey of transmission line has been completed and check survey, soil test and cadastral survey are in progress. Design of transmission line and substation are in progress.

21. Pokhara –Lekhnath 132 kV Transmission Line Up-gradation

Objective of this project is to reinforce existing power supply system of Pokhara Metropolitan City of Kaski district by upgrading the conductor of existing Pokhara – Lekhnath 132 kV transmission line. It also helps to supply quality, reliable and uninterrupted power supply in Pokhara. The scope of project includes replacement of 7 km existing ACSR Wolf conductor from Pokhara to Lekhnath substations with High Temperature Low Sag (HTLS) conductor. Estimated cost of the project is US$ 0.5 Million and funded by GoN. This project is initiated on FY 2077/2078(2020/2021) and expected to be completed by 2021/22.

As of July 2021, contract has been signed on June 2021 for replacement of conductor from Pokhara to Lekhnath within nine months period. Detail survey works by the Contractor is being completed.

Projects under Planned and Proposed

1. Sunwal (Bhumahi) – Hakui 132 kV Transmission Line
2. Raxaul Parwanipur 132 kV Second Circuit Transmission Line
3. Kaligandaki-Ridi 132 kV Transmission Line
4. Amarpur- Dhungesaghu 132 kV Transmission Line
5. Lalbandi-Salimpur 132 kV Transmission Line
6. Dhalkebar – Balganga 132 kV Transmission Line
7. Godak – New Anarmani Transmission Line
8. Pathlaiya – Harniya Transmission Line
9. Sunkoshi 132 kV Substation (Barhabise-Lamosangu 2nd Circuit)
10. Bafikot-Khungri 132 kV Transmission Line
11. New Pokhara (Birauta) 132 kV Substation
12. Godak-Soyak 132 kV Transmission Line
13. Lahan - Sukhipur 132 kV Transmission Line
14. Rupani – Bode Barsain 132 kV Transmission Line
15. Chandrapur - Sukhdevchauk 132 kV Transmission Line
16. Dhaubadi 132 kV Transmission Line
17. Jhurjhure 132 kV Transmission Line
18. Kathmandu Valley Transmission System Upgradation
19. Surkhet substation
20. Syaule Sanfebagar 132 kV Transmission Line

II. Major 220 kV Transmission Line Department

Projects under Construction

1. 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.

Contract was signed with M/s PINGGAO GROUP CO., LTD (China) on November 13, 2017 and the contract became effective from December 20, 2017 for the construction of both the substation and transmission line. 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 Contract price for construction of 320MVA capacity 220/132/33 kV Chilime Hub New GIS Substation is US$ 6,412,900.86 + NRS 547,472,116.35. The Power Grid Corporation of India has been awarded the consultancy service contract for the project supervision on 6th July 2016.

The scope of the project includes construction of 28 km long 220 kV transmission line from Chilime Hub to Trishuli 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 has achieved overall physical progress of about 74%. The progress on design/drawing approval, site leveling, river protection (15m section out of 50m), 7 (seven) numbers of foundation works with fire walls for, 53.33MVA, single phase auto transformers, major foundations of gantry structures are almost completed. Construction works like quarter buildings, boundary walls, foundation

for equipment like CB, CVT, and Isolator etc., control room building, Transit Camp are under progress. Major supplies like 245 kV GIS equipment and communication equipment have been dispatched and reached to the site. Power transformers and have been dispatched and will reach the site very soon. Other equipment like CB, Instrument Transformers etc. are under dispatch stages.

As of July 2021, regard to the transmission line construction of 25 out of 79 complete tower foundation and 12 nos. of legs foundation have been completed. Type test of insulators, GSW earth wire, testing of DB, DD, MB, MD tower type have been completed and type test of OPGW, Hardware is under the process. Major supplies like partial stubs, tower parts and conductors have been dispatched and reached to the site.

Various studies like feasibility study, IEE, LACP were completed in different phases of the project and technical, social & environmental monitoring & implementation is under progress with support of ESSD, NEA and the Consultant POWERGRID, India.

The major challenges to the project are the terrain, accessibility of road, protection works. Due to COVID-19 Pandemic, project is impacted and is re-scheduled to be completed by December, 2021.

Ongoing Foundation

2. Trishuli 3B 220 kV HUB Substation

There are numerous projects currently being constructed and in advanced phase of construction in the Trishuli basin, namely: Upper Trishuli 3A, Upper Trishuli-1, Upper Trishuli 3B, Sanjen, Rasuwagadhi and other IPPs. The objective of this Trishuli 3B 220 kV Hub substation is to accumulate about 600 MW of power 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 Pairebesi, Kispang Rural Municipality of Nuwakot district. The 220/132 kV transformer includes two Banks of 160 MVA Auto transformers (6 numbers of 220/132 kV, 53.33MVA Single phase auto transformers plus 1 number spare) and 132/33 kV transformer includes 50 MVA, 132/33 kV, 3 Phase Power Transformer. 220 kV switchyard bays shall comprise of Hybrid GIS.

The project cost is estimated to be US$ 17.29 Million with the joint funding of Government of Nepal, KfW Development Bank (German Bank) 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 US$ 12.5 Million and the contract became effective from December 20, 2017.

Since this is a very urgent project to evacuate the power from various IPPs in the Chilime-Trishuli corridor, the project is given a high priority. As of July 2021, the project has achieved overall physical progress of about 87%. The progress on design/drawing approval is about 97%, site leveling (95%) and rivulet protection (96%). Preliminary works like quarter building and boundary walls were completed in 2018.

7 (seven) numbers of foundation works with fire walls for 220/132kV, 53.33MVA, single phase auto transformers are ready for transformer installation.

67 out of 72 foundations of gantry structures have been completed and foundations for equipment like CB, CT, CVT, BPI, LA and Isolator etc. are under progress.

Major supplies like power transformers, communication equipment, CB have been dispatched and will reach to the site very soon. Other equipment like Isolator, Instrument Transformer, LA, BPI etc. are under dispatching stage.

Various studies like feasibility study, SEP, IEE, ESIA & LACP were completed in different phases of the project and technical, social & environmental monitoring & implementation is under progress with support of ESSD, NEA and the Consultant POWERGRID, India. Impact of the COVID-19 Pandemic, non-performance of the contractor and design reviews/approval are few of the major reasons for the delays of the project. Project completion period has been re-scheduled to January 2022.

3. Koshi Corridor 220 kV Transmission Line

There is a massive potential for hydropower generation in Taplejung, Panchthar, Sankhuwasabha, Bhojpur, and Terhathum districts Province 1, Nepal. In these districts, from within the Arun and Tamor river basin several hydropower projects have been identified, and some of those are under various stages of construction. The power generated from these hydropower plants require some a robust transmission line for evacuation and connection to the INPS. The objective of Koshi Corridor 220kV Transmission Line Project is the fulfilment of this requirement and to make the transmission and distribution network of NEA more resilient in this region.

This project is jointly financed by the Government of Nepal, and the Government of India supported Line of Credit from EXIM Bank of India. USD 90 million has been earmarked for this project of out the USD 250 million Line of Credit to 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 ~30km 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 ,220/132 kV; 2x 25/30MVA, 132/33 kV), Baneshwar (2x 25/30MVA, 220/33 kV), and Basantapur (2x 100MVA, 220/132 kV; 1x 20/30MVA, 132/33 kV) and Bay Extension (2x 220kV Bays) works at the Inaruwa substation.
- **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 of a 132/33 kV AIS (2x 15MVA). This transmission line will only be charged at 132kV level in the present scope of the project.

- Consultancy service is being provided by M/s WAPCOS India Ltd.
- In the present scope of the project, stringing of only single circuit will be carried out. With this infrastructure the transmission line will be capable of evacuating ~1,000MW of power. 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 Road So Far:

Despite the challenges in land acquisition, securing Right-of-Way, and forest land, formation of access roads and the social problems that form the part and parcel of development of any transmission line, Koshi Corridor 220kV TLP has successfully completed all foundations, all erections, and all of stringing associated with package KC1. Only final checking, testing, and commissioning remains. In the same vein, 75% of KC-3's transmission line's work has been completed so far.

Line (KC-1)

Hilly region of Koshi Corridor Transmission Line (KC-1)

Tower Erection under progress in Basantapur-Dhungesanghu section (KC-3)

Coming to substations, the Tumlingtar, and Baneshwar substations are almost ready and is in the final stages of testing before commissioning. Dhungesaghu and Basantapur Substations are a little behind but construction work is going on strongly despite the inclement climate of continuous rain and fog, despite the pandemic induced disruption in supply chain, and access road that is hard to travel and maintain.

Under constructional Tumlingtar substation view in Night (KC-2)

Baneshwar substation (KC-2)

Control Room Building at Baneshwar substation (KC-2)

Challenges:

The Pandemic: The novel coronavirus pandemic is the most prominent culprit in this category. The pandemic has disrupted the supply chain affecting the influx of the variety of skilled human resources and materials. Sealed borders, hesitant labours, and disturbed manufacturing and supply system has severely impacted the progression of the project.

Climate: The various sites of this project are spread out across Sankhuwasabha, Taplejung, Terhathum, Dhankuta and Sunsari districts presenting a wide range of elevation and climatic conditions from as little as ~100m above msl to ~3,000m above msl. From the tropical heat to freezing cold. Where workers are hard to retain and very few hours per day are conducive to physically taxing jobs. In the high elevation areas, long durations of rain, fog, snow and hail slow down workers and machinery.

Access: Access to some tower locations, and especially the Dhungesanghu substation site is only available for a few dry months a year. During the rest of the year said route can only be traversed by very specific vehicles and by heavy equipment—that too with great difficulty. This obvious effect in supply has

large consequences in the whole of substation works.

Miscellaneous: Transmission line works, in all areas are riddled with social issues, bureaucratic quagmires in acquisition of land, securing right-of-way, and forest land.

Target:

KC1: The completion of all facilities of KC1 is expected by September, 2021.

KC2: The completion of all facilities at Tumlingtar SS, Baneshwar SS, and Inaruwa Bay Extension works is expected by September, 2021. Basantapur substation, given its challenging climate and topography is expected to be completed by October, 2021.

KC3: The completion of all facilities under KC-3 is expected by December, 2021.

4. 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 New Lekhnath to New Damauli, and 220/132/11kV substations at Lekhnath (600 MVA) and New Damauli (64 MVA). The cost of this project is estimated at US$ 65 Million. The project is funded by the GoN and Germany (KfW). The project is expected to be completed in F/Y 2080/81.

As of July 2021, detailed survey, feasibility study, Initial Environmental Examination (IEE), baseline Survey for Avian species, procurement of the Project Implementation Consultant (PIC), and the Environment and Social (E&S) Consultant have been completed. Land acquisition for the New Damauli Substation and its access road have been completed. Crop compensation for the affected landowners has been distributed during the Land acquisition for the Damauli substation. Environment and Social (E&S) Consultant, ERM, is preparing the Rapid Assessment & Risk Screening of new Damauli Substation, Habitat Assessment and Biodiversity Action Plan (BAP), Environmental & Social Management System, Resettlement Action Plan (RAP), Grievance Redress Mechanism (GRM). Project Implementation Consultant FICHTNER, Germany, is currently preparing the detailed design and Bid Document of the project for the tendering process. The tender of Access Road and Bridge at New Damauli Substation has been floated.

Geotechnical Investigation Works (Test Pit) of Chabdi Khola for Bridge construction at New Damauli Substation.

Projects under Planned and Proposed

1. Tumlingtar-Shitalpati 220 kV Transmission Line
2. Trishuli 3B- Ratmate 220kV Transmission Line
3. Dhaubadi Iron Mines Electricity Transmission Line
4. Dharan 220/33 kV Substation

III. Major 400 kV Transmission Line Project

Projects under Construction

1. 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 400kV 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 scope of project includes 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 contract had been awarded to ABB India Limited on December 2017 (latter on assignment of the project had been transfer to Linxon India Pvt. Limited on July 2020). The cost of project is US$17.58 million and NPR 220.33 million. Despite covid-19 pandemic and lockdowm imposed by GoN the construction of the Dhalkebar substation has been completed and in operation since November 11, 2020. Honorable Prime Minister of Nepal KP Sharma Oli inaugurate the substation on February 1, 2021 (BS 2077-10-19).

Tamrapatra anabaran of 400 kV Dhalkebar Substation by PM KP Sharma Oli

Similarly, for the construction of 400 kV GIS substation at Hetauda and Inaruwa, contract has been awarded to Siemens Limited, India on December 2018 and expected to be completed on December 31,2021. The estimated project cost is US$ 28.41 million and NPR 410.54 million. As a consequences of COVID-19 pandemic and lockdown imposed by Government of Nepal, the works schedule of the substations has been affected. As of July 2021, the majority of engineering & design works has been completed. Majority of equipments including 400 kV GIS, 400/220 kV outdoor equipments, reactors, transformers, CRP & SAS Equipments, PEB Building Materials etc. are already reached at both site while several items including Battery & charger, Communication equipment, firefighting

material, earthing materials have been dispatched from respective factories. GIS Hall foundation works is completed and is ready of installation of PEB superstructure at both sites. Civil foundation works for transformers, reactors, towers, equipments structures and Structural part of the buildings works are completed at both sites. The installations of tower & equipment structures, finishing works of the CRB, Cable trenches etc. work is in progress. Installations works will be stated immediately after received of equipments at sites.

Under construction 400 kV GIS Hall at Hetauda

400 kV Transformer and Reactor at Inaruwa

2. Bheri Corridor 400 kV Transmission Line

This project is initiated by Nepal Government (NG) under Energy Crisis Eradication budget head to electrify Rukum (West) district, since it hasn't been connected to National grid yet. Objective of this project is to evacuate power from Uttarganga Hydro Power Project as well as IPP's upcoming in the Sani Bheri river basin and its tributaries. The project is started in 2072/073 and expected to be completed in 2080/081.

The scope of the project comprises of construction of about 25 km long 400 kV double circuit transmission line from Bafikot (Rukum west) to Nalsingadh Hydropower project (Jajarkot), which crosses various municipality/ VDC's of Rukum (West) & Jajarkot district. The scope also includes the construction of one 400/132 kV, 200 MVA Uttarganga substation hub at Bafikot, Rukum (West).

As of July 2021, the land acquisition for the Uttarganga substation hub at Bafikot, Rukum (West) has been completed after long detainment of around 3 years due to numerous reasons. Tendering for Civil works at substation land has been completed recently. Detail field survey of Substation areas, line route, Initial environmental examination (IEE) works along with preparation of office estimate works is aimed to be started simultaneously by FY 2078/079.

3. Ratmate-Rasuwagadhi-Kerung 400 kV Transmission Line

The Ratmate – Rasuwagadhi - Kerung 400 kV Transmission Line Project is being implemented as the first power grid interconnection of Nepal with China in line with the government policy to ensure energy security by facilitating cross-border electricity trade between Nepal and Tibet of China. This will open new avenues in terms of electricity market in Nepal as the rising demand of electricity shall be fulfilled by importing from China and to export surplus energy after a few years in near future. So, the power interconnection is one of the major components to carry out the development projects between Nepal and China for

connectivity. The project was initiated in the year 2017. The project cost is estimated to be around US$ 96.79 Million.

Scope of the project consists of design, supply and construction of approximately 70 km of 400 kV double-circuit transmission line with Quad Moose ACSR conductor from Rasuwagadhi border point at Rasuwa district to Ratmate substation at Nuwakot district, via proposed Trishuli Substation. Furthermore, DC converter station is to be constructed at Gyirong County, Tibet for the purpose of power exchange between two countries and a 400 kV substation is to be constructed at Ratmate, Nepal for evacuation of the power to load centers.

As of July 2021, the detail survey works for this project is being carried out and final report Phase-I (Transmission line) and draft report Phase-II (Substation) have been prepared. The route alignment of the transmission line has been optimized as per the GIS routing tools of spatial sciences. Similarly, Environmental Impact Assessment (EIA) study is being carried out by NEA Engineering Company ltd, after obtaining the relevant permissions from Department of National Parks and Wildlife Conservation, Government of Nepal, as the northern portion of the proposed route alignment passes through Lamtang National Park. Survey and demarcation works at proposed Trishuli Substation area have been completed so far and detail design works are being carried out.

Furthermore, Load flow analysis of the Nepali side of the Ratmate-Rasuwagadhi-Kerung 400 kV line has been conducted. Forecasted Power capacity and Energy balance report of the Integrated Nepalese Power System has been sent to the State Grid Corporation of China, Beijing and similar report of Tibet Electric Grid has also been received.

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,construction of Hetauda-Bharatpur -Bardaghat 220 kV Transmission Lines and concomitant 132 kV substation at Hetadua, Bharatpur and Bardaghat. In addition, Transmission System Master Plan of Nepal had been prepared under this project and 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

1. Hetauda-Dhalkebar-Inaruwa 400kV Transmission Line

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 check and construction supervision Consultant for 400kV Hetauda-Dhalkebar-Inaruwa Transmission Lines and Hetauda-Dhalkebar-Inaruwa 220kV substations construction works. This project was started on year 2012 and likely to be completed by year 2022. The estimated project cost is around US$ 170 million and it is funded by World Bank. For this, contract has been 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 2022.

The scope of the project includes 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, and 220 kV line bays for the termination of 220 kV double circuit lines from Khimti.
- 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.

As of July 2021, Out of 792 tower pads, 659 foundation have been completed and 633 towers have been erected . The remaining parts mostly fall in the forest area and the process of tree-cutting and stacking along the right-of-way of the route is under process in Makwanpur and Bara districts. There is public dispute at some location which is also hindering the progress. Out of eight pile foundations, two pile foundation work at Koshi river has been completed.

Similarly, for the construction of 220/132 kV Substation at Hetauda, Dhalkebar and Inaruwa, Contract was awarded to Central China Power Grid International Economic & Trade Co., China on June, 2014 but due to non-performance of the contractor, contract was terminated on September 22, 2017. After termination of the contract, 220/132 kV Dhalkebar substation balance works has been awarded to M/s Telmos Electronics on January 23, 2018. Initially, Dhalkebar-Muzzaffaur 400kV Transmission Line was charged at 132kV importing 100MW power from India. After successfully charging of 220kV Dhalkebar substation at 220kV voltage level on August 16, 2018, 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 220kV AIS substation. The capacity of 220/132kV Dhalkebar substation is 950 MVA.

In addition, the 220/132 kV Hetauda and Inaruwa substation balance works has been awarded to M/s Consortium of Siemens Limited and Telmos Electronics on December 20, 2018. As of now, for Hetauda and Inaruwa substation majority of the substation equipment delivered at site. At Hetauda substation, about 80% of 220kV switchyard equipment and gantry tower erection completed and water tank work is in progress. At Inaruwa substation

220kV equipment, gantry tower erection, about 90% of 132kV equipment and gantry tower erection has been completed. Control building, Switchyard Panel Room (SPR), cable trench, 33kV equipment foundation, transformer foundation and other civil works are in progress. The project is expected to be completed by the year 2021.

400 kV Tower Erection Works

2. Hetauda – Bharatpur - Bardaghat 220kV Transmission Line

Objective of this project is to enhance the transmission capacity and bolster the reliability of the Integrated Nepal Power System (INPS). With its 220 kV transmission line 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.The project was started in 2008 and funded by World Bank.

2.1 Bharatpur-Bardaghat 220 kV Transmission Line.

Scope of the project is to construct of a 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, 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 US$ 5.5 Million.

As of July 2021, out of 246 tower pads, 244 tower foundations, 244 tower erections and stringing of 134 circuit kilometers of conductors have been completed. 100% of the site is cleared and 90% of Project Affected Families (PAFs) are compensated for their structure damage. The line is expected to be completed by December, 2021 as there is significant divergence from proposed schedule expecting to completed by the end of next month because of the stay order issued by the Supreme Court of Nepal against the construction work in Dumkibas (the disputed area) and the nationwide lockdown (and thus complete abandoning of site activities for the period) due to Covid-19.

2.2 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 for the same was signed on March 9, 2009 with the contract value of US$ 15.3 Million but was terminated on 29th April, 2019 due to contractor's non performance. After the termination of contract, new contract for the balanced work was awarded to M/s KEC

International Ltd., India on 5th June, 2020 with the contract value of US$ 5.4 Million plus NPR 368.8 Million.

As of July 2021, Hetauda - Bharatpur line section: out of 226 tower pads, 196 tower foundations have been casted, 121 towers have been erected, a 20 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 new Contract for balanced work with KEC International Ltd. covers all remaining activities of the project and is expected to be completed within 15 months from the effective date of the Contract.

The scope of this project also includes 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 same was signed on December 16, 2009 with the contract value of US$ 5.8 Million.

As of July 2021, the overall progress of the construction of substation is about 96%. Almost all the equipment have been supplied and the installation works is about to complete.

Projects under Planned and Proposed

1. Arun-Inaruwa-Tingla-Mirchaiya 400 kV Transmission Line

As a part of project preparation studies, under the Power Sector Reforms and Sustainable Hydropower Development Project funded by the World Bank, NEA has undertaken the feasibility study and detail design of three transmission lines and concomitant substations in the Eastern part of Nepal namely (i) about 100 km long Inaruwa-New Anarmani 400 kV Transmission Line and substations (ii) about 130 km long Inaruwa-Arun 400 kV Transmission Line and associated Substations (iii) about 115 km Long ArunDudhkoshi-Tingla400 kV Transmission Line and associated substations. For feasibility study and detail design contract was signed with ELC Electroconsult S.p.A, on 23rd September, 2019. As of July 2021, desk study and walkover survey for all three transmission line has been completed and the power flow study is underway. For the Environmental and Social Studies, contract was signed with WAPCOS Limited, India on 25th July, 2021. Both feasibility study & detail design and environment & social study is expected to be completed by September 2022. After the completion of the study, the construction of transmission line and associated substation will be taken up by arranging the necessary funds.

IV. System Operation Department

The Load Dispatch Centre (LDC) centrally located at Siuchatar, Kathmandu under the System Operation Department (SOD), Transmission Directorate is the core center for operation, monitoring, and control of integrated Nepal power system (INPS) to ensure continuous and quality power supply to consumers. The SCADA (Supervisory Control and Data acquisition system) set up in LDC facilitates collecting real time system data of generators and power system elements like transmission lines, power transformers, feeders, etc. of the interconnected system thus contributing considerably for monitoring and supervision of the system for proficient system operation. The major highlights of this fiscal year are presented below.

1	Annual Peak Demand	1481.85 MW	1/13/2078
2	Annual Energy Demand	8960.31 GWh	
3	Annual Load Factor	69%	

4	Total export Energy	32.38 GWh	
5	The maximum Energy demand of the Day	30.53 GWh	1/30/2078
6	The maximum power imported in a Day	846.74 MW	1/14/2078
7	The maximum Energy import of the Day	18.30 GWh	1/15/2078

**based on LDC data*

The key accomplishments of LDC in this Fiscal Year

- **Participation in IEX DAM**

NEA started to purchase power from India by participating in Day Ahead Market through Indian Energy exchange and trading partner NVVN. Nepal is the first country to participate in Indian energy Market. The required quantum can be purchased on day ahead basis, which enables system operator to operate the system efficiently balancing supply and demand. The power trading unit in LDC has a responsibility to bid daily on IEX-DAM. So far 144832.13 MWh of energy has been purchased from IEX in this FY.

- **Up gradation of system voltage:**

The up gradation of Dhalkebar- Muzzafarpur 220 kV line to 400 kV on 2077/07/26 with commissioning of Dhalkebar 400/220/132 substations and operation of newly constructed Dana-Kusma 220kV line helped meaningfully to maintain the system voltage at desired level. Furthermore up to 350 MW power from Muzzafarpur India has been imported which helps to cater the growing demand of power in the country especially in dry season. Similarly Dana-Kusma 220kV transmission line made possible to evacuate power generated from some of the IPPs from that reason. The commissioning of New khimti 220/132 kV substation on 2078/03/20 helps immensely to strengthen the grid as 220 kV transmission line from Upper Tamakoshi hydroelectric project is connected to the grid via this substation. The addition of Samundratar 132/33 kV substation and Samundratar- Trisuli 3B transmission line on 24th June 2021 benefits upcoming IPPs from that region as their generation can easily delivered to INPS and growing power demand of the area can also be met.

- **Frequency and voltage control:**

Frequency and voltage are the crucial parameters of the power system as it determines the quality of power supply to costumers. In this FY, most of time the system frequency is maintained at 50 Hz. In this FY, 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. However, in mid-western region, occasionally system voltage was recorded low than permissible limit in some substations. However due to installation of capacitor bank in various strategically located substations by Grid Department and the effective monitoring by LDC, voltage is maintained at the desired level.

- **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 of power from India. This has enabled LDC to realize the economic dispatch of power keeping voltage and frequency of the system within a standard limit. This fiscal year generation of Kulekhani 1 and Kulekhani 2 storage plant has increased by 21% and 17 % respectively as compared to last year. Despite the Kulekhani water being best exploited in this fiscal year, the tactical planning of Kulekhani water level

by LDC aided to maintain the respectable level of reservoir at present also. Similarly, the generation of other NEA ROR and PROR plants has also increased considerably due to the well-organized operation of the system.

- **Shutdown coordination:**

On the coordination of LDC, major power plant like Kaligandaki-A, Marsyangdi took shutdown for overhauling of their unit (generator) in this FY. Also major shutdowns of transmission lines were completed. 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 system by the operator during the shutdown period has made it possible to supply power with minimum interruption.

- **Partial system tripping:**

The persistent monitoring of the system and the prompt decision of the operator during abnormal situations has helped significantly to control the partial tripping of the system. In this fiscal year the number of total partial system tripping has dropped down to 40 as compared to 41 last year. This has contributed a positive impact on the financial shape of the NEA.

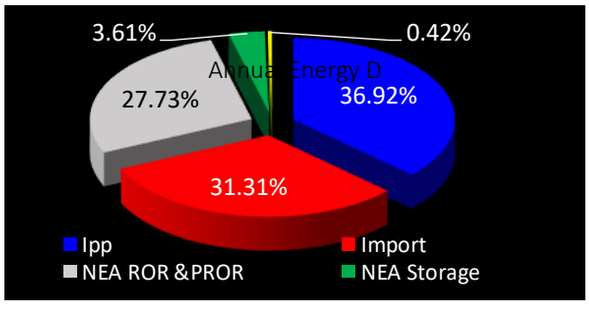
- **Maintenance of SCADA and communication facilities:**

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 component of SCADA: RTU, Communication equipment and optical fibers, master stations. A significant amount of revenue is being received annually by leasing (to Nepal Telecom and other private companies) optical fiber cable.

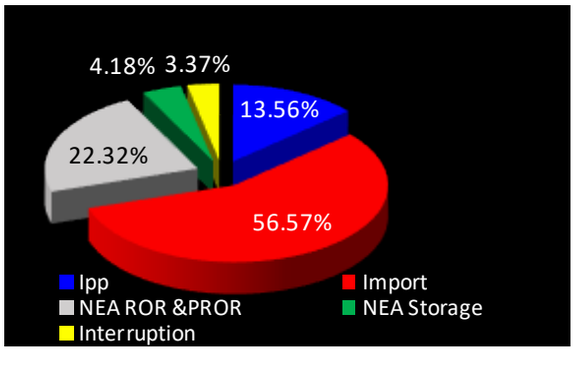
- **Status of Supply and Demand:**

In this fiscal year, 221 MW of power is added to the INPS including one unit of Upper Tamakoshi3A (75 MW), Mistri Khola (42 MW) and other IPPS. which facilitated to fulfill the increasing demand of the system and also helped to minimize power import to certain extent. The quantum of imported power has increased by 78.45 % as compared to last year whereas the generation of IPPs and NEA storage plant has been increased by 19.82 % and 35.54 % respectively. The overall energy demand and peak demand increased by 11.7 and 9.11 percent respectively in this FY.

The contribution of different sources to meet the total annual energy demand and Peak demand of the INPS for the fiscal year 2077/78 is given below.



Demand management from contribution of different sources



Peak Demand of the year management from contribution of different sources

III. Challenges

- Because of an addition of the generation in system, the existing ageing transmission structures are inadequate to transmit power to load centers. Depending on the system scenarios, the transmission line Hetauda-Bharatpur 132 kV, Damauli-Bharatpur 132kV, Bharatpur-Kawasoti-Bardghat 132 kV were being operated almost in full capacity continuously which might have instigated the power cut in some areas.
- In this fiscal year, in the first week of Ashadh, high flood had damaged completely one tower of New Marsyangdi-Middle Marsyangdi transmission line and some towers of Indrawati –Panchkhal 66 kV transmission line. Thus significant quantum of power is unavailable in the system creating difficulty in smooth operation of the system.
- The frequent forced outages of power plants during rainy season and frequent unforced shutdown of transmission line has created difficulty in the smooth operation of the system.

IV. Future Plan

NEA is planning to synchronize the Indian system with INPS. The objective of this arrangement includes the installation of SPS (special protection scheme), Communication and SCADA system within the Nepalese power system. LDC has been given responsibility to implement the project. For the same, the contractor had been already selected for the execution of works to install the SPS system at existing Dhalkebar, Chandranigahapur, Kamane, Bharatpur, Butwal, Hetauda, Bhaktapur and Lamahi substations. The strengthening of the protection system and the communication system of present INPS are also on the contractor's scope of the work. Synchronization of two grids will increase the reliability and security of the INPS system as well as creates an opportunity for power exchange between two countries through market transactions.

V. Grid Operation Department

Grid Operation Department (GOD) is one of the department 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 & higher voltage substations and transmission lines upto 400 kV. This department also carry out preventive and breakdown maintenance works of the substation and associated transmission lines. The extension, replacement works, reactive compensation, rehabilitation and reinforcement works etc of substations are also performed by 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 400kV Dhalkebar - Muzzaffurpur transmission line which was charged at 400 kV Voltage level on 2077/07/26 and owned by Power Transmission Company of Nepal (PTCN) is also done by this department. It supervises three division offices in Kathmandu, Hetauda, Butwal and four branch offices in Duhabi, Pokhara, Attaria & Dhalkebar.

A. Major reinforcement/upgradation works performed

This department has executed numbers of transformer reinforcement/upgrading works at various substations. Up-gradation, reactive power compensation and rehabilitation of power system equipments 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. Reallocations 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. The department has carried out and completed various up-gradation and reinforcement works in FY 2077/78 (2020/21) which are attached in the report.

B. Major reinforcement/upgradation works in progress

The major up-gradation & reinforcement works for various substations have been initiated and these works are under progress as attached in Annexure B.

C. Grid Connection Agreement

The Department has successfully accomplished the Grid Connection Agreement with 25 IPPs (Independent Power Producers) for 701.67MW capacity to meet future load demand.

D. Major Maintenance works

The following major maintenance works have been completed in FY 2077/78.

a. Relocation of damaged Tower No. 205 of Siuchatar- Marshyangdi 132kV Transmission Line at Kurintar. The Tower was damaged due to landslide.

b. Rearranging of phase sequence at Khimti Substation for synchronizing Dhalkebar 132kV and Lamosanghu 132kV Transmission Line.

c. Repair of damaged Tower No. 183 of Siuchatar- Marshyangdi 132kV Transmission Line. The Tower got damaged as it was struck by large stone due to landslide.

d. Synchronization of Raxual Line with INPS after phase sequence re-arrangement at Parwanipur Substation.

e. Erection of ERS Tower for Tower no. 9 of Middle Marshyangdi to Marshyangdi 132kV Line. The Tower was totally damaged due to Landslide.

f. Total of 105 relays were tested at various substations.

g. Total of 69 energy meters were tested.

E. Transmission Loss Status

Comparison of Transmission Line Loss of different F/Y.

S. No.	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%
8	2077/78	8,170,175.54	7,791,266.08	378,909.47	4.64%

DISTRIBUTION AND CONSUMER SERVICES DIRECTORATE

Distribution and Consumer Services Directorate (DCSD), one of the major directorates of Nepal Electricity Authority (NEA), is responsible for overall management of electricity distribution network and services throughout the country. This directorate is mainly responsible for planning, expansion, operation, maintenance & up-gradation of electricity distribution networks, substations up to 33 kV voltage level and consumer services activities, for instances consumer connection, grievance, meter reading, billing and revenue collection through 129 distribution centers (DC) throughout the country. In addition, the operation and maintenance of off grid small hydro power plants falls under the jurisdiction of this directorate.

Recently, DCSD has introduced smart meter reading and billing technology called advanced metering infrastructures (AMI) with plans to expand all over the country.

This directorate is headed by deputy managing director as a chief of DCSD. Planning and technical services department (PTSD) and community rural electrification department (CRED) are two departments at the central level and seven provincial & two divisional offices, headed by provincial/division chiefs, to help manage overall distribution and consumer services in effective and efficient manner under this directorate.

DCSD is the largest directorate of NEA in terms of number of employees and business. Based on approved positions74.23% of the total staff of NEA are working under DCSD. The directorate is in leading front to earn revenue for sustaining planning, expansion, operation, maintenance and growth of NEA.

Performance Highlights

In FY 2020/21, total number of consumers under DCSD reached 45,28,411 an increase of 7.37% this year.

Customer Category	No of consumer (% of total consumers)	Sales %	Revenue %
Domestic	92.91%	43.05%	39.63%
Non-Commercial	0.64%	2.80%	4.07%
Commercial	0.71%	7.02%	10.33%
Industrial	1.34%	38.69%	39.00%
Others	4.39%	8.44%	6.97%

Similarly, in FY 2020/21, a total of 7,277.147GWh of energy was sold earning gross revenue of Rs. 70,997.228million. Industrial and commercial categories together

constitute only 2.06% of total consumers but share 45.71% of total sales. Similarly, domestic consumer category represents 92.91% of total consumers but contributes only 43.05% to the total sales.

Programs and Activities

The programs and activities of DCSD were hit hard in F/Y 2020/21 by covid-19 induced lock downs & prohibitory orders all over the country. Similarly, shortage of materials like insulator & hardware, ABC cable also contributed its share due to rift in procurement management.

Despite covid-19 epidemic, DCSD took special drives to monitor and execute loss reduction, metering & billing, and elevating amount receivables. The goods on stock were closely monitored which resulted in substantial decrease in the stock material/amount. As part of expansion and reinforcement of distribution system, many programs, projects and activities were undertaken by departments and provincial/divisional offices in F/Y 2020/21 to expand and improve supply quality and service delivery.

Queue management System using token at Lekhnath Distribution Centre

Safety of Personnel and Equipment:

Safety has become a big challenge for DCSD with extensive expansion of distribution network throughout the country. Thus, safety of personnel and equipments has been put in high priority. NEA employees have been regularly trained for workplace electrical safety. Safety awareness campaign has also been organized for common people through various media platforms.

Like previous years, NEA marked Chaitra 26 as "Electrical Safety Day" organizing an interaction program at the center in collaboration with society of electrical engineers (SEEN). Provincial, divisional and distribution center offices marked the day with safety day interaction with employees, displaying safety related banners, posters, pamphlets etc. However, mass scale programs could not be organized due to covid-19 protocol issued by the government.

Awareness program to students of Bhimodaya Secondary School conducted by Arughat DC on the occasion of Electricity Safety Day 2077

Loss Reduction Activities

Distribution loss reduction is the high priority area, thus, was addressed mainly by two separate ways: reduction of non-technical and technical losses. In the year under consideration, special efforts were made to identify/segregate loss prone areas and matching actions were taken to reduce both technical and non-technical losses. Losses were monitored at the central level and directives were issued to the lower level to improve overall loss situation.

Provincial/ Divisional offices were assigned loss targets to achieve within the fiscal year. This was also linked with the performance evaluation of distribution center chief.

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

- Continuous loss reduction program was carried out for hooking control. Teams were mobilized 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 with TOD meters were done.
- Replacement of electromechanical meters, both three & single phase, with smart digital meters and replacement of unmatched current transformers were carried out to eliminate possible errors in multiplying factors.
- Theft control public awareness media campaign was organized in the central as well as provincial/divisional level.
- Handheld meter reading devices (HHD) uses were augmented to minimize human errors at meter reading and improve the energy sales. It also has helped for efficient functioning of online payment system.
- Special effort was made with the help of employees, trade unions, local administration, govt. bodies etc. in meter tamper investigations and action was taken for electricity pilferage.
- Replacement of bare conductor with Ariel Bundled Conductor (ABC) cable in loss prone areas.
- Upgrading of overloaded conductors and transformers were also carried out to reduce the technical losses.
- Addition of new feeders and distribution transformers in loss prone areas were also carried out to curb line loss.
- Projects were lunched with covered HT conductor & ABC LT conductor to reduce loss & improve quality of supply.
- Electromechanical meters of 25-50 kVA consumer range were continued to replace with electronic (TOD) meters.
- New three phase connections for lesser load are being made through smart meters only.

Despite the measures taken as listed above, distribution system losses accounted 11.64% which is higher than last year's value of 10.28%. The following factors contributed to the increased loss.

- Due to covid-19 induced lockdown/ prohibitory orders, distribution infrastructures could not be upgraded as planned, but the overall energy consumption increased.
- Massive non technical loss control campaigns could not be organized due to Covid situation in the country. Local administration were busy containing virus infection, thus could not support NEA local offices as in previous years.
- A section of people are taking services of NEA apps for self meter reading, but, still, significant mass of people are adamant to use digital platform. Thus, overall meter reading was poor due to restriction of movement during lockdowns.
- Hostile public attitude towards loss & theft control activities and adverse working conditions at local levels especially in Terai and some hill areas played its role to increase loss.

Installation of 11/0.4, 50 kVA Distribution Transformer under Solu Corridor Rural Electrification Project

Demand Side Management

The electricity supply-demand gap in the country is still significant. For the sake of meaningful & efficient use of electricity, people are consistently advised to use efficient LED lights instead of conventional, energy-intensive incandescent, CFL lamps and other inefficient appliances. DCSD undertook media campaign in this regard this year also.

Besides, the electricity supply scenario is expected to improve significantly once the Upper Tamakoshi and other NEA/Chilime subsidiary projects are brought into operation shortly. Various generation projects from IPPs are also under construction and are expected to complete soon. NEA thus is, also trying to diversify the use of electricity in other areas as electric vehicles (EV), cooking, heating and cooling, etc.

Construction of 33/11 kV, 6/8 MVA Dorambha Substaion at Ramechhap

Future Plans and Programs

With the elimination of load shedding, NEAhas shifted its dedication to supply safe, reliable and quality electricity to its consumers. NEA's future programs are thus focused to meet peoples' aspirations through improved supply quality and customer care services.

- NEA is executing distribution system expansion plan to avail electricity for all within next 2 years and upgrade its networks so as to enhance per capita consumption to 700 units by F/Y 2022/23
- With cooperation from federal, provincial and local governments, NEA has been able to fully electrification in16 districts this fiscal year; Morang and Jhapa in Province No. 1; Saptari, Siraha and Sarlahi in Province No. 2.; Lalitpur, Sidhupalchowk and Dolakha in Bagmati Province; Kaski, Baglung, Manang and Mustang in Gandaki Province; Rupandehi, Parasi and Banke in Lumbini Province; and Kanchanpur in Sudurpaschim Province.

11 kV line maintenance work under Mahendranagar DC

- Thus, with fully electrification is 16 districts in last (2019/20) fiscal year: Sunsari and Dhankuta in Province No. 1; Bara, Parsa, Dhanusha, Mahottari and Siraha in Province No. 2; Kathmandu, Bhaktapur, Rasuwa and Nuwakot in Bagmati Province; Parwat and Syangja in Gandaki Province; and Bardia, Gulmi and Kapilbastu in Lumbini Province, Total number of fully electrified districts have reached now to 32 districts.
- DCSD is planning to complete substantial electrification of Taplejung, Ilam, Terhathum, Panchthar and Udaypur, in Province No. 1; Kavre, Dhading, Ramechhap, Chitawan 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; in total of 22 districts in upcoming F/Y 2021/22.
- Province No. 2 is now fully electrified province of the country.
- High system loss is a major challenge for NEA. DCSD is trying to make every effort to bring down the distribution system loss which contributes adversely in its financial health.

Initiation of One Door System for assistance to public at Lekhnath DC

DCSD has implemented centralized customer care center (one door system) to ensure single point of contact for all consumer related activities, timely service, less processing time for new connection and centralized control and monitoring over the entire customer care process in some distribution centers and has plan to expand it.

- NEA is also planning to improve the quality of the services through the use of new capacity building technologies to meet the challenges of new environment in utility business. Consumer complaints are being addressed without delay and the procedure for new connection related works are being made simple and user friendly.

NEA has been implementing online payment through internet based payment system for consumers. High value consumers are also planned to provide with such facility in coming year.

33/11 kV, 6/8 MVA Chautara Substation

- DCSD has also initiated electronic metering system for its domestic (low end) consumers and also to make its distribution network underground in some selected urban areas.

Some of the major highlights of work executed by various departments under DCSD are listed in the following pages.

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 works 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 & 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 construction standards and guidelines for electrical installations and construction activities up to Voltage level 33 kV.
- Testing and locating faults of underground cables of 11 kV & 33 kV feeders throughout the country with the help of cable testing equipment along with technical support.

177 collection centers out of 181 have computerized billing system. It is planned to extend the system to all centers in 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 Rs 20,46,78,516.43 from 158 consumers was done 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 & download, and recommended for re-programming, replacing & 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 validation of output data was done so that AMR could give required data in desired format.

Major projects executed under PTSD are listed with brief description in the following pages.

A. Computerized Billing and Networking Division

Computerized Billing and Network Division has always been striving towards enhancing the revenue collections of NEA. Our M-Power Billing System Software, currently in the De-Centralized System architecture, still has been a very competent billing system, providing NEA with several features and modules for monitoring the entire process and transparency of the revenue management system.

M-Power has already been implemented in 178 revenue collection centers out of 181 revenue collection centers. This Division has targeted the data migration/implementation of M-power Billing System in all the remaining revenue collection centers of NEA within this Fiscal Year. Currently M-Power Billing System covers more than 99.6% of the total consumer's count and also covers more than 99.8% of the total NEA revenue.

Handheld Meter Reading Device (HHD) is currently operating in more than 130locations. HHD has helped in reducing human errors during meter reading and improving the energy sales. With the innovation in new technology, the division has implemented Online Meter Reading Handheld Device (SBM-Spot Billing Machine) with GPRS functions in 60 revenue collection centers. The meter reader directly uploads the meter reading data to the concerned branch server, collecting the data from the consumer premises which results in efficient meter reading.

Web Based Services has been provided to the consumer that helps to view the bills, where the consumers can query regarding bills through NEA website. The Consumer Management Information System (LAGAT) has been implemented in various revenue collection centers which will help to keep the consumer's database up to date.

Online Payment Collection system was introduced from Bhadra, 2074 and has been successfully implemented in 176 revenue collection centers. This system has focused all groups of consumers where the consumer can pay their electricity bills through various online banking, mobile banking services, kiosks, cooperatives etc. Online system has eased the difficulty of the consumers for waiting in queue for hours just to pay the electricity bill, saving time and money by reducing travelling expenses on the way to billing counters. Currently, more merchants have been added to the Online Payment Collection System, so that consumers can pay their electricity bills with more ease, within and outside country as well.

Any Branch Payment System (ABPS) has been implemented inside Kathmandu valley, helping the consumers to pay their bill in any locations within Kathmandu valley. It has facilitated NEA to collect revenue and get analytical reports on time.

In the process of striving to the excellence, Computerized Billing and Network Division has enhanced the online meter reading Hand Held Device by providing SMS facilities to a limited quantity of consumers after meter reading to make paperless environment which will help in financial savings. This service shall be provided to all consumers in the future as the system becomes more stable.

With the concept of making centralized system, Computerized Billing and Network Division are planning to move on Digital Collection Centre to reduce the hustle and bustle of the collection counters.

Computerized Billing and Network Division along with IT department has enhanced existing DCS Activities to get a Real time Revenue Management Information which will help MIS for Data Analysis and evaluate NEA's financial health.

Due to the covid-19 pandemic, lockdown had been implemented in various parts of the country, due to which meter reading has been affected for several months. Hence,with the concept of automation, globalization and moving towards consumer's easiness, Online Self Meter Reading System has been introduced from Jestha, 2077 which has been successfully implemented in more than 100 revenue collection centers. This system has focused all groups of consumers where the consumers can effortlessly enter their present meter reading, through online web application as well as mobile application. Online Self Meter Reading System has eased the consumers to read and enter their meter reading details.

Computerized Billing and Network Division has coordinated with many other offices to generate information regarding consumption patterns for tariff fixation processes, network related works, revenue data for accounting purposes, consumer information for the usage

of Smart Meter implementations and other purposes.

B. Smart Metering Smart Grid Project

The scope of the project includes:

Phase 1: This phase includes implementation of Automatic Meter Reading (AMR) System with implementing Advanced Metering Infrastructure in TOD meters like EDMI, Bluestar, Actaris, Wasion, Risesun. For this purpose, 10,000 Intelligent GPRS/GSM Modem has been procured. Out of the procured modems, 8198 modems have been installed in consumer sites. This phase work had been completed. The information like billing data, load profile, instantaneous data, event tampers can be retrieved via AMR/AMI system. The Integrated Branch Billing data can be retrieved through email and SMS. Server setup with all hardware and Network is completed.

Phase 2: This phase includes installation of Smart Three phase energy meter replacing three phase whole current electromechanical meter. The programming of these smart meters can be executed remotely and supply can be controlled remotely in case of due payment. Out of 60,000 Three Phase Smart Meter, 60,000 meters have been delivered to NEA. Out of 60,000, around 43500 Electro- mechanical meters are replaced with the new Smart Meter and about 16500 meters are installed as new connections. Out of 43500 smart meters installed, 3500 consumers' demand was found increased and 1000 defaulter's lines were disconnected. About 350 lakhs was collected from those consumers within a month. The billing of consumer reading is integrated with M-power Billing System. The system is two-way communication allowing AMI system to read and write as per requirement. The mode of communication between meter and system is GPRS.

Phase 3: This phase includes remaining installation of Smart Three phase energy meter replacing three phase whole current electromechanical meter. The programming of these smart meters can be executed remotely and supply can be controlled remotely in case of due payment. Total 50,000 Three Phase Smart Meters are procuring in this phase it will help to replace the existing Electro mechanical with Smart Meters and for New connection also the smart meters shall be used as New connection. The AMI system is two-way communication which helps in read and write as per requirement. The mode of communication between meter and system is GPRS/GSM. The SMS command is used in case of failure of GPRS or AMI System failure to get the consumption, programmed demand, APN Name, URL, Postpaid mode, Prepaid Mode and many more information can be available in SMS Command.

C. Solu Corridor Rural Electrification Project

Under the project, distribution system will be expanded and reinforced for people and places affected by Solu Corridor 132 kV Transmission Line Project, by constructing 158 km of HT line, 330 km of LT line and installation of 79 numbers of 11/0.4 kV distribution transformers and also upgrading of existing poles, conductors and transformers in Solukhumbu, Okhaldhunga and Udaypur districts of Nepal.

Charging of 11 kV Lines and Distribution Transformers at Solukhumbu District

The scope of project includes Solu-Dudhkunda Municipality, Necha-Salyan and Thulung-Dudhkoshi Rural Municipality of Solukhumbhu District, Siddhicharan Municipality and Manebhanjyang Rural Municipality of Okhaldhunga Districts and Katari Municipality of Udaypur District.

The project is funded by Government of Nepal (GoN). Contact agreements were signed on July 25, 2019.

100% line materials are delivered to the Project sites and installation works are under last stage of completion. 20 load centers are charged despite Covid 19 pandemic. The project is scheduled to be completed by August 21, 2021.

D. Reconstruction and Improvement of Electricity Distribution System (KfW funding)

Neighborhood Electrification Project

This project deals with neighborhood electrification in Salme, Bhalche and Kaule VDC and in the vicinity of the transmission line benefitting local people. It includes construction of a 33/11 kV substation at Bhalche, 33 kV transmission line between Bhalche and Trishuli 3B hub substation and a network of 11 kV with 0.4 kV distribution lines in Nuwakot and Rasuwa District.

Germany, as a lead development partner for 220 KV transmission line project of Chilime-Trishuli has been supporting for the neighborhood electrification in the transmission line corridor. This project is co-financed by EU, EIB, Germany through KFW and GoN which is expected to be completed by F/Y 2078/79 providing a reliable electricity supply for 2200 households in Nuwakot and Rasuwa districts.

Regarding progress of this project, Neighborhood Electrification component was successfully commissioned at no load on 3rd December 2020. The major infrastructure includes construction of control building, staff quarter, office building, 33/11 kV Switchyard, 12 km 33 kV line, 26 km of 11 kV line, 40 km of 0.4 kV line and 20 numbers of distribution transformers.

Switchyard at Bhalche Substation

Reconstruction and Improvement Project

After the devastating earthquake in Nepal in 2015, Germany through KFW had committed Five Million Euros for reconstruction, extension and upgrading of electricity distribution network in Rasuwa and Nuwakot districts. The project aims in constructing two new 33/11 KV substations at Kalikasthan and Ratamate under electrical component, also construction and rehabilitation of infrastructures under social development component in Rasuwa and Nuwakot districts respectively. This project is expected to be completed in the fiscal year 2079/80 providing reliable electricity supply to 1200 households the districts.

The scope of this project is to improve the access to electricity in Nuwakot and Rasuwa districts by rehabilitating and improving the electricity distribution infrastructure after the earthquake of April 2015. The project comprises financing for immediate relief measures with respect to the distribution network and long

term electrification measures as well as other social issues identified after earthquake.

To realize the socio-economic requirement after the massive earthquake and to finalize the scope of works, consultant Power Grid Corporation of India Limited (POWERGRID) in association with Jade Consult Pvt. Ltd. (JADE), was appointed as an Implement Consultant in 2017. The procurement works has been completed in 2020 for both social development component and electrification component. The project is under implementation by contractor M/s. Waiba Infratech for electrification component and M/s. Dhulikhel Nirman Sewa for social development component.

Under the electrification contract, the 33/11 kV Ratamate and Kalikasthan substations are under construction.Site clearance, boundary wall, retaining wall works are under progress. The construction of control building, office building and gantry equipment's has been started. Manufacturing and supply of the major substation equipment is under progress.

Status of control building at 33/11 kV Ratamate S/S

Regarding social development component, one health post, two community hall building, one heritage temple, one vegetable collection center along with school building and water tank are envisaged. The major engineering works of the all infrastructure has been completed and construction of health post, vegetable collection center and temple is under progress. The community hall building works is about to start and the land for the school building is in process to be finalized by local government.

E. Khokana- Nijgadh 33/11kV 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 aims to 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 33kV Sub-Transmission Line and 33/11kV, 16.6 MVA Substation. Field survey work for 33KV Sub-Transmission Line is completed and final cost estimate is under progress. The land acquisition for substation area is under process. The Project is scheduled to be completed by F/Y 2022/23.

F. 33 kV Line Expansion and Rehabilitation Project

The project is funded by GoN and aims to meet the growing demand of electricity in various parts of country by rehabilitation/capacity upgradation/new construction of 33 kV lines. The scope of this project includes construction of Bhurigaun-Gulariya (Bardia) 35 km of 33 kV line, out of which 1100 poles has been erected and 14 km conductor has been stringed.

The scope of this project also includes construction of Yadukuha-Dhanushadham15 km of 33 kV line, out of which 200 poles has been erected.

G. Madankudari-Makaibari-Singati 33 kV line Project

The project funded by Government of Nepal aimstomeetthegrowingdemandofelectricityin

Madankudari– Majhifeda area of Kavre District and its vicinity area. The scope of the project includes the construction of 33/11 kV, 6/8 MVA Substation at Majhifeda, Kavre district with interconnection facilities. Power generation from IPP will be connected to this substation and part of this power will be consumed locally and remaining power will be evacuated at Mude-Lamosanghu, Sindhupalchok district. All substation equipments have been delivered to the site. Control building, civil foundations for switchyard have been completed. 33 kV Transmission line works and 11/0.4 kV distribution line works are on progress. The Project is scheduled to be completed by FY 2021/22.

H. 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 construction of 33 kV line from Lamosanghu to Chautara and 11/0.4 kV distribution completion, the 33/11 kV, 6/8 MVA Chautara Substation has been charged and handed over to local DCS for operation.

I. Transformer Testing Lab Construction Project

This project is funded by Government of Nepal. The scope of the project includes construction of Transformer Testing Lab at Biratnagar, Butwal and Nepalgunj. The facilities provided from this project will help to reduce overall system loss by connecting quality and low loss type of transformer in NEA Power System. Similarly, small, medium and large private consumers of the nearby respective provincial NEA office shall be benefitted by timely testing and unnecessarily burden for transportation to another testing lab farthest from the region. Transformer testing lab and workshop building including installation of transformer testing equipments have been completed.The project has been handed over for operation to province no.1 Biratnagar Provincial Office and Provincial Office, Lumbini Province, NEA. Delayed in calibration works due to COVID-19 pandemic, at Provincial division office, Lumbini Province, Nepalgunj operation is underway.

Transformer Testing Lab at Butwal, Rupandehi

J. MatatirthaNaubise 33 kV Transmission Line Project

This project aims to supply power for cement industry at Naubise, Dhading and existing NEA consumers in its vicinity. The scope of the project includes the construction of 33/11 kV, 2*6/8 MVA substations along with 17 km 33 kV double circuit line. Construction of the transmission line & substation at Naubise is completed. Naubise substation is charged from Matatirtha Substation through Matatirtha - Naubise 33 kV double circuit transmission line and handover to the Dhading DCS.

K. Matatirtha Markhu 33 kV Transmission Line Project

This project aims to meet the growing demand of electricity in Thaha Municipality, Indrasarobar and Kailash Rural Municipality. The project will help to improve the quality

of supply and reduce the technical losses of the areas. The main scope of the project is to construct 33/11 kV, 6/8 MVA substation at Markhu with single circuit 15 km Transmission line from Matatirtha to Markhu. Construction of substation, with control building & installation of electrical instruments including Power Transformer has been completed. 33 kV Bay extension work and 33 kV Control Panel Installation works at Matatirtha Substation has been completed. Testing and commissioning of Markhu substation is on process. Transmission line construction work is in progress. The project is expected to be completed in FY 2078/79.

33/11 kV, 6/8 MVA Markhu Sub-Station

L. Matatirtha Malta 33 kV Transmission Line Project

This project aims to supply power for Laxmi Cement Industry Pvt. Ltd. in Malta, Lalitpur and evacuation of power produced by Pashupati Energy Pvt. Ltd. (6MW) and supply existing NEA consumers in its vicinity. The project will help to improve the quality of supply and reduce the technical losses of the area. The scope of the project includes the construction of 33/11 kV, 16.6 MVA substation at Malta along with double circuit 35 km 33 kV line. Civil and electrical work of Malta substation is completed and the substation is in operation, charged with evacuation of power from Khanikhola and Tungun Thosne hydropower. Sub-Station is handover to the Lagankhel DCS. Construction of 33 kV line from Matatirtha to Malta is in progress. Line construction work has been obstructed at different location by local community. Number of trees in the ROW (Right of Way) of 33 kV line has increased than approved IEE report, so the IEE report of the project is updated accordingly and tree cutting work is ongoing on behalf of divisional forest offices. About 70% of the transmission line construction work is completed and remaining work is scheduled is to be completed within FY 2078/79.

M. GIS Smart Grid Project

NEA has planned to develop GIS (Geographical Information System) software to manage DCS asset inventories like substation, feeder, transformer, poles & meters along with its position on earth. It will help to identify the actual information about s/s, feeder, and poles, transformers, and consumers' capacity and also to balance the transformer's load as per connection to the consumer. It also helps to facilitate the consumer service faster & reliable against any fault in distribution system. Additional benefit of this smart distribution system will aid for outage management, no light management, optimal connection path for new consumer can be built. GIS based Data Survey work for certain 30 branches across the country will be conducted in F/Y 2077/78.This project is funded by the Government of Nepal (GoN).

N. 33/11 KV Substation Rehabilitation Project

This project aims to improve the reliability of the distribution system by upgrading more than 36 Substations under different distribution centers across the country. This project is funded by Govt. of Nepal (GON) and NEA.

The main purpose of the Project is to rehabilitate substations and strengthen the distribution system by F/Y 2078/079 under 5 different Packages.

The scope and progress under this project for different packages is briefly described as follows.

- Package 1: Rehabilitation of 33/11 KV Substation at Dharan, Inaruwa, Mirchaiya, Rajbiraj and Mujalia with 33/11 kV Power Transformers of 10/13.3/16.6 MVA capacity. All substations have been charged successfully and running smoothly till date.
- Package 2: Rehabilitation of 33/11 KV Substation in Pokharia, Harsa andSimrangaud with 33/11 kV Power Transformers of 20/24 MVA capacity. All substations have been charged successfully and running smoothly till date.
- Package 3: Rehabilitation of 33/11 KV Substation in Mukundapur, Kawasoti andKalaiya with 33/11 kV Power Transformers of 20/24 MVA capacity. All substations have been charged successfully and are running under Defect Liability Period.

Substation Upgradation at Kawasoti DC, Nawalparasi East

- Package 4: Rehabilitation of 33/11 KV Substation in Guleriya, Jeetpur, Bhairahawa and Lumbini with 33/11 kV Power Transformers of 20/24 MVA capacity. All substations have been charged successfully and running smoothly till date.
- Package 5: Rehabilitation of 33/11 KV Substation in Jhalari, Belauri, Dhangadhi, Mahendranagar and Ghorahi with 33/11 kV Power Transformers of 20/24 MVA capacity. All substations have been charged successfully and running smoothly till date.

O. Grid Solar Energy and Energy Efficiency Project

The Government of Nepal (GoN) has received a credit from the World Bank (WB) towards the cost of Grid Solar Energy 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.

i) **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 & Maintenance of 25 MWp Utility Scale Grid Tied Solar Farms. Among seven different locations selected for solar plant installation 11 MWp has been connected to national grid and additional 14 MWp will be connected within December 2021. Installation of the Solar Modules, Construction of Transmission Line is being carried out. Initial Environmental Examination (IEE) for further one Location is being carried out.

ii) **Component 2: Distribution System Planning and Loss Reduction w**ith 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:

a. Design,planning,engineering, procurement,installation, testingand commissioningof 8 New 33/11kVsubstationsand33kVlines inthedevelopmentof theNEAgrid. (Kapilbastu, Arghakhachi, Sindhuli, Ramechap&Gulmi.)

b. Design, Supply, Installation/Erection, Testing and Commissioning of 11/0.4 kV Distribution System(Dolakha, Sindhuli&Ramechap).

c. Design, Supply, Installation/Erection, Testing and Commissioning of 11/0.4 kV Distribution System(Gulmi, Arghakachi & Kapilbastu).

d. Design, Supply, Installation/Erection, Testing and Commissioning of 11/0.4 kV Distribution System(Taplejung, Panchthar & Illam).

e. Preparation of Distribution Loss Reduction Master Plan Along With Design, Supervision and Monitoring Of Loss Reduction Activities.

f. Design, Supply and Installation of total 13 Nos. of Substations and 33kV Lines in Bharatpur, Dhading, Hetauda, Kavre, Lagankhel, Nuwakot, Palung, Ramechhap, Dolakha and Sindhupalchok districts.

g. Design, Supply and Installation/ Erection, Testing and Commissioning of of 11/0.4 kV Distribution System in Kavre, Dhading and Nuwakot districts.

h. Design, Supply and Installation/ Erection, Testing and Commissioning of Distribution System in Melamchi, Dolakha, Ramechhap, Rasuwa, Palung, Bharatpur and Sindhuli districts.

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 Distribution and Consumer Services Directorate (DCSD), Nepal Electricity Authority (NEA). Later on in 2010, CRED was dissolved in the process of restructuring of NEA and the activities of CREP were carried out through eight Regional Offices. However, the CREP activities were slowed down due to lack of coordination at central and regional level. On this background, CRED was formed again in July 2013.

The GoN is contributing 90% of total rural electrification and rehabilitation cost of related infrastructure of the electrified areas through NEA; and a Community Rural Electrification Entity (CREE) is required to contribute remaining 10% of the cost. 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 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 18years, CREP has achieved a major success of providing access to electricity to around580,177 consumers of 52 districts through 516 nos. of different CREEs (300 CBOs and 216 Entities of Kailali Kanchanpur ***Gramin Bidhyut Chhata Sansthan and*** Rural Municipalities/ Municipalities).

The districts with CREEs have been depicted in following map:

The households have been electrified through 3077 numbers of distribution transformers of which 483are of 25 kVA, 1576 are of 50 kVA; and 1037 are of 100 kVA capacities.

Despite some technical and administrative issues, performance of CRED of FY 2020/21 was satisfactory. During this review period, CRED initiated activities to resolve & 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 six (36) Rural Electrification projects, initiated in this year and previous years with a total of 422.41 km of HT line, 1961.38 km of LT Line and 263 Distribution Transformer Installations have been completed and capitalized in this Review Period.
- The works related to replacement of 1,705 wooden poles by Steel tubular poles have been completed and capitalized in this Review Period.
- 33/11 kV Substations in the rural areas of Sindhuli, Panchthar, Taplejung and Lamjung along with 33 kV line extensions are in progress.

The details of projects under CRED in different stages of execution from FY 2013/014 to FY 2020/21 are as follows.

- Total number of projects: 186

✓ Electrification, System Improvement and Rehabilitation Projects : 177

✓ 33/11 kV, 6/8 MVA Substation Projects with 33kV line Construction : 5 (Lamjung, Baglung, Sindhuli, Taplejung, Panchthar)

- Completed Projects: 136
- Ongoing Projects: 50

- Projects executed by contractors: 136
- Total Wooden Pole replaced : 70,705

CRED is planning different activities 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

Operational Highlights

There are 24 Distribution Centers under Province No. 1 Provincial Office spread over 14 districts. The distribution loss is 11.98%. Sales contribution to NEA system of this office is 16.61%. The performance highlights of this provincial office during review period are as under.

Energy sales (MWH) – 1,208,689

Revenue (million) – Rs.11,441.878

Numbers of consumers –858,961

Project Highlights

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

- LetangRajarani 33 kV Transmission Line & Sub-station Project
- Biratchowk (Keraun) – Letang 33 kV Transmission Line & Sub-station Project
- Harinagara 33 kV Transmission Line & 10/16 MVA Sub-station Project.
- Pakhribas (Hiley) Transmission Line & 6/8 MVA Sub-station Project
- Majhkharka (Udaypur) 33 kV Transmission Line & Sub-station Project
- Ohaldhunga-Koshbhanjyang 33 kV Transmission line & Sub-station Project
- Sanghutaar Ghurmi 33 kV Transmission line & Sub-station Project
- Chainpur Sitalpati (Tumlingtaar) Sankhuwasabha 33 kV Transmission line & 3 MVA Sub-station Project
- Tingla – Dudhkoshi 33 kV Transmission line & Sub-station Project
- Okhaldhunga-Salleri 33 KV Transmission line Project

Replacement of 11 kV wooden poles by Steel Tubular Poles at Deumai, Illam

Province No. 2 Provincial Office, Janakpur

Operational Highlights

There are 23 Distribution Centers under Province No. 2 Provincial Office spread over 8districts. The distribution loss is 16.54%. Sales contribution to NEA system from this office is 20.76%. The performance highlights of this provincial office during review period are as under.

Energy sales (MWH) –1,510,914

Revenue (million) – Rs.13,855.775

Numbers of consumers –941,535

Project Highlights

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

Construction works for stringing conductor across Koshi River for Rural Electrification at Hanuman Nagar Kankalini Municipality-13, Gobhargadha.

Bagmati Provincial Office, Kathmandu

Operational Highlights

There are 20 Distribution Centers under Bagmati Provincial Office spread over 10 districts. The distribution loss is 6.77%. Sales contribution to NEA system from this office is 23.12%. The performance highlights of this provincial office during review period are as under.

Energy sales (MWH) – 1,682,248
Revenue (million) – Rs18,552.287
Numbers of consumers – 805,375

Project Highlights

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

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

Maintenance work for inclined double feeder pole at ShreeRamPati, Panchkhal.

Bagmati Division Office, Hetauda

Operational Highlights

There are 6 Distribution Centers under Bagmati Division Office, Hetauda spread over 3districts. The distribution loss is 7.70%. Sales contribution to NEA system from this office is 7.80%. The performance highlights of this divisional office during review period are as under.

Energy sales (MWH) – 567,566
Revenue (million) – Rs. 5,398.966
Numbers of consumers – 286,248

Project Highlights

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

- Chanauli-Madi 33 KV underground Sub-Transmission Line Project
- Kamanae-Riddhi Siddhi Cement 33kV Sub-Transmission Line Project

Twinning of 11 kV conductors using crane with bucket

Gandaki Provincial Office, Pokhara

Operational Highlights

There are 13 Distribution Centers under Gandaki Provincial Office spread over 11 districts. The distribution loss is 10.54%. Sales contribution to NEA system from this office is 6.42%. The performance highlights of this provincial office during review period are as under.

Energy sales (MWH) – 467,093
Revenue (million) – Rs 4,506.051
Numbers of consumers – 402,706

Project Highlights

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

- Lekhnath-Sindhabesi 33 kV Transmission Line and Substation Project
- Galkot 33 kV Transmission Line and Substation Project
- Damauli-Khairenitar 33 kV Transmission Line and Substation Project
- Damauli-Bhorletar 33 kV Transmission Line and 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
- Gharap-Chhusang-Mustang 33 kV Transmission Line and Substation Project

Construction of 11kV Line on Lapsibot at Dharche Rural Municipality, Gorkha

Lumbini Provincial Office, Butwal

Operational Highlights

There are 11 Distribution Centers under Lumbini Provincial Office, Butwal spread over 6 districts. The distribution loss is 12.95%. Sales

contribution to NEA system from this office is 14.45%. The performance highlights of this provincial office during review period are as under.

Energy sales (MWH) – 1,051,847

Revenue (million) – Rs 9,997.391

Numbers of consumers – 485,633

Project Highlights

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

- Jeetpur-Thada 33 kV Substation Project
- Gulmi-Shantipur 33 kV Transmission line and Substation Project.
- Jitpur-Saljandi 33 kV Transmission line and Substation Project.
- Saljhandi-Majganwa (Marchawar) 33 kV Transmission line and Substation Project.
- Distribution Line Reinforcement at Arghakhachi
- Distribution Line Reinforcement at Palpa

Inauguration of 33/11 kV, 3 MVA Durgapfaat Substation by former Honorable Minister for Energy, Water Resources & Irrigation and NEA Managing Director

Lumbini Division Office, Nepalgunj

Operational Highlights

There are 10 Distribution Centers under Lumbini Division Office, Nepalgunj spread over 6districts. The distribution loss is 10.78%. Sales contribution to NEA system from this office is 6.41%. The performance highlights of this divisional office during review period are as under.

Energy sales (MWH) – 466,386

Revenue (million) – Rs 4,419.944

Numbers of consumers – 354,442

Project Highlights

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

- Dang Bhalubang 33 kV Transmission Line Project:
- Kapurkot-Koilachaur 33 kV Transmission Line Project
- Pyuthan Substation Project
- Koholpur- Dhampur 33 KV Transmission Line Project
- Khawang 33 kV Transmission Line and Substation Project:
- Rajwada 33 kV Transmission Line and Substation Project:
- Rukumkot 33 kV Transmission Line and Substation Project

Upgradation of 33/11 kV, 10/13.3/16.6 MVA Mainapokhar Substation, Gulariya

Karnali Provincial Office, Surkhet

Operational Highlights

There are 10 Distribution Centers under Karnali Provincial Office spread over 10 districts. The distribution loss is 17.73%. Sales contribution to NEA system from this office is 0.75%. The performance highlights of this provincial office during review period are as under.

Energy sales (MWH) – 54,421

Revenue (million) – Rs 535.411

Numbers of consumers – 108,205

Project Highlights

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

- Chhinchu-Rakam-Jajarkot 33 kV Transmission Line Project
- Surkhet Bijaura 33 kV Transmission Line and Substation Project
- Surkhet Gangate Matela Project 33 kV Transmission Line Project
- Dailekh Chilkha Jumla 33 kV Transmission Line and Substation Project
- Kudu – Chaukha Bajar - Jajarkot 33 kV Transmission Line and Substation Project
- Chaukha Bajar–Jajarkot - Dolpa 33 kV Transmission Line and Substation Project
- Nagma – Mugu (Gamgadi) 33 kV Transmission Line and Substation Project
- Dullu – Kalikot 33 kV Transmission Line and Substation Project
- Surkhet Chingad Electricity Extension Project
- Rakam, Dailekh 33 kV Substation Project
- Rakam, Surkhet 33 kV Substation Rehab Project

33 kV Line Construction for Dullu Substation at Dailekh

Sudurpaschim Provincial Office, Attariya

Operational Highlights

There are 12 Distribution Centers under Sudur paschim Provincial Office spread over 9 districts. The distribution loss of ARO is 14.90%. Sales contribution to NEA system from this office is 3.68%. The performance highlights of this provincial office during review period are as under.

Energy sales (MWH) –267,983
Revenue (million) – Rs. 2,289.524
Numbers of consumers –285,306

Project Highlights

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

- Budar-Jogbuda, Bagarkot (Dadeldhura) 33 kV Transmission Line and Substation Project
- Khodpe (Baitadi)-Chainpur (Bajhang) 33 kV Transmission line and Substation Project
- Balanch (Gokuleshwor)-Khalnga (Darchula) 33 kV Transmission Line and Substation Project
- Sanfebagar-Chamara-Chautara 33 kV Transmission Line and Substation Project
- Sanfe-Manma-Jumla 33 kV Transmission Line & Substation Project
- Attariya-Punarbas 33 kV Transmission Line and Substation Project
- Sanfebagar - Achham – Martadi 33 kV Transmission Line & Substation Project
- Sakayal (Dadeldhura) 33 kV Transmission Line & Substation Project

33/11 kV, 3 MVA Bagarkot Substation at Dadeldhura

No. of Consumers (Nos) for F/Y 2077/078

S.No.	Category	Province 1 PO	Province 2 PO	Bagmati PO	Bagmati DO	Gandaki PO	Lumbini PO	Lumbini DO	Karnali PO	Sudurpaschim PO	Total
1	Domestic	776256	852367	772118	261742	384196	461594	327731	103855	267471	**4,207,330**
2	Non-Commercial	5133	3943	4570	1495	3349	3505	2675	1498	2842	**29,010**
3	Commercial	5294	3746	9378	2053	3391	3598	2317	703	1841	**32,321**
4	Industrial	10240	13781	11376	4189	5847	7018	4224	1288	2819	**60,782**
5	Water Supply	355	303	901	328	637	591	219	38	122	**3,494**
6	Irrigation	57345	64841	1830	15414	3069	6797	15988	612	9021	**174,917**
7	Street Light	1545	740	1152	183	268	419	224	8	38	**4,577**
8	Temporary Supply	102	161	1057	87	95	125	99	18	73	**1,817**
9	Transport	6	0	41	1	2	1		0	0	**51**
10	Temple	1734	987	870	470	1007	1189	572	121	531	**7,481**
11	Community Sales	300	134	147	31	385	241	199	14	431	**1,882**
12	Non-Domestic	409	370	1734	180	344	443	138	16	44	**3,678**
13	Entertainment	58	30	30	13	27	12	16	2	4	**192**
14	Internal Consumption	184	132	171	62	89	99	40	32	69	**878**
15	Export to India						1	0		0	**1**
Total		858961	941535	805375	286248	402706	485633	354442	108205	285306	4528411

Sales Unit (MWh) for F/Y 2077/078											
S.No.	**Category**	**Province 1 PO**	**Province 2 PO**	**Bagmati PO**	**Bagmati DO**	**Gandaki PO**	**Lumbini PO**	**Lumbini DO**	**Karnali PO**	**Sudurpaschim PO**	**Total**
1	Domestic	488417	515428	958892	206059	250916	347682	191291	35926	138487	**3,133,098**
2	Non-Commercial	26826	17886	94610	11749	14340	13993	10645	4117	9337	**203,504**
3	Commercial	62733	47426	226335	35826	48287	39928	23915	6279	20162	**510,892**
4	Industrial	532324	844036	252893	272623	84581	593470	196632	4478	34464	**2,815,501**
5	Water Supply	26047	8316	30430	14992	13715	17858	6505	1037	4413	**123,313**
6	Irrigation	23720	23902	2019	11068	2697	7672	10029	658	5882	**87,647**
7	Street Light	11650	30499	23561	6593	3017	7255	2880	948	1916	**88,320**
8	Temporary Supply	111	210	2067	105	120	350	205	41	203	**3,412**
9	Transport	171	31	1557	280	20	3	0	0	0	**2,062**
10	Temple	1503	937	2715	488	742	1265	567	49	247	**8,513**
11	Community Sales	23418	17170	9005	3258	39496	10972	17092	631	52280	**173,322**
12	Non-Domestic	8531	4015	75667	4114	8697	8295	6065	147	326	**115,856**
13	Entertainment	2336	248	608	169	195	63	298	7	23	**3,947**
14	Internal Consumption	902	810	1889	242	268	472	262	103	243	**5,191**
15	Bulk Supply						2569				2,569
	Total	1208689	1510914	1682248	567566	467093	1051847	466386	54421	267983	7277147

REVENUE(NRs.in Thousands) for F/Y 2077/078											
S.No.	Category	Province 1 PO	Province 2 PO	Bagmati PO	**Bagmati DO**	**Gandaki PO**	**Lumbini PO**	**Lumbini DO**	**Karnali PO**	**Sudurpaschim PO**	**Total**
1	Domestic	4261582	4289599	9469805	1797339	2206612	3057381	1652871	289781	1113880	**28,138,850**
2	Non-Commercial	373916	264216	1335192	161889	196197	205839	152150	61112	137982	**2,888,492**
3	Commercial	901771	695399	3162782	503959	734220	581341	349564	101654	301076	**7,331,765**
4	Industrial	5244547	8018515	2744562	2648350	920133	5701206	1958133	59142	393464	**27,688,052**
5	Water Supply	144411	50928	180326	80637	75388	108572	36723	5758	23612	**706,355**
6	Irrigation	101537	102427	8854	47878	11886	40262	44247	2920	26162	**386,174**
7	Street Light	97297	258818	242797	57263	29144	63504	23635	6552	20354	**799,365**
8	Temporary Supply	2029	4410	40866	2499	2386	6919	4084	813	3359	**67,365**
9	Transport	1208	265	13238	3591	286	81	0	0	0	**18,669**
10	Temple	8740	6078	19927	2973	4517	9492	3728	299	1491	**57,245**
11	Community Sales	118024	85761	36165	17781	178454	48724	84891	2731	256754	**829,285**
12	Non-Domestic	135056	64647	1258350	67562	138339	136692	99363	2960	6428	**1,909,396**
13	Entertainment	40476	5227	14925	3912	4612	1532	7334	169	1114	**79,301**
14	Internal Consumption	11285	9484	24498	3333	3878	5933	3221	1520	3848	**67,000**
15	Bulk Supply	0		0	0	0	29914	0	0	0	**29,914**
	Total	11441878	13855775	18552287	5398966	4506051	9997391	4419944	535411	2289524	70997228

DCSD Loss Percentage

S.No.	Category	Province 1 PO	Province 2 PO	Bagmati PO	Bagmati DO	Gandaki PO	Lumbini PO	Lumbini DO	Karnali PO	Sudurpaschim PO	Total
1	Received Energy, KWH	1,378,127,905	1,797,633,966	1,807,299,044	617,688,797	585,178,167	1,210,449,768	523,524,192	65,841,652	315,244,505	8,300,987,995
2	Sales Energy, KWH	1,213,015,431	1,500,246,573	1,685,005,950	570,103,060	523,522,612	1,053,709,804	467,108,149	54,167,661	268,275,442	7,335,154,682
3	Loss Unit, KWH	165,112,474	297,387,393	122,293,094	47,585,737	61,655,555	156,739,964	56,416,043	11,673,991	46,969,063	965,833,314
4	Loss percentage (2020/021)	11.98%	16.54%	6.77%	7.70%	10.54%	12.95%	10.78%	17.73%	14.90%	11.64%
5	Loss percentage (2019/020)	11.19%	15.60%	5.38%	8.08%	8.72%	10.18%	12.17%	15.66%	12.05%	10.28%
6	Loss percentage (2018/019)	12.15%	23.36%	7.40%	8.39%	9.79%	12.39%	11.57%		14.39%	11.28%

*PO=Provincial Office, DO=Division Office

Distribution System Data for F/Y 2077/078

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	31	469.80	1,058	8,498	22,517	6,786	661.57
2	Province 2 PO	25	428.10	784	6,503	20,302	6,798	662.74
3	Bagmati PO	14	90.60	416	6,643	23,826	7,148	696.86
	Bagmati DO	7	84.20	148	2,674	7,489	2,252	219.55
4	Gandaki PO	18	171.00	605	4,732	12,785	3,594	350.38
5	Lumbini PO	22	281.40	1,143	3,974	12,938	3,870	377.29
	Lumbini DO	12	163.10	903	2,797	10,170	2,769	269.95
6	Karnali PO	10	46.50	346	1,625	3,683	846	82.48
7	Sudurpaschim PO	22	193.00	646	3,737	14,309	3,100	302.22
	TOTAL	161	1,928	6,048	41,181	128,018	37,163	3,623.02

Electrification Status of Local Levels									
Description	**Status**	**Province 1 PO**	**Province 2 PO**	**Bagmati PO**	**Gandaki PO**	**Lumbini PO**	**Karnali PO**	**Sudurpaschim PO**	**Total**
Metropolitan	Fully Electrified	1	1	3	1	0	0	0	**6**
	Partially Electrified	0	0	0	0	0	0	0	**0**
Sub-Metropolitan	Fully Electrified	2	3	1	0	2	0	1	**9**
	Partially Electrified	0	0	0	0	2	0	0	**2**
Municipalities	Fully Electrified	19	73	26	19	26	0	9	**172**
	Partially Electrified	27	0	15	7	6	23	23	**101**
	Non-Electrified	0	0	0	0	0	2	1	**3**
Rural Municipalities	Fully Electrified	15	59	30	31	39	0	3	**177**
	Partially Electrified	65	0	43	25	34	30	43	**240**
	Non-Electrified	8	0	1	2	0	24	8	**43**
No. of Distribution Centers		**24**	**23**	**26**	**13**	**21**	**10**	**12**	**129**

PLANNING, MONITORING AND INFORMATION TECHNOLOGY DIRECTORATE

Planning, Monitoring and Information Technology Directorate, a corporate wing of NEA is headed by Deputy Managing Director. This directorate is entrusted with directing and monitoring the activities of five 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 carrying out load forecasting, generation planning and transmission system planning of power system of Nepal. Corporate Planning and Monitoring Department is entrusted with the responsibility of developing Corporate Plan of NEA along with monitoring and evaluating NEA implemented projects. Information Technology Department develops innovative IT services so as to modernize various activities of NEA. Power Trade Department is responsible for trading of power both in domestic as well as in international market as per NEA's strategy and policy. Finally, Economic Analysis Department carries out financial analysis of projects and proposes electricity tariff and service charge adjustments.

System Planning Department

System Planning Department (SPD) is mainly responsible for load forecast study and analyses the power evacuation study of generation projects in Nepal. SPD identifies constraints in the grid that could pose operational risk and that reduces efficiency due to outages in the Integrated Nepal Power System (INPS). The department also develops transmission configurations for evacuating power from planned generation projects by conducting different technical studies such as load flow, short circuit, steady and transient stability etc. Grid Impact Study (GIS) for new generation projects is also one of the main area of work of the Department. The GIS analyzes the effect of new connection to NEA Grid to ensure satisfactory operation of the Grid in conformity with the NEA Grid Code. The department assist the concerned directorate of NEA for the preparation of Generation and Transmission Line Plans.

Furthermore, SPD also support to update the Corporate Development Plan of NEA and assists other departments of NEA by providing necessary data and suggestions regarding implementation of planned projects.

The department jointly conducted the network analysis study with Technical Team of India. The department 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).

In FY 2020/21, SPD carried out the following major technical studies at the request of NEA's different departments.

i. Energy Simulation for formulation of Corporate Development Plan.

ii. Load flow study of:
   a. New Khimti- Garjyang 132 kV Transmission Line.
   b. Dhaubadi- Falamkhani Transmission line.

iii. System Fault Level calculation of:
   a. Samundratar-Trishuli 3B Hub substation.
   b. Tumlingtar-Baneshwor-Basantapur-Inaruwa substation.
   c. Upper Tamakoshi Hydropower Project.
   d. Lekhnath –Damauli 220 kV substation.
   e. New Khimti-Barabishe-Lapsiphfedi 400kV substation.

iv. Network Analysis of Lekhnath-Damauli 220kV Transmission Line Project.

v. Grid Impact Study of total 1029.364 MW capacity of 35 hydropower projects to be developed by IPP'S.

vi. Grid Impact Study of total 123.49 MVA capacities of 10 bulk load industries to be connected to the INPS.

Out of the 35 GIS conducted hydropower projects 34.29% projects were below 10MW covering 57.86MW and 25.71% falls in range of 10-25MW with total installed capacity of 169.27MW. The projects in the range 25-50MW were 25.17% with total installed capacity of 317.63 MW whereas Only 5 projects (14.29%) were above 50MW with total installed capacity of 484.6MW.

Manahari Khola, Kisedi Khola, Lower Thulo Khola, Lower Bhim Khola, Tadi Dhyampedhi, Upper Deuma, Trishuli Khola and Kalinchowk hydropower projects were small size (below 10MW) hydropower project considered for the GIS. Lower Chameliya, Suti Khola, Apsuwa 1, Super Seti, Upper Solu, LapcheTamakoshi and Down Piluwa were the hydropower projects in 10-25 MW range for which GIS was conducted. The large size hydropower projects includes Nilgiri Khola 2 Cascade, Tamakoshi –V, Ghunsa Khola, Kaligandaki Gorge and Himchuli Dordi.

Out of the 10 GIS conducted for bulk load centers 70% were up to 10 MVA capacity covering total load of 46.5 MVA whereas 30% are more than 10 MVA covering 76.99 MVA total load. The GIS conducted below 10 MVA load centers consist Balaju Industrial District Management Office, Palpa Cement, Butwal Industrial District, Arun 3, Shree Steels, Reliance Spinning Mills and Aarati Strips. The major bulk centers includes, Himal Iron and Steel, Jay Ambe and Ghorahi Cement Industry.

INFORMATION TECHNOLOGY DEPARTMENT

This Department is responsible for providing the infrastructure for automation and plays a vital role for core ICT activities within the organization. It implements the governance for the use of network and software systems, as well as assists the operational units by providing them the functionality they need.

Apart from the implementation of new IT Systems, the department provided continuous ICT support, maintenance and training to all NEA offices round the clock.

Information Technology Audit has been conducted and based on the output of the audit, the department has upgraded the necessary computer hardware for sever requirements, network security equipment and software requirements.

Communication backbone establishment (intranet connectivity) is being carried out throughout the nation. The Department has started network connections to the NEA offices and has planned to connect all the offices under NEA within this Fiscal Year.

This Department is providing support and maintenance to the implemented software systems such as CAIS (Customized Account& Inventory System), Payroll, Pension, Asset Management, DCS-Activity's Information System, Consumption Analysis System, etc. Payroll Information System has been upgraded in such a way that employees can view the salary and tax sheet.

NEA vacancy application process was introduced for an online Recruitment System. Applicants could easily submit the forms online from any location within convenient time.

Centralized E-attendance System has been introduced where all the attendance activities can be accessed centrally for the entire NEA offices. Employee attendance self-portal has been introduced where the employee can view his/her attendance report.

IT Department has also introduced NEA mobile app where consumers can do self-meter reading. Further, Customer Relation Management System will be introduced where consumer can post a complaint through mobile app and NEA portal. Other features will also be added for the case of the consumer.

Personal Information System (PIS) and Darbandi Management System (DMS) will be implemented with the use of concerned old system. IT Department will centralize the Asset Management System and NEA Inventory System. NEA Video Conference System has been introduced where all the offices of NEA can be connected using NEA's Intranet with secure connection.

The Department is also providing IT related system's training to concerned employee in coordination with NEA-Training Centre, Kharipati.

Corporate Planning and Monitoring Department

Corporate Planning and Monitoring Department bears sole responsibility of planning and preparation of annual budget, quarterly and yearly assessment of progress and monitoring of entire NEA development and operational activities.

Appropriation of the received ceiling of annual budget from Government of Nepal and NEAs available internal resources is to be carried out to ensure the realization of targets set forth. Prioritization among similar project for annual fund allocation is carried out with multiple round discussion with various projects, departments and directorates and so as to be in line with NEAs overall goal. Best tradeoff between competing activities has to be assessed in this process.

Monitoring of status of to-be-implemented and ongoing plans, projects and activities on continuous basis and reporting to management is another vital responsibility of the department. In addition to 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, transmission line length, upgraded and new substation added number of new consumers, loss reduction and coverage of rural electrification etc.

Development of suitable monitoring and evaluation directive, assisting National Planning Commission, Ministry of Energy, Water Resources and Irrigation and Ministry of Finance in functions related to NEA, entry of annual budget in the Line Ministry Budget Information System (LMBIS) software are other works to be carried out by the department.

The Department provides necessary support to NEA management for carrying out various studies related to institutional reforms and development. In addition, the Department also provides input for studies undertaken by various organizations on topics related to NEA. Development and periodic revision of Corporate Development Plan is an equally important responsibility of the department. The department also plays the coordinating role in the development of hydropower projects under different financing mode.

Power Trade Department

Power Trade Department 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 application for Power Purchase Agreement (PPA). Functions of Power Trade Department may be broadly classified into three categories:

i. PPA processing and signing:

   It covers PPA processing activities up to and including its signing.

ii. PPA implementation and monitoring:

   It includes PPA administration after its execution till commercial operation.

iii. Operational Administration and monitoring of PPAs:

   It includes PPA administration after commercial operation.

The department has 3 Divisions to carry out these functions. 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 and published in its notice board. The different stages involved are document study and investigation, technical review, grid connection agreement followed by Grid Impact Study and PPA draft preparation and negotiation.

A total of 11 new projects developed by the Independent Power Producers (IPPs) with their combined capacity of 119.077 MW were commissioned in FY 2077/78. Projects that were commissioned are: Hadi Khola Sunkoshi A (0.997 MW), Upper Rawa (3 MW), Namarjun Madi (11.88 MW), Butwal Solar Project (8.5 MW), Ghatte Khola (5 MW), Everest Sugar and Chemical Industries Ltd. (3 MW), Bijayapur 2 Khola Small (4.5 MW), Mithila Solar PV Electric Project (10 MW), Taksar Pikhuwa (8 MW), Upper Chaku A (22.2 MW), and Mistri Khola (42 MW). With these 11 projects, the total number of IPP-owned projects that are in operation has reached 108 with their combined installed capacity of 814.65 MW. Similarly, 138 projects of IPPs with their combined capacity of 3506.8 MW are under construction. Likewise, 99 projects of IPPs with their combined capacity of 1851.3 MW are in other stages of development. During FY 2077/78, 5 new PPAs with a combined installed capacity of 183.699 MW were concluded.

With this, total number of PPAs concluded till the end of FY 2077/78 has reached 345 with their combined capacity of 6172.75 MW.

ECONOMIC ANALYSIS DEPARTMENT

Economic Analysis Department (EAD) is mainly responsible for conducting the activities related to the economic and financial analysis

of NEA. The department is assigned to the following tasks:

- Formulate criteria for economic and financial analysis of NEA's projects.
- Prepare documents for review of electricity tariff for submission to NEA management and Electricity Regulatory Commission (ERC).
- Study on Financial Resource Requirement.
- Financial/ Economic, 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.
- Carryout 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.
- Assists other departments of NEA in prioritizing the selection of the projects.

The department is the focal point of NEA for retail tariff. It also contributes to Demand Side Management (DSM) via revision of tariff. In addition to periodic tariff revision the department is planning to conduct encouraging off- peak demand and reducing peak demand via Time-of-Day tariff revision.

The department assists to conduct Cost Benefit Analysis related to G, T & D activities of NEA. Its role now has been both extensive and intensive in the context of identifying the factors that leads to manage the internal demand and studying the avenues. In addition, the department is involved for updating the Corporate Development Plan (CDP) and Financial Viability Action Plan (FVAP) of NEA. The department takes initiation and plays vital role by establishing coordination among various department while doing these activities.

Main activities conducted by the Department in the FY 2021/22

- **Review of electricity tariff -** EAD team successfully filed the tariff petition to ERC via authorization of NEA Board abiding by the regulation of ERC. It mainly constitute the sequence of activities including: i) Data acquisition and Database preparation, ii) Study on cost of service of FY 2021/22, iii) Documents preparation for Regulatory compliance, iv) Analysis of data- the impact of finalized tariff on financials and overall activities of NEA has been conducted and it is ongoing, v) Tariff analysis and proposal preparation has been done based on consumer category wise.

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 neutral tariff for each category has been prepared. While operationalizing the module, various sheets has been interlinked namely Cost Data, Revenue Data, Costumer Data, Losses Data, Energy Allocation Factors, Demand Allocation factors, Customer allocation factors, Functionalize Asset Base, Functionalize Cost Data, Assets base Classification, Cost Classification, Cost allocated to Consumers, Revenue to Cost Comparisons, Combined Categories, Target Revenues, Marginal Cost of Supply, Energy Charges on Dry, Energy Charges on Wet, Fixed Charges, and Summary of Calculated Data Sheets **.** While developing module, care has been given 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.

- **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, analyzed and used as base for projection of demand and growth pattern of various categories of consumers.
- **Corporate Development Plan (CDP) of NEA**- It comprises the Vision, Mission, Themes, Goals and Activities (Action) plan of NEA developed by the core team in order to materialize the future prospects in coming five years. The CDP contains Key Performance Indicators (KPI) of each Directorate and Department to achieve the target. The department has taken the initiation to develop and finalize the CDP that visualize the unbundling of NEA via restructuring it.
- **NEA Financial Viability Action Plan (FVAP) Updated** - 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 2020. It basically focuses on the: i) Study of Cost of Service, ii) Study on financial Resource Requirement, & iii) Tariff Adjustment. It also estimates the Financial Viability Gap Funding (FVGF) as a grant of GoN, in case the tariff not able to meet the resource requirement of NEA, which could be the basis for the prosperous future of NEA and overall electricity sector in the nation. The team for updating the module has prepared the draft report.
- **Financial analysis** - EAD has done 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.
- **Demand stimulation action plan –** Based on energy balance, Consumer Sector wise implementation steps to be done by NEA has been detail studied.

ENGINEERING SERVICES DIRECTORATE (ESD)

Nepal Electricity Authority (NEA) is a well-known name in Nepal's hydropower sector. The role of NEA in the field of generation, transmission and distribution of hydropower sector is incomparable. Founded in 1985, it is the oldest government-owned institution in the country and has a glorious history. Engineering service Directorate (ESD) is one of the nine directorates of NEA. This directorate is established since the NEA foundation. It is entrusted with the responsibility to carry out engineering studies beginning from the identification to feasibility study, detailed engineering design, environmental studies, geological and geotechnical studies. The Directorate renders its services to NEA and private sector particularly for the study of hydropower as well as transmission and other infrastructures. It is headed by Deputy Managing Director (DMD). There are four departments functioning under ESD. These are Project Development Department (PDD), Soil Rock and Concrete Laboratory (SECL), Environmental and Social Studies Department (ESSD) and Training Center. There is an Electromechanical Division that has to provide technical services and support to various departments within NEA and to the private sector.

Objective & Scope of ESD

The main objective of NEA ESD is to provide consulting and advisory services on hydropower sectors mainly. Its aims to identify and study the hydropower projects, transmission line projects and other infrastructures and provide trainings regarding engineering and environment fields. Besides, transformer maintenance, and production of local transmission poles are also under its scope.

The specific objectives of NEA ESD are the followings:

- 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
- To provide training and enhance human resources in engineering and environment fields.

Different departments, divisions and projects running under ESD are as below.

Project Development Department (PDD)

The Department mainly focuses on the preparation of hydropower projects for development by NEA. This includes identification of projects, their screening and ranking, carrying out their feasibility studies and finally preparing tender documents and detailed drawings through a detailed design study. The Department has also been providing construction supervision services for the projects under construction as per the agreements with the concerned projects. In addition, PDD has also been providing consulting services for the detailed survey of a number of transmission line projects being carried out by Grid Development Directorate and detail design works of other projects. It is headed by a Director. PDD looks after the study of hydropower projects at different levels. There are six divisions under the Department. Following are the projects being studied under PDD.

1. Chainpur Seti Hydroelectric Project (210MW)

Chainpur Seti Hydroelectric Project (CSHEP) is Peaking Run off River type Hydropower project being developed in Seti River that is located in Saipal, Talkot and Masta Rural-Municipality in the Bajhang District of Sudurpaschim Province. The project features include 40 m high concrete gravity dam with four number of radial gates, 3 numbers of intake gate of width 8 m and 3.5 m high;3 numbers of underground desanding basin of length 100 m each and width of 15 m;12492.20 m long headrace tunnel of 5.4 diameter; 87.3 m high surge shaft with 14 m internal diameter ; 1575 m of 3.5 m diameter and 161.30 of 2 m diameter of steel lined pressure shaft; semi surface powerhouse with 3 units of Pelton turbine each of rated capacity of 70 MW and tailrace structures. 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 at the right bank of Seti River. The ongoing study shows that the project will have a nominal installed capacity of 210 MW generating annual energy about 1,158.02 GWh with 6 hours daily peaking. The dry peak energy and off-peak energy generation is respectively 219.50 GWh and 136.91 GWh during dry period with. The power generated from the project shall be connected to proposed 400/132 KV Bajhang Substation via 0.5 km long Transmission Line.

Proposed Headworks Area of Chainpur Seti Hydroelectric Project

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 GoN has been constructing a highway which links the district headquarter Chainpur to the Nepal-China Border. Other project components lie at the vicinity of this highway under construction.

The consultant submitted the final updated feasibility study of the project. The preparation of Engineering Procurement and Construction (EPC) tender document of the project is at final stage. The updating of design of access road to power house and camp facility near powerhouse has been completed. Besides, automatic water level recorder installation at proposed powerhouse site has been completed for continue recording water level of Seti River. The final environmental impact assessment (EIA) study report of the project has been submitted to Department of Electricity Development for approval process. The project is planning to start the pre-construction activities like access road test adits during this fiscal year.

2. Begnas Rupa Pump Storage Hydroelectric Project (150MW)

Begnas Rupa Pump Storage Hydroelectric Project (BRPSHEP), the first of its kind in Nepal, was identified in the year 2074 by the Project Development Department. The Project has obtained the survey license issued by Department of Electricity Development (DoED) in Kartik, 2074. The Project is located at Pokhara Metropolitan City in the Kaski District, Gandaki Province of Nepal. The natural head of 58m available between the Begnas Lake and Rupa Lake shall be utilized for reserving Integrated National Power System (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. Installed capacity of the project is proposed to be 150MW.

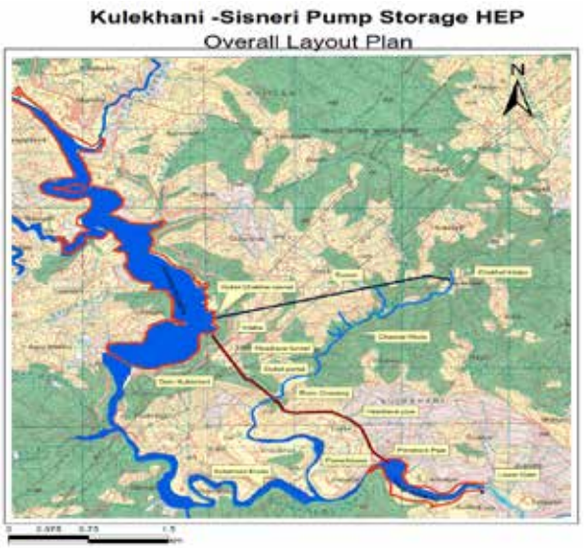
Begnas Rupa Pump Storage Hydroelectric Project Area

The Geotechnical Investigation in downstream of Begnas Dam is on progress as per recommendation from the JICA expert, Mr. Yukiyoshi Ozaki for NEA. On the other hand, hydrological study and gauge readings on Rupa and Begnas Lake are in continuation.

3. Kulekhani Sisneri Pump Storage Hydroelectric Project (100MW)

Kulekhani Sisneri Pump Storage Hydroelectric Project (KSPSHEP) was identified by NEA Engineering Company in the year 2077 and handover to Nepal Electricity Authority. This scheme will serve as a natural battery to generate the hydroelectric power using the same water in cyclic manner which provides higher flexibility in operational schedule and requires relatively low capital cost compared to other peaking units. NEA has obtained survey license issued by Department of Electricity Department (DoED) on Chaitra 2077. The Project is located on the Kulekhani khola, a major tributary to Rapti River, in central part of Nepal. The entire project area including major components like upper reservoir (existing Kulekhani I reservoir), tunnel, pipeline alignment, surge system lower reservoir and powerhouse is located on the Lambagar village of Indrasarovar Rural Municipality in Makwanpur district of Bagmati Province. Now the project is under pre-feasibility study from the Project Development Department. Memorandum of Understanding (MoU) between the KSPSHEP and Environment and Social Service Department (ESSD) has been completed for the study of Environmental Impact Assessment (EIA) on Jestha, 2077. Similarly MoU between the KSPSHEP and Soil Rock and Concrete Laboratory (SRCL) for Detailed Engineering Geological Mapping and Geotechnical Investigation has been completed on 26th Ashad 2078.

General Layout Plan of KSPSHEP



General Layout Plan of KSPSHEP

The main structures of the project are Upper dam (Kulekhani-I Existing Dam), submerged intake, headrace tunnel, headrace pipe, surge tank, penstock pipe, sub surface powerhouse, tailrace and Lower Dam and Reservoir. All the major component shall work for both generating and pumping mode.

The existing dam of Kulekhani –I Storage Hydropower Project acts as the upper reservoir of the project .The proposed intake is side intake on right side at about 900 m upstream of the existing dam of Kulekhani-I Storage HEP. The maximum diverted discharge of 46.24m^3/s from upper reservoir will pass through the intake. The headrace consists of 4.5 m diameter of tunnel of 650 m length and 4.3 m steel pipe of 1550 m length .The surface type surge tank is proposed at the end of the headrace pipe .The water will be released to the sub surface powerhouse via 3.5 m diameter steel pipe .The lower dam axis is proposed at about 1 km downstream of the powerhouse. The proposed dam is of 36m height from the river bed level with the crest level of 1261 m and maximum water level of 1260 masl which will provide the total storage volume of 3.57 Mm^3 with surface area of 0.244 Sq. km. The live storage volume of the lower dam is proposed

to be 1 Mm^3 with Minimum Water Level set at 1255 masl. The maximum discharge of 35.23 m^3/s will be pumped to the upper reservoir via tailrace/outlet which also acts as intake for the lower reservoir. The generation/pumping Francis type will be two units having capacity of 50 MW each. NEA is planning to complete all the detail design within one year after the completion of prefeasibility.

Survey and Feasibility Study of Transmission Lines, Substations and Hydropower Projects

PDD has been conducting topographical survey of various transmission lines, substations and hydropower projects. In the fiscal year 2077/78 following survey works have been accomplished by survey division of PDD.

Transmission line works carried out by Survey Division, F.Y. 2077/78

S. No.	Transmission Line Projects	Districts	Length (km)	Status
1	Khungri-Bhedakhet 132 kV T/L Survey and Tower Spotting	Rolpa and Rukum	73.176	Completed
2	Lahan-Sukhipur 132 kV T/L Survey and Feasibility Study	Siraha	16.136	Completed
3	Rupani-Bordebarsnain 132 kV T/L Survey and Feasibility Study	Saptari	18.449	Completed
4	Nijgadh-Pokhariya 400 kV T/ LSurvey and Feasibility Study	Bara and Parsa	64.07	Survey work completed/ Feasibility study to be done
5	Godak-Soyak 132 kV TL Survey and Feasibility Study	Ilam	6.56	Completed
6	Surkhet Dailekh 132 kV T/L Survey (Re-Route)	Surkhet	32.053	Draft Report Completed
7	Kali Gandaki Corridor 220 kV T/L (Tower Protection & River Training)	Myangdi		Survey work completed/ Design to be done
Topographical Survey of Internal Works carried out by Survey Division, F.Y. 2077/78-				
1	Kulekhani Sisneri Pumped Storage HEP (Detailed Survey & Bathometric survey)	Makwanpur		Completed
2	Uttarganga Storage HEP Camp site Survey (Survey for camp site)	Baglung		Completed
3	Chainpur Seti HEP Access road & ERT Survey	Bajhang		Completed

Study of New Hydroelectric Projects

Government of Nepal has allocated the budget for the study and identification of new hydropower projects in the FY 2077/78. The activities conducted for the study and identification of new hydropower projects in the FY 2077/78 are presented below:

1. Chera 1 Storage Hydroelectric Project (135.00MW)

Chera 1 Hydroelectric Project is studied as storage project. This project is proposed on Chera River at Jajarkot District of Karnali Province. The study shows the installed capacity of 135.00 MW. The project features include rockfill dam, intake structure, headrace tunnel, surge tank, penstock pipe, powerhouse and tailrace including approach road. A 160m height rockfill dam is proposed to divert 80.5 m3/s of water through approx. 4.5 Km headrace tunnel to generate 396.49 GWh energy annually. The power generated will be connected to the nearest national grid.

2. Dandagaun Khalanga Bheri Storage Hydroelectric Project (135.00MW)

Dandagaun Khalanga Bheri Hydroelectric Project is studied as storage project. This project is proposed on Bheri River at Jajarkot and Rukum West District of Karnali Province. The study shows the installed capacity of 135.00 MW. The project features include rockfill dam, intake structure, headrace tunnel, surge tank, penstock pipe, powerhouse and tailrace including approach road. A 105m height rockfill dam is proposed to divert 172.09 m3/s of water through approx. 3.5 Km headrace tunnel to generate 640.61 GWh energy annually. The power generated will be connected to the nearest national grid.

3. Kulekhani Sisneri Pump Storage Hydroelectric Project (100.00MW)

Kulekhani Sisneri Hydroelectric Project is studied as pump storage project. This project is proposed on Kulekhani River at Makawanpur District of Bagmati Province. The study shows the installed capacity of 100.00 MW. The project features include RCC dam, intake structure, headrace tunnel, penstock pipe and powerhouse. A 42m height RCC dam is proposed at lower pool whereas the Indrasarobar is used as upper pool. After construction of this project 205.9 GWh peak energy will be generated annually.

4. Tanahun Pump Storage Hydroelectric Project (300.00MW)

Tanahun Hydroelectric Project is studied as pump storage project. This project is proposed on Seti River at Tanahun District of Gandaki Province. The study shows the installed capacity of 300.00 MW.

Dudhkoshi Storage Hydroelectric Project (DKSHEP)

Dudhkoshi Storage Hydroelectric Project (DKSHEP) is located on the Dudhkoshi River bordering Khotang and Okhaldhunga, close to a settlement called Rabuwa, which is about 140 km (aerial distance) east from Kathmandu, approximately 1.5 km northwest from Lamidanda airport at Khotang. The project area lies in the Khotang, Okhaldhunga and Solukhumbu districts of Province no. 1 of Nepal. It is a storage type hydropower project with total installed capacity of 635 MW capable of addressing prevailing power and energy deficit during dry season.

At present, with the grant support from Asian Development Bank (ADB), NEA is conducting the updated feasibility study and detailed design of this project. A contract agreement was made between NEA and ELC Electroconsult S.p.A. (Italy) in association with NEWJEC Inc. (Japan) to perform related

investigations, Feasibility Study, Environmental and Social Impact Study, Detailed Design Study and Preparation of Bidding Documents.

With the assistance from Norwegian Government, Panel of Expert has been formed with the overall objective of achieving, in accordance with modern practices cost effectiveness, adequacy, high technical efficiency and safety of the project structures and components, including environmental and social components, over the life of the project.

The Consultant has submitted Updated Feasibility Study Report, Pre-qualification Document, Detailed Design Report, Environmental Impact Assessment 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, Plant contract and 400 KV Transmission Lines contract.

Dam Site of Dudhkoshi Storage Hydroelectric Project

The Upgraded Feasibility Study envisages two alternatives. First alternative is with total installed capacity 835 MW comprising a underground powerhouse with installed capacity of 600 MW located near Sunkoshi river with a 13.3 km long headrace tunnel and a underground powerhouse with an installed capacity of 235 MW located in the right abutment immediately downstream of the dam site including a hydro unit of 35 MW to generate energy from the release of the environmental flow. Second alternative is with total installed capacity 635 MW comprising a powerhouse with installed capacity of 600 MW located near Sunkoshi river with a 13.3 km long headrace tunnel and a surface powerhouse of capacity 35 MW located in the right abutment at dam toe to generate energy from the release of the environmental flow.

For Layout 835 MW, the Financial Internal Rate of Return is 9.2%, the Project Net Present Value is 211 million US $ and the Average Debt

Service Coverage Ratio is 2.4. For Layout 635 MW, the Financial Internal Rate of Return is 9.6%, the Project Net Present Value is 280 million US $ and the Average Debt Service Coverage Ratio is 2.5. For both the layouts, the debt-service indicators as well as the Project Financial Internal Rate of Return are higher that the reference figures for similar cases. Nevertheless, the Layout 635 MW is the best option from the economic and financial point of view and detailed design has been carried out for 635 MW.

Regarding Geotechnical Investigations, 1500 m of Core Drilling works and 750 m of Construction of Test Adit has been completed by separate contractor in close co-ordination and assistance from the Consultant. 200 m of Inclined Core drilling has been completed by Soil, Rock and Concrete Laboratory (SRCL), Nepal Electricity Authority. The Project is also carrying out suspended sediment sampling from suspension bridge over Dudhkoshi River at Rabuwa Bazar.

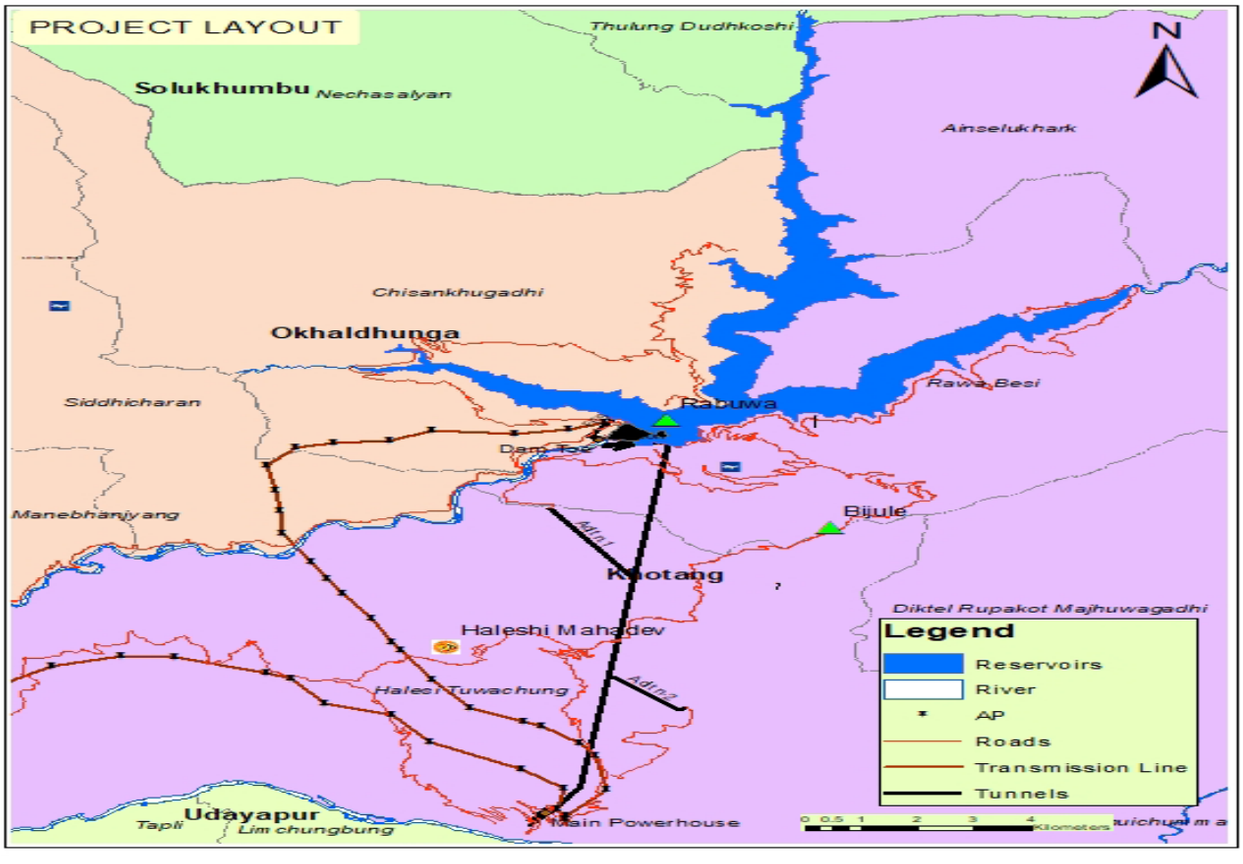
Inclined Core Drilling at Dam Site

The Draft Detailed Design Report was submitted by the Consultant and an International Panel of Experts and ADB experts have reviewed the reports and documents submitted by the Consultant and provided comments / suggestions on the documents.

The Consultant submitted the Final Detailed Design report incorporating comments / suggestions on the documents. An International Panel of Experts and ADB experts have reviewed the reports and provided comments / suggestions on the documents. There were some gaps in the Reports and the Consultant has been requested to fulfill the gaps and address the provided comments/ suggestions. Consultant is working to fulfill the gaps and comments/suggestions provided by the Client in consultation with Panel of Expect (PoE). Consultant is also preparing

for the remaining activities (Physical Model Testing, LiDAR Survey, Hydro fracture Testing) and additional investigations Audio Magneto Telluric (AMT) Survey. As per the work schedule of the Consultant, Consultant is planning to complete the remaining activities and finalization of Detailed Design Report by the end of November 2021.

The proposed layout in the Detailed Design Report includes: 220 m high Concrete Face Rockfill Dam (CFRD) with a 630 m long crest at elevation 648m.a.s.l,, with Full Supply Level at 640 m.a.s.l.,located on Dudhkoshi River in a gorge nearly one kilometer downstream of the confluence between Dudhkoshi River and Thotne Khola (a tributary); an underground powerhouse with the installed capacity of 600 MW located on Sunkoshi river with a 13.3 km long headrace tunnel; 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) located 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 has been proposed to ensure the safety of the dam. The total storage capacity of the reservoir is 1,581 Mm3 out of which the live storage capacity is 1,342 Mm3 and the dam body volume is about 26.7 million m³.



General Layout of the Project

The annual energy production is 3,443GWh per year, with an average energy production of 1,358 GWh in Dry season and 2,084GWh 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 Scoping and Terms of Reference (ToR) report for EIA for hydropower component has been approved by Ministry of Forests and Environment, Government of Nepal (GoN).

As part of the environmental assessment of the project, consultations and meeting with affected persons and concerned stakeholders and the Public Hearings on the EIA report was carried out and the Final EIA Report for hydropower component has been submitted to Department of Electricity Development (DoED) for approval and the report is in the process of approval.

With an involvement of national indigenous people expert, community level consultations with Indigenous People was conducted from 1st to 14th April 2021. Wide range of consultations was made to inform all people about the project and receive the concerns of the key indigenous people living in the project affected settlement area.

Consultation with project affected community

The Terms of Reference (ToR) report for IEE of Transmission Line has been submitted to Department of Electricity Development (DoED) for approval and the report is in the process of approval.

In comparison to similar projects, Dudhkoshi Storage Hydroelectric Project can produce the most energy in terms of cost and installed capacity with minimal social impact (less than 200 severely displaced household) and is financially more viable.

The project has also started the process for land acquisition. The identification of land (land parcel) and collection of ownership details for reservoir and other structure in Khotang districts has been completed and preliminary notice of Land acquisition in reservoir area in Khotang District has been published. The identification of land (land parcel) in Okhaldhunga and Solukhumbhu districts has been completed and collection of ownership details is ongoing. The land acquisition for project is planned to be complete by the end of FY 2078-79.

The project has also started the construction of access road. The Memorandum of Understanding (MoU) was made between NEA and Halesi Tuwachung Municipality to open about 2 Km track road from Dhitung to Main Powerhouse and the track opening has been completed. Detail Survey of access road connecting main PH to Tailrace has been completed and alignment and design is being prepared. The project is also planning upgrading the road at dam site.

Government of Nepal has initiated groundwork with development partners to raise investment for the project. Ministry of Finance has sent the letter to Asian Development Bank (ADB), European Investment Bank (EIB), Asian Infrastructure Investment Bank (AIIB) and Korean Exim Bank requesting investment for the project and the discussion is ongoing. ADB conducted the Reconnaissance Mission from 21 June to 2 July 2021 and Modality of Project Financing was discussed between the authorities of the Ministry of Finance, Ministry of Energy, Water Resources and Irrigation and Nepal Electricity Authority (NEA).

As presently conceived, the project can be implemented and fully commissioned in 7 years' period. The Detailed Design of Project including Tender Document preparation is

expected to complete by end of 2021. However, the ongoing lockdown due to pandemic Corona may affect completion of some remaining activities and the finalization of the document within target date. The land acquisition for the project is planned to be complete by the mid of July 2022 and the financial arrangement for the project is expected to complete by the end of 2022 and the construction of the project is expected to commence from the start of 2023 and complete by the end of 2029.

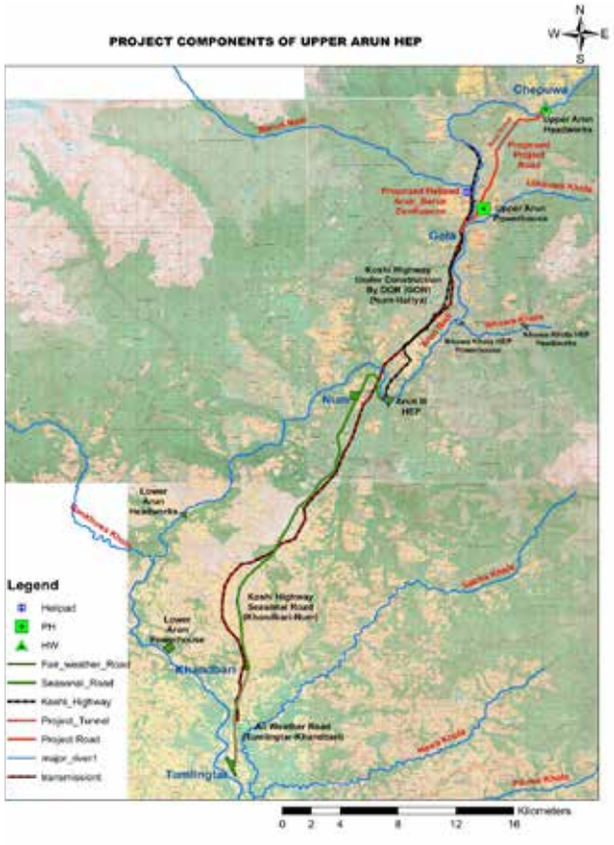
Upper Arun Hydroelectric Project (UAHEP)

The UAHEP, which lies on the upper reach of the Arun River, is one of the most attractive projects in the Province No. 1, Sankhuwasabha District of Nepal. It is located at about 700 km east of Kathmandu. The access to the project area starts from "Koshi Rajmarg" which is a national high way to Kimathanka (China Border) and is presently under construction by Government of Nepal (GoN).

The stretch of Arun River in the project area is the boundary of the buffer zone of Makalu Barun National Park. The right bank of Arun River in this stretch lies within the buffer zone. Except the head works, all the main structures of the project are located on the left bank of Arun River which is outside the buffer zone of Makalu Barun National Park.

Feasibility study of this project was carried out by the Joint Venture of Morrison Knudsen Corporation in association with Lahmeyer International, Tokyo Electric Power Services Co. and NEPECON on behalf of Nepal Electricity Authority (NEA) in 1991.

As preparation of the projects for implementation, the study of UAHEP & IKHPP (Ikhuwa khola Hydropower Project) (Detailed Engineering design and Environmental and Social Study) is being carried out with the financial assistance of World Bank (WB) under Power Sector Reform and Sustainable Development Hydropower Projects (PSRSHDP). The Detailed Engineering design and Construction Supervision of the Access Road for the UAHEP is being carried with funding of Government of Nepal. NEA Board decided to develop both projects under the Public Company for which Upper Arun Hydroelectric Limited (UAHEL) has been formed. The license for study of UAHEP and IKHPP has already been granted to UAHEL. In addition, UAHEL received the survey license for 400 kV power transmission of UAHEP and 132 kV power transmission of IKHPP from DoED on 2077/05/11 and 2077/07/25 respectively.



The following is the present status of the main activities of the project:

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 May 19, 2021.The UFSR of UAHEP has been accepted by NEA after the approval by the DSPOE. The project is optimized for 1040 MW capacity with 6 hours peaking and the Project would supply an estimated average annual energy of 4,531 GWh (including 18.57 GWh from the eco-flow power station). The investigation works; hydrology, topographic survey and drilling bore hole for UFSR have been completed while the test adit excavation work is ongoing and 993 m out of 1275 m has been completed. DSPOE (Dam safety Panel of Experts) has recommended the additional investigation work for Detailed Engineering Design of UAHEP for which the MOU (Memorandum of Understanding) was signed between the Project and the SRCL (Soil, Rock and Concrete Lab). The additional investigations are ongoing at site and 365m out of 4125m has been completed by the SRCL. The SRCL has submitted the inception report on March 2021. The UFSR of IKHPP was also submitted on April 2021. The DSPOE and UAHEP, NEA team sent the comments on the UFSR. The Consultant will submit the final report after incorporating all comments within July 2021.

- 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 involved. ESSD is responsible for the IEE of Camp Facility, Fishery Baseline Study (FBS) and EIA of Access road. The IEE and FBS were completed and the preparation of EIA of Access Road has completed and has been submitted to DOED for Approval.
- ERM was assigned the ESIA, CIA and SPS work of Hydropower component. The Scoping document/ ToR of UAHEP had been approved from concerned department and the preparation of EIA document have been complete but the public disclosure of the document and submission of the document is pending. In Parallel, Draft ESIA document and its Appendices (RAP, Stakeholder Engagement plan, ESMP, CIA) of UAHEP has been submitted. A separate contract was signed to NEFIN on 13th Feb, 2020 for Free Prior Informed Consent (FPIC). NEFIN has submitted the Scoping Document and was finalized by ESPOE (Environmental and Social Panel of Expert) and World Bank. The NEFIN has submitted their 1st Deliverable namely Selection of community representatives for Adibasi Janajati Advisory Council (AJAC) and has been approved by Panel and World-Bank. The working group has already been formed and are Social mapping/consultations on priorities for IPP is ongoing.
- 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 Draft Design Report and Bidding Document. The World Bank Transport team has reviewed the report and recommended for the additional investigations (SRT, drilling and MASW) for alternative analysis of the road tunnel and slope stability analysis of the critical sections. The Consultant has completed the alternative analysis of the road tunnel portals as per the final geological investigation report submitted by the SRCL (Additional geotechnical investigation for alternative analysis of road tunnel

portal was assigned to SRCL). Recently, the Consultant is working on the slope stability analysis of the critical areas with the guidance of the World Bank experts.

- The UAHEP is planned to start the construction work of project from February – 2024.
- Some snaps from Site:

Test Adit at Proposed Powerhouse Site

Borehole Drilling at nearby Proposed Powerhouse Site

Upper Modi Hydroelectric Project

Upper Modi Hydroelectric Project is located approximately 250 km west of Kathmandu in Annapurna Rural Municipality of Kaski District in the Gandaki Province of Nepal. This project comprises two run of river projects, Upper Modi 'A' (42 MW) and Upper Modi (19.8 MW) respectively.

The Upper Modi 'A' Hydroelectric Project consists mainly of a concrete weir and under sluice to be constructed on the Modi River. The head works will include a power intake structure; gravel trap, desanding basins, and a Head pond. A low-pressure horizontal tunnel, surge shaft, vertical shafts and the powerhouse also lie in the right bank of Modi River. The total annual average energy generation for UMAHEP is estimated to be 215.70 GWh out of which 28.93 GWh dry and 186.21 GWh wet season energy. Similarly, the Upper Modi Hydroelectric Project is a cascade project of UMAHEP and consists of interconnection structure, covered box culvert, low pressure tunnel, surge shaft, vertical and horizontal penstock and powerhouse structures. The average annual generation for UMHEP is estimated to be 102.11 GWh out of which the total dry season energy is estimated to be 11.85 GWh and the total wet season energy is 87.99 GWh. The inlet portal is located in the vicinity of Syauli Bazar. Powerhouse of UMHEP is located at Birethanti Village. A seasonal serviceable road both headworks and powerhouse site is available from Pokhara Baglung Highway at Nayapul. The access road of 10 km from Nayapul to Ghandruk is in final stage of upgrading from the Gandaki Province.

The preparation of updated feasibility study as well as detailed project reports was completed through an international consultant. Final energy production from both projects has been revised after detailed investigation of hydrological and metrological study. An EIA of Upper Modi A Hydroelectric Project and Supplementary EIA of Upper Modi Hydroelectric Project have been completed. Similarly, the IEE study of transmission line is in progress. The construction of project is planned to be carried out under an EPC contract model. An international Consultant has also submitted detailed engineering design

reports, pre-bid document, bidding documents of civil, hydro-mechanical, electromechanical and transmission line works for both projects.

Upper Modi A HEP, Headworks

Financial closure for the projects shall be finalized in this fiscal year and pre-qualification of contractor for construction of project works are expected to be completed. The selection of consultant for the review of design and supervision, i.e. Employer's Engineer for the project will be initiated from this fiscal year based on model of financial closure.

About 178 Ropani private land acquisition for powerhouse area, camp area and access road area of UMAHEP has already been completed. In this Fiscal Year 2077/78, official work for remaining private land acquisition work for both projects has been almost completed. Likewise, request for permission for utilization of government land, forest tree cutting has been sent to concerned ministry via. Department of Electricity Development Department (DOED) and the respective departments are processing on it to grant permission.

The land acquisition work for hydropower component of the project has been completed. If financial closure can be done, the project can enter into procurement phase. The remaining land acquisition will be for transmission line work and others work during construction.

Camp facilities construction works and access road to camp area has been initiated through Contractor selected by National Competitive bidding process. The contractor mobilized to site and about 15% of physical work progress has been achieved till date. The Camp facility construction works is expected to be completed within eighteen months from start date.

Ongoing Construction for Office and Resident

The project activities for these two project has been carried out by NEA subsidiary Company; Modi Jalabidhut Company Limited (MJCL) since Mangsir 1, 2077.

Andhikhola Storage Hydroelectric Project

NEA is concluding Updated Feasibility study of Andhikhola Storage Hydroelectric Project (180 MW) which is situated in Syangja district. There is an urgent need to implement storage hydropower projects in order to fulfill the power system requirement of Nepal. The existing Siddhartha Highway and Kali Gandaki 'A' access road provide an easy access to the project site. The proposed Dam site of this project has been located just 3.1 km upstream of Kaligandaki/ Andhikhola confluence. The proposed Powerhouse site is located 12 km downstream of Kali Gandaki 'A' (KG-A) Powerhouse site and 5.5 km along the Kaligandaki River from Ramdi Bridge in Palpa-Syangja Border.

The crest level of dam has been proposed at 710 masl so that Galyang Bazar on the highway will be protected. After the site visit

by JICA/NEWJEC experts in November, 2017, an alternative dam site has been proposed for further study which is located at about 1.2 km upstream from the previously proposed dam site. The newly proposed rock fill dam will be 167 m high from the river bed. A sloping type intake has been proposed to convey the discharge from the reservoir through a 3.112 km long Headrace tunnel, Surge shaft, 227.5 m high Drop shaft and 1.277 km long Pressure tunnel to the powerhouse. A semi surface powerhouse with three turbine-generator units and ancillary facilities has been proposed on the left bank of Kaligandaki River instead of the underground powerhouse proposed in earlier study.

Field investigation works including Geological drilling, Geological mapping, ERT survey, Topo Survey has been carried out. Sediment sampling & Discharge measurement work of the river is being carried out. The EIA study of this project is conducted by Environment and Social Studies Department, NEA. Final EIA Report has already been submitted to Department of Electricity Development, MoE for approval. This project can generate about 674.45 GWh of total energy with 8.25-hour peak in dry season which is very much needed in the Power system. Estimated cost of the project is about US$ 573 Million.

Major Environmental impact comprises of acquisition of about 712 households, 966 Ha of land and 9.4 MW Andhikhola run of river hydropower project owned by BPC. Based on the interaction made at Galyang Bazar with the local stakeholders in April 2018, the local people are positive for the implementation of this project

Due to easy access for construction, favorable location and moderate environmental impact, this storage project could be promising scheme for implementation in near term. Andhikhola Power Company Ltd. has been established as a subsidiary company of NEA to execute this project. In the fiscal year 2077/078 NEA Village and access road survey, design and tendering work will be carried out. Furthermore, Expression of Interest and Request for Proposal will be called from International Consultant for Detail engineering design and Tender document preparation of this project.

Drilling at Dam Site

Proposed Intake Location

Proposed New Dam Site

Drill Hole Location at Powerhouse Site

Building and Physical Infrastructure Construction Project (BPICP)

Building and Physical Infrastructure Construction Project (BPICP) was established on 2074/06/09. The main objective of this project is to construct the Corporate Office building at Durbarmarg and other office building at lainchaur and swayambhu along with other infrastructures. BPICP is running three projects concurrently and planning to initiate the construction within the FY 2078/79. The detail designs of these buildings are at the final stage. The BPICP had submitted the IEE reports to MoUD and building permit from KMC, is in progress. The BPICP is planning to execute the construction of these buildings in FY 2078/79.

1. Corporate Office Building (COB) at Durbarmarg

NEA planned to establish a corporate office and other infrastructure at Durbarmarg, Kathmandu. A master plan was developed in 1989. NEA had selected a consultant to carry out the detail design of Corporate Office Building and multiplex building, which was completed in FY 2070/71.

NEA had submitted the design drawing of 16 storey building to Kathmandu Metropolitan City (KMC) for approval. But, due to change in building by-laws, imposed by Ministry of Urban Development (MoUD) after the earthquake of 2015 as "बस्ती विकास, सहरी योजना तथा भवन निर्माण सम्बन्धि आधारभूत निर्माण मापदण्ड, २०७२", demanding setback of one-fourth of the building height in all sides of the building, the above design could not meet the requirement of the new by-law, the Initial Environment Report (IEE) was not approved by MoUD and the project was delayed. Now BPICP had revised the architectural design of COB, compliance to the bylaws of MoUD and KMC.

The new design is with eight storey and double basement parking. The plinth area of building is 674.94 Sqm. The total floor area is 7367.96 sqm (including basement). The architectural out looks is mix of traditional Nepalese architecture. There is a provision of vertical movement lift for parking vehicle along with ramp. The building consists of two passenger lift, one seminar hall, canteen, library, waiting room and other. The BPICP had also designed HVAC system, Interior Design and CCTV security surveillance system.

South-West view of Corporate Office Building

The detail design is in final stage. The IEE report preparation work is in progress. The Environment and Social Study Department (ESSD), responsible for IEE report preparation, had conducted the Public hearing program under Environment Protection Rule on 11th Asadh 2078, by following the public health guidelines issued by Nepal Government.

2. New Office Building at Lainchaur

The existing office space in NEA head office complex at Durbarmarg is not adequate to accommodate all office requirements. Nepal Electricity Authority had planned to construct the office building to accommodate some of the directorate office and its departments in the transformer workshop premises at Lainchaur.

NEA has 5-13-0-0 land area at Lainchaur. The land is located at prime location. BPICP had selected the consultant for detail design of New Office Building at Lainchaur. The Contract Agreement was done on 6th Jan 2020. The Consultant had submitted the Draft Design report with eight storey and single basement parking. The Ground floor will be used as control room of Lainchaur substation. An access road is provided for the fire brigade and other heavy equipment for maintenance work of substation transformer. The plinth area of Building is 628.97 sqm. The total floor area is 6231.15 sqm. The exterior outlook is designed according to modern architecture.

Proposed office building at lainchaur

3. Office Building at Bhagwanpau

NEA has planned to construct another office building at existing Soil, Rock and Concrete Laboratory (SRCL) premises, located at Bhagwanpau, Kathmandu. The land is located at the toe of Swoyambhu, a world heritage site.

BPICP had selected consultant for detail design of Office Building at Bhagwanpau. As this site is located at the buffer zone of the monumental zone, the Consultant had submitted the design of four storied building compliance with the by-laws of Department of Archeology. The architectural design is of typical traditional Nepalese architecture with exposed brick work façade, sloped roof with Jihngati, carved wooden window and central court yard for natural lighting. The Plinth area of building is 1606.48 sqm. The total floor area is 5715.54 sqm.

Proposed Office Building at Bhagwanpau

Soil, Rock and Concrete Laboratory

Soil, Rock and Concrete Laboratory (SRCL) under the Engineering Services Directorate of Nepal Electricity Authority has been established with the aim at providing investigation services for different sorts of development projects. These services include geological, geophysical, geotechnical investigation works and laboratory testing works of materials. Geological works include geological mapping, hazard mapping, discontinuity measurement and their analysis.

Geophysical investigation works includes Electrical Resistivity tomography (ERT), Seismic Refraction Tomogrpahy (SRT) and Multichannel Analysis of Surface Waves (MASW). SRCL has extended the arena of geophysical works in terms of bore hole observation through insertion of bore hole camera. Geotechnical Investigation works include core drilling, pitting and in-situ testing. It also includes the construction material survey and laboratory testing of materials. SRCL has the highest capacity of core drilling as deep as 1000m in Nepal. Furthermore, SRCL is planning to execute Test Adit Tunnel Excavation works for hydropower projects in near future.

Followings are the major works executed by SRCL in fiscal year 2077/78

1. Geotechnical investigation works of Phukot Karnali Hydroelectric Project, Kalikot.

According to the new agreement made between SRCL and NEA Engineering Company Limited, SRCL has started the additional investigation works of Phukot Karnali Hydroelectric Project (PKHEP) and is undergoing now.

2. Geological, Geophysical and Geotechnical investigation works of Betan Karnali Hydroelectric Project, Surkhet/Achham

SRCL has completed all the investigation works at Betan Karnali Hydroelectric Project promoted by Karmachari Sanchay Kosh. 1192m core drilling along with in-situ tests have been accomplished at the site. Final report for this project is under preparation.

3. Geological, Geophysical and Geotechnical investigation works of Andhi Khola Storage HEP, Syangja.

Geotechnical investigation works for phase III of this project includes 770m core drilling works along with 2.3km long ERT surveys and Geological mapping of damsite. SRCL has completed all these assigned works and submitted the final report to the Client.

4. Geological and Geophysical investigation of Uttarganga Storage Hydroelectric Project, Baglung

SRCL has completed 130m core drilling works at the powerhouse site of this project within this fiscal year. Total depth of this hole is 330m. Because of the geological surprises, drilling work is becoming a tough job for this terrain. SRCL will continue this job in the coming fiscal year 2078/79 too.

5. Geotechnical investigation works of Upper Arun HEP, Sankhuwasabha.

Geotechnical Investigation works of Upper Arun Hydroelectric Project is undergoing. Core drilling works along with in-situ testing have been carrying out at the headworks area. So far, SRCL has completed around 400m core drilling works at different locations of this project. All the investigations work has been perturbed due to the effect of second wave of COVID-19 pandemic. Now, it has been resumed and will be accelerated soon.

6. Geotechnical investigation works of Dudhkoshi Storage Hydroelectric Project, Khotang/Okhaldhunga

Core drilling works (each of 100m inclined) at the dam site of the Dudhkoshi Storage Hydroelectric Project has been completed and the draft report for this works has been submitted to its client.

7. Geological investigation works of Lower Seti hydroelectric Project, Tanahu

Lower Seti Hydroelectric Project promoted by Tanahu Hydropower Limited had rendered Geotechnical Investigation Works (Phase III) to SRCL. SRCL completed all the works there

and final report for this investigation works incorporating 323.5m core drilling, 2km SRT survey and laboratory testing of core samples has been submitted to the Client.

8. Geological investigation works of Begnas Rupa Pumped Storage Project, Kaski

SRCL completed all the investigation works of the Begnas Rupa Pumped Storage Project. This investigation works included core drilling works of 30m at different locations of the dam and piezometer installation at those bore holes, MASW for 4 locations and Test Pitting for 6 different locations and their laboratory testing of test pit materials.

9. Geological investigation works of Bharatpur 220kV Substation, Chitwan.

After the completion of the geotechnical investigation works for this project, SRCL has cubmitted the final report to its Client for this project.

10. Geotechnical Investigation and Laboratory Tests

- Begnas Rupa Pumped Storage Project
- Chhabdi Khola Bridge, Damauli 132 kV substation, Tanahun
- Bharatpur Substation, Marshyangdi Corridor 220kV T/L Line Project.

11. Miscellaneous Laboratory Tests:

SRCL carried out different sorts of laboratory tests within this fiscal year for the following projects as per ASTM, AASTO & IS standards.

- Rock mechanical testing of Lower seti Hydropower Project, Tanahu Hydropower Limited.
- Rock mechanical testing of Andhi Khola Storage Hydroelectric Project, Syangja.
- Rock mechanical testing of Betan Karnali Hydroelectric Project, Surkhet/Achham.
- Sediment analysis of Dushkoshi Storage Hydroelectric Project, Khotang.
- Laboratory testing on soil samples of Upper Trishuli 'A' HEP.
- Laboratory testing on soil samples of The Peoples HPP Company Limited.
- Compressive strength tests on compressed stabilized bricks of Build Up Nepal, Tara Interlock Block Udhyog, Shree Tamangkharka SS Block Udhyog etc.
- Rock mechanical tests on core samples of Asia foundation Pvt. Ltd.
- Uniaxial Compressive Strength Tests and Point Load Tests of Koshi Corridor 220kV Transmission Line Project of L & T, India,
- Uniaxial Compressive Strength Tests and Point Load Tests of China Railway No. 2 Engineering Group Company Limited, China Overseas Engineering Group Company Limited.
- Various laboratory tests of Kathmandu Terai Fast Track Project, Praganna & Badkapath Irrigation Project, Mega Dang Valley Irrigation Project, National Reconstruction Authority (NRA), Tanahu Hydopower Projects etc.

12. Future Plans

SRCL has a long history of material testing in Nepal for many kinds of development projects. Now, SRCL has forwarded its step to acquire **ISO standards** to advance the quality of rendering services to its Clients. The process of getting an ISO certification is under process.

SRCL is planning to execute the **Test Adit Tunnel Excavation** works in near future for which most of the equipments needed for this purpose has already been purchased and few equipments are in the process of procurement.

Core Drilling works at Phukot Karnali HEP

Seismic Refraction survey at Upper Arun HEP

Sample of core recovered

Laboratory tests on core sample

Electromechanical Design Division

Established under Engineering Services Directorate, the Electromechanical Design Division has been providing technical support for all electro-mechanical issues associated with its own concrete pole plants as well as transformer workshop. The issues range from the design of electro-mechanical and hydro-mechanical equipment of hydropower projects under various stages of study as well as electrical installations for various projects. Under the engineering service, it provides Power evacuation study with collaboration of the Power System Planning Department of NEA. From this fiscal year this division is involved in the feasibility study of Kulekhani-Sisneri Pumped Storage Hydro Electric Project, it is Studying and analyzing the electro-mechanical design part, and is continuing the study of Begnas-Rupa Pumped Storage Hydroelectric Project. Apart from it, the Division is also involved in procurement and maintenance of vehicles under the Engineering Services Directorate. It has been fully involved for the establishment of new concrete pole plants in Tankisinuwari, Morang and Lamki, Kailali. Also this Division has been monitoring the overall functioning of the Central Workshop in Hetauda, which is involved in maintenance and repair of transformers. Similarly, it has also been monitoring the overall functioning of

Kotre Pole Plant, Tanahu as well as Concrete Pole Plant, Amlekhgunj.

In near future, it is also planning the establishment of concrete pole plant in central region of Nepal which shall ease the PSC pole supply to this region. Another future plan of Electromechanical Design Division is to provide service in the construction/maintenance work of urgent and vital Transmission Line, Distribution Lines and associated infrastructures under the Engineering Directorate. Also the Division is planning to develop pole testing facility and make ISO Certified concrete pole plants in coming fiscal year.

1. Concrete Pole Plant, Amlekhgunj, Bara

Concrete Pole Plant was established in 2051 BS which is located at Amlekhgunj, Bara, Province no. 2. It is an entity under Engineering Services Directorate, Nepal Electricity Authority and contributing the role for production of PSC poles used for electrification and maintenance of distribution system. Its main objective is to produce 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 74 poles (out of these 12 nos. of 8 meter, 30 nos. of 9 meter and 32 nos. of 11m pole produces daily). 22 permanents and 49 daily wages employees are working to achieve annual target of pole production.

This plant is business motive office. For the fiscal year 2077/78 gross profit achieved by the plant is around 40million. The plant is conducting best using of its available manpower and resources to meet time bound production and delivery of the poles.

Status of Ashar 2078

S.N.	Size of pole (m)	Annual target	Production	Sales	Remarks
1.	8	5601	5673	6720	
2.	9	7636	8459	8761	
3.	11	5196	5483	4991	
		18433	19615	20472	*Sales>production due to previous stock.

1.

2.

2. 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. After termination of that project, this plant was handed over to Nepal Electricity Authority (NEA) being an entity under Engineering Services Directorate. Now it has been working to implement concrete pole production and sales of poles to DCS of NEA under the Gandaki, Lumbini and Bagmati Province. Currently the plant is producing 8.0m, 9.0m and 11m sizes pole of standard sizes as per design norms. The daily production capacity of plant is 8 Nos. of 8m Pole, 24 Nos. of 9m Pole and 24 Nos. of 11m Pole in total of 56 nos. of poles. In F/Y 2077/78, the plant is working to its best using available manpower and resources to meet time bound production and delivery of poles under the despite lockdown due to COVID-19 pandemic.

S.N	Type of poles	F.Y-075/76	F.Y-076/77	F.Y-077/78
1	8 m	4632	3880	1936
2	9 m	4272	5184	5784
3	11m	1368	3120	5652
4	10.4m	684	-	-
	Total	10956	12184	13372

1. Concrete Pole Plant, Tankisinuwari & Lamki

Concrete Pole Plant, Tankisinuwari & Lamki is working under Electromechanical Division, Engineering Service Directorate, Durbarmarg, Kathmandu. Its objectives of producing 8m, 9m and 11m size PSC poles for distribution to Provincial offices of NEA and private firm. The Tankisinuwari Pole Plant site office is located at Budhiganga Rural Municipality; ward No.2, Morang along the famous Morang-Sunsari Industrial Corridor, almost 6 km distance from Biratnagar Airport.

The testing of the pole plant is expected to commence from mid of Shrawan 2078. Civil Structures like Office Building, Cement and HT Wire Store, Boiler House, Guard House have already been completed. Likewise, production equipment and systems like Modular Concrete Batching Mixing plant, Double acting type Hydraulic Power Pack, Hydraulic Cylinder Assembly and Tensioning.

The plant is almost ready to commence the test production and in its full phase, the plant has capacity of production as below: 14 nos. of 8m pole, 48 nos. of 9m Pole and 30 nos. of 11m pole having total of 92 poles per day, currently the largest capacity of any NEA Pole Plant. The production will start from fiscal year 2078/079, which will fulfill the demand of PSC Poles in eastern part of Nepal.

In case of Concrete pole plant in Lamki, Plant has completed construction Office building, Store Buildings, Installation of PSC Pole Moulds and Boiler. In addition to this, the plant has started to prepare tensioning posts, Cranes and Concrete Mixture in the factory. The construction work of this pole plant will be completed in fiscal year 2078/79. This pole plant has a production capacity as below: 14 nos. of 8m pole, 48 nos. of 9m Pole and 20 nos. of 11m pole having total of 82 poles per day. The production is planned to commence from fiscal year 2078/079, which will fulfill the demand of PSC Poles in western part of Nepal.

4. Central Workshop

Central Workshop is the largest transformer testing and maintenance service entity in NEA, located at Bhairav Road, Hetauda-5, Makawanpur and established in 2055 BS, the Central Workshop has been contributing to Nepal Electricity Authority being an entity under Electromechanical Division, Engineering Service Directorate with its purpose of repairing Distribution and Power transformer of NEA and its subsidiary companies, testing of transformers and providing the available heavy equipment on rent. While transformers are among the most reliable equipment used in electrical power systems, failures do occur. And with these failures, profits and people can suffer. Replacing a transformer can take several weeks resulting in serious

financial and productivity losses. In many cases, a transformer can be repaired but only if the problem is caught before it escalates. Central Workshop employs the necessary resources and equipment to ensure that the repaired transformers are delivered, installed, commissioned and tested to the highest standards.

Power Transformer Unloading

Inside Transformer Testing Lab

The achievements of the workshop in the last five fiscal years are tabulated below:

S.N.	Descriptions	F.Y. 2073/074	F.Y. 2074/075	F.Y. 2075/076	F.Y. 2076/077	F.Y. 2077/078
1	Distribution Transformer Repair	636	805	807	850	1101
2	Power Transformer Repair	13	8	13	9	7
3	Transformer Testing	4041	2362	8476	8250	3000
4	Heavy Equipment (in Thousand NRs.)	11,125.047	12,151.39	1,193.203	1375901.45	2211833.95

Major Accomplishment of FY 2077/078:

- Repaired highest number of distribution transformer (1101 numbers) in FY 2077/078.
- Highest income record of ***NRs. 5,14,29,170.00*** resulting from auctions.
- Highest income or revenue generation record of ***NRs. 17,41,06,115.10*** in the history of Central Workshop.
- Construction of power transformer repair workshop building is about to complete.

NEA Training Center

NEA Training Center (referred as NEA TC) is situated at Kharipati, Bhaktapur has been providing different skill enhancing trainings to the staffs as well as Nepalese citizens since 2046 B.S. It was at Ratnapark, Kathmandu from 2046 to 2057 B.S. and serving from Kharipati since 2057. During the last 31 years, NEA TC has trained 21,550 employees from the different core group of NEA and some from other organizations. With the view to expand its training programs for clients outside of NEA,

upon their request, NEA TC is also conducting various programs to non NEA staffs too.

NEA TC occupies around 203 Ropanis of land with well-equipped academic as well as hostel buildings for residential training. It has a two storey academic building having 48 halls and rooms for training purposes which includes classrooms, computer labs, electrical labs, mechanical labs and seminar halls. Most of the rooms are occupied by various project offices running under NEA. Here are 3 hostel buildings with the capacity of 130 beds and a VIP Guest House. It has one Administrative building for office use and a modern type of canteen building too.

NEA TC is conducting different types of technical as well as non-technical trainings with its sovereign identity. It has 28 (Technical 13 and Nontechnical 15) different levels approved posts under the control of Director (21 employees are working). Those staffs cover electrical, mechanical, civil engineering as well as administrative and financial functions. They prepare trainings/seminar programs annually and provide services effectively. The main function is to prepare trainings/allocate resources management/collect appropriate trainees and other general management activities.

Objectives

- 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.
- Design training packages and implement.

Vision

NEA TC is to be strengthened day by day to be a sovereign academic institution capable to cope with the training requirements of power sector of the country. Finally, NEA TC aim to be developed as an engineering and management center of excellence. It also aims its academic standard to be comparable with the best SAARC regional institutions.

Activities in F/Y 2077/78

The term training refers to the acquisition of knowledge, skills and competencies as a result of the teaching of vocational or practical skill and knowledge that relate to specific useful competencies. As Human Resource is one of the most important ingredients of any organization, its development is indispensable for the survival and advancement of the organization. So, investment in training is treated as corporate assets of the organization.

NEA TC has been providing need based short term training covering 3 days to 10 days for NEA employees with an objective to upgrade their professional knowledge, skills and attitudes of manpower at operational and managerial levels involved in the power sector. The training types involve induction, in-service or refreshers and as per requirement. The training programs are designed as per training needs assessment of an organization and at the personnel level after discussion with the management and feedbacks provided by trainees. In this F/Y NEA TC has sign a memorandum with **State Grid of China Technology Collage** on Tittle **Personnel Training & Capacity Building on June 22, 2021.** New procedure for training purpose is also going on in this F/Y. In the fiscal year 2077/78

trainings were conducted in its own building were 4 whereas 2 number of the trainings were at the regional level especially for the assistant level staffs from DCS. In this fiscal year total numbers of trainings conducted were 6 with 129 trainees in number. Due to the pandemic COVID situation the target did not meet in this F/Y.

Nepal Electricity Authority
Training Center
Training Program Conducted on F/Y 2077-078

S.No	Date	Training	No. Of Participants	Level	Venue
1	2077/11/17 to 2077/11/21	TOD Meter with AMR/AMI system	21	Assistant	Kharipati
2	2077/12/01to 2078/01/6	Hydrological and Hydraulic Using HEC-HMS and HEC-RAS	18	Officer	Kharipati
3	2077/1/08 to 2078/01/13	Training of Trainers	16	Officer	Kharipati
4	2077/12/22 to 2077/12/27	TOD Meter with AMR/AMI system	32	Officer	Biratnagar
5	2078/01/05 to2078/01/ 10	Accounting ,PMIS and Inventory	26	Assistant/ officer	Attariya
6	2078/01/06 to 2078/01/9	Central E-Attendance system	16	Assistant/ officer	Kharipati
Total					

Extra Activities

In addition to training programs, NEA TC 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 NEA TC for various purposes. The total income generated from these services amounted to Rs.4,43,067.35 (With VAT) in the fiscal year 2077/78. As compare to last F/Y its 83.61 % amount less due COVID pandemic situation. The Training Center has also provided space and services to various offices of NEA at its premises. A Transformer Testing Lab is also in the premises of the Training Centre. During the COVID pandemic period, Nepal government also made NEA TC hostel premises as quarantine Centre for Nepali people.

Future Activities

As being dedicated a part of NEA, it's trying to manage different sector training that it can offer to its employee member. Some of the future plans that are being carried out by NEA TC are as follows:

- NEA TC has been giving induction training for its newly recruited member from its established period. The timing for that training was only for 3 days but now its planning to provide the training for 6 weeks for Officer level and 3 weeks for non- officer level.
- NEA TC is planning to provide training for Centre Chief of different directorate which is new program.
- NEA TC is proceeding on curriculum preparation for the in service training for all the staff of NEA accordance to NEA employee regulation 2075.

Short term Training programs to be conducted on fiscal year 2078/79

S.No	Name of Training	Level	Service	Participant Nos	Duration (Days)	Secession
1	Auto Cad (2D & 3D)	6-9	Technical	24	10	38
2	GIS	6-9	Technical	24	9	34
3	Advance Excel	6-9	Technical	24	10	38
4	Prime Vera (Project Management)	6-9	Technical	24	6	22
5	EAT(Electrical power System Analysis Software	6-9	Technical	24	6	22
6	AMI/AMR TOD Meter Connection, Data Download & Analysis	6-9	Technical	24	6	22
7	Electro-Mechanical & Hydro-Mechanical maintenance of Power House	6-9	Technical	24	6	22
8	MS Project	6-9	Technical	24	6	22
9	HEC RAS	6-9	Technical	24	6	22
10	DAM Break Analysis	6-9	Technical	24	6	22
11	PPMO-E bidding	6-9	Technical	24	6	22
12	Power Transformer Maintenance	3-5	Technical	24	6	22
13	Transmission line Management	3-5	Technical	24	6	22
14	GIS Substation Maintenance & Upgrading Training	3-5	Technical	20	6	22
15	Operation &Maintenance of Power Plant	3-5	Technical	20	10	38
16	Electrical Training	3-5	Technical	20	10	38
17	Cable Head Jointing	3-5	Technical	24	6	22
18	Breaker & Relay Testing	3-5	Technical	20	6	22
19	Substation Operation Maintenance	3-5	Technical	20	5	18
20	Transformer Maintenance	3-5	Technical	20	10	38
21	Distribution Line Maintenance	3-5	Technical	20	10	38
22	Safety Training	All	Technical	20	6	22
23	Staff Management Training	6-9	Administration	24	6	22
24	E-Attendance Training	4-6	Administration	20	5	18
25	Office Management (Consumer Relationship &Hospitality)	4-7	Administration	20	6	22
26	Basic Computer	4-6	All	20	6	22
27	Stress Management	All	All	20	5	18
28	Contract Management	6-9	All	20	5	18
29	CIAS & Inventory Training PMS	4-6	Account	20	6	22
30	Revenue Management (M-power, Online /Self Meter Reading)	4-6	Account	20	6	22
Total Secessions that will be conducted for F/Y 2078/79						752

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. This unit functioned under the Project Preparation Department of Engineering Directorate of NEA. 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). Since then, ESSD is one of the integral departments 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 scope of work of ESSD has increased significantly.

ESSD executes all the activities related environmental and social aspects of hydroelectric Projects (HEPs) and transmission line projects (TLPs) which are being planned, designed, constructed or operated by NEA. This department is a commercial wing of NEA and with its technical expertise involved in conducting Environmental Impact Assessment (EIA), Initial Environmental Examination (IEE), Social Impact Assessment (SIA), Vulnerable Community Development Plan (VCDP), Resettlement Action Plan (RAP), Land Acquisition and Compensation Plan (LACP) studies along with environmental monitoring and implementation of mitigation measures and community support programs of hydroelectric, transmission line and distribution line projects.

During the fiscal year 2020/21, ESSD was actively engaged in environment and social studies, monitoring and protection of the environment. However, the performance of the department was affected by the global pandemic COVID-19 as well change in legal regime governing the study projects. The following sections provide a brief of different tasks carried out by ESSD in the FY 2020/21.

1. Study Projects

a. Projects Requiring EIA

The whole process of EIA in Nepal is primarily guided by Environment Protection Act, 2019 and EPR, 2020. All the documents subject to EIA including the Scoping Document (SD); Terms of Reference (ToR) and main EIA document are subjected to approval by the Ministry of Forests and Environment (MoFE). In the fiscal year 2020/21, ESSD was involved in the EIA of following nine projects, out of which S-EIA of one project have been approved by the ministry and the EIA of five projects have been submitted through DoED for approval.

1. Upper Modi HEP (18.02MW): S-EIA report approved by MoFE
2. Uttarganga Storage HEP (828MW): EIA report submitted to DoED
3. Andhikhola Storage HEP (180MW): EIA report Submitted to DoED
4. Access Road of Upper Arun HEP: EIA report submitted to DoED
5. Chainpur Seti HEP (210MW): EIA report submitted to DoED
6. Rolwaling Khola HEP (22MW): EIA report submitted to DoED
7. Begnas-Rupa Pump Storage HEP (150MW): SD/ToR approved, waiting for technical details.
8. Sisneri Kulekhani Pump Storage HEP (100MW): MoU signed
9. Jagatpur-Madi 33kV TL Project: MoU signed for S-EIA, waiting for study permission from Department of National Parks and Wildlife Reserve

b. Projects Requiring IEE

The documents, ToR and IEE are subject to approval from the concerned ministry as per EPA, 2019/EPR, 2020. In the FY 2020/21, ESSD

was engaged in IEE of 23 projects and was able to get approval for IEE of three projects from Ministry of Energy, Water Resources & Irrigation, and IEE of nine projects were submitted for approval. The status of projects requiring IEE is presented as follows;

1. Borang-Ratmate 220kV TL Project: IEE report approved
2. Mainaihaya-Sampattiya 132kV TL Project: IEE report approved
3. Koshi Corridor 220kV TL Project: Revised IEE report approved
4. Tumlingtar-Sitalpati 220kV TL Project: IEE report submitted to DoED
5. Amarpur-Dhungesanghu 132kV TL Project: IEE report submitted to DoED
6. Lalbandhi-Salempur 132kV TL Project: IEE report submitted to DoED
7. Trishuli 3B-Ratmate 220kV TL Project: IEE report submitted to DoEd
8. Dhalkebar-Balganga 132kV TL Project**:** IEE report submitted to DoED
9. Kaligandaki-Ridi 132kV TL Project**:** IEE report submitted to DoED
10. Parwanipur-Pokhariya 132kV TL Project: IEE report submitted to DoED
11. Bhumahi-Hakoi 132kV TL Project: IEE report submitted to DoED
12. Grid Tied Solar Power Project Block No.5 (6.5MW): IEE report submitted to DoED
13. Godak-Soyak 132kV TL Project: ToR approved, IEE report under preparation
14. Surkhet-Dailekh 132kV TL Project: ToR approved, IEE report under preparation
15. Baneshwor-Bhaktapur 132kV Underground TL Project: ToR submitted to DoED
16. Banfikot-Khungri 132kV TL Project: ToR submitted to DoED
17. Lahan-Sukhipur 132kV TL Project: ToR submitted to DoED
18. Rupani-Bodebarsain 132kV TL Project: ToR submitted to DoED
19. Kohalpur-Nepalganj 132kV TL Project: ToR under preparation
20. Modi A-New Modi 132kV TL Project: MoU signed, waiting for study permission from Department of National Parks and Wildlife Reserve
21. Tamakoshi V 220kV TL Project: MoU signed, waiting for study permission from Department of National Parks and Wildlife Reserve
22. NEA Corporate Building Project: IEE report under preparation
23. Dharan 220/33 kV Substation Project: MoU Signed

Public hearing for IEE of Kaligandaki-Ridi 132kV TL at Beltari, Syangja

Public hearing of Amarpur-Dhungesanghu 132kV TL at Singhpur, Panchthar

c. Other studies

Beside the IEE/EIA studies mentioned above; in the FY 2020/21, ESSD was involved in other studies as followings:

1. Environment Management Plan of Balanch-Attariya 132kV TL Project: Approved from Ministry of Forest and Environment.
2. Environment and Social Management Plan of Grid Solar and Energy Efficiency Project (8 districts).

2. Monitoring Projects

ESSD was involved in environmental monitoring and mitigation of nine 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 Memorandum of Understanding (MoU). The status of different monitoring projects is as follows;

1. Hetauda-Dhalkebar-Duhabi 400kV TL Project: 29th Quarterly report submitted
2. SASEC Project: Semi-Annual Report (January-June, 2020) submitted
   a. Kaligandaki Corridor (Dana-Kushma) 220kV TL Project
   b. Marsyangdi-Kathmandu 220kV TL Project
   c. Kaligandaki Corridor (Kushma-New Butwal) 220kV TL Project
   d. Marsyangdi Corridor (Udipur-Markichowk- Bharatpur) 220kV TL Project
3. Tamakoshi-Kathmandu 400kV TL Project: Semi Annual report (Jan-June, 2021) submitted.
4. 132/220kV Chilime Substation Hub and Chilime-Trishuli 220kV TL Project: 15th Quarterly Report submitted
5. Hetauda-Bharatpur-Bardghat 220kV TL Project: 29th Quarterly report (Hetauda-Bharatpur section)
6. Trishuli 3B Hub substation Project: 15th Quarterly report submitted
7. Samundratar-Trishuli 3B Hub 132kV TL Project: 19th Quarterly report submitted
8. Garjyang-Khimti 132kV TL Project: 13th Quarterly Report submitted
9. New Modi Lekhnath 132kV TL Project: 8th Quarterly Report submitted.

3. Mitigation and Enhancement Programs

Under mitigation and enhancement programs, different activities were conducted in this FY 2020/21 and their status is as follows;

3.1 Hetauda-Dhalkebar-Duhabi 400kV TL Project

The department is conducting site based environmental monitoring and implementation of mitigation works of the project through its three site based unit offices located in Inaruwa, Bardibas and Hetauda. Under the compensatory plantation mitigation program, by the end of FY 2020/21, a total of 329,500 seedlings of various species have been planted in about 214 ha forest area of 10 project affected districts and the plantation area is being managed. Out of that, about 147,132 seedlings including replacement of mortality have been planted in about 34ha of forest land in this fiscal year.

Till date, ESSD has provided various skill development trainings to 204 participants of the project affected families (PAFs) in the field of tailoring, building electrician, plumbing, driving, computer hardware, mobile repairing and others. Similarly, various short-term trainings ranging from 1 to 7 days related to social awareness, community/workershealth and safety, wildlife conservation, forest management, vegetable farming, livestock farming and others have been provided at 78 localities of the project. During 2020/21, three numbers of one-day awareness training on health and safety including Covid-19 awareness were provided to the construction workers.

3.2 SASEC Projects:

Under SASEC, currently four projects are under construction which include Kali Gandaki corridor (Dana-Kusma) 220kV TL Project, Kaligandaki Corridor (Kushma-New Butwal) 220kV TL Project, Marsyangdi-Kathmandu 220kV TL Project and Marsyangdi Corridor (Udipur-Markichowk-Bharatpur) 220kV TL Project. ESSD has been carrying out environment and social monitoring of these projects by establishing the site based Environment and Social Management Units (ESMUs). In the FY 2020/21, the following activities were carried out in these projects.

Public Consultation

A total of 67 public consultations were undertaken in SASCE Transmission Line Project and 958 locals were participated.

Public consultation in the project area of UMBTLP

Public Consultation in the project area of MKTLP

Safeguard implementation

A total of 156 locals and affected people were trained under the mitigation measures of the projects during this period. These trainings include Driving, Tailoring and Computer under Skill Development Training and other general trainings are Livestock Farming, Mushroom Farming and Forest and Wildlife Conservation Awareness. Similarly, 125 workers also were trained under occupational health and safety measures in Kushma-New Butwal section. Social awareness programs were also conducted in Baglung and Parbat under KNBTLP. Identification of PAFs in New Butwal Bardhaghat and Marsyangdi Corridor 220 kV Transmission Line is being carried out and no trainings were conducted in these projects.

Driving Training in Dhading

Mushroom Production Training in Palpa

3.3 Tamakoshi-Kathmandu 400kV TL Project

ESSD has been conducting an Environment and Social Monitoring of the project by establishing the site based Environment and Social Management Unit (ESMU) at CharikotDolakha and Khandichaur, Sindhupalchowk. ESMU has conducted 27 public consultations in different places of New Khimti-Barhabise and Barhabise-Kathmandu section during this period. ESSD has implemented various environment and social safeguard program in different locations of the transmission Line alignment. These programs include Community/Social Awareness (Six Programs), Forest and Conservation awareness program (Two programs), Health and Sanitation (Three Programs) and Occupational Health and Safety (Three program).

Safety Training to Workers at the project site

Social Awareness Program in Dolkha

3.4 132/220kV Chilime Substation Hub and Chilime-Trishuli 220kV TL Project

House wiring training of 390 hours duration has been provided to 10 persons from the project affected families at the project site.

3.4 Trishuli 3B Hub Substation Project

Sewing training of 390 hours duration has been conducted for 10 women from the project affected family at the project site.

3.5 New Modi-Lekhnath 132kV TL Project

Vegetable and mushroom production training of 5 days' duration was conducted at two different places in the project area, in which 50 people from the project affected families participated. Forest Management and wildlife management Training of 4 days' duration was conducted at three different locations in the project area, which covered 75 participants mainly from the affected community forest user's groups. Similarly, Non-Timber Forest Products (NTFPs) cultivation training of 7 days' duration was conducted at two places for 50 people altogether.

Training programs at the project sites of New Modi-Lekhnath 132kV TL

4. Community Support Programs

Under Community support programs of under-construction projects, different activities were completed in the FY 2020/21, which are as follows;

4.1 Hetauda-Dhalkebar-Duhabi 400kV TL Project

In the year 2020/21, the community support was provided for the construction of park component to Ratamata Panikholsi CFUG, Mahottari and construction materials (TMT bar, cement and bricks) were provided to two CFUGs of Sarlahi district for the construction of their office building. Similarly, the support was provided to 3 schools affected or located nearby the TL in Bara, Rautahat and Sarlahi districts including construction of boundary wall, construction of office room and maintenance of school building.

4.2 SASEC Projects:

a. Marsyangdi-Kathmandu 220 kV TL Project

Under CSP activities, construction materials such as cements (PPC/OPC), TMT rebar, tubular pipe, tile, sand and stone, bricks and CGI steel were provided to Nama Buddhal Committee located at Dharke of Dhading district for the construction of cremation sites of Tamang Committee.

b. Kaligandaki Corridor (Dana-Kushma) 220 kV TL Project

The construction materials (cement) and Irrigation Pipe (HDPE) have been distributed for Jaljala Rural Municipality Ward No. 8 of Parbat district under the CSP.

c. Marsyangdi Corridor (Udipur-Markichowk-Bharatpur) 220 kV TL Project

A Shade for Fulbari Ghat located at Sundarbazar of Lamajung has been constructed by ESSD under the CSP Activities of the Project.

4.3 Tamakoshi-Kathmandu 220/400kV TL Project

Under the Community Support Program, ESSD has accomplished different community development works in the project areas. In this fiscal year, ESSD continued the CSR activities supporting to construct Water Supply Management for Toilet of Kriyaputri Bhawan and Compound Improvement of Bhimsen Temple in Barhabise, Sindhupalchowk.

4.4 132/220kV Chilime Substation Hub and Chilime-Trishuli 220kV TL Project

Under the community support program in the fiscal year 2020/21, ESSD provided office furniture and a hand saw machine to the project affected Community Forest Users Groups in Nuwakot and Rasuwa districts. ESSD supported to Tribhuwan Secondary School for construction of a building with a sum of NRs 40 Lakhs at Kispang Rural Municipality-3 in the project area.

School Building Construction

Office Furniture Distribution to Community Forest Users Group in Rasuwa

4.5 Samundratar-Trishuli 3B Hub 132kV TL Project

Distribution of Construction materials to the project affected communities in Nuwakot for local development works was done under the community support program**.** Under this program, 240 bags OPC cement and 600 kg of TMT iron bar were provided to Youth Club of Bohore Bhanjyang, Suryagadhi. Similarly, 154 bags OPC cement to each of Ward Committees of Ward No. 5, 6 and 7 of Tadi RM and 104 bags OPC cement Welcome Gate Construction Users Committee of Dupcheshwor RM.

4.6 New Modi-Lekhnath 132kV TL Project

Under the community support program in Fiscal Year 2020/21, ESSD distributed 11 sets of plastic tunnels to ward 6 of Macchhapuchhre Rural Municipality, 50 bags of cement to Lamichhane Kul Mandir community of Modi-2 and construction materials to Gupte Sirwani Community Forest Users Group.

Cement bags distribution in Parbat and Distribution of Construction materials

PROJECT MANAGEMENT DIRECTORATE

Project Management Directorate (PMD) in the 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 that is or will be funded by ADB. 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)SASEC – Power System Expansion Project (SPSEP) (ii) Electricity Transmission Expansion and Supply Improvement Project (ETESIP) (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). PMD is also leading environmental and engineering study of different transmission linesup to 400 kV voltage level with length of more than 1000 km and substations associated with it under ADB Grant No. 0361: Project Preparatory Facility for Energy (PPFE).

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

1. 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. This project includes three sub-projects viz. (i)New Khimti – Barhabise 400 kV DC Transmission Line of length 44km (ii) Barhabise-Lapsiphedi 400 kV DC Transmission Line of length 46km & 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 subprojects "220 kV GIS Substation Construction in Barhabise" has been financed through 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 is signed with M/S KEC International Limited, India. Design/drawings for most of the equipments are already approved. Out of 114 nos. of towers of 400 kV TL, 22 tower foundations have been completed and 2 towers have been erected.This transmission line is expected to be completed by July 2022.

Location AP 30/2 tower erection competed for Bahrabise – Kathmandu 400 kV Transmission Line

The contract for construction of Barhabise-Kathmandu 400kV and 132 kV Lapsiphedi-Changunarayan Transmission Line has been awarded to M/s Larsen and Toubro Limited, India. Till date, tower design and testing has been completed for both 132 kV and 400 kV TL section. More than 90% of TL materials have been supplied. Out of 122 nos. of towers of 400 kV TL, 98 tower foundations have been completed and 78 towers have been erected. The transmission line has been expected to be complete by July 2022.

The contract for procurement of plant for 220 kV Barhabise GIS SS has been awarded to M/SJV of Guangxi Transmission & Substation Construction Co. and Shenzhen Clou Electronics Co. Ltd, China. Construction work at site is going on. Power and station transformer has been received at site. 220 & 132 kV GIS equipments are under manufacturing process.

Transformer foundation works under progress at Bahrabise Substation

B) SASEC Power System Expansion Project (SASEC PSEP)

1. Samundratar-Trishuli 3B132kV, in Tadi 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 has the capacity to evacuate 270 MW power generated from hydropower projects which will be transmitted to Trishuli 3B Hub Substation, which is in final stage of construction in Pairebeshi, Nuwakot. The construction of this project was successfully completed in the F/Y 2077/78 with the connection arrangement made to one of the 132kV line bays of Upper Trishuli 3A HPP which is already connected to national grid at Matatirtha Substation. The 26 km long 132kV Double Circuit Transmission Line and 132/33/11kV, 2x 30MVA Substation constructed by the project were successfully

commissioned and inaugurated by Rt. Hon. Prime Minister K.P. Sharma Oli on July 3, 2021. 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.

132 kV Switchyard of Samundratar 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, transformer capacity of Chaughada Substation was upgraded to 8 MVA in 33/11kV level with replacement of instrument transformers and Switchgears by this project.

The EPC contract for the project was signed between NEA and ETERN-CCCE-FEPEC JV, China and the contract was effective on November 28, 2016. The financing agreement for this project was concluded on April 20, 2015 with European Investment Bank in coordination with Asian Development Bank to finance loan equivalent to USD 12 Million.

Aerial view of Samundratar 132 kV Substation

2. Marsyangdi Corridor 220 Transmission Line Project

Marsyangdi Corridor 220 kV Transmission Line Project was formulated to connect power generated by hydropower stations in Marsyangdi basin/ river and its tributaries to the Integrated Nepal Power System (INPS). This project plans to construct approx. 113 km long Double Circuit 220 kV Transmission Line from Manang (Dharapani Substation) to Chitwan (New Bharatpur substation) via Khudi substation, Udipur substation and Markichowk substation and associated substations at Dharapani, Manang (220/132 kV, 100 MVA & 132/33 kV, 30 MVA), Khudi, Lamjung (220/132 kV, 160 MVA & 132/33 kV, 50 MVA), Udipur, Lamjung (220/132 kV, 160 MVA & 132/33 kV, 50 MVA) and New Bharatpur, Chitwan (220/132 kV 320 MVA).

The entire project has been divided into three packages. The first package consists of construction of about is 67 km of 220 kV, double circuit transmission line with twin ACCC Drake conductors from Udipur to Bharatpur. Contract for this package has been awarded to M/s Pinggao Group Co. Ltd, China

and construction work is in progress. All types of tower design and testing work has been completed. Construction of 31 nos. of tower foundations and erection of 15 towers have been completed in Lamjung district.

Under construction Udipur Substation

The second package consists of the construction of 220/132 kV substations at Udipur and Bharatpur. The contract for this package has been awarded to M/s Larsen and Toubro Construction, India. Around 50% of work associated with supply and delivery has been completed while about 15% of the civil work has been completed.

Erection of 220 kV tower of Udipur – Markichowk section

The contract for the third package, consisting of construction of about 46 km of 220 kV, double circuit transmission line with twin conductors (ACCC Drake and ACSR Moose) from Dharapani, Manang to Udipur, Lamjung via Khudi, Lamjung and associated substations at Khudi and Dharapani has been signed with M/s TBEA Co., Ltd, China. About 5% of works associated with supply portion has been completed. Survey works of transmission line and survey & soil investigation work of substation has been completed.

Both the sections of transmission lines and associated substations of the project are expected to be commissioned by end of FY 2078/079 (2021/22). The overall progress of the project till date is 29%.

3. Marsyangdi – Kathmandu 220kV Transmission Line Project

The objective of this project is to evacuate power from various hydropower projects in Marsyangdi Corridor to Kathmandu valley which ultimately reinforces INPS and improve reliability of transmission system. The scope of this project includes design, supply and construction of 82 km double circuit transmission line and 220kV Air Insulated Substation (AIS) at Matatirtha (Kathmandu) & 220kV Gas Insulated Substation (GIS) at Markichowk (Tanahu). The whole project has been split into two packages.

The first package covers construction of about 82 km of 220 kV Double Circuit twin "ACSR MOOSE" line from Markichowk to Matatirtha. The contract for this package had been awarded to M/s TATA Projects Limited, India on 30 June 2016 with the construction period of 30 months. However, project couldn't be completed on the scheduled time due to various reasons beyond control of NEA including, but not limited to the effects of COVID-19 pandemic. Construction progress of this transmission line has been affected due to local issue at Siddhalekh RM-07, Pipaltar, Dhading district where two nos. of tower foundation along with erection and stringing work has been halted due to public hindrance. Out of 231 towers, foundation and erection of 229 towers has been completed along with stringing of about 79 km conductor.The line is planned to be commissioned by the end of October 2021.

The second package consists of construction of 220/132/33kV Air Insulated Substation (AIS) of 320 MVA at Matatirtha, Kathmandu and 220/132/33kV Gas Insulated Substation (GIS) of 320MVA at Markichowk, Tanahu. The contract for this package had been awarded to M/s Shenzhen Farad Electric Co. Ltd., China on 22 December 2016 which was terminated due to non-performance of the contractor on 17 January 2020. After re-bid, the contract for the same has been awarded to M/s China Machinery Engineering Corporation, China on 31 December 2020 with the construction period of 18 months. The contractor has started to submit design/drawing for the project. The substations are planned to be commissioned by September 2022.

4. Kaligandaki Corridor 220kV Transmission Line Project

The scope of the project includes construction of 220/132 kV, 100 MVA & 132/33 kV, 25 MVA Substation at Dana (Myagdi), 220/132 kV, 100 MVA Substations at Kushma (Parbat) and 127.57 km of 220 kV D/C transmission line (Dana- Kushma- New Butwal).

The project has been divided into two packages. First package covers construction of 39.6 km of 220 kV transmission line from Dana to Kushma and associated 220 kV substation each at Dana & Kushma.

220/132 kV Kushma Substation

The contract for this package was awarded to M/s JV of TATA Projects Limited & CHINT Electric Co. Ltd., India. Both substations and transmission line were successfully completed and inaugurated 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 has been awarded to M/S Larsen & Toubro Limited, India. For this package, check survey and cadastral survey has already been concluded. Foundation of 145 nos. out of 231 nos. towers has been completed. This transmission line is planned to be commissioned by the end of 2021.

5. 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 Substation in New Butwal (Nawalparasi) has been awarded to M/S Tata projects Limited, India.The substation is in advance stage of completion and planned to be commissioned by September 2021.

Kushma- New Butwal 220 kV Transmission Line Tower

The contract of design, supply, installation and commissioning of 21 km of 220 kV transmission line from New Butwal to Bardaghat has been undertaken by M/S Powerchina Sepco1Electric Power Construction Co. Ltd.Though pre-construction activities like field survey, soil investigation, tree counting, etc. have been completed before second wave of COVID-19, supply of tower stubs and civil construction schedule is badly affected and yet to start. Due to delay in EIA approval and COVID-19 pandemic, project activities are being delayed. The transmission line is expected to be completed by December 2022.

6. Grid Substation Reinforcement and Capacity Expansion Project

The idea of this project was drafted to reinforce & upgrade eight numbers of existing grid substations of NEA which includes reinforcement and upgradation of 132 kV Gandak S/S, Butwal S/S, Bharatpur S/S, Kawasoti S/S, Damauli S/S, Banepa S/S, Dhalkebar S/S and Lahan S/S. 280 MVA capacity was added in the grid when reinforcement and upgradation work of all these eight grid substation was concluded on December 2017. Protection upgradation and addition of Substation Automation System in Gandak SS and Baneswar SS were also 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 is also completed.

7. 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 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, 5 substations have been commissioned & charged and has contributed to 40 MVA additional capacity into the system. Similarly, a total of 128 km of 33 kV line, 69 km of 11 kV line and 34 km of 400/230 V line has been completed and 29 number of distribution transformers have been installed till date. 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 by the end of 2021.

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, 8 substations have been commissioned & charged and has contributed to 49 MVA additional capacity into the system. Similarly, a total of 125 km of 33 kV line, 44 km of 11 kV line, 25 km of 400/230 V line has been completed and 25 number of distribution transformers have been installed till date. 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 by the end of 2021.

Lot 3: This contract 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.

8. Distribution System Master Plan Project

This project is now complete and was designed to prepare a Distribution System/ Rural Electrification Master Plan of Nepal (DS/ REMP-N) for the entire country, with emphasis on providing electricity for all for betterment of livelihoods in the remote settlements of the country in an efficient way. The prime assignment of this project was to identify least cost and economically viable means to reinforce, upgrade and expand Nepal's electricity system, including on and off-grid, to achieve universal access to electricity by 2023 and optimized access in on-grid areas by 2035. The final report which included Seven (7) provincials Distribution System / Rural Electrification Master Plan and a consolidated National Master Plan report for Nepal and other relevant reports such as socio-economic survey report, environmental and social safeguard

report was submitted by the consultant M/s Gesto Energy, Portugal. The master plan also includes policy recommendations, comprehensive electrification and distribution augmentation program and detailed case studies. The project was funded by Norwegian Grant, administered by ADB.

9. 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 grant of USD 20 Million from Strategic Climate Change Fund under ADB administration of SASEC Power System Expansion Project. NEA will utilize 18.5 Million of the grant as VGF to purchase solar power from eligible solar power developer. The Solar Power Developer will be encouraged by the upfront payment they would receive from NEA for power they sell upto June 2022. Under this scheme, NEA will purchase power from grid tied solar plant for 25 years at the posted rate of NRs. 6.60. The VGF will be utilized to fill the gap of posted solar power purchase rate of NRs. 6.60 per kWh and the competitive rate quoted by the Solar power Developer for up to June 2022.

Under this VGF scheme, five (5) solar power developers have been selected through competitive bidding process and contract has been signed with them to procure solar energy generated byinstalledutility scale grid tied solar power plant with total capacity 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 concluded with four (4) developers and is in process for the remaining one developer.

C) 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 Kathmandu valley. The project value is of USD 189 Million and is jointly funded by ADB and GoN. Out of the project cost of USD 189 Million, ADB has funded USD 150 Million as a loan and the balance is being financed through GoN and NEA. Additional USD 2.0 Million 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:

1. 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 SS at Changunarayan. Additional scope 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 has also been included. These substations will play major role to evacuate the power generated by IPPs and Upper Tamakoshi Hydro Electric Plant through Khimti–Barhabise–Kathmandu 400/220 kV Line, which will be initially charged

at 220 kV. The addition of these substations will also help reinforce transmission network of Kathmandu valley and increasing the reliability of transmission network feeding power to Kathmandu valley. Further, since the areas around these substations are supplied from substations far from load center, addition of these substations aids to improvement of power quality in these areas.

Construction of boundary wall at Changunarayan

The contract for this project has been awarded to M/s Larsen and Toubro Limited, India on November 2020. Till date, detail survey and soil investigation work at Changunarayan, Suichatar and Teku substation has been completed. Tower foundation, boundary wall as well as approach road works at Changunarayan substation are on the verge of completion. Other design of electrical and civil components of substations is under review/submission. These substations are expected to be completed by the end of December 2022.

2. Kathmandu Valley Transmission Capacity Reinforcement Project

As an essential project to cope growing demand in the outskirts of the Kathmandu valley and to reduce burden on the existing substations, this project will augment grid substation capacity by adding 3 new 132/11kV substations, 2x45 MVA each at Mulpani, Futung and Chapagaon. These substations will not just increase the reliability of distribution network but also serve to supply qualitative electricity to the consumers. The Contract of these Substations is being executed by M/S Pinggao Group Co. Limited, China.

View of Phutung Substation

Manufacturing of major equipment such as power transformer and GIS has already been completed and design/drawings of most of other electrical equipment has also been concluded. Approval for designs and drawings related to civil works such as sub/superstructure has been obtained. Due to geological and social problems, civil works at the sites were delayed thus extending contract completion period up to November 2021. Land acquisition of Chapagaon Substation was delayed and contractor was provided with alternative construction plot at Thimi switching station. Further, due to the soil strata and necessity of extra works that were not envisaged in the contract, location from Mulpani had to be changed to Chovar. Official process has been started to obtain construction plot from Government of Nepal. Ongoing COVID-19 pandemic has further affected the project activities causing delay in the completion time.

3. 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.

Erection of A Type Feeder Pillar at Baluwatar

The scope of the project includes design, supply, installation and commissioning of underground distribution network using trenchless boring methodology under Maharajgunj Distribution Center including reinforcement and automation. Major work includes construction of 278 circuit km of underground 11 kV line, 390 circuit km of underground 400 volt line, 96 km of underground optical fiber laying, 17 circuit km of construction and upgrading of 11 kV overhead line by AB Cable& 38 circuit km of 400 Volt overhead line by AB Cable and 147 nos. of and RMU installation.

The contract agreement was made on 15 March, 2019 with KEI Industries Limited, India. As of now, route survey for 280 km of HT feeder and 467 km of LT line covering 317 distribution transformers has been completed. In addition, 176 km of pipe laying and 154 km of cable laying has been completed. Due to effect of COVID-19 pandemic, this project is expected to be completed by middle of 2022.

4. 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. Major work includes construction of 217 km of underground 11 kV line, 388 km of underground 400 volt line, 108 km of underground optical fiber laying, 3 km of construction and upgrading of 11 kV overhead line by AB Cable & 20 km of 400 Volt overhead line by AB Cable and 70 nos. of and RMU installation.

The contract agreement was made on the 15 March, 2019 with KEI Industries Limited, India. Till date, 43 km HT cable laying, 63 km LT cable laying 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 middle of 2022.

5. Kathmandu Valley Smart Metering Project

This is first smart metering project as a pilot project of NEA which covers all single and three phase consumer be equipped with

smart meter and a milestone to modernize the distribution business eventually improving financial health of NEA with reduction of distribution losses and increment of overall efficiency of distribution system operation. NEA intends to introduce smart 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 lots of benefits to the customers that can be seen in a number of countries.

Smart meter being installed

Under this project, a pilot project is underway to roll out smart meters and implement Advanced Metering Infrastructure (AMI) for 97,000 consumers of Ratnapark and Maharajgunj DC and 1,000 LT distribution transformers. This contract is undertaken by M/S Pinggao Wisdom JV which was awarded in March 2019. More than 60,000 smart meters for various consumer categories have already been installed and configured in head end system and meter data management system. During the COVID-19 pandemic lockdown, smart meters have facilitated timely meter reading and billing of consumers without any human intervention. In the initial stages of program rollout, immediate benefits such as reduced meter reading costs and cut back in AT&C losses has been realized. This project software features Head End System (HES), Meter Data Management System (MDMS), Business Intelligence (BI) and Network Management System (NMS).

6. 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 centralized supervision based process for monitoring and control of power system parameters essential to maintain health of integrated system by providing uninterrupted and quality power to end-users. Further, this project is crucial for NEA in terms of 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 S/S. The contract of this project has been awarded to M/S GE T&D India Limited on 5 January 2020 and is expected to be completed within March 2022.

D) SASEC Power Transmission and Distribution System Strengthening Project (PTDSSP)

This project continues some of the activities of the ongoing project PTDEEP to some extent. 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:

1. Kathmandu Valley Transmission Capacity Reinforcement Project (Phase II)

The project is the continuation of 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 single circuit 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 132 kV GIS Substation at Koteshwor with 2x45 MVA,132/11 kV and 2x63 MVA, 132/66 kV Transformer via Thimi Substation. The project also includes approximately 2 km of 66 kV double circuit underground transmission line from newly proposed Koteshwor Substation to existing Baneshwor Substation and necessary bay extension works at both ends of the transmission line.

Survey license for the transmission line has already been acquired and ESSD, NEA is conducting IEE study for the line. Due to unavailability of land in targeted area of Koteshwor/Tinkune area, project is assessing other alternatives for the construction plot of Koteshwor substation. Preliminary survey has been completed and bidding document preparation is underway. The detail survey of Chovar-Patan-Chapagaun double circuit 132 kV underground transmission line with total length of 12.5 km is being conducted by NEA Engineering Company (NEAEC). After obtaining survey license detailed survey as well as IEE study will be conducted.

2. Upgrading of Khimti-1, Barhabise and Lapsiphedi SS to 400 kV

To evacuate power generated by IPPs including Tamakoshi and Middle Bhotekoshi, the Khimti – Bahrabise – Lapsiphedi transmission line have to operate at 400 kV and accordingly the substations at Khimti, Bahrabise and Lapsiphedi need to upgrade to 400 kV voltage level. To meet these power evacuation requirements, Khimti-Bahrabise-Lapsiphedi 400 kV substation project has been initiated.

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 ICT bays for connecting two single phase Auto-transformers' bank of 315 MVA each with 3*105MVA plus 1*105MVA spare unit with total capacity of 630MVA (ii) Barhabise 400/220kVsubstation including 4 numbers of 400kV line bays to terminat double circuit Quad Moose ACSR transmission line, construction of two numbers of ICT bays for connecting two single phase Auto-transformers' bank of 3*53.33MVA plus 1*53.33MVA spare unit with total capacity of 320MVA and construction of 1 bay for connecting 1 nos. of 420kV, 50MVAR, 3-phase Shunt Reactor along with supply and installation of the reactor (iii) Lapsiphedi 400/220 kV substation including 2 numbers of 400kV line bays to terminate 400kV 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*105MVA plus 1*105MVA spare unit with total capacity of 315MVA.

Contract agreement was signed between NEA and M/s Grid Solutions SAS, France on 2 October 2020. Till date, preliminary survey works have been completed at New Khimti and Barhabise substation while soil investigation works is also ongoing. Engineering drawing/ documents are being submitted and approved.

3. Kathmandu Valley West Distribution System Enhancement Project

This project intends the enhancement of distribution system and/or rehabilitation of the distribution system (11kV and 0.4kV) along with the provision of automation in distribution areas under Kirtipur, Kuleshwor, Baneshwor, Balaju and Jorparti Distribution Center of the Kathmandu Valley.

The scope of the project includes design, supply, installation and commissioning of underground distribution network using trenchless boring methodology under five (5) distribution center including reinforcement and automation.

Major work in this project includes construction of 225 circuit km underground 11 kV line & 239 circuit km underground 400 volt line, 225 km underground optical fiber laying, Construction and upgrading of 11 kV overhead line by AB Cable: 165 circuit km & 400 Volt overhead line by AB Cable: 240 km, RMU installation: 360 nos. and OPGW stringing: 165 km. Survey works, Network design and equipment design is finalized. Dispatch Authorization of major equipment has been given. The contract has been awarded to M/S Larsen and Toubro Limited, India on 24 June, 2020. The project is expected to complete by end of 2023.

4. Lalitpur and Bhaktapur Urban Distribution Network Reinforcement

The aim of this project is the 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 scope of the project includes design, supply, installation and commissioning of underground distribution network using trenchless boring methodology including reinforcement and automation. 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.

Contract agreement of the project was concluded with M/s TATA Projects Limited, India on June 4, 2021 with project completion period of three years. Preliminary survey work of the project is being carried out by the Contractor.

5. Distribution System Reinforcement and Modernization of Bharatpur and Pokhara

This project aims 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.

Work under this project is divided into two sections (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. Bids received from the bidders are under evaluation.

6. 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.

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.

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.

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.

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.

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.

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 is ongoing.

7. Hetauda-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 132 kV Transmission Line along with the 132 kV substation at Pokhariya (Parsa district) to meet the current demand of industrial growth. Nijgadh-Pokhariya 400 kV Transmission Line along with the concomitant substations in Nijgadh and Pokhariya has been planned for future electricity demand of industries.

Proposed 132 kV double circuit transmission line from Parwanipur to Pokhariya of 21 km in length will be constructed using HTLS conductor. The survey of the line is

already completed, which was carried out by Engineering Directorate of NEA. The IEE study of the line has also been concluded by Environment and Social Studies Division (ESSD) and approved by GoN. Bids for construction of 132 kV line and 132 kV Substations at Pokahariya is planned to be invited by October 2021 immediately after land acquisition for Pokhariya substation.

Likewise, study of the 400 kV Nijgadh-Pokhariya transmission line of approximate length of 75 km has also been initiated. The detailed survey is being carried out by Engineering Directorate of NEA and expected to be completed by September 2021.

8. Electric Vehicle Charging Infrastructure Development Project

This project supports government's vision of sustainable environmental 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 50 (Fifty) 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 on-site 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).

Contract Agreement of the Project was concluded with M/s Wanbang Digital Energy Co., Ltd., China on April 09, 2021 with the project completion period of one year. The preconstruction survey works of the project is being carried out.

E) 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:

1. Construction of Distribution Command and Control Centre (DCC)

Distribution system control and data center project is constructing Supervisory Control and Data Acquisition System (SCADA) / Distribution Management System (DMS) / Outage Management System (OMS) for underground electricity distribution system within Kathmandu Valley and an International standard Tier III Data Center for NEA at Load Dispatch Centre, Syuchatar premises. Project has just signed a contract for the SCADA/DMS/ OMS system and Data Centre on July 2021. This project will be integrated/interfaced with GIS system of electricity distribution system reinforcement Projects, GIS Smart Grid Project, Smart Metering projects etc.

Illustrativel DCC Control Room

Altogether 30 substations and switching stations within Kathmandu valley will be connected, monitored and controlled from the Distribution Command and Control Centre within Kathmandu Valley. Currently only 18 substations and switching stations are in plan and remaining 12 substations will be connected gradually as the substation projects are in pipeline. Electricity distribution system equipment deployed through different distribution system reinforcement projects will be connected through Optical fiber will also be configured, monitored and controlled remotely through SCADA/DMS/OMS system. Further, the project is also constructing containerized type international standard Tier III data center with the ability to accommodate all IT facilities within different utilities in NEA.

2. Smart Metering Project (Phase II)

With an aim to revolutionize distribution system throughout Kathmandu valley, EGMP (Electricity Grid Modernization Project) is introducing Kathmandu Valley Smart Metering project Phase II, supplementing Smart Metering Phase I project being implemented under PTDEEP (Power Transmission and Distribution Efficiency Enhancement Project). Through this project, NEA intends to replace 3,90,000 electromechanical meters of the consumers of remaining nine distribution centres (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 distribution centers inside Kathmandu to obtain all necessary information to plan and improve energy efficiency and bring other operational benefits that will lead to manage costs more effectively and improve customer services. The final bidding document for the project has already been prepared and is under review.

3. Grid Substation Automation Project (Phase II)

The purpose of this project is to automate grid substations of various Grid Division Offices outside Kathmandu valley built over a strong and vibrant communication backbone. The scope of Substation Automation System (SAS)-Phase II includes controlling and monitoring of 132 kV, 66 kV & 33 kV Transmission and Distribution system of 49 grid substations, construction of 6 Master Control Center (MCC) at each division office and integration of all 400kV/220kV/132kV/66kV/33kV/11kV substation with MCC and Load Dispatch Center (LDC) with replacements and retrofitting of control & relay panels, switchgear panels, isolators and other electrical & mechanical auxiliary systems which are not compatible to SAS.

Through SAS implementation, all grid substations will be unmanned and controlled from Master Control Center (MCC). NEA aims to mirror benefits such as reduced operating staffs at substations, improving operating decision ability and quality of service provided to consumers, while maintaining acceptable levels of risk and reliability with technical database. Survey of existing substation has finished so far. PMD has planned to invite bids for this project by November 2021.

4. Dandakhet-Rahughat 132 kV Transmission Line and Substation Project

This project has been designed primarily to evacuate power generated from IPPs from Rahuganga and Kaligandaki river basins of Myagdi district, Dhaulagiri zone.

Staff quarter building at Dandakhet substation

The scope of this project includes construction of 25 km, 132 kV double circuit transmission line using ACSR cardinal conductor from Dandakhet to Rahughat through LILO arrangement in 220 kV Kaligandaki transmission line, 132/33 kV, 30 MVA substation at Dandakhet and 220/132 kV, 200 MVA substation at Rahughat. Bids for construction of substation and transmission line are under evaluation. Land acquisition of Rahughat substation has been completed while in case of Dadakhet substation, with the acquisition of required land, construction of staff quarter, guard house and boundary wall has been concluded.

5. Ghorahi – Madichaur 132 kV Transmission Line and Substation Project

This project is initiated by Nepal Government under Energy Crisis Eradication budget head to electrify Rolpa district, since it hasn't been connected to National grid yet. 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 will evacuate approximately around 200 MW of power generated to the INPS.

The project comprises of construction of approximately around 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.

Land for Khungri substation at Khungri, Rolpa has been acquired. Civil works of constructing boundary wall, store building along with others protection works at substation land is completed. The detail survey of the transmission line route and Initial Environment Examination (IEE) of the project has also been completed. Bids for construction of substation and transmission line are under evaluation.

6. Borang – Lapang 132 kV, Lapang – Ratmate 220 kV Transmission Line and Substation Project

The project aims to evacuate power generated by IPP's of Aankhu Khola Corridor & Budhigandaki corridor to INPS. The scope of this 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 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 now, detailed survey, feasibility study and IEE has been completed. In addition, land acquisition has been completed for both Borang and Lapang, Biharthok substation. Technical evaluation of the bidder’s proposal is ongoing.

7. 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 Pangtang and necessary bay extension works at Barhabise substation. Till date, land acquisition for the Pantang (Balefi) substation has been accomplished. Construction of approach road, compound wall fencing and protection works has been completed at substation site. Bids invited for the construction of substation are under evaluation.

8. Construction of 132 kV Keraun Substation

This project intends to reinforce power supply system to supply adequate and reliable power in Morang district and to minimize overloading problem of existing Duhabi 132/33kV grid substation as well as 33/11 kV Rani, Rangeli and Biratchowk substations. The project covers construction of Keraun 132/33kV, 2X63 MVA and 132/11kV, 22.5 MVA AIS sub-station, Keraun-Rangeli 15 km double circuit &Keraun-Biratchowk 25 km double circuit 33kV sub-transmission line. Till date, layout design and single line diagram of substation, geo-investigation works have been approved and detail designs and drawing of civil works are in approval process. For the main substation work and 33 kV line, contract has been recently signed on June 11, 2021. The project is expected to be completed by September 2023.

Substation site at Keraun, Morang

9. 132/66 kV Transmission Line Upgradation Project

Transmission network in Kathmandu valley currently comprises of ACSR Bear, Panther, Wolf and Dog conductors. Most of these lines are overloaded and can't handle contingency conditions. In few instances, even the normal loading creates system instability. In order to mitigate these problems and abnormalities, 7 km Suichatar-Matatirtha 132 kV TL, 5 km Suichatar-Balaju 132 kV TL, 13 km 132 kV Suichatar-Patan TL and 8.5 km Suichatar- Teku 66 kV TL within Kathmandu valley has been planned to upgrade by replacing existing conductor with HTLS conductor.

In addition to transmission line in Kathmandu valley, 120 km of Pathaiya-Dhalkebar 132 kV DC transmission line built with ACSR Bear conductor is another important transmission line section as the supply can be routed from either Hetauda to Dhalkebar or Dhalkebar to Pawanipur substation. Currently, major power source is Dhalkebar SS and sometimes, it becomes necessary to supply uptoButwal through the Dhalkebar - Patlaiya line. This is also the main line to supply Birgunj area where numbers of industries are facing power shortages and this line tends to operate in overloading. Thus, to avoid overloading and outages during contingency and normal loading condition, this line has also been planned to upgrade using HTLS conductor. Further, another transmission line planned for upgradation is 30 km of Kushaha- Duhabi 132 kV TL section constructed with ACSR Bear conductor. It becomes imperative to upgrade this transmission line section as this line is the main export / import point for power trade with India and connected with Kataiya substation in India. This line also acts a major power carrier for the substations supplying Duhabi and Biratnagar area.

Bids for this project had already been invitedon 10 August 2021 but contract with the bidder could not succeed.Therefore, annulment notice was published on 1 July 2021 and re-tender for same has been floated again on 12 July 2021.

10. Kohalpur–Nepalgunj 132 kV Transmission Line & Substation Project

This project is necessary to improve power quality and reliability of Banke district. After construction of this substation at Janaki Gaupalika area, it can feed power to the industrial sector at Nepalgunj as well as to nearby 33/11 kV substations. This project was initiated in FY 2075/076 (2018/19) and later funded by ADB. The estimated cost of the project is US$ 12 Million. This project includes construction of about 10 km long double circuit 132 kV transmission line with ACSR Bear conductor and construction of 2x132/33 kV, 63 MVA substation at Bakaspur. As of July 2021, detail survey and IEE works are in progress. Land for New Nepalgunj substation has been identified at Banke, Janaki Rural Municipality Ward No. 6, Bakaspur. Land acquisition for substation is in progress.

11. Arun Khola (Dumkibas) 132 kV Substation Project

This project is focused on the development of 132/33/11 kV Substation at Dumkibas of Binayee Triveni Rural Municipality to meet increasing power demand of industrial consumers in Dumkibas and Arunkhola areas, improve voltage in middle and western parts of Nawalparasi (Bardghat-Susta east) district, enhance quality and reliable power supply and minimize overloading problem of Bharatpur-Kawasoti-Bardghat 132 single circuit transmission line of INPS.

The scope of this project includes construction of a 132/33/11 kV, 2x30 MVA substation at Tamang Danda of Dumkibas, Ward No.2 of Binayee Triveni Rural Municipality in Gandaki province of Nepal. The proposed 132/33/11 kV Substation will fed from exiting NEA Bardghat-Sardi 132 kV double circuit transmission line. This project is also focused to construct 11 kV feeders of distribution line to Dumkibas Bajar, Arunkhola Bajar areas and community consumers from the 132/33/11 kV Substation at Dumkibas.

Substation site at Dumkibas

As of July 2021, required land acquisition works for the 132/33/11 kV substation at Tamang Danda of Dumkibas is in final stage while bidding document preparation is underway. The substation facility is planned to be commissioned by the end of July 2023.

F) 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 & substation design with tower spotting and demarcation in site, soil tests, all necessary civil and electromechanical design, safeguard studies, preparation of cost estimate, preparation of bidding documents and necessary activities in detail enough to provide adequate information & 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.

1. 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 proud to be 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 ADB grant assistance under Project preparatory Facility for Energy. ELC Electro consult S.P.A, Italy has been awarded the job of detail engineering and complete design of 400 kV TL and associated substations along the route. As of now, the consultant has completed detail survey, soil investigation works, tower and foundation design works and bid documents works of Chhinchu - Surkhet 132 kV DC transmission line and has submitted the documents to the project for final approval. Similarly, consultant has also completed detail survey & soil investigation works of New Butwal - Lamahi 400 kV transmission line.

For the substation part, consultant has submitted design of Dododhara (New Lumki) 400 kV substation and Surkhet 132kV substation. Furthermore, the consultant has also submitted a review report of the existing tower design. The detailed study on due diligence related activities and engineering design on the remaining transmission line and substation design is targeted to be completed by this fiscal year. The proposed transmission route and substation under the scope of detail study and engineering design are as follows:

Transmission Lines:

- New Butwal - Lamahi 400 kV DC Transmission Line (150 km)
- Lamahi–Chhinchu 400 kV DC Transmission Line (95 km)
- Chhinchu – Dododhara (New Lumki) 400kV DC Transmission Line (91 km)
- Chhinchu- Surkhet 132kV DC Transmission Line (25 km)
- Dododhara (New Lumki) – New Attariya(Daijee) 400 kV DC Transmission Line (90 km)

Substations:

- New Butwal 400kV Substation
- Lamahi 400kV Substation
- Dododhara (New Lumki) 400kV Substation
- Surkhet 132kV Substation
- Chhinchu 400kV Substation
- New Attariya(Daijee) 400kV Substation

2. Other Transmission Line and associated Substations

NEA has initiated the detail engineering design and environmental study of other three (3) different 400 kV transmission lines and two (2) 132 kV transmission lines and associated substations. Consultant recruitment has been

done in three (3) separate packages, CP-1, CP-2 and CP-3. The details of line and substation under each consulting packages are as follow:

Consulting Package (CP-1):

(i) 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.

(ii) 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.

Consulting Package (CP-2):

(i) 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).

(ii) 132 kV Double circuit Dailekh - Kalikot – Jumla (approx. 80 km) and associated substations at Jumla and Kalikot and bay extension work at Dailekh substation

(iii) 132 kV Double circuit Lamoshangu – 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.

Consulting Package (CP-3)

(i) 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.

Contract for all three consulting packages has been signed with Power Grid Corporation of India Limited, India in association with Jade Consult Pvt. Ltd., Nepal on November 2019. Power evacuation study, walkover survey etc. have been completed and detail survey is going on for all three packages. The study is planned to be completed by December 2021.

3. 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 requires 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.

The contract was signed on 2 April 2021 between NEA and WAPCOS Limited, India which became effective on 21 April 2021. Tentative cost for the assignment is US$ 1.2 million. Relevant input data are being collected for assignment and complete scope of works is planned to be completed in June 2022.

G) 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 and 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. distribution transformers (11/0.4 kV). The contract was awarded to M/s JV of East India Udhyog and WaibaInfratech on 29 November 2018. Till date, supply of equipment have been completed and civil works of the substations are near completion. 80 km of 11kV line and 115 km of 400V line has been constructed till date. The project is expected to complete by end of 2021.

NEA'S SUBSIDIARY & ASSOCIATE COMPANIES

Apart from development activities which NEA is undertaking on its own, quite a few 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 headed by a Deputy Managing Director was created in February,2018. NEA's existing subsidiary companies are listed below:

1. NEA Engineering Company Limited
2. Upper Tamakoshi Hydropower Company Limited
3. Tanahu Hydropower Limited
4. Raghuganga Hydropower Limited
5. Chilime Hydropower Company Limited
6. Sanjen Jalavidhyut Company Limited
7. Rasuwagadi Hydropower Company Limited
8. Madhya Bhotekoshi Jalavidhyut Company Limited
9. Trisuli Jalavidhyut Company Limited
10. Power Transmission Company Nepal Limited11. Tamakoshi Jalavidhyut Company Limited
11. Uttarganga Power Company Limited

The subsidiary companies as listed below are in their transitional stages and are still being managed by the Engineering Services Directorate except for Nepal Power Trading Company Limited, which is being managed by the Power Trade Department under the Planning, Monitoring and IT Directorate.

12. DudhKoshi Jalavidhyut Company Limited
13. Upper Arun Hydropower Company Limited
14. Modi Jalavidhyut Company Limited
15. Aandhikhola Power Company Limited.
16. Nepal Power Trading Company Limited
17. Transformer Utpadan Company Limited
18. Tower& Pole Utpadan Company Limited

NEA ENGINEERING COMPANY LTD.

Introduction

NEA Engineering Company Ltd (NEC) was established on July 13, 2017 to provide complete Engineering Services and solutions in the sector of Hydropower and Infrastructure Development. NEC provides 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, Hydromechanical, Electromechanical, Transmission Line and distribution system, Operation/maintenance and Rehabilitation works etc.

The Company intends to develop National Engineering Capability for the design of medium to large hydro-projects, extra high voltage engineering and similar techno-intensive areas and provide a resource pool of competent manpower for the private sector to draw upon. It aspires to be a Renowned Regional Consulting Institution in the Power Sector.

Establishment and Business:

The Company was registered in Office of Company Registrar (OCR) on March 3, 2017. It obtained permission to operate from OCR on July 13, 2017. The Company was registered in VAT on September 20, 2017. The Company had its first Assembly of General Members (AGM) on June 14, 2018. The Company's issued capital is 1 billion rupees while its paid-up capital is 200 million rupees.

The Company now employs more than 120 staffs, the majority of whom are highly skilled and qualified Engineers and Specialists. At present NEC has its office in two locations, one on the second floor of Trade Tower, Thapathali and the other in Nepal Telecom Building Imadol.

Since the establishment, NEC is progressing towards its Core Vision and Mission in the field of Engineering Consulting Services. A brief description of the completed and under study projects are as follows:

A. Study Completed Projects:

1. Study and Analysis of Optimal Distributed Generation for access to Grid Electricity for all in five years with participation from Local Government:

NEC completed the study of Optimal Distributed Generation and Grid Access by 2022 on September 2017 for the National Planning Commission. It provides a workable solution to provide access to grid electricity with the active participation of local government. This was NEC's first project and completed within the stipulated time & budget.

2. Comparative study of Sunkoshi - Marin and Sunkoshi - Kamala Diversion Multipurpose Projects:

The Contract Agreement was signed in December 2018 between NEC and Ministry of Energy, Water Resources and Irrigation, Sunkoshi-Marin Diversion Multipurpose Project. The study of the project was completed on March, 2019.

3. Consultancy Services on Upgradation Design of existing 66kv Transmission Line for HTLS Conductor:

The Contract Agreement between NEC and Nepal Electricity Authority, Transmission Directorate, Bhaktapur - Baneshwor - Patan 66 kV Transmission Line Upgradation Project was signed on October 2018. The study of the project was completed on July, 2019.

4. Detail Feasibility Study of Trishuli 3B -Ratmate 220kV Transmission Line Project:

The Contract Agreement was signed in November 2018 between NEC and Nepal Electricity Authority, Transmission Directorate, Trishuli 3B - Ratmate 220KV Transmission Line Project. The study of the project was completed in July, 2019.

5. Consulting Services of Design Estimate of Transformer Workshop at Kharipati, Bhaktapur:

The Contract Agreement was signed in May, 2019, between NEC and Nepal Electricity Authority, Distribution and Consumer Services Directorate, Transformer Workshop Branch, Lainchaur, Kathmandu.The project was completed in February, 2020.

6. Detail Feasibility Study of Kusawa-Biratnagar 132kV Transmission Line Project:

The Contract Agreement was signed in September 2019 between NEC and Nepal Electricity Authority, Transmission Directorate, Kusawa - Biratnagar 132KV Transmission Line Project. The study project based on drone survey was completed in March, 2020.

7. Phukot Karnali PROR Hydroelectric Project (PKHEP) - 480 MW:

The Contract Agreement was signed in October 2017 between NEC and Vidhyut Utpadan Company Limited (VUCL) to conduct the detailed Feasibility/Engineering Study of PKHEP incorporating the technical, financial, and relevant aspects of the project development based on detailed survey and investigations including preparation of bidding document of PKHEP. The project study works has completed on July, 2021.

8. Jagdulla PROR Hydroelectric Project (JSHEP) - 106 MW:

The Contract Agreement was signed on December 6, 2017 between NEC and Jagdulla Hydropower Company Ltd (JHPCL) to conduct the detailed Feasibility/Engineering Study of JSHEP incorporating the technical, financial, and relevant aspects of the project development based on detailed survey and investigations including preparation of Bidding document of JSHEP. The project study works has completed at the end of FY 2077/078.

9. Betan Karnali Hydroelectric Project (BKHEP) - 439 MW:

The Contract Agreement between NEC and Betan Karnali Sanchayakarta Hydropower Company Limited (BKSHCL) was signed in November 2017 for the detailed Feasibility/ Engineering Study including technical, financial assessment and preparation of Bidding document of the Project with an installed capacity of 439 MW. The project study works has been completed in July, 2021.

10. Rolwaling Khola Hydroelectric Project (RKHEP) - 20.2 MW:

The Contract Agreement was signed in March, 2018 between NEC and Upper Tamakoshi Hydropower Ltd. (UTKHPL) to conduct the detailed Feasibility/Engineering study of RKHEP incorporating the technical, financial, and relevant aspects of the project development based on detailed survey and investigations. The project study work was completed in January, 2021.

11. Study of Kusawa - Biratnagar 132kV Transmission Line Project, Verification of Line Route Survey and Tower design review of 33kV Double Circuit Transmission Line:

The Contract Agreement was signed in September 2019 between NEC and Nepal Electricity Authority, Transmission Directorate, Kusawa Biratnagar 132KV Transmission Line Project. The Transmission line project study works has completed in February 2021.

Presentation by AIT Delegates on Physical modelling of Hydropower structures

12. Consulting Services for design of Tower for 400kV Transmission Line Project:

The Contract Agreement was signed in November 2019 between NEC and Rastriya Prasaran Grid Company Ltd. (RPGCL). The scope of services under this contract was to prepare design of tower type DB and DD using tower design software PLS-TOWER, loading tree diagrams/design calculation for different conditions (Normal, Reliability and Safety condition). The project was completed in February 2020.

13. Kathmandu – Terai/Madesh Fast Track (Express way) Project:

The Contract Agreement was signed in March 2020 between NEC and Nepal Army to provide consulting service for the design and drawing of River Training works under 9 different Chainage for The Kathmandu -Terai/Madesh Fast Track (Express way) Road Project. The project was completed in December, 2020.

14. Mini/Micro Hydropower Inter - connected Mini Grid Project:

The Contract Agreement was signed in October, 2020 between NEC and Alternative Energy Promotion Center (AEPC) for detailed Feasibility study of mini/micro hydropower inter-connected mini grid project, Jumla. The project study works was completed in January, 2021.

15. Assessment on the readiness for widespread adoption of Electric Cooking in Nepal:

The Contract Agreement was signed in August, 2020 between NEC and Vrock, United Nations Foundation, Clean Cooking Alliance. The project study works was completed in June, 2021.

16. Chandrapur - Sukdev Chowk 132kV Transmission Line Project:

The Contract Agreement for detail Feasibility study of Chandrapur - Sukdev Chowk 132kV Transmission Line Project was signed in September 2019 between NEC and Nepal Electricity Authority, Transmission Directorate, Chandrapur - Sukdev 132kV Transmission Line Project. The project study works has been completed on April, 2021.

17. Sunkoshi Marin Diversion Multi-purpose Project (SMDMP) – 31.07 MW:

The Contract Agreement was signed in February 2020 between NEC and Ministry of Energy, Water Resources and Irrigation, Sunkoshi-Marin Diversion Multipurpose Project. The scope of the Consulting services was to evaluate existing Feasibility Study Reports and carry out final Detailed Engineering Design of the Headworks (Barrage), intake, Approach Canal, Desander, Powerhouse, Hydro-mechanical and Electro-Mechanical works and associated structures including the final construction drawings, cost estimate and technical specifications of the construction works. The project works has been completed in February 2021.

B. Under Study Projects:

B.1: Hydroelectric Projects

1. Kimathanka Arun Hydroelectric Project (KAHEP) - 450 MW:

The Contract Agreement was signed in December 2017 between NEC and Vidhyut Utpadan Company Limited (VUCL) to perform detailed Feasibility/Engineering Study of KAHEP. The main objective of the assignment is to carry out detailed Feasibility/Engineering Study of KAHEP including technical, financial assessment and prepare Bidding documents. Field Works of the project completed with 100% physical progress including drilling works, additional works (drilling, topographic survey, geological study, preliminary design, drawings, costing and financial analysis) completed for alternate Dam Option B and access road study, detail design of selected Dam Option C is in

progress. The Project work is scheduled to be completed in September 2021.

2. Jagadulla - A Hydroelectric Project (JAHEP) - 82.3 MW:

The Contract Agreement was signed in December 2020 between NEC and Jagdulla Hydropower Company Limited to conduct the detailed Feasibility/Engineering Study of JAHEP incorporating the technical, financial, and relevant aspects of the project development based on detailed survey and investigations including preparation of Bidding documents of the project. The Project work is scheduled to be completed in December 2022.

Contract Agreement between NEC and Jagdulla Hydropower Company Ltd.

3. Mugu Karnali Hydroelectric Storage Project (MKHEP) - 1,902 MW:

The Contract Agreement was signed in February 2019 between NEC and Vidhyut Utpadan Company Limited (VUCL) to conduct the detailed Feasibility/Engineering Study of MKHEP incorporating the technical, financial, and relevant aspects of the project development based on detailed survey and investigations including preparation of Bidding documents of the project. The Project work is scheduled to be completed in November 2023.

4. Review of updated Feasibility Study Report (UFSR) and Detailed Design Report (DDR) of Nalgad Hydroelectric Project:

The Contract Agreement was signed on February 2020 between NEC and Nalgad Hydropower Company Ltd. (NHCL). The scope of the services under this contract is to review and provide comments on the Feasibility Study Reports and Detailed Design Report prepared by the Main Consultant of the NHCL. The main objective of the task is to review of the main report, field investigation report, design criteria and layout, draft detailed design report and draft tender document. The review report with comments has been submitted to the NHCL and the Main Consultant is preparing the Final Reports of the project and will be completed in August 2021.

B.2:Environmental Impact Studies Projects:

1. Environmental Impact Assessment (EIA) of Phukot Karnali PROR Hydroelectric Project (PKHEP), Kimathanka Arun Hydroelectric Project (KAHEP), Betan Karnali Hydroelectric Project (BKHEP) and Jagadulla Storage Hydroelectric Project (JSHEP):

NEC has signed the Contract Agreement with VUCL, JHCL and BKSHCL to carry out the detailed Environmental Impact Assessment of Phukot Karnali HEP, Kimathanka Arun HEP, Jagdulla HEP and Betan Karnali HEP respectively. The EIA study of all these projects have been continued and expected to be completed within this Fiscal Year 2078/079.

2. EIA Study of Ratmate - Rasuwagadhi -Kerung 400kV Transmission Line Project:

The Contract Agreement was signed in June 2020 between NEC and Nepal Electricity Authority, Ratmate – Rasuwagadi - Kerung 400KV Transmission Line Project. The scope of the services under this contract is to carry out the EIA study as required by the prevailing Acts and Regulations of the Government. The scoping and TOR study of the project has been continued and expected to be completed within this Fiscal Year 2078/079.

3. Initial Environmental Examination Study of Mewa - Change 132kV Transmission Line Project:

The Contract Agreement was signed on November 2019 between NEC and Rastriya Prasaran Grid Company Ltd. (RPGCL) for the IEE study of Mewa -Change 132KV Transmission Line Project. The prime objective of consulting services under this contract is to conduct Initial Environmental Examination Study of 132KV Mewa Change Transmission Line Project. The IEE study of the project has been continued and expected to be completed within December 2021.

4. Environmental and Social Studies of Distribution System and Expansion Project (DSUEP):

The Contract Agreement was signed on June 2020 between NEC and Nepal Electricity Authority, Distribution and Consumer Service Directorate. The scope of the services under this contract is to conduct IEE or appropriate Environmental Assessment as required by the prevailing Acts and Regulations of the Government and AIIB's and EIB's Environmental screening criteria. The Environmental and Social Studiesof the project has been continued and expected to be completed within this Fiscal Year 2078/079.

B.3:Transmission Line and Substations Projects:

1. Design Check and Construction Supervision of 400 kV Dhalkebar Substation Project:

The Contract Agreement was signed in February 2018 between NEC and Nepal Electricity Authority, Hetauda - Dhalkebar - Inaruwa 400KV Substation Expansion Project for the Consulting Services to conduct design check and construction supervision of 400KV Dhalkebar Substation. The prime objective of consultant is to review the designs submitted by the Contractor ABB India, supervise the construction for smooth operation of construction activities. The project work will be completed in August 2021.

2. Design Check and Construction Supervision Consultancy Services for 400 kV Hetauda and Inaruwa substations:

The Contract Agreement was signed in February 2019 between NEC and Nepal Electricity Authority, Hetauda - Dhalkebar - Inaruwa 400 KV Substation Expansion Project for the Consulting Services to conduct design check and construction supervision of 400 KV Hetauda and Inaruwa Substation. The prime objective of consultant is to review the designs submitted by the Contractor SIEMENS, India, supervise the construction for smooth operation of construction activities. The supervision work is in progress and going as per schedule and NEC has provided all necessary expertise required by NEA and expected to be completed within February 2022.

3. Detailed Engineering and Environmental Study of Kimathanka Arun - Arun Hub 400kV Double Circuit Transmission Line Project:

The Contract Agreement was signed in December 2018 between NEC and Rastriya Prasaran Grid Company Ltd. (RPGCL) as a consulting service contract to prepare Detailed Project Design covering route alignment survey, transmission lines and substations design including tower spotting, ROW plan, environmental studies, cost estimates, land demarcation and identification, preparation of Contract packages and Bidding documents. Transmission line Route alignment study of all alternatives are based on optimum routing using GIS Intelligence.

The GIS-based intelligent routing and detailed survey of the route based on the alignment selection and detail design as well

as tower design has been completed. The detail Engineering design, Scoping and TOR documents has been submitted and EIA study is expected to be completed within October 2021.

4. Additional Transmission Line Study of Upper Modi Hydroelectric Project:

The Contract Agreement was signed in April 2021 between NEC and Nepal Electricity Authority. The scope of the services under this Contract is to prepare additional study for Re-alignment of Towers in two sections (altogether 7 no. Towers) from powerhouse to connecting substation. The study of the project has been continued and expected to be completed within September 2021.

5. Route Alignment and Detail Survey of Chhobar - Patan - Chapagaun 132kV Double Circuit (Underground) Transmission Line Project:

The Contract Agreement was signed in March 2021 between NEC and Nepal Electricity Authority. The scope of the services under this contract is to select the Route Alignment and prepare Detail survey of 132KV Double Circuit (Underground) Transmission Line from Chobhar - Patan - Chapagaun. The project study has been continued and expected to be completed within September 2021.

6. Study of Kathmandu Valley Transmission System Reinforcement for 2000 MW Load:

The Contract Agreement was signed on February 8, 2021, between NEC and Nepal Electricity Authority. The scope of the services under this contract is to perform Feasibility Study of Katmandu Valley Transmission System Reinforcement for 2000 MW Load. It includes Detail Feasibility of River Corridor Transmission Lines within Kathmandu Valley with monopoles and compact substations. The project has been continued and expected to be completed within September 2021.

7. Preparation of Integrated Master Plan for Minigrid (IMPM):

The Contract Agreement was signed on May 16, 2021 between NEC, Alternative Energy Promotion Centre, and Nepal Electricity Authority. The scope of the services under this Contract is to create a Grid Interconnection Master Plan for micro hydro of Nepal. The project has been initiated and expected to be completed within October 2021.

8. Detail Feasibility Study of Jhurjhure 132 kV Transmission Line and Substation Project:

The Contract Agreement for Detail Feasibility Study of Jhurjhure 132 kV Transmission Line and Substation was signed on January 29, 2021 for feasibility study of 132 kV double circuit transmission line from Kamane substation to proposed 132 KV substation at Jhurjhure, Faparbari in Makawanpur district. The scope of service also includes the design of 132/33/11 kV Substation at Jhurjhure. The project has been continued and expected to be completed within August 2021.

9. Consultancy Services for Site Supervision Works of Chilime Trishuli 220 kV Transmission Line Project:

The Contract for site supervision works of Chilime Trishuli 220 kV Transmission Line was signed on 26 April 2021 for the site supervision of Chilime Trishuli 220 kV Transmission Line and associated Substations at Chilime Hub and Trishuli 3B Hub. The project works has been continued and is expected to be completed within April 2022.

10. Design and Preparation of Conductor Stringing Charts and Supervision of Stringing Works of Hetauda - Bharatpur 220 kV Transmission Line Project:

The Contract for preparation of Stringing Chart and site supervision of 220 kV Hetauda Bharatpur Bardaghat Transmission Line was

signed on August 5, 2020. The scope of the works under this contract is to prepare the stringing chart and verification of the same through site supervision of conductor stringing works. The project has been continued and expected to be completed within December 2021.

B.3: Solar Power Project:

1. Construction Supervision of 25 MW Grid tied Solar Farms:

The Contract Agreement was signed in October 2019, between NEC and Nepal Electricity Authority, Distribution and Consumer Services Directorate, 25MWp Grid Tied Solar Project. The main objective of the Consulting Services is to carry out Design and Documents review, supporting Contract Management and Construction Supervision. The project has been continued and expected to be completed within March 2022.

Overview of Forebay site

B.4: Power Plant Rehabilitation Projects

1. Consulting Services for Tender Document review and recommendation, assistance in Tender Evaluation, Design review, Erection and Commission Supervision under Rehabilitation and Modernization of Trishuli HEP- 24 MW:

The Contract Agreement was signed in April 2019 between NEC and Nepal Electricity Authority, Generation Directorate, Medium Generation Operation and Maintenance Department to review the designs, drawings submitted by the main Contractor, supervise the erection and commission of rehabilitation works of Trishuli Hydropower Project (24 MW) in Nuwakot district. The project works have been continued and expected to be completed within December 2022.

2. Consulting Services of Tender Document review and recommendation, assistance in Tender Evaluation, Design review and Erection and commission Supervision under Rehabilitation and Modernization of Gandak HEP - 15 MW:

The Contract Agreement was signed in October 2020 between NEC and Nepal Electricity Authority, Generation Directorate, Medium Generation Operation and Maintenance Department to review the designs, drawings submitted by the main Contractor, supervise the erection and commissioning of rehabilitation works. The project works have been continued and expected to be completed within August 2021.

3. Detailed Feasibility Study of Upgradation/ Rehabilitation of Tinau Hydropower Plant:

The Contract Agreement was signed in December 2019 between NEC and Nepal Electricity Authority, Generation Directorate, Medium Generation Operation and Maintenance Department, Tinau - Sundarijal Jalavidhyut Kendra Rehabilitation Project to conduct Feasibility Study on upgradation/ rehabilitation of Tinau Hydropower Plant (1000 kW). The main task under this contract includes review of previous studies, field visits, topographical survey, geological and geotechnical investigation, review and update of hydrological and sedimentological studies, power evacuation study, detailed engineering design, cost estimate, preparation of tender documents and financial analysis.The project works have been continued and expected to be completed within November 2021.

Tinau Hydropower Project site

B.5: Other Research, Independent Study and Business Exploration:

The Company is actively engaged in research and study of Electrical Vehicles (EV), charging stations and other infrastructure to promote the use of EV into nation as a strategy for increasing clean energy consumptions. At the same time, it has adopted the EV only principle for mobility within the valley by procuring the first EV and continues to do so. The purpose of this EV fleet is to generate confidence in public towards the EV and at the same time to gain experience and insight into different EV that are available so as to provide expertise services to Government and NEA in the future.

The Company had also carried out its research and indigenous design of floating solar plants that can be used in lakes and reservoirs.

NEC is presently carrying out research on H2H (Hydrogen to Hydrogen) and particularly Hydrogen generation and using Hydrogen for Electricity generation and urea production. It is also continuing research on 132kV monopole design and application in the context of Nepal.

UPPER TAMAKOSHI HYDROPOWER LIMITED (UTKHPL)

UTKHPL was established on 09 March 2007 as an autonomous public company for the construction and operation of Upper Tamakoshi Hydroelectric Project (UTKHEP) utilizing domestic financial resources. 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 company has issued the shares to the contributors in Employees' Provident Fund (17.28%), NEA and UTKHPL staffs (3.84%) and staffs of debtor institutions (2.88%) in the Fiscal Year 2014/15 and the remaining 25% of equity capital have been allocated to General Public (15%) and Residents of Dolakha district (10%) in Fiscal Year 2018/19.

A shareholder agreement had been signed among NEA, NT, CIT and RBS on 26 July 2010. A tripartite loan agreement had been signed among NEA, Employees' Provident Fund and UTKHPL on 30 July 2010. In addition, loan agreements had been signed by UTKHPL with CIT and RBS separately on 7 December 2010. After signing the loan agreement between UTKHPL and Nepal Telecom on 12 May 2011, financial closure of the Project was completed.

Inauguration of the Project

After impounding of the reservoir, then Honorable Minister for Physical Infrastructure and Transportation, Mr Basanta Kumar Nembang, and then Honorable Minister for Communication and Information Technology, Mr Parbat Gurung had jointly inaugurated the work of releasing water in the Waterways on 29 April 2021. After water filling in the Water Ways and successful Wet Tests of associated Civil Structures and Hydromechanical Equipment, wet commissioning of the first two units started from 31 May 2021. Subsequently, on 5 July 2021 (21 Ashad 2078), the Project was inaugurated by the then right honorable Prime Minister Mr K P Sharma Oli and First Generating Unit was synchronized with the National Grid via 220/132kV New Khimti Substation.

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 with the available gross head of 822 m and design discharge of 66 m^3/s. The major components of the project are as follows: 22 m high and 60 m long diversion dam integrated with 35 m wide intake; 225 m long and 26 m wide each twin settling basin; Headrace tunnel having inverted D-shape section with 6m x 6m size and length 8.0km; penstock of length 1,165m (dia. 1.47 to 3.6 m); Powerhouse cavern (142m x 13m x 25 m) along with a Transformer cavern (167m x 13m x 17.5 m); 3 km long Tailrace tunnel; Electro-mechanical equipment consisting of 6 nos. vertical Pelton Turbines (rated power of 79.5 MW each), 6 nos. synchronous generators (rated power of 90 MVA each) and 18 (plus 1 spare) single phase transformers (rated capacity of 90 MVA each); 47 km long double circuit 220 kV transmission line from Gongar to 220/132kV New Khimti Sub-Station.

After signing the Consultancy Services agreement between UTKHPL and The Joint Venture of Norconsult AS and Lahmeyer International GmbH (JVNL) on 16 December 2010, JVNL has been appointed as a Consultant/ Engineer for construction supervision of UTKHEP. Apart from consultancy Services for construction supervision, there were four other lots for procurement of Civil Works (Lot 1), Hydro-mechanical Works (Lot 2), Electromechanical Works (Lot 3) and Transmission Line and Substation Works (Lot 4). Sinohydro Corporation Ltd, China has been selected for execution of civil works and the contract has been signed on 01 August 2010. Texmaco Rail and Engineering, India has been selected for execution of Hydro-mechanical works and the contract has been signed on 28 February 2012. Andritz Hydro GmbH, Austria has been selected for execution of Electro-mechanical works and the contract has been signed on 26 February 2012. Similarly, KEC International Ltd, India has been selected for execution of Transmission line and Substation works and the contract has been signed on 10 January 2013.

Initially it was planned to complete all works including electromechanical works of the Project within 6 years. Original estimated cost to complete the Project was 456 MUSD, prior to the international competitive bidding, excluding Interest during Construction (IDC). But due to multiple reasons such as design modifications of Headrace Tunnel and Surge System, upgrading and rehabilitation of access roads, time delays and additional scope of works due to the devastating earthquake of April 2015, some other design changes in the project components, poor work performances of Lot 2 Contractor, Nepal India boarder blockade and pandemic due to Covid-19 and subsequent international lockdowns in the constructions, installations, manufacturing of some remaining items and transportation, etc, Project could not be completed within the original completion period of 6 years and accordingly the Project cost and time have been increased. As per the latest forecast, the revised cost for completion of the Project is 590 MUSD excluding IDC.

Power Purchase Agreement (PPA) & Financial Arrangement

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 annual escalation of 3%, the average purchase rate will remain as NRs. 5.30 per unit throughout the tenure of PPA. The project is being financed through debt-equity ratio of 70:30. The financial closure with all financial institutions has been concluded on 12 May 2011 for the required debt portion. As per the separate loan agreements (supplementary agreements), EPF and NT have invested NRs. 14 Billion and NRs 8.4 Billion respectively whereas CIT and RBS have invested loans of NRs. 2.8 Billion each so far. Similarly, Government of Nepal (GoN) has provided loan of NRs. 13.08 Billion and Nabil Bank has provided short-term loan of NRs. 2 Billion so far.

Rolwaling Khola Hydroelectric Project (RKHEP)

As the second stage development of UTKHEP, Upper Tamakoshi Hydropower Limited (UTKHPL) intends to implement Rolwaling Khola Hydroelectric Project (RKHEP) having installed capacity of 20 MW. The Company has obtained Survey License of Rolwaling Khola Hydroelectric Project from Department of Electricity Development on 6 September 2017. Apart from 105 GWh of annual energy generated from this power plant itself, additional 216 GWh of annual energy will be generated from Upper Tamakoshi Hydropower Plant.

Following activities are ongoing under procurement of Infrastructure Works.

1. Construction of Exploratory Tunnels and Connecting Road: Contract Agreement was made on 14 November 2019 with the Contractor High Himalaya Hydro Construction P. Ltd. for Construction of 2.2 km long connecting road to Adit of Headrace tunnel and around 800 m long exploratory tunnels and the works are ongoing.
2. Construction of Mule Track from Lower Lamabagar to Rikhu Village: Contract Agreement made on 16 June 2020 with the Contractor Mahagauri-Simpani JV for Construction of 2.2 km long Mule Track having width of around 1.5m as an access to Headworks area and the works are ongoing.
3. Design and Build of Permanent Bridge at Lamabagar: Contract Agreement made on 13 January 2021 with the Contractor Khampache-Sherpa Hydro JV and the works are ongoing.

Following activities are ongoing under procurement for the construction of Main Works.

1. Prequalification of Bidders for EPC Construction of Rolwaling Khola HEP: The Re-invitation for Prequalification was made on 26 April 2020 and four applicants have been selected after evaluation of the applications.
2. Detailed Engineering Design and Preparation of EPC Bidding Documents: Contract Agreement made on 13 March 2018 with NEA Engineering Company Limited. The Consultant has submitted the Final Report on Detailed Design and EPC Bidding Document in January 2021.
3. Power Purchase Agreement with NEA: The application for power purchase agreement has been submitted to Nepal Electricity Authority. System Planning Department is conducting the Grid Impact Study of the project.

In addition, a Memorandum of Understanding (MoU) was signed between UTKHPL and Environment and Social Studies Department of NEA on 14 February 2018 to carry out Environmental Impact Assessment (EIA) study of RKHEP. The final report of the EIA study has already submitted to Department of Electricity Department on 27 April 2021 for approval.

Tanahu Hydropower Limited

Tanahu Hydropower Limited (THL) was established as a subsidiary company of Nepal Electricity Authority (NEA) on 25March 2012 to develop Tanahu Hydropower Project (previously known as Upper Seti Hydropower Project). The company also envisages to develop Lower Seti (Tanahu) Hydropower Project at the lower reaches of Seti River. The overall management of THL is entrusted to the Board of Directors, headed by the Managing Director of NEA.

Tanahu Hydropower Project

Tanahu Hydropower Project is located on the right bank of Seti River, about 150 km West of Kathmandu near Damauli, the district headquarters of Tanahu District. The storage type project with an installed capacity of 140 MW will have an estimated annual energy generation of 590 GWh. The project is designed for at least six hours of peaking operation during the driest month of the year. The salient features of the project are as follows;

Dam	Concrete Gravity; 140 m high and 215 m Crest Length
Headrace Tunnel	1,390 m long; 7.4 Internal Diameter
Surge Shaft	61.5 m high; 28 m internal Diameter
Underground Powerhouse	89m x 22m x 50.8m
Tailrace Tunnel	210 m
HM Equipment	Four Spillway Gates (12.8m x 18.7m); Two Water Lowering Gates (3.8m x 3,8m); and Two Flushing Gates (5m x 5m)
EM Equipment	Two Units of Francis Turbines with maximum outputs of 71. MW each coupled with 3 phase synchronous generator with maximum output of 82.3 MVA
Transmission Line	220 kV DC of length 34 km to New Bharatpur Sub-station

As per the Project Administration Manual (PAM) of January 2013, the total cost of the project was estimated to be 505 MUSD including the interest during construction. The financial arrangements have been concluded after signing the respective loan agreements with ADB, JICA and EIB. THL has also concluded the Power Purchase Agreement (PPA) with NEA on 29 June 2018 as a maiden PPA for storage type hydropower projects.

Project Status and Progress

The main construction works of all contract packages except of the Package 1 are underway. The overall physical and financial progress have reached to 27.39 % and 25.66 % as of July 2021. The overall works of the project is expected to be completed by December 2025. The current status of project is briefly summarized as follows:

Pre-Construction Activities

All pre-construction works including the access road and a bridge across Seti River, the camp facilities and the 33/11 construction power sub-station of capacity 8 MVA have been completed under contracts of the National Competition Bidding. The company has distributed 10.98 MUSD to 512 affected HHs out of total 559 affected HHs (compensation coverage of 91.6%) as compensation payments for the acquisition of land and structures

including livelihood support allowances. However, 15 affected HHs of Paltyang area within the reservoir has lodged the complaint to the Office of Special Project Facility (OSPF) of the ADB and the Complaint Mechanism (CM) of EIB. As advised by both ADB and EIB, the collaborative resolution process has been initiated for early resolution of the complaint.

Major Construction Packages

Package 1: After termination of the Contract with CMC di Ravenna, Italy and the rejection of all bids received for the Re-bid I being non responsive to the requirements of the bidding documents, THL again issued the Invitation for Bids (IFB) for Re-bid II on 28 February 2020. However, following the global spread of pandemic COVID-19 and the subsequent nationwide lockdown imposed by the Government of Nepal, the bid submission deadline was extended until 6 July 2020.

D/S View of Dam Site

Finally, following the evaluation of technical and price bids, the contract has been awarded to the Joint Venture of Song Da Corporation, Vietnam-Kalika Construction (P) Limited, Nepal on 22 March 2021. After mobilization to the site, the Contractor has already initiated pre-construction activities including the core drilling works at the downstream portal of diversion tunnel and at the river bed of the downstream coffer dam. However, the main works under the contract is expected to commence by the end of August after finalization of the detailed work program including interface schedules and sectional milestone dates.

Package 2: After conclusion of the contract agreement of the Package 2 (Waterway, Powerhouse and Related Equipment) on 01 October 2018, the Contractor, M/S Sinohydro Corporation Limited, China has commenced the works under the contract since 19 January 2019. In addition to the site establishment works including access roads, the Contractor has so far completed the excavation and support works of Cable Tunnel (188 m), Main Access Tunnel (281 m), Approach Tunnel (314 m) to the right bank of dam and tailrace outlet structure.

View of Powerhouse Cavern

The Contractor is currently being involved in five different underground works fronts, namely the underground powerhouse, the work tunnels 1 and 3 inside the powerhouse, the access tunnel to the surge tank and the tailrace Tunnel. The bench excavation of powerhouse has reached to the elevation of 302 m with the required supports of rock bolts and shotcrete, thereby facilitating the construction of auxiliary crane beam. The total numbers of 235Double Corrosion Protective (DCP) anchors have been installed including stressing and pull out tests. About 391 m of access tunnel to surge tank, 162 m of work tunnel 1 (to Headrace Tunnel) & 12m of work tunnel #3 (to Penstock Bifurcation) have been excavated along with the required support works.

Junction of Work Tunnel 1 and 3

In addition, 130 m of the heading section of tailrace tunnel has been excavated with required support works of shotcrete and rockbolts. The further activities have been stopped, as the heavy flood of 15 June 2021 on Seti River had washed away the access road to the tailrace tunnel. Works have been initiated for the re-establishing the access to the tailrace outlet.

Package 3: THL signed the contract agreement with M/s KEC International Limited, India for Package 3 (220 kV Double Transmission Line from Damauli to Bharatpur) on 25 December 2018. After completion of the detailed survey of TL alignment and the geological investigation at the designated tower locations, the Contractor started the tower foundations works in various locations. Following approval of the design and test reports of steel towers (DB, DC, DD type), the tower and line materials (Stubs, ACSR Conductor, GS Earthwire and Insulators) are being delivered to the site.

Concreting Works in Tower Foundation

Following tree enumeration works of Tanahu and Chitwan districts, the final report has been submitted to the Department of Forest and Land Conservation for the approval of forest clearance. The Compensation Determination Committee (CDC) chaired by the Chief District Officer of Tanahu district, has determined the compensation rates for land to be acquired for tower foundation works within the Tanahu district,

Rural Electrification: The Project management Directorate of NEA has been implementing "Rural Electrification and Distribution System Improvement of Tanahu District" under the Contract ICB-PMD-DSAEP-074/075-01-TANAHU with East India Udyog/Waiba Infratech JV. The project covers majorly the South-East belt of Tanahu District, which have no connectivity to the national grid. Under this project, two substations one at Ghiring and another at Saranghat are being constructed along with the constriction of 33 kV lines, 11 kV feeders and 400 V LT lines.

The progress as of July, 2021 is summarized as follows:

- The boundary wall construction has been almost completed, whereas the finishing works of control building and staff quarter are ongoing for 33/11 kV sub-stations at Ghiring and Saranghat.
- Out of total 922 poles of 33 kV line, 668 poles (72%) have been erected, whereas stringing of 12 km (29%) of conductors out of 41.2 km has been completed.
- For 11 kV line, 3561 poles (75%) have been erected out of 4689 poles, whereas stringing of 334 km (51%) out of 651 km has been completed.
- Similarly, out of total 5425 poles of 400 V LT line, 5100 poles (94%) have been erected, whereas stringing of 70 km (22%) of conductors out of 309 km has been

completed. In addition, 21 distribution transformers (30%) have been charged after installation.

Major Consulting Contracts

Project Supervision Consultant (PSC): THL concluded the consulting services contract with M/S Tractebel Engineering GmbH (then Lahmeyer International GmbH) Germany in association with Manitoba Hydro International, Canada on 29June, 2015. After completion of the activities under the Phase 1, the Consultant has been carrying out the review and approval of designs/drawings submitted by the Package 2 and Package 3 Contractors as well as the construction supervision and contract administration of both packages under the current Phase 2 of Contract. The Project Supervision Consultant (PSC) has also provided the technical support to THL in the procurement process of Package 1 including the pre-award negotiation.

Environment & Social Management Service Provider (ESMSP): A contract agreement was signed with M/S Electro-consult, Italy in association with GEOCE Consultant (P) Limited, Nepal on 20 May 2019 for management of environmental and social safeguard activities. After commencement of the services from 01 July 2019, the Consultant has been regularly monitoring the environment and social safeguard activities including personal health and safety aspects and thereby recommending the corrective measures for non-compliances as recorded. In addition, the ESMSP is being engaged on preparation of Consolidated Environmental Management Plan (CEMP) including the Fish Management Plan, the Water Release and Dam Safety Plan, the Wild Life Management Plan and the Forestry Management Plan.

Panel of Expert (PoE): As provisioned in the Project Administration Manual, THL has appointed three individual experts, namely Dam Safety Expert, Environment Expert and Social Safeguard Expert, as Panel of Experts (POE) to provide an independent review and guidance on the treatment of safety issues associated with the dam construction and operation and environmental and social safeguard activities. A virtual meeting was conducted in November 2020 among the THL, the POE and the ADB to discuss on the safety aspects of the dam including the current environmental and social safeguard issues of the project

External Monitors: THL has also appointed an external environment monitor and an external social safeguard monitor to carry out periodic and independent review of the implementation of Environment Management Plan (EMP) and Resettlement and Indigenous People Plan (RIPP). The first mission of external monitors conducted in January 2021 has reviewed the compliance status associated with the environmental and social safeguard matters of the project.

Impact of COVID-19

Following the recession of the COVID-19 active cases, both Package 2 and Package 3 Contractors resumed the construction activities maintaining the health and safety protocols of the GoN from October 2020. However, the spread of second wave COVID-19 with a new variant of Virus and the subsequent prohibitory orders enforced by the local authorities since May 2021 has again affected construction activities at the site to certain extent.

The mobilization plan of the expats from Song Da Corporation, Vietnam and also the PoE could not be realized due to the travel restriction

imposed by the GoN. Despite the prohibitory order imposed by local authorities, the Package 2 Contractor continued the construction activities following the operational health and safety protocols. THL, in coordination with the District Administration Office, has been providing the required supports for the supply of construction materials to the site. However, following the demobilization of the local Contractors since the imposition of prohibitory order, the progress of tower foundation works being carried out by the Package 3 Contractor has been severely affected.

Livelihood Restoration and Community Development

THL has established four Local Consultative Forums (LCFs) in addition to one Public Information Centers (PIC) for the registration of grievances and dissemination of project related information. THL is being regularly engaged in consultation with local administration and authorities to address the grievances of the APs to the extent possible. The first broad-based participatory and socially inclusive consultations on GESI's goals, objectives, and status in each Rural/Municipality as defined in the project area has been carried out along with the surveys for the livelihood restoration plan. The GESI team has initiated awareness programs on sexual and reproductive health and gender-based violence issues to the project affected communities.

The ESMSP is preparing a community development strategy. Further, a local NGO selection tool has been developed with a vision to facilitate community development plan in the project affected communities. For the implementation of livelihood support program, following the recommendation of ESMSP, THL has conducted vocational training on tailoring to 20 women from affected HH.

Construction of an Isolation Center at Jhyaputar

Under the domain of community development strategy, the Users' Committee has completed the construction of a kitchen room for Parashar Old Aged Home of Vyas-5. The construction of masonry retaining structures and gabion wall for the road protection works at Patan is at the final stage of completion. Similarly, the Local Users' Group has been continuing the works for the construction of escape drainage system for drainage management of Turture Khola at Prithvi Tole, Jhaputar, Rishing-1, whereas the construction works of an isolation center at Rishing-1 is also under progress.

Lower Seti (Tanahu) Hydropower Project

THL has envisaged to develop Lower Seti (Tanahu) Hydropower Project located about 18 km downstream of the tailrace of Tanahu Hydropower Project. The peaking type ROR project with an installed capacity of 126 MW will have an estimated annual energy generation of 520 GWh with the utilization of regulated discharge of Seti River from the tailrace of Tanahu Hydropower Project in addition to the flows of Madi River. At the request of THL, the DoED has extended the Survey License of Generation of the project until 29 October 2021.

Core Drilling at Headworks Area

Under the Grant-0361-NEP, Project Preparation Facility for Energy of the ADB, THL signed a Contract Agreement with JV of WAPCOS Limited, India and Nippon Koei Co. Ltd, Japan on 12 April 2019 for the Detail Engineering Design and Preparation of Bidding Documents of the project. After completion of the field investigation works, the Consultant has submitted the draft design report and bidding documents during the first quarter of 2021. As per the agreed plan with the ADB, THL has appointed international Panel of Experts (POE) for the independent review of design documents submitted by the Consultant. Following the commencement of services, the POE has submitted the first draft design review report to THL. The consulting services contract has been extended till the end of December 2021 due to the Force Majeure event caused by the pandemic COVID-19 and it is expected that the Consultant would submit the final detailed design report along with the bidding documents within the extended time period.

RAGHUGANGA HYDROPOWER LIMITED

1. Background/Description:

Raghuganga Hydropower Limited was established as a subsidiary company of NEA on 7th March 2017 (24 Falgun 2073) to develop and manage Rahughat Hydroelectric Project (40MW). Rahughat Hydroelctric Project is a peaking run of the river (PROR) scheme with 6-hour peaking time. The Project envisages to generate 40MW (2X20MW) of power by diverting 16.67 cumecs of water through a Head Race Tunnel (HRT) and Pressureshaft to a surface Power House located at right bank of Kaligandaki River at Galeshwor, Myagdi which is about 300m upstream of the confluence of Raghuganga River with Kaligandaki River. The major components of the Project lie at the left bank of Raghuganga River. It is one of the major tributaries of Kaligandaki Riverthat flows from west to east to meet Kaligandaki River at Galeshwor. Raghuganga River will be diverted through a Barrage to 6.270 km headrace tunnel (HRT) to generate 40 MW of power. The proposed headrace tunnel runs along left bank of Raghuganga River. The surface powerhouse is located on the right bank of the Kaligandaki River. The project envisages construction of 25 m high Barrage with 2 no Spillways and one Under Sluice, an 80m long Desander with 2 bays, a 6.270 km long Head Race Tunnel of 3.30 m finished diameter, a 53.2 m high, 10m diameter Surge Tank, 1026m long 2.15m diameter Pressure Shaft, a manifold bifurcating into two Penstock, a 55.40m x 24.9m Power House and a cut & cover Tail Race arrangement.

2. Power Purchase agreement and financial management:

PPA for the Rahughat Hydroelectric Project has been signed with Nepal Electricity Authority on 1st April 2019 (18 Chaitra 2075) with the provisions and tariff as per the guidelines and directives issued by Nepal Government/Nepal Electricity Authority. Out of total estimated project cost of 81.89 million USD, the project is being financed by Government of Nepal and Nepal Electricity Authority along with the loan of 67 million USD financed by Exim Bank of India under LOC-1 and LOC-2.

3. Major Construction Packages

a. **Lot 1- Civil and Hydro-Mechanical Works**: The Contract Agreement on EPC contract for Lot-1 -Civil & Hydro Mechanical Workwas signed between RGHEP (NEA) & M/s Jaiprakash Associates Limited, Noida, India on 21 November 2017 and Notice to proceed (NTP) was issued to commence the work on 24th May, 2018 after getting concurrence from EXIM Bank of India.

b. **Lot 2 - Design, Manufacture, Supply, Installation, Erection, Testing and Commissioning of Electromechanical Works:** The Contract Agreement on PLANT DESIGN- BUILD form of CONTRACT for LOT-2: Electro-Mechanical Works was executed on 15th October, 2019 between RGHPL and M/s Bharat Heavy Electrical Limited, India under PDB Contract and after getting concurrence from EXIM bank on the agreement of LOT-2 on 30th November 2019, Notice to Proceed (NTP) to Lot 2 Electro-Mechanical Contractor M/s Bharat Heavy Electrical Limited, India had been issued for commencement of works on 04 December, 2019.

3. Project Status and Progress:

a. Lot 1: Civil and Hydromechanical works

- Opening of Access road from Power House to Head works (11km) is being excavated from different locations.
- Excavation and support works of all adit tunnels (Adit 1, Adit 2, Adit 3 and Adit 4) completed.
- Head Race Tunnel excavation in is progress from 5 faces and 1500m HRT out of 6270m has been completed.
- Pressure Shaft having upper horizontal and lower horizontal segments with vertical shaft are in progress from two faces and 180m out of 1007m pressure shaft has been completed
- The excavation of 10m dia. surge shaft well 61m out of 61m well excavation has been completed.
- All foundation, super structures and steel structure installation of permanent bridge over Raghuganga River is completed and commissioned on 23 Nov, 2020.
- Excavation of powerhouse work is in progress and Support system for stability of rock slope of Powerhouse is under progress.
- Model studies of headworks and desander had been successfully conducted at IRI Institute at Rudkee. Design works of headworks and associated structure are in progress. Right Bank side protection retaining wall construction is in progress.

4. Lot 2: Electromechanical works

- Model testing of turbine had been completed and report for the same had been submitted.
- Design of electromechanical components are in progress.
- Delivery of the electromechanical components at site in under process.

5. 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.

6. Impact of Covid-19 Pandemics:

Due to the imposition of national lockdown announced by Government of Nepal to prevent the spreading of pandemic Covid-19 on March 2020, works at site had been stopped after notification of force majeure event and with the subsequent discussion with Government Authority and Contractor, the works had been

resumed after 15 days maintaining the health and safety protocol directed by GoN. But due to the restriction in the movement of vehicles, custom clearance, transportation of materials, unavailability of materials in market, lack of manpower and its movement, psychological fear among workers, local people pressure etc, overall progress of the project got affected. Again the second wave of Covid-19 after April 2021 also affected the work progress of the project. Due to pandemic Covid-19, the site mobilization from Lot 2 is also being delayed.

7. Intended time of completion

The scheduled completion date of the project had been estimated on Dec 2022. Due to delay in the explosive approval, master list approval, supplementary master list approval, delay in induction process and, weak geology compared to the estimated geology and effects of Covid-19 pandemic, all these may lead to the extension of project completion date.

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. 51% of the company's share is owned by NEA while the rest is owned by the public.

Chilime Hydroelectric Plant

The Company commissioned Chilime Hydroelectric Project in 2060/05/08 (24 August 2003) which is located in Rasuwa district. Installed capacity of the power plant is 22.10 MW and total average annual energy generation is 155.668 GWh including 132.917 GWh of contract energy and 22.76 GWh of excess energy. The generated energy is transmitted into the NEA grid at Nuwakot district through a 38 km long 66 kV transmission line.

During the dry season FY of 2077/78, dismantling of old components (central control system, excitation system, protection system, and other electrical system) and installation & commissioning of new system has been completed.

Chilime Subsidiaries

CHPCL has formed four subsidiary companies. Three are for the development of new hydropower projects and the one is to provide engineering services for hydroelectric projects.

Four hydroelectric projects with total capacity of 270.3 MW are being developed under the subsidiaries viz. Rasuwagadhi Hydropower Company Limited (RGHCL), Madhya Bhotekoshi Jalavidyut Company Limited (MBJCL) and Sanjen Jalavidyut Company Limited (SJCL). All of these projects are scheduled to be complete by the end of FY 2078/79.

1. Rasuwagadhi Hydropower Company Limited

Rasuwagadhi Hydropower Company Limited (RGHPCL), promoted by Chilime Hydropower Company Limited (CHPCL) and Nepal Electricity Authority (NEA), was established on Shrawan 17, 2068. The company is developing Rasuwagadhi Hydroelectric Project (RGHEP) of 111 MW capacity in Rasuwa district. The project can be accessed by the Kathmandu-Trisuli- Rasuwagadhi road which is about 150 km North from Kathmandu. After going through numerous hindrances from the earthquake of 2015 and the yearly floodings and landslides, the most recent one exceeding 1 in 100 years flood on 15th June 2021 which forced water into the underground powerhouse through Tailrace Outlet gate, full efforts will be made to complete the project by the end of this fiscal year.

1.1 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 project is a run-of-river type having installed capacity of 111 MW and the annual energy generation will be 613.875 GWh.

Key Features of the Project:

Type of Project:	Run-of-River(ROR)
Design Discharge (Q_{40}):	80.00m^3/s
Geology:	Quartzite, Migmatite and Gneiss Rock
Gross Head:	167.9 m
Headwork:	Overflow Diversion Weir with Under sluice and Side Intake
Desander, Type and Size:	Underground (3-125mx15mx23m), S4 Flushing System
Headrace Tunnel length and size:	4185m, dia.- 6m~7m
Powerhouse type and size:	Underground, 76.3m x 15.0m, 35.0m
Turbine, Type & No:	Francis, Vertical Axis & 3 Nos.
Turbine Unit Capacity	37.0 MW each
Generator, Capacity & No.:	3 Phase Synchronous AC, 3x43.75 MVA
Installed Capacity:	111.0 MW
Annual Energy Generation	613.87GWh
Dry Months Energy	84.32GWh
Wet Months Energy	529.55GWh
T/L length, Voltage	10km, 132kV 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. The contract agreement was signed on 5th January, 2014. Similarly, for Lot 2: Electromechanical Works, the contract was signed with M/S VOITH Hydro Pvt. Ltd, India on 31st July, 2014. For Lot 3: Transmission Line works which includes construction of about 10 km long 132 kV double circuit transmission line, the contract agreement was signed with M/S Mudbhary and Joshi Construction Pvt. Ltd., Kathmandu on 15th June, 2017. 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.

Present Status of the Project

The progress summary of the major construction activities are as follows:

- **Infrastructure works**

Due to the effect of Earthquake 2015 and the subsequent rock fall, under construction permanent camp facilities at Ghatte Khola was heavily damaged and work stopped. After Tender awarding to Tulsi Bhakta Sherpa Hydro JV the re-construction and maintenance of the camp office building has been started and due to Safety Risk the permanent Camp building has not been started yet. As an alternative, Employer's temporary camp facilities (Pre-fab buildings) which includes both the project office and residence on the Timure/Thuman area has been used and the whole project team has been working from this site office.

- **Lot 1: Civil and Hydro-Mechanical Works**

The concrete works at Undersluice and Intake with Gate Installation has been completed whereas Weir construction and Stilling Basin concreting work is on the verge of completion. Out of 3 numbers of Underground Desanding Basin (UDB), Concreting work at UDB #1 and UDB #2 has been completed and at UDB #3 it is in progress. The installation of S4 flushing system has been started from UDB #1. In addition, the concrete works at RCC Pressure conduit is ongoing.

After completing the excavation of 4184.5m long Headrace Tunnel, final support works (Blinding concrete, Invert Concrete, and Full section lining) is nearly complete. Excavation of Surge Shaft with Gate was completed on June 7, 2021 and now preparation for lining via Headrace Tunnel is going on. Penstock Vertical Shaft excavation and steel lining with backfill concrete has been completed. The excavation & support works of Underground Powerhouse & Transformer Cavern is completed. Excavation of Tailrace Tunnel with primary support except weak-zone has been completed and heading of the weak-zone has also been completed but due to 15.06.2021's heavy flood it is totally filled with water. After dewatering and taking care of safety risk, the necessary work will continue.

- **Lot 2: Electro-Mechanical Works**

Lot 2: Electromechanical Work Contractor M/S VOITH Hydro Pvt. Ltd, India has completed the detail design and manufacturing of the electromechanical equipment. Most of the equipment have already been delivered to the site and is in process of installation. Due to Covid-19 Pandemic, they unilaterally demobilized from site on 21 March 2020 and still have not fully remobilized. The Contractor was to start full remobilization; however, after 15.06.2021's heavy flood and subsequent flooding of Powerhouse and washing away of the access road they are reluctant to resume work until the access to and dewatering of the Powerhouse is completed.

- **Lot 3: Transmission Line Works**

For the construction of Lot 3: 10 km long 132 KV double circuit Transmission Line Works, the Contractor has completed the detail survey and the detail design work. Acquisition of

private land except Tower number 2 which is in the national conservation area (Lamtang Rastriya Nikunja) has been completed and subsequently excavation and the concreting of tower foundation work is going on. Out of 32 Towers, concreting of 19 Towers has been completed.

The overall progress of the project construction work is 80%.

Because of various unforeseeable events (2015 earthquake followed by Nepal-India boarder blockade, massive landslides in the public road as well as the project work fronts due to heavy rainfall in each monsoon season, frequent flash flood, adverse geological condition in Tailrace Tunnel, Safety challenges at Surge Shaft and access road # 3 and # 4 and 15.06.2021's flood exceeding 1 in 100 years return period), the project completion schedule has been revised.

Financial Arrangement

The company has planned to manage the capital requirement for the construction of the project 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 signed on 22nd Marg, 2068. The equity portion has the investment proportion of 51% promoter share and 49% public share. The promoter share comprises of 32.79% from Chilime Hydropower Company Ltd., 18% from Nepal Electricity Authority and 0.21% from local level (District Coordination Committee and Gaupalika) of Rasuwa district. Similarly, the public share comprises of 19.50% from Depositors of EPF, 4.5% from Employees of Promoter & Investor Institutions, 15% from General Public and Employees of the Company and 10% from the Locals of Rasuwa district.

The equity investment has already been paid up by the Promoter group as per their commitment. Among the public investment, 24% Public Shares, that include 19.50% to the Depositors of EPF, 3.5% to the Employees of Promoter Institutions & 1% to the Employees of Investor Institution have already been issued in the first lot. Out of remaining 25% Public Share, 15% to the General Public and Employees of the Company have also been issued in the second lot. Now the necessary preparation for the issuance of the remaining 10% to the Locals of Rasuwa district is going on.

2. MIDDLE BHOTEKOSHI HYDROELECTRIC PROJECT(102MW)

Madhya Bhotekoshi Jalavidyut Company Ltd. (MBJCL),a subsidiary company of Chilime Jalavidyut Company Limited,is constructing Middle Bhotekoshi Hydroelectric Project(102MW) in Sindhupalchowk Distric of Bagmati Province of Nepal.

I. Capital Structure

The Company managed its 59 % debt part from EPF and 41% equity parts as follows:-

Promoter Shares (51%)

1. Chilime Hydropower Company Ltd.-37 %
2. Nepal Electricity Authority-10%
3. Nepal Araniko Hydropower Co. Ltd.-1%
4. Sindhu Investment Pvt. Ltd.-1%
5. Sindhupalchowk Hydropower Co. Ltd.-1%
6. Sindhu Bhotekoshi Hydropower Ltd.-1%

Public Shares (49%)

1. Employees of Promoter Companies-3.5%
2. Employees of EPF-1%
3. Depositors of EPF-19.5%
4. Local Public of Sindhupalchowk district-10%
5. General Public-15%

In the first stage of IPO, shares were issued for the depositors of EPF and employees of EPF

& promoter companies in FY 2075/76. The process of remaining IPO (Local Public and General public, in second stage) issuance was started but suspended due to COVID-19

II. 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

III. Key Construction Activities

The Main Construction works are divided into following packages:

1. Civil and Hydro-mechanical work(Lot-1)
2. Electromechanical works (Lot-2)
3. Construction of Transmission line

Construction Activities at Headworks

1.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 work.

Headworks: Diversion Dam and Intake are completed. Concreting works in Desander, Forebay and pressure conduit is going on.

Pressure conduit construction

Power house: Concreting works in Machine Hall and Erection Bay is completed up to 925m. and Auxiliary Powerhouse concreting works going on at 930m.

Power house construction works

Underground works: Out of total 7116m., 414m headrace tunnel excavation is remaining. Surge tank and penstock tunnel as well as vertical shaft excavation and support work has been completed. Fabrication of steel pipe is going on.

2. Electromechanical Works (Lot-2):

Andritz HydroPrivateLimited (AHPL),India is the Contractor for Electromechanical works. Equipment manufactured and supplied are stored at storage site. Installation of draft tube, second stage concreting has been completed.

Bhotekoshi flood of 2077/03/24 damaged some of the Electromechanical equipment located at site store. The process of claim settlement of the damaged equipment is undergoing.

Temporary storage of EM equipment

Power house machine hall

3. Transmission Line works:

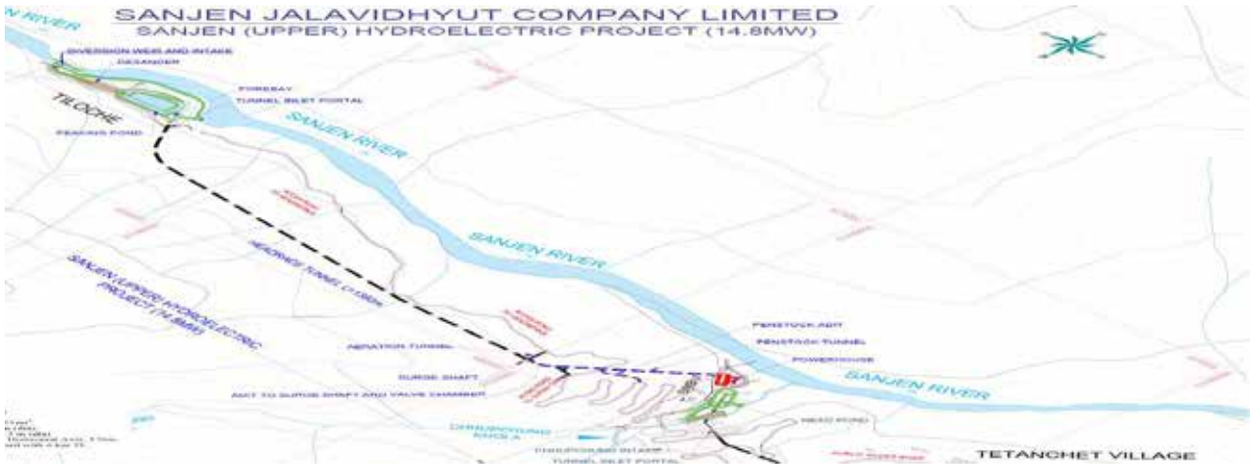
-Urja AC JV, has completed the manufacturing of tower & Stubs which are delivered to site for the foundation construction. Conductor is also in process of delivery to site.

3. SANJEN JALAVIDHYUT COMPANY LIMITED (SJCL)

Sanjen (Upper) 14.8 MW and Sanjen (42.5 MW) Hydroelectric Projects

Sanjen Jalavidhyut Company Limited (SJCL), established in 2010 AD is a subsidiary of Nepal Electricity Authority (NEA) and Chilime Hydropower Company Limited (CHPCL) with promoter shares of 10.36% and 39.36% respectively. SJCL is developing two hydroelectric projects namely, Sanjen (Upper) Hydroelectric Project (SUHEP) (14.8 MW) and Sanjen Hydroelectric Project (SHEP) (42.5 MW) in cascade and both are in under construction stage with the financing arrangement of 50:50 debt equity ratio. All the debt portion (50% of total) has been arranged from Employer's Provident Fund (EPF) of Nepal.

The equity shares from promoters and also shares from depositors of EPF, Employee of EPF, staffs of promoters and General Public have been already paid up and the remaining equity portion of 10 % for the project affected local people of Rasuwa district is planned to be concluded within the fiscal year 2078/079.



1. Sanjen (Upper) Hydroelectric Project (SUHEP) - 14.8 MW

The project is located in Chilime VDC (now Amachhodingmo Rural Municipality). The headwork of this project is located in Tiloche and powerhouse is in Simbu Village. The project has approximately 161 m gross head and design discharge of 11.07 m3/s. Total annual saleable energy is 82.44 GWh.

SUHEP Peaking Pond and Powerhouse

The overall progress of SUHEP is approximately 90.4%. The Civil Works (Lot 2) is around 98% completed. Penstock installation is almost completed and approximately 90% Hydro-mechanical works has been completed. Electromechanical Works, particularly EM installation work is yet to be started and this work has been severely affected due to COVID 19 pandemic and travel restrictions and, as a result, the delivery of equipment and deployment of manpower from China is being delayed. The most critical work for the overall project has been the EM installation work. The project is targeted to be completed and commissioned within this fiscal year.

2. Sanjen Hydroelectric Project (SHEP) - 42.5 MW

This project is a cascade project of SUHEP and has gross head 442 m. Additional 0.5 m3/s discharge from Chhupchung Khola is added for a total design discharge of 11.57 m3/s. This project will produce a total of 251.94 GWh with annual saleble energy of 241.86 GWh. The overall progress of the project is approximately 79.80%.

In Civil Works, excavation of the headrace tunnel, the construction of Chhupchung headworks, balancing pond, syphon pipes, inlet slopes have been completed while the tunnel support and final lining works are ongoing. In HM works, the penstock installation works are ongoing. The civil works in the powerhouse is almost complete and ready for the EM installation works. Every effort is being made to bring the EM Contractor, Dongfang to site as soon as possible to continue the EM works. The project is also targeted to be completed and commissioned within this fiscal year.

SHEP Headwork and Powerhouse

Consulting Services for the Projects

SMEC International Pty. Ltd., Australia, which was the original Consultant and subsequently to the expiry of the date of completion of Consulting Service, an alternative arrangement to execute the project was agreed. Accordingly, Chilime Engineering and Services Company Ltd. (Chesco) has been engaged since May 2017 for the Detailed Engineering Design & Construction Supervision of both projects.

Transmission Line Works

Mudbhary and Joshi Construction Pvt. Ltd. is carrying out the construction of approx. 6 kms 132 kV transmission line works. Tower erection work at site is in the final stages. Among 20 Towers, 16 towers have been erected and are ready for stringing.

SUHEP's completed Tunnel Lining

Erected Tower for Power Transmission

CHILIME ENGINEERING AND SERVICES COMPANY LIMITED (CHESCO):

Chilime Engineering and Services Company Limited is promoted by Chilime Jalavidhyut Comapany Limited with its 100% ownership to provide complete engineering and consulting services for the development of hydropower projects and other infrastructure works. ChesCo aims to be a major contributor to a sustainable development of the projects in Nepal as well as other parts of the world. ChesCo endeavors to achieve our goals through the following simple distinct ways:

- Development of employees' abilities and performance vide' emerging technologies;
- Achieve mutual goals with Clients through the best practices; and
- Strengthen our compliance with corporate values with ethical practices.

Since the establishment in 2016 AD, ChesCo is progressing towards the core vision in the field of engineering and services. A brief description of the services and under study projects are as follows:

1. Feasibility Study Projects:

a) **Budhi Gandaki Prok Hydroelectric Project:**ChesCo is undertaking the Feasibility Study of the project owned by Chilime Jalavidhyut Company Ltd. CJCL has obtained the Survey License for electricity generation of Budhi Gandaki Prok Hydroelectric Project (420 MW) in Gorkha District of Nepal. The Consultant has completed its topographical surveying works, ERT and Gauge installations. Likewise, hydrological, sedimentology, geological studies and field investigations related works are also in progress. A draft feasibility study report is completed.

b) **Seti Nadi-3 Hydroelectric Project:** ChesCo is undertaking the Feasibility Study of the project owned by Chilime Jalavidhyut Company Ltd. CJCL has obtained the Survey License for electricity generation of Seti Nadi-3 HEP (65MW) in Bajhang

District of Nepal. The Consultant has completed its topographical surveying works, Gauge installations, ERT, surface geological mapping. The optimization and hydraulic design, electromechanical and hydro-mechanical design, structural stability analysis and design works has been completed. Core Drilling works, rate analysis, project costing, planning and scheduling and financial analysis is ongoing.

c) **Chumchet Syar Khola Hydroelectric Project:** ChesCo is undertaking the Feasibility Study of the project owned by Chilime Jalavidhyut Company Ltd. CJCL has obtained the Survey License for electricity generation of Chutmchet Syar Khole HEP (60MW) in Gorkha District of Nepal. The topographical survey and geological surface mapping works have been completed. Automatic Gauge has been installed. Other field and design works are in progress.

2. Detailed Project Report and Detailed Design:

a) **Chainpur Seti Hydroelectric Project:** Review and Update of the Feasibility Study Report of Chainpur Seti Hydroelectric Project (210MW) located in Bajhang District of Nepal which is owned and prepared by Nepal Electricity Authority has been completed. Likewise, an updated report in the form of a Detailed Project Report has been submitted to the Client.

b) **Bajra Madi HEP:** A detailed design works is being carried out to BMHEP.

3. Project Management and Construction Supervision:

a) Sanjen Jalavidyut Company Limited: ChesCo is engaged in services for design and supervision of Sanjen (Upper) HEP (14.8MW) and Sanjen Hydroelectric Project (42.5MW) which lies in Rasuwa District of Nepal. The Client is Sanjen Jalavidyut Company Limited. The construction works is being executed under FIDIC Red Book and FIDIC Yellow Book.

b) Tamakoshi Jal Vidhyut Company Limited: Consulting Services for Construction Management and Supervision of Camp Facilities of Tamakoshi V Hydroelectric Project. The construction works are under progress.

4. Modernization and Rehabilitation:

a) **Phewa Hydropower Station:** An agreement was signed between ChesCo and NEA, Generation Directorate for the Consulting Services to prepare EPC Tender Documents (Phase 1) and Supervision Works (Phase 2) for the Rehabilitation and Modernization of the Plant on September 12, 2019. The Station was commissioned on June 12, 1969 by Nepal Electricity Authority with assistance from the Government of India. The Station has been in partial operation for many years and has now sought Rehabilitation and Modernization with updated technology for operation in full load in safe and efficient manner. The Consultant conducted the Plant diagnosis, prepared a rehabilitation plan, financial viability assessment of the Rehabilitation and Modernization scheme, and prepared EPC tender documents. The Consultant has submitted the Final Report and Tender Documents marking the completion Phase 1.

b) **Rehabilitation of Chilime Hydropower Plant:** ChesCo is awarded the contract on November 19, 2020 to provide services to Chilime Jalavidhyut Company Ltd. for the design review and supervision works during installation for the rehabilitation of plant works. The installation works has been completed.

5. Plant Operation and Maintenance:

Given the criticality of hydropower in the Nepal power sector and the Nepal economy, the existing O&M challenges pertaining to the hydropower generation in the country need to be addressed in order to achieve the Maximization of plant availability through reduction of forced outages; Fullest utilization of the hydro-generation assets; Most optimum, efficient and sustainable generation of hydro-electricity; and Sustainable revenue from the sale of hydro-electricity generated. Given the current level of O&M challenges faced by the Nepal hydropower plants and the vast upcoming hydropower capacity (around 5 GW) in the coming years, there will be a huge requirement of skill base pertaining to the O&M activities. ChesCo is planning to have a specialized team in future.

6. Tender Documents Preparation:

ChesCo has been providing services for the preparation of tender documents including technical specifications, drawings and cost estimate for civil, hydromechanical and electromechanical works. Assistance is also provided during the tender evaluation stage. At present, a complete set of EPC/Turnkey Tender Documents has been prepared and submitted to NEA based on FIDIC Silver Book and Yellow Book 2017 edition.

7. Geotechnical and Geophysical Investigation Works:

ChesCo is equipped with WD240 and WD320 drilling machines required for the geotechnical investigation works. The Drilling works at weir, intake, desander locations, Surge Tank of SN3HEP are completed. ChesCo also completed the Geological and Geotechnical Investigations related works related to Kathmandu-Terai/ Madhesh Fast Track (Expressway):

Currently, the following services are being provided:

a) Geophysical Investigations - ERT, SRT, MAM and MASW.

b) Geotechnical Investigation works - Drilling/Boring, Coring Works

7. Environmental Impact Assessment/ Initial Environmental Examinations:

ChesCo is carrying out the Environmental Impact Assessment (EIA)/ Initial Environmental Assessment (IEE) for the following projects:

a) Budhigandaki Prok Hydroelectric Project -EIA
b) Seti Nadi-3 Hydroelectric Project-EIA
c) Chumchet Syar Khola Hydrolectric Project-EIA
d) Betan Karnali Hydroelectric Project (33kV and 400kV)-IEE

8. Others:

ChesCo also provides services on the followings:

1. Projects Identification & Investigation.
2. Due Diligence study.
3. Transmission lines survey and design works.
4. Project Infrastructure related works –access roads, camp facilitates, construction power, etc.
5. Value Engineering
6. Project/ Plan Valuation.
7. Project Costings / Financial Analysis

TRISHULI JAL VIDHYUT COMPANY LIMITED

Introduction

Trishuli Jal Vidhyut Company Limited (TJVCL), is a joint venture of Nepal Electricity Authority (NEA) and Nepal Doorsanchar Company Limited (NDCL) established in 2011 with the main objective of developing the Upper Trishuli 3B Hydroelectric Project (37 MW) 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.

The Project

Upper Trishuli 3B Hydroelectric Project (UT3BHEP) is a Run of the River type cascade development Project. The Project will utilize the water coming out of the tailrace tunnel of the upstream UT3A Hydroelectric Project. A head pond will be constructed at the outlet of the upstream project to divert the water towards the Headrace Tunnel (HRT) of the UT3BHEP. Construction of the UT3BHEP had been started on 14 March 2018 with the aim to complete within 3 years. However, due to the impact of Covid-19 pandemic and encountering of poor geological condition in the HRT than anticipated, the completion of Project will be delayed by about two years. Shuifa ANHE Group Co. Ltd. (Previously Sichuan ANHE Hydraulic and Hydroelectric Engineering Co. Ltd.) of China is the EPC Contractor for all three components of the Project i.e. Civil, Hydro-mechanical and Electro-mechanical. The power produced by the Project will be evacuated to the under construction Trishuli 3B Hub Sub-station through 3 km long 132kV transmission line. The transmission line is being built by Nepal Electricity Authority under a separate agreement with TJVCL.

Some of the major features of the Project are highlighted in the table below:

Project Location	
Districts	**Nuwakot & Rasuwa**
Head pond and Approach Pressure Conduit	
Head pond:	29m (L) x 5.2 to 11.0 m (B) x 7.4 to 14.8 m (H)
Approach Pressure Conduit:	243.47m (L) , 5.1m x 5.1m Box Culvert + 40m long, 5.1m dia. Steel Pipe
Headrace Tunnel	
Total Length	3805.48 m
Surge Tank	
Diameter	15 m
Height	39.3 m
Vertical penstock shaft	
Diameter	4.2 m (circular)
Length	72 m
Powerhouse	
Type/ Length x width x height	Surface/ 40.42m×19.30m×33.81
Tailrace	
Length and Type	180 m, Box Culvert
Turbine	
Turbine Type/ number	Francis (vertical axis)/2
Generator	
Rating/ No. of units	22.7045 MVA/ 2
Power and Energy	
Maximum Goss Head	90 m
Installed capacity	37 MW
Average annual energy	292.58 GWh
Length of Transmission line (132 kV)	3 km
Cost and Financing	
Total Development Cost	NPR 8227 Million including Interest During Construction
Mode of Financing	30% Equity from the Promoters, 70% Debt from the Consortium of Banks led by Nabil Bank Limited

Progress of Project Construction

- About 12% concreting of the Approach Pressure Conduit has been completed.
- About 2000 m (52.5%) of HRT excavation and temporary support installation has been
- completed.
- About 75% of Powerhouse excavation and slope support has been completed
- Detail design of about 90% of the Hydro-mechanical equipment has been approved and manufacturing of that equipment is under way.
- Detail design of about 60% Electro-mechanical equipment has been approved. Manufacturing of draft tube elbow has been completed. Manufacturing of draft tube cone, spiral case, turbine runner is underway.

HRT section

Approach Pressure Conduit

Powerhouse Slope Support

Draft Tube elbow

The construction of the Project has been severely impacted by the Covid 19 pandemic. The construction work which had been halted in March 2020 after the enforcement of nationwide lockdown could only be resumed after about a year from April 2021. Shortly after the resumption of construction, the second wave of Covid19, once again, disrupted the construction. Many construction workers got infected by Covid19 resulting in partial stoppage of work for about a month. With

the ebbing of second wave and recovery of infected workers, construction is now back to full swing. The continuous encountering of poor geological condition than anticipated in the HRT is also slowing down the progress of the work. At this point in time, the Project has been delayed by about 2 years and is expected to come into operation in March 2023.

POWER TRANSMISSION COMPANY NEPAL LIMITED

(A Joint Venture company of Nepal Electricity Authority, Power Grid Corporation of India Limited, Hydroelectricity Investment & Development Company Limited and IL&FS Energy Development Company Limited)

400 kV D/C Dhalkebar–Bhittamod Cross Border Transmission Line

Power Transmission Company Nepal Limited (PTCN), a subsidiary of Nepal Electricity Authority(NEA) was established 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. Power Transmission Company Nepal Ltd. (PTCN) was incorporated on Bhadra 30, 2064 (i.e. 16th September, 2007) with the objective of developing infrastructure, management & executing job related to transmission of electricity. 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 twin moose line interconnection between Muzaffarpur in India and Dhalkebar in Nepal.

(i) Nepal Portion of line consists of 42.1 km long from Nepal Border at Bhittamod to NEA Substation at Dhalkebar in Nepal has been implemented by **'Power Transmission Company Nepal Limited' (PTCN)**- a Joint VentureCompany of NEA, POWERGRID,HIDCL &IEDCL

Nepal Government & EXIM Bank of India entered into a loan agreement on September 14, 2007, where EXIM Bank agreed to provide 100 Million US Dollar to Nepal Government. NEA also signed Subsidiary Finance Agreement with Power Transmission Company Nepal Ltd. (PTCN) on 2070.11.27 (11th March, 2014). As per the agreement, NEA agreed to provide in Nepali currency amount equivalent to US Dollar 13.2 Million, for execution of 400 kV Nepal India Cross Border Transmission Line. Transmission Line lying within the Nepalese territory was successfully constructed by PTCN and initially charged at 132kV voltage level under contingency arrangement in 19th Feb, 2016.Final executed project Cost of PTCN is NRs 1545.68 Mn. **Annual Turnover and Profit After Tax of PTCN during FY 2077-78 is 315.12 Mn and 130.76Mn respectively**.

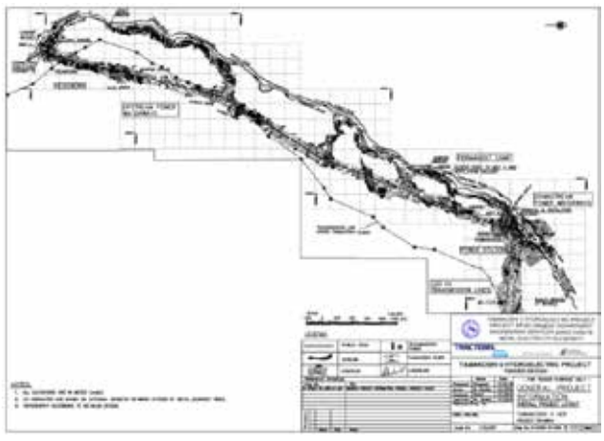
NEA is presently drawing upto 410 MW of power from India through this line in dry season. Line has been successfully charged at 400 kV since 11.11.2020 at 20:20 PM. Now, Nepal will be able to import/export around 1000MW of power through this Cross border line from India.

TAMAKOSHI-V HYDROELECTRIC PROJECT

Tamakoshi V Hydroelectric Project is a cascade development of the Upper Tamakoshi Hydroelectric project (UTHEP) with tandem operation. The project area is located approximately 170 km north east of Kathmandu and approximately 40 km away from the district head-quarter of

Dolkha District-Charikot Bazaar. The road connecting Singate Bazaar and Lamabagar for the construction of UTHEP passes through both powerhouse and headwork sites of this project. Feasibility study of the project was carried out by NEA in fiscal year 2010/11. The project being a cascade development to UTHEP, it does not require separate headwork. It takes necessary design discharge from the tailrace of the Upper Tamakoshi Project through an underground inter- connection arrangement and conveys to headrace tunnel of this Project. An underground powerhouse is proposed at Suri Dovan. The design discharge of the project is 66 m^3/sec and has installed capacity of 99.8 MW. Although the installed capacity of the project is 99.8 MW, maximum generating capacity of the project is 94.8 MW and the total energy generation is 543 GWh. An additional 5 MW unit is installed to obtain the minimum flow coming through the Upper Tamakoshi powerhouse during the off-peak operation hours. Hence, the 5 MW turbine will be operational for about 18 hours a day during 6 dry months.

General arrangement of the project comprises of underground interconnection system connecting headrace tunnel of the Project with tailrace tunnel of Upper Tamakoshi HEP. This interconnection system consists of connecting tunnel, a head pond required to maintain suction head at the pressurized head race tunnel entrance, spillway and spillway tunnel. Water from tailrace of Upper Tamakoshi HEP is diverted through this interconnection system and conveyed to 8.13 Km long headrace tunnel, a 152.72 m (including bend) high drop shaft, underground powerhouse containing four Francis turbines, and 404.36 m long tailrace tunnel, from where it is released into the Tamakoshi river at about 0.7 km downstream from the confluence of Tamakoshi River and Khari Khola at Suri Dovan.



Generation license of the project was obtained from Department of Electricity Department (DOED) with revised license area on 2074/02/09. Tamakoshi Jalvidhyut Company Limited has been registered on Company Registration Office for development of Tamakoshi V HEP in a company model. Generation License of Tamakoshi V has been transferred from NEA to Tamakoshi Jalvidyut Company Limited on 2074/09/05. Supplementary Environment Impact Assessment (SEIA) of the project has been approved by Ministry of Forest and Environment (MoFE) for increase in project capacity from 87MW to 99.8MW.

Survey License for construction of Transmission Line has been obtained from Department of Energy Development on 2077/09/05. MOU has been signed between Tamakoshi Jalvidhyut Company Limited and Environmental & Social Study Division (Nepal Electricity Authority) for carrying out Environmental Impact Study of the 3.4 Km Long Transmission Line of the project. At present the Study is being carried out by Environmental & Social Study Division (Nepal Electricity Authority) at the project site.

For the speedy implementation of Tamakoshi V HEP, NEA has already initiated the construction of Interconnection system between tailrace tunnel of Upper Tamakoshi HEP and headrace tunnel of Tamakoshi V. Construction work is being carried by the Contractor working for the UTHEP with the arrangement of work variation of UTHEP. Construction of Interconnection Tunnel, Chamber and Gate Shaft and Adit Tunnel has been completed whereas the installation of gates at the interconnection will be completed soon.

The Detailed Engineering Design and Tender Document Preparation work for the project has been completed by consultant Tractebel Engineering GmbH (Formerly Lahmeyer International GmbH), and has submitted Final Detail Design Report and Tender Documents on August 2019. During Detailed Engineering Design and Tender Document Preparation work, apart from the other field investigation/s, as a part of Geotechnical investigation, a Test Adit was excavated with total length of 175.7m up to the whole length of powerhouse crown. The Excavated Test Adit, will later be used as cable and ventilation tunnel during operation phase of the project.

Land required for the powerhouse area and permanent camp area has been acquired. Land required for access to the adit portals are under the acquisition process and is in final stage. Similarly, the Project has send a request letter to Department of Energy Development (DoED), regarding permission for use of government land during the construction phase of the project.

Project has already started the construction of Permanent Camp Facility at the project site. Construction of Permanent Camp Facility is being carried out by the Contractor Shringeshwor-Prera JV and was hired through National Competitive Bidding Process. For the Construction Management and Supervision of the Permanent Camp Facility Construction work, Chilime Engineering and Services Company Limited (ChesCo) has been hired as the consultant. Permanent Camp Facility has altogether 16 numbers of buildings and is expected to be completed within FY 2078-79. Similarly, a Prefabricated House has been constructed on the Permanent Camp Area and project office has been established.

Beside this, under the preparatory works for Construction Management and Supervision of the Project, The EOI document (prepared on the Basis of PPMO Guidelines) has been reviewed and the report submitted by the review committee.

Nepal Electricity Authority (NEA) had requested Ministry of Energy (MOE) to request Ministry of Finance for needful doings for financing the project through AIIB as it is positive towards it. Ministry of Energy had requested the same with Ministry of Finance (MOF).

At present pre-concept approval has been issued by AIIB to this project. AIIB has provided grant of 900,000 US$ for the following additional studies:

1. Biodiversity Action Plan (BAP)
2. Supplemental Environmental and Social Documentation (SESD),
3. Panel of Technical Expert (PTE)
4. Free, Prior, Informed Consultation (FPICon) Process

Panel of Technical Expert (PTE) has reviewed the Project's Detailed Design Report and have submitted their comments/suggestions. Similarly, contract was signed between Tamakoshi Jalvidhyut Company Limited and the Consultant "Hagler Bailly Pakistan" for performing Biodiversity Action Plan (BAP) and Supplemental Environmental and Social Documentation (SESD). Consultant has already completed their studies and has submitted their final report.

Evaluation of submitted RFP has been completed for the FPICon study. Contract signing will have carried out soon with the successful Consultant. These activities are the pre-requirements of AIIB for funding the projects. Hence, these activities are being carried out in mutual coordination with AIIB.

UTTARGANGA POWER COMPANY LIMITED

Introduction

Uttarganga Power Company Limited was established on 30th March, 2017 as a subsidiary company of Nepal Electricity Authority. The company has undertaken the study and development of Uttarganga Storage Hydroelectric Project. A survey license was received for conducting Feasibility Study for 300 MW in FY 2072/73 which was upgraded to 828MW in FY 2074/75 after carrying out the optimization study. The survey license of Uttarganga Storage Hydroelectric Project for 828MW was transferred from NEA to Uttarganga Power Company Limited on 2074/04/02 BS. Application for Generation License was submitted to DoED on 2076/03/17 and other related documents were provided to DoED on 2076/05/08 upon further query. In the FY 2077/78, the company has selected an international consultant to prepare the Detailed Engineering Design of the project.

Proposed Uttarganga substation hub at Bafikot, Rukum (West) for power evacuation

Uttar Ganga 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 on 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 nearest road head from the proposed Powerhouse site is at Burtibang Bazar. The access road to the powerhouse site forms 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. However, upgrading and realignment of certain parts is required for proper utilization of the road for project construction.

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 2334 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 is 417MW 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.

Maintenance work of staff gauge at the dam site of UGSHEP at Gaba (Baglung)

In the fiscal year 2077/78, the overall progress is as listed below:

1) Detailed Project Report

a. Selection of Mahab Ghodss Consulting Engineering Company as international consultant for review of feasibility study report, preparation of detailed engineering design and bidding documents.

b. The contract agreement between Uttarganga Power Company Limited and Mahab Ghodss Consulting Engineering Company is in process.

2) Transmission Line

a. The desk study for 65 km transmission line was carried out and field visit was done to update the desk study report.

3) Employer's Camp Building

a. A total of 9 ha area of land at Nisheldhor (near the dam site area) is surveyed for which agreement was done with Project Development Department, Engineering Services Directorate, NEA.

b. Layout of the camp facilities at powerhouse area is prepared.

4) Access road

a. The desk study of the 22km access road from powerhouse to dam site was carried out.

5) Hydrology and others

a. The staff gauge installed at the dam site was washed away by flood in Uttarganga River which was replaced on 2077/09/12 and the reading of the staff gauge was continued thereafter.

b. The reading of the staff gauge height is being taken throughout the year at dam site and at tailrace site of the project.

CENTRAL ACTIVITIES

Internal Audit Department

The Internal Audit Department is an independent organizational unit that is accountable for its work 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 Byelaws, 2073 and Internal Audit Guidelines. Guided by the Audit Committee and headed Director, the department 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 on the assurance that internal audit can provide

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.

Internal Audit Components

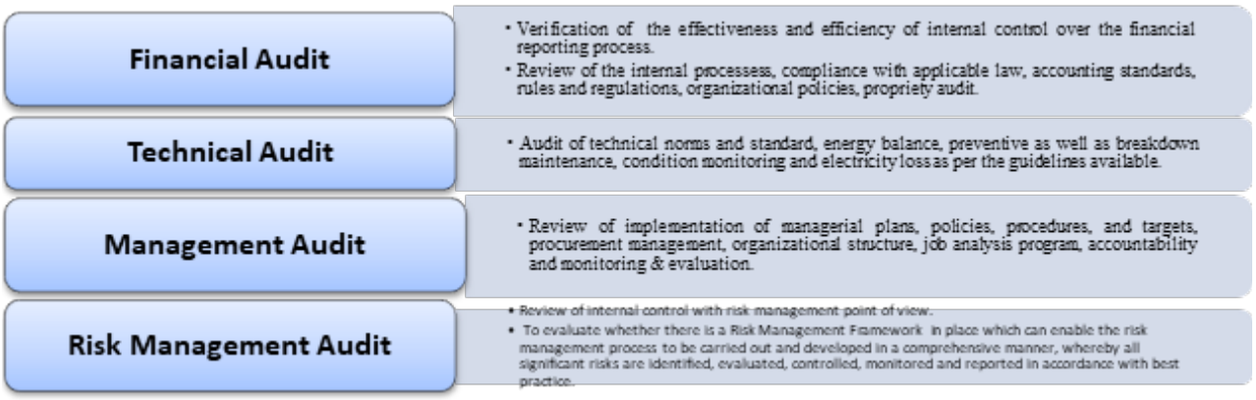
❖ Audit Committee:

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.
- ✓ Monitoring the financial reporting process and effectiveness of the company's system of internal check, internal audit and risk management.

❖ Divisions within the Internal Audit Department



The department performs the aforesaid audits on quarterly 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.

Progress Observed

❖ Audit Coverage (No of budget centers audited)

Offices	Financial Audit		Technical Audit		Management Audit	
	FY 2076/77	FY 2077/78 Quarterly & Half Yearly	FY 2076/77	FY 2077/78 Quarterly & Half Yearly	FY 2076/77	FY 2077/78 Quarterly & Half Yearly
Central Office	3	-	-	-		
DCS Directorate	77	118	48	23	74	41
Transmission Directorate	4	7	1	4	12	1
Generation Directorate	11	16	8	2	4	4
Engineering Service Directorate	7	6	-	-		
NEA Projects	73	16	-	-		
Total	175	163	57	29	90	46

❖ Capacity Building & Resource Strengthening

- ✓ Service of 7Chartered Accountants *(On Contract basis)*has been carried this year for improving quality of audit, professional ethics and standards among the auditors.
- ✓ Planning for conducting training on M-Power (Revenue) software is on process for all the internal audit department members to enhance their performance.

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.
- ✓ 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.
- ✓ Adequate training programs should be conducted to refine the knowledge of the auditors.
- ✓ The organization should introduce 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

The Minister of Energy, Water Resources and Irrigation Ms. Pampha Bhusal has been chairing the NEA Board meeting. Earlier ex-Ministers Mr. Barsha Man Pun 'Ananta',Mr. Top Bahadur Rayamajhi, Mr. Sarat Singh Bhandari and Mr. Bishnu Prasad Poudel chaired the NEA Board during the last fiscal Year 2077/78 during their respective tenure.

Mr. Devendra Karki, Secretary (Energy), Ministry of Energy, Water Resource and Irrigation is representing as an ex-officio member in the NEA Board from 2078.01.26.Mr. Dinesh Kumar Ghimire was an ex-officio member earlier.

Mr. Bhakta Bahadur Pun was Re-nominated as the Board of Director on2077.09.02. Mr.Kapil Acharya was nominated as the Board of Director on 2077.09.02. Mr.Hitendra Dev Shakya is representing as ex-Officio Member Secretary in the Board from 2078.7.23. Earlier Kulman Ghising and Lekhnath Koirala represented as ex-officio Member Secretary.

Rest of the Board of Directors has remained unchanged Mr. Ram Sharan Pudasaini, Secretary (Revenue), Mr. Vishwo Prakash Gautam and Mr. Rajendra Bahadur Chhetri are the other Board Members.

A total of 36 Board Meetings were held in the last fiscal year, 2077/78.

ENERGY EFFICIENCY AND 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.

A. 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 339nos 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, 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 300 nos of APFC panels at Biratnagar, Birgunj, Butwal, Bhairahawa, Nepalgunj, Bharatpur, Janakpur, Itahari and Hetauda have already been completed and charged. APFC installation works at remaining 39 sites in other distribution centres are underway. Works for Data uploading at cloud and enabling data analysis and remote monitoring have also been successfully completed and the works of report customization and generation are underway.

The department has also been preparing for supply/installation of 11 kV APFC at 33/11 kV Distribution Substations for reactive power compensation and power factor improvement in the FY 2078/79.

Smart Street Light

Smart street light project at Lalitpur (Phase-I) has been completed successfully with installation of 669 nos of smart street lights in the core areas of Lalitpur with funding from Lalitpur Metropolitan City. The project features 50W, 80W and 120 LED Smart Street lights and 9m steel tubular poles. Smart technology used in this project enables facilities listed herein but not limited to automatic switch-on of lights after sunset, auto switch-off after sun-rise, full intensity of light at peak hours, dimming as required of individual luminaries at night, software billing, data storing and controlling of individual lights from central server.

Smart Street Light implementation projects are also running at Bharatpur Metropolitan City, featuring the installation of around 2000 nos of LED Smart Street Lights and 4 nos of High Mast Lights in the major areas of Bharatpur with joint funding of NEA and Bharatpur Metropolitan City.

Similarly, Smart Street Light projects are also running at Kanakai Municipality-Jhapa, Belaka Municipality-Udaypur, Bhimeshwar Municipality-Dolakha and Bhimdatta Municipality-Kanchanpur with joint funding from NEA and corresponding municipalities. The project features installation of a total of 340 nos of LED Smart Street Lights and 16 nos of High Mast Lights. For both these tenders, the selected contractor has completed pre-construction survey and manufacturing of goods is underway.

Smart Street Light projects for Kathmandu, Pokhara and Lalitpur Metropolitan has been started- bid invitation process is completed and evaluation of bids is going on. These projects aim to install 2078, 1553 & 1400 smart street lights in respective Metropolitan cities. Also, total 38 nos 16 m high mast lighting system will be installed in Pokhara & Lalitpur metropolitan.

On the request of other various municipalities viz Budhanilkantha, Mahalaxmi, Kirtipur, Dhulikhel, Katari, Janakpur, Jaleshwar and Dhangadhi, the department has been preparing documents for supply/installation of Smart Street Lights.

Nepal Energy Efficiency Program (NEEP-III)

Nepal Energy Efficiency Programme (NEEP) is being implemented to promote and realize energy efficiency in Nepal since 2010. NEEP is implemented by the Ministry of Energy, Government of Nepal with technical assistance provided by GIZ, acting on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). Third phase of Nepal Energy Efficiency Program is in effect since December 2018. The program is focused on the market based energy efficiency services for the private and public sector. NEA is the major partner organization to implement the NEEP III program. Energy Efficiency and Loss Reduction Department in cooperation with GIZ Nepal is continuously working for enhancing the supply side and demand side efficiency of distribution system under NEEP III.

As per the scope of works under NEEP III, Integration GmBH in coordination with the department successfully implemented various pilot projects at Nagarkot feeder of Bhaktapur Substation for system reinforcement and DSM activities such as GIS mapping, Network AMR metering, smart metering of public transformers, real time feeder power system monitoring, feeder energy accounting/audit, technical/commercial feeder loss assessment etc. The program also included capacity development of NEA employees, public campaign for creating awareness about energy efficiency and loss reduction among NEA consumers and general public.

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.

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, 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 has been successfully implemented at K2 substation, Baneshwor substation, Bhaktapur substation, and Balaju substation.

The department has already initiated for implementation of central data storage and online monitoring at 25 other substations outside Kathmandu Valley. The consultant has been performing the assigned job and will be completed soon.

Awareness Campaigning

The department has conducted several campaigns to create public awareness on energy efficiency and loss reduction.

Television commercials of 1 minute duration were prepared using animated characters and popular celebrities for creating public awareness on use of energy efficient appliances and electricity theft/loss control and were broadcasted in the prime time before news on Nepal Television.

Agriculture/ Irrigation Line

With aim of electrifying large area of agricultural land for irrigation, the department has identified various sites in Rupandehi, Taulihawa, Kapilvastu and Kailali districts which are currently facing problems regarding electricity and have a high prospect of increasing the yearly agricultural yield upon availability of quality electricity supply for pumping motors. The department focuses on extending 11 kV and 0.4 kV line with implementation of monitoring and remote control facilities for energy efficient operation. Site identification and bid document preparation works has been completed.

B. Loss Reduction Division

Electricity Loss Reduction division which is under the Energy Efficiency and Loss Reduction Department led by manager is entrusted with the responsibility to control the electricity theft, energy leakage and loss. Division is conducting activities like random as well as planned inspection of energy meters and field raid operation wherever required. Division is dedicated towards supporting additional revenue generation by controlling electricity theft, pilferage, tampering, demand leakage, CT/PT outage, loss due to oversized transformers in LT consumer, wrong MF calculation and energy meter connection.

Interaction by Loss Reduction Division with local people in highly electricity theft area of Sindhupalchok DCS

Target of Loss Reduction Division

In the fiscal year 2077/078, division had set target to inspect 150 consumers with TOD

meters installed and 1000 consumers with whole current meters installed under different provincial offices. Focus has been given to industrial consumers. Division has also set target for monitoring, inspection and data download of rural community consumers.

Electricity theft found in Baneshwor DCS by Loss Reduction Division during random inspection

Electricity theft found by Loss Reduction Division at Dhangadi DCS (Theft is done by drilling hole in electromechanical meter)

Besides annual target, division has also conducted activities as directed by Managing Director, NEA as and when required. The division's regular work has been affect by COVID-19 pandemic. However, intensive field visit and inspection of energy meters have been carried out in some distribution centres which have helped additional revenue collection.

TOD meter inspection in Sudur Paschim Province

Inspection of community whole sale consumer's Transformer in province 1

Meter inspection during FY 2077/078 is as follows.

Out of set target, 340 whole current meters and 35 TOD meters were inspected under different provincial office. Detail field visit report and amount billed and to be billed are as follows

TOD Meter Inspection

Number of DCS visited	No of TOD meter inspected	Unit recovered from m.f. missing , reverse energy etc.	Amount Collected/billed
4	35	1,84,089.57	13,43,810.63

Whole current meter Inspection

Number of DCS visited	No of meter inspected	unit recovered from theft, demand theft, hooking etc.	Amount collected/ billed
11	340	26,825	5,28,681.3

Total

Total unit recovered	Total amount collected/ billed.
2,10,914.5	Rs. 18,72,491.93

ADMINISTRATION DIRECTORATE

Administration Directorate is responsible for overall planning, organizing, directing, implementing & monitoring 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 pointto the oversight bodies 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.

"Nepal Electricity Authority, Employee Term and Condition Bylaws 2075" has been amended its second and third edition.

"Centralized e-Attendance" has successfully tested and deployed from corporate office. Gradually, it will be implemented in regional and branch offices within this year as an integrated e-attendance system.

Organization and Management Study (O&M) committee has successfully completed the Study and submitted the report to the NEA management for necessary approval.

1. Personnel Administration Division:

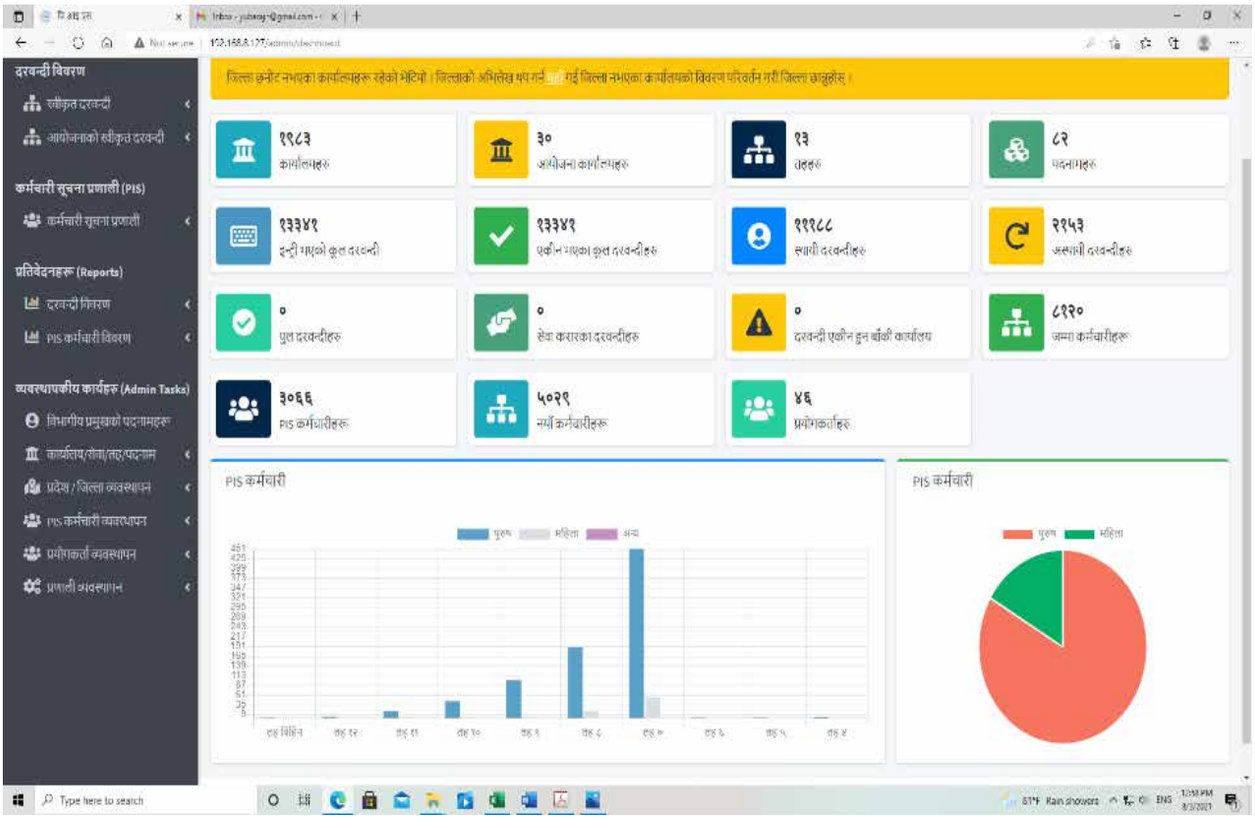
a) Central Personnel Administration Section:

Employee Status FY 2020/2021

The statistics of employed human resource till the end of fiscal year 2020/21 is given in the table.

Level	Service	Approved Position			Existing situation		
		Regular	Project	Total	Permanent	Periodical/ Daily/ wages / contract	Total
Managing Director		1	0	1	1	0	1
DMD (Level-12)		9	0	9	8	0	8
Officer Level (Level 6-11)	Technical	1254	113	1367	1091	0	1091
	Non-tech	590	23	613	526	9	535
	Total	1844	136	1980	1617	9	1626
Assistant Level (Level 1-5)	Technical	5913	0	5913	4205	61	4266
	Non-tech	3285	0	3285	2439	46	2485
	Total	9198	0	9198	6644	107	6751
Grand Total		11051	136	11188	8270	116	8386

A complete Personnel Information System has been launched and in the process of implementation that will enhance the reliability of personal records and service log ofeach staff of NEA.



Similarly, Central Personnel Administration Section has accomplished the given human resource activities in the fiscal year 2020/21:

S.No.	Description	Nos.	Remarks
1.	Regular Transfer, deputation in NEA projects & NEA Subsidiary Companies	948	By provision of NEA Service Bylaws clause 43, 46, 47
2.	Promotion	11	By provision of NEA Service Bylaws Chapter 7
3.	Special Promotion	95	By provision of NEA Service Bylaws clause 67 and 100.
4.	Placement	175	By provision of NEA Service Bylaws clause 36.
5.	Opportunity for provincial transfer as per bylaw	510	The then regional posting lock has been opened for one time and inter-province transfer has been performed as per staffs requestthroughamendment in bylaws.
6.	Appointment of daily wage employees	10	By the provision of NEA Service bylaws clause 104(6)

The total numbers of approved position in NEA stands at 11,188 whereas working staff by the end of FY 2020/21 remained 8270. Remaining vacant positions are in the process of recruitment via Public Service Commission. During the year under review, 365 employees got retirement, this retirement comprises of compulsory retirement of 271, voluntary retirements of48, resignation of10 and 36 employees have deceased during their service period.

A separate web-based application is under developing phase for transfer management. This will go under implementation within FY 2020/021.

b) Disciplinary Action

During the year under review, the following activities were performed under disciplinary action.

Activities	No. of Employee	Remarks
Suspend	14	
Force dismissal	7	
Dismissal from Service	4	
Termination by Service	51	
Resume from Suspend	5	

Similarly, complaints from government agencies like Criminal Investigation Abuse of Authority (CIAA), National Vigilance Center and Ministry of Energy, Water Resources and Irrigation were received and addressed as following;

S.No.	Agencies	Total Complaint	Resolved	in process
1.	Complaint received from CIAA	92	82	10
2.	National Vigilance Center	6	6	-
3.	Ministry of Energy, Water Resources and Irrigation	13	13	-
4.	Complaintwithin NEA	20	18	2

2. Employee Welfare Division

Employee welfare division under Human Resource Department has provided following facilities to the employeesin accordance to NEA rules and regulations.

S.No.	Descriptions	Types	Nos.	Amount (Rs.)	Remarks
1	Grant	Grant	-	-	
		KajKiriya	352	3,495,000	
2	Medical Insurance	Accidental	4	2,800,000	
		Medical Treatment	945	41,958,796	
3	Group Endowment Life Insurance	Payment received from Beema Corporation	327	88,226,681	
		Additional Payment by NEA (Different)		303,245,778	
		Insurance Renewal	-	555,286,331	
5	Soft Loan	Medical Treatment Loan	229	2,290,000	
		Social Loan	235	4,700,000	
		House Maintenance Loan	235	11,750,000	
		Natural Disasters Loan	-	-	
		House/Land Purchase Loan (Additional 100,000)	1	100,000	
		House/Land Purchase Loan (Additional 200,000)	20	4,220,000	
		House/Land Purchase Loan (Additional 300,000)	7	2,162,500	
		House/Land Purchase Loan (Additional 500,000)	413	206,500,000	

3. Human Resource Planning and Development Section

Under the Human Resource Department, Human Resource Planning and Development Section has completed the following works in the F.Y. 2020/2021:

S.N.	Actions	Description
1	Review the report of Organization and Management (O&M) Survey prepared and submitted to management for necessary approval	Organization Structure and positions are assigned each individual office as per consumer, Revenue, Capacity of Hydropower, Substations etc.
2	Review of Organization and Management (O&M) Survey	Workshops were conducted in each provincial office with offices located on the geographical area of the province.
3	O & M Survey has been completed of the newly established offices in the period	4- Distribution Centers 1-Hydropower Station

S.N.	Actions	Description
4	Nomination for Post Graduates Study in NEA Scholarship Quota	1-MBA
5	Pre Approval for Self-Financing Study	4- Ph.D. 1- Master 1-Bachelor
6	Leave Granted for Study in NEA Quota	1-Master
7	Leave Granted for Study in Self Finance	2-Ph.D.
8	Nomination for Post Graduates Study for Nepal Government Quota	1-Master
9	Nomination for Factory Acceptance Test, Inspection, Pre-Dispatch Witness, Training, Conference, Seminar in aboard	13 individuals
10	Review on Temporary Positions of NEA Projects	1334 Temp. Positions for 89 different Projects
11	Nomination of Intern (OJT) Students from various academic institutions	466 students from 23 different institutions.
12	Nomination of Intern to individual Students	5 individuals from 4 different institutions.

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 forevents management, publishing regular magazine "Vidyut", public relation and public grievance handling.

In the year under review, the following grievances/complaints were lodged and resolved.

S.No.	Sources of Grievances	Total Complain	No. of Settled	Remarks
1.	Hotline Number (1150)	15471	15471	All were resolved.
2.	Hello Sarkar	266	258	8 grievances were sent to concern office for necessary action.
3	Social Media (Facebook Page, Twitter)	492	491	1 grievance was sent to concern office for necessary action.
4	Email	52	51	1 grievance was sent to concern office fornecessary action.
5	Complain Box	1	0	1 grievance was sent to concern office for necessary action.
6.	CRM(Consumer relationship management system)	6663	6374	289 grievances are in progress of settlement.

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 31,485-9-1-0.96Ropaniand 153-14-12-01 Bigaha land spread all over the country. Similarly, NEA has 1199 vehicles in service throughout the country of which, 1027 are in working condition.

RECRUITMENT DEPARTMENT

Recruitment Department recruits fresh candidates and promotes the working 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 published by recruitment department. Similarly, it performs staff promotion as per the prevailing employees' service bylaws.

During the year,8candidates for different level have been recommended for contract service after completing the selection procedure. Department is being engaged to develop and introduce online application system for both open competition and promotion. This will be implemented during FY 2020/021.

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.

Thelegaldepartmentalsoinvolvesinarbitration, 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, 176number of cases were registered in different courts for and against of NEA. The different courts have finalized 34 number of cases, out of them, 27 verdicts were in favor of NEA and7 cases were against the NEA, 1 case is in adjourn and 142 cases are under consideration for courts judgment. Most of the legal cases filed by industrial consumer related to dedicated feeder tariff has been settled by different courts in favor of NEA.

FINANCE DIRECTORATE

1. Introduction

The Finance Directorate, headed by Deputy Managing Director (DMD), is responsible for carrying out overall financial and accounting functions of NEA. Key responsibility areas include revenue administration, accounting system operation, budgetary control and treasury management. The finance wing is also responsible for financial planning, control and monitoring at corporate level of decision-making process. Two functional departments, namely Accounts Department and Corporate Finance Department, are structured to support the finance wing. Two separate projects namely Institutional Strengthening Project (ISP) and Physical Verification and Valuation of assets (PVV) have been also formed under this Directorate.

2. Operational Performance

Despite the effect of COVID-19 pandemic, the year 2020/21 became mixed in terms of operational and financial performance. Due to long dry season, the water discharge level of most of the rivers dropped, which regulated less generation by NEA's and IPPs power plants. Furthermore, during the month of June 2021, NEA's major power plants like Kaligandaki (144 MW), Madhya Marsyangdi (70 MW) and Trishuli 3A (60 MW) were shut down due to heavy flood. This resulted to a total power generation of only 2,810.74 GWh, a decrease of 210.26 GWh (6.96%) from 3,021 GWh of FY 2019/20 and also a decrease of 327.26 GWh (10.43%) as compared to targeted level of 3,138 GWh.

NEA has targeted to procure 4,945 GWh from IPPs during the FY 2020/021which was expected to be possible by efficient management of energy and commissioning of Upper Tamakoshi Hydropwer Ltd. (UTKHPL-456 MW), a largest under construction HEP. Due to the delay in commissioning of UTKHPL (456 MW), only 3,241 GWh was available in the system as against the targeted level of 4,945 GWh. The short fall production from NEA's plants and IPPs' plants was compensated by import from India to meet the country's electricity demand. The total import from India stood 2,826.21 GWh as against the targeted 1,057 GWh which is 1,769.21 GWh high as compared to budgeted figure.

NEA's share of generation in total availability of power decreased from 39.02% of previous year to 31.66% this year. The percentage of energy supplied by IPPs and import from India constitutes 36.51% and 31.83% respectively. During the fiscal year 2020/021, NEA has

estimated to sell 7,760 GWh internally, however due to the nationwide lockdown of COVID pandemic for 3 months (April 30 to July15, 2021), offices, industries, factories, businesses establishments were stand still and the consumption of electricity was not as per the estimation. The revised estimate till the end of this fiscal year is 7,275GWh. However, contribution to the gross revenue by domestic consumers stands at 39.57% only. On the other side, Industrial consumer category holds only 1.34% of entire consumer volume but contributes 38.84% to the total gross revenue. Similarly, NEA had targeted to export 110GWh of electricity to India whereas revised figure stands44GWh, a decrease of 60% due to the delay in commissioning of UTKHPL (456MW) and other private IPPs.

3. Number of Consumers

The consumer base at the end of the fiscal year 2020/21 was estimated to be 4,658 thousand but the revised estimate was reduced by 130 thousand resulting in 4,528 thousand. The main reason behind is undoubtedly the months long shutdown due to COVID-19 pandemic. Though NEA sells power in bulk and provides support in operation and management to Various Community Rural Electrification Entities (CREEs), working under the Community Rural Electrification Program (CREP), the consumers of such CREEs are not included in the above figures. Such CREEs customers, out of NEA, are around 550 thousand.

In the FY 2020/21, the domestic consumer category remained the largest category with 92.93% share of the entire electricity consumers, while industrial consumers and other consumers remained at 1.34% and 5.73% respectively.

4. Revenue and Collection

The energy demand during this fiscal year was slightly less than the target. However, NEA maintained optimum level of regular and reliable energy supply to bring about positive impact in its overall financial performance. The nationwide lockdown from May 30 to July 2021 due to second variant of COVID pandemic seriously hampered various loss reduction activities such as timely meter reading, monitoring meter tempering and hooking wires to overhead distribution lines. The net income through sales of electricity for the fiscal year 2020/21 was estimated to be NRs. 75,860 million while the revised estimate stands at NRs. 70,473 million which is 7.10% less than the target. The major reason of decrease in the revenue is less electricity consumption by industrial and commercial customers due to the effect of Covid-19 pandemic.

The income from other services and finance income was estimated to be NRs.4,959.61 million and NRs. 2,813.54 million while the revised estimate amounts to NRs. 6,303.31 million and NRs 3,579.38 million respectively in FY 2020/21. NEA had received NRs. 355 million as dividend. Out of investments in more than 25 companies, dividend has been provided by Chilime Hydropower Company Ltd, Power Transmission Company Nepal Ltd (PTCN), Cross Broder Power Transmission Ltd (CPTC) and Butwal Power Company Ltd. Other companies are under construction/ Initial phase of operation; hence they are not able to declare dividend till date. NEA had estimated to collect NRs. 71,910 million from the sales of electricity in this fiscal year however the revised estimate is NRs. 65,833 million only. This reduction in cash collection is mainly because of not being able to collect the tariff from the domestic and other consumers in the months long nationwide lockdown. The total dues by the end of the fiscal year 2020/21 is NRs. 38,011 million. Out of this, NRs. 18,116 million is from industrial consumers (including the dues of about NRs. 15,540 million on

dedicated & trunk line), NRs. 490 million is from GoN offices and NRs. 3,706 million is from street light of different municipalities.

5. Accounts Receivable:

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. Keeping in the mind of the court verdict, NEA board has given relaxation to pay installment wise beginning from 16th July 2021. But most of such customers are not showing their willingness to pay NRs. 15,540 million which is overdue since long time.

6. Cost of Sales

NEA's total cost of sales has increased from NRs. 50,132 million to NRs. 56,397million in the year 2020/21. Cost of sales includes generation cost, transmission cost, distribution cost, power purchase cost and royalty cost. Major increment in cost of sales experienced is under the head of power purchase cost. NEA recorded NRs. 35,120 million as power purchase cost in 2019/20 and NRs. 41,461 million in 2020/21. This escalation of 18.06% was due to the increase in power import from India. The cost of Generation and Transmission reached to NRs. 1,926 million and NRs. 2,066 million respectively. NEA increased investment on strengthening distribution system throughout the country that resulted into increase in distribution costs from NRs. 9,401million to NRs. 9,478 million. Other cost of sales includes royalty expenses of NRs.1,621 million.

7. Other Costs

Interest cost on long term borrowing increased by NRs.508million during this year. Interest expense in this FY 2020/21 has been calculated to NRs.5,000 million as compared to NRs.4,492million in the FY 2019/20. Likewise, depreciation expenses on property, plant and equipment resulted into NRs.5,750 million in FY 2020/21as against NRs. 5,339 million in FY 2019/20. NEA recorded foreign exchange gain of NRs. 178 million in FY 2020/21 while it was NRs. 228 million loss in FY 2019/20. The gain was due to foreign currency translation loss to Japanese Yen (for the loan taken on Kulekhani Disaster Prevention Project). NEA estimated provision of NRs. 4,000 million in FY 2020/21 towards long term employee liabilities with respect to gratuity, pension, medical facilities and accumulated leave facilities under employees' benefit plan scheme which is 7.45% higher than FY 2019/20. NEA had made the provision of 3,702 million in FY 2019/20 based on the actuarial valuation report till that date.

8. Profit & Loss

NEA experienced reduction in its operating performance as compared to last financial year. Net profit before tax for the year 2020/21 decreased by 54.72% to reach at NRs. 6,008 million (Provisional) from NRs. 13,794 million in FY 2019/20.The expected profit for the FY 2020/021 was NRs. 10,900 million. However, the reduction in the power generation by NEA plants due to low water discharge in the dry season, increased in system loss from 15.27% in FY 2019/020 to 17.18% in FY 2020/021 and power import at expensive rate from India contributed to the decline in the profit of FY 2020/21.

9. Other Non-Current Assets

Non-current assets include Property, Plant & Equipment (PPE), Capital Work in Progress (CWIP), Investments, Loan & Advances measured at amortized cost. Property, plant and equipment (PPE) constitute the largest component of NEA's return generating assets. Net carrying amount of PPE reached to NRs. 176,176million at the end of the FY 2020/21. During the year, NEA has completed various

distribution system reinforcements, rural electrification projects, major sub-stations like Dhalkawar 400 Kv s/s, Dana 220 kV s/s, Samundratar s/s and distribution line projects which contributed an additional net capitalization of NRs. 18,792 million in property, plant, and equipment.

During the review period, NEA has invested a significant amount of resources in various projects under generation, transmission and distribution. Accumulated investment in capital works in progress reached to NRs. 140,940 million with net addition of NRs. 26,641million in the year 2020/21. The sources of investment included government equity and loan, foreign loan and grants and NEA's internal cash generation. However, financial returns from investments are not being obtained due to the considerable delay in project completion. The major investment is in hydroelectricity projects, transmission line and substation projects of different voltage levels and rural electrifications in the various parts of the country.

Investments in subsidiaries, associates, joint ventures and others reached to NRs. 55,393million in the year 2020/21. During the year, NEA increased its investment in subsidiaries and other companies by NRs. 7,056 million. At the end of the FY 2020/21, total investment in Upper Tamakoshi Hydropower Co. Limited reached NRs. 4,341.90 million as equity and NRs. 22,458.50 million including interest capitalization as a long-term loan. Further investment includes NRs. 14,942.30 million & NRs. 10 million in Citizen Investment Trust for gratuity payment and retirement fund respectively. Fair value adjustment in investments as per NFRS of NRs. 8,986.34 million has also been included under investment of various Subsidiaries, Joint ventures & Associates.

10. Current Assets

Current Assets include Inventories, trade receivables, prepaid advances & deposits, Cash & Cash equivalents and Current tax assets. Trade receivable for this year is estimated to be NRs. 38,011 million, an increase of 20.7% than that of previous FY 2019/20. Substantial trade receivable was reflected due to non-recovery from customers during lockdown and dedicated& trunk line billing. Dedicated & trunk line billing receivable amount has not been recovered yet. Current assets cover 20.87% of total assets in this fiscal year.

11. Non-Current Liabilities

Total long-term borrowings from GoN, the main source of project financing, reached to NRs.184,023 million in FY 2020/21 from NRs.163,737 million in FY 2019/20.NEA received NRs.1,646.7million as long-term loan from GoN internal source to invest in various projects. In the similar manner, donor agencies provided around NRs.18,138.7million as long-term loans and grants through direct payment to the consultants and contractors as per GON budgetary program in the FY 2020/21. In addition to this, GoN also provided NRs.12,318.3 million as equity investment in NEA.

12. Current Liabilities& Provisions

Current liabilities include trade & other liabilities and short-term borrowings. Loan repayment within next 12 months has been presented under short-term borrowing as per the requirement of NFRS. Since NEA's internal cash generation are used in projects constructions, all reflected short-term borrowings have not been paid to GON as per the loan agreement. Current liabilities cover 23.93% of total liabilities during this fiscal year. During the year, NEA contributed NRs.1,621million towards royalties, NRs.7,000million as arrears

of interest on long term loan and 2,000 million as loan installment.

13. Financial loan Covenants

NEA is required to achieve a number of covenants in respect of borrowing from the donor agencies. Major covenants related to financial performance are Rate of Return (RoR 6%), Debt Service Coverage Ratio (DSCR 1.2 times), Average Collection Period (ACP <3months). NEA met all these covenants except ACP in this FY.

14. Donor's Commitment

For the electrification of Province 5,6 and 7, Asian Infrastructure Investment Bank (AIIB) and European Investment Bank (EIB) committed to provide an amount equivalent to USD 112.3 million and Euro 100 million respectively as concessional loan to NEA. The subsidiary loan agreement (SLA) with GON is under process. Similarly, Asian Development Bank (ADB) has also extended its commitment to provide an amount equivalent to USD 200 million as a concessional loan for the development of power transmission and distribution system strengthening under SASEC. SLA of the same with GON has also been signed.Under this project, Norwegian grant of USD 35 million will be received as committed by Government of Norway.

In addition to this, ADB has further committed to provide an amount equivalent to USD 156 million for the automation and modernization of electricity grid.

15. Accounts and Audit

Accounts department is responsible to maintain accounts, prepare financial statements, conduct statutory audits, settlement of irregularities, dealing with tax authorities etc. Large Tax Payer's Office has concluded final income tax assessment up to the FY 2015/16. NEA expects to settle long pending audit qualifications worth NRs. 1.05million since FY 1993/94. NEA Board periodically reviews the audit qualifications and instructs the management to settle by complying applicable rules and procedures. Management is in the process of resolving policy related audit qualifications by implementing time bound action plan. Accounts department is coordinating with auditors and management to complete audit within specified period.

NEA prepared its first time NFRS based consolidated financial statements (group & stand alone) for the F/Y 2019/20. Due to Covid-19, the statutory audit for the year 2019/20 was completed within a period of nine months after the end of fiscal year. Office of the Auditor General has appointed Mr. Narayan Bajaj, Mr. Madhu Bir Pandey and Mr. Prabin Dhoj Joshi, Fellow Chartered Accountants, to carry out statutory audit for the financial year 2020/21. The auditors have commenced their audit procedures by submitting audit-planning memorandum.NEA is in a process of strengthening financial accounting and management decision support system. During this year an Interunit automation system was implemented in CAIS (accounting software) system, where interunit vouchers created by one accounting unit will be automatically reconciled upon accepting/rejecting through online by another accounting unit. Whole of the inter unit transactions had been reconciled through system base automation after the implementation of auto reconciliation.

Beside above, Accounts Department has planned to update on reporting framework based on NFRS during the FY 2021/022.

16. Institutional Strengthening Project (ISP)

Information Technology (IT) is evolving in every sector of businesses and Nepal Electricity

Authority is too modernizing its various operational activities to enhance its efficiency. NEA is in the process of strengthening financial accounting and management decision support system. Institutional Strengthening Project (ISP) is functioning under the Finance Directorate. The main objective of this project is to procure and implement ERP based system consisting of two major blocks namely a) Integrated Financial Management Information (IFMIS) and b) Revenue Management System (RMS) in NEA. The project had invited bids through an ICB tender with the loan assistance from World Bank for the procurement of Integrated package of ERP based IFMIS and RMS. The price quoted by the single technically qualified bidder was substantially higher than the approved estimation by NEA. This bid was rejected and from the lessons learnt NEA management decided to separate this integrated package into two packages and re-invite the bids.

NEA management has decided to publish the RFPs for the procurement of three packages: i) Procurement and Implementation of ERP based Integrated Financial Management Information System (IFMIS) ii) Procurement and Implementation of Centralized Revenue Management System (RMS) and iii) Procurement of Project Management Consultant (PMC) for the supervision of Implementations of ERP and RMS projects. All the three procurements will be carried out with the loan assistance from Asian Development Bank (ADB). The EoI and ToR for PMC has already been published on 23 July 2021 and NEA is in the process of updating and finalizing the RFPs for ERP and RMS.

17. Assets Verification& Valuation Project

Asset Verification and Valuation at Nepal Electricity Authority (AVNEA) is a World Bank funded project under Power Sector Reform and Sustainable Hydropower Development Project (PSRSHDP). The main objectives include Conduction of Physical Verification of Assets & Inventories of NEA, Development of Database/ Register, Valuation, Recommendation of adjustments based on valuation and Develop standard operating procedures/ manuals for PPE& Inventories as per NFRS. The created database will be synchronized with the ERP System which is being implemented by NEA. A Contract for Consultancy Services has been signed with Deloitte Touche Tohmatsu, India LLP. This project is expected to complete on October 2021.

18. Retirement Fund Division

This division is responsible for operation and management of Contributory Retirement Fund (RF) of the employees appointed from17 July 2006 and the Employees Welfare Fund (EWF) of the entire employees of NEA. Total employees involved in the RF at end of FY 2020/021 are 5,529 and the total employees involved in the EWF are 8,618. At the end of FY 2020/021 the total fund balance has reached to NRs. 3,356.30 million against which NRs. 228.31 million has been provided as loan to the contributors and NRs. 1,904 million has been invested in fixed deposits at various interest rates. Likewise NRs. 1,019.39 million has been invested in other portfolios.

Nepal Electricity Authority

Highlights of FY 2020/21

Description	FY 2021*	FY 2020	Increase/(Decrease)	
			Amount	%
Revenue				
Net Sales Revenue from Electricity (M.NRs.)	70,473	71,293	(820)	(1.15)
Income from other Services (M.NRs.)	6,253	4,783	1,470	30.73
Total Revenue (M. NRs.)	**76,726**	**76,076**	**650**	**0.85**
Operating Expenses				
Generation Expenses (M. NRs.)	1,926	1,896	30	1.58
Power Purchase- IPPs (M. NRs.)	18,981	21,695	(2,714)	(12.51)
Power Purchase -India (M. NRs.)	22,480	13,425	9,055	67.45
Royalty (M. NRs.)	1,621	1,571	50	3.18
Transmission Expenses (M. NRs.)	2,066	2,014	52	2.58
Distribution Expenses (M. NRs.)	9,478	9,401	77	0.82
Administration Expenses (M. NRs.)	6,474	6,941	(467)	(6.73)
Depreciation & Amortization Expenses (M. NRs.)	5,750	5,339	411	7.70
Total Operating Expenses (M. NRs.)	**68,776**	**62,282**	**6,494**	**10.43**
Operating Surplus (M. NRs.)	**7,950**	**13,794**	**(5,844)**	**(42.37)**
Finance Income (M. NRs.)	(2,537)	(5,337)	2,800	(52.46)
Finance Cost (M. NRs.)	5,000	4,537	463	10.20
Other losses/(Gain)/Forex (M. NRs.)	229	185	44	23.78
Imapairment (charge)	(750)	1,139	(1,889)	(165.85)
Net Profit/(Loss) (M. NRs.)	**6,008**	**13,270**	**(7,262)**	**(54.72)**
Long-Term Borrowings (M. NRs.)	184,023	163,737	20,286	12.39
Net Property, Plant & Equipment (M. NRs.)	176,176	157,384	18,792	11.94
Number of Consumers	**4,528,411**	**4,217,710**	**310,701**	**7.37**
Total Sales of Electricity (GWh)	**7,319**	**6,529**	**790**	**12.10**
Internal Sold/Utilized (GWh)	7,275	6,422	853	13.28
Annual Average Consumer's Consumption (kWh)**	1,616	1,548	68	4.41
Average sales Price of Electricity (NRs./kWh)	9.63	10.92	(1.29)	(11.81)
Peak Load Interconnected System (GWh)	1,482	1,408	74.00	5.26
Total Available Electric Energy (GWh)	**8,878.00**	**7,741.06**	**1,137**	**14.69**
NEA Generation (GWh)	2,810.74	3,021.00	(210)	(6.96)
Thermal Generation (GWh)	0.05	0.06	(0.01)	(16.67)
Purchased Energy (GWh) - India	2,826.21	1,729.00	1,097	63.46
Purchased Energy (GWh) - Nepal (Internal)	3,241	2,991	250	8.36
Average Power Purchase Rate -IPPs (NRs./kWh)	5.86	7.25	(1.40)	(19.26)
Average Power Purchase Rate -India (NRs./kWh)	7.95	7.76	0.19	2.44
Exported Energy (GWh)	44	107	(63)	(58.88)
Self Consumption (GWh)	34	30	4	13.33
Net System Losses (Percentage)	**17.18**	**15.27**	**1.91**	**12.49**

Note: *Provisional figures (Subject to audit)
**On internal sales

Nepal Electricity Authority

Statement of Financial Position

Particulars	2021*	2020	2019	2018	2017	2016	2015	2014	2013	2012
Assets										
Non Current Assets										
Property, Plant and Equipment	176,176	157,384	125,977	112,985	90,341	88,521	86,439	84,239	83,873	85,461
Capital WIP	140,940	114,299	104,841	77,607	80,272	66,684	58,052	46,994	39,843	29,905
Goodwill and Intangible Assets	56	44	-	-	-	-	-	-	-	-
Investment in Subsidaries & Associates	23,814	20,815	20,387	37,793	33,741	21,755	17,551	12,288	6,808	5,049
Deposit	**978**	**913**	**912**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Loans and Advances measured at Amortised Cost **	30,601	26,609	24,130	1,132	663	651	625	657	605	622
Total Non Current Assets	372,565	320,064	276,247	229,517	205,018	177,611	162,667	144,178	131,129	121,037
Current Assets										
Inventories	15,713	11,931	9,483	7,544	4,218	3,376	3,170	2,859	3,043	3,034
Trade and other receivables	38,011	31,492	18,854	15,951	13,955	11,187	9,927	9,016	7,930	6,693
Prepaid, Advances and Deposits	**7,321**	**6,625**	**2,127**	**3,507**	**3,700**	**3,153**	**3,158**	**2,988**	**2,696**	**3,601**
Shorterm Loan	**2,382**	**2,156**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Investment in Fixed deposit	9,500	8,050	11,450	-	-	-	-	-	-	-
Cash and Cash Equivalents	21,778	33,228	27,097	34,495	24,824	15,362	10,622	6,122	4,715	2,697
Current Tax Assets	3,599	2,946	2,412	1,909	1,611	-	-	-	-	-
Total Current Assets	98,304	96,428	71,423	63,405	48,309	33,078	26,877	20,984	18,384	16,025
Total Assets	470,869	416,492	347,670	292,922	253,326	210,689	189,544	165,162	149,513	137,062
Liabilities										
Non Current Liabilites										
Long Term borrowings	184,023	163,737	133,917	109,550	100,063	111,304	98,253	82,692	75,035	68,909
Deferred tax Liabilities	4,518	3,765	2,244	2,040	2,598	693	693	693	693	693
Other Non Current Liabilities	**35,855**	**31,855**	**26,701**	**25,945**	**23,426**	**21,359**	**19,309**	**17,259**	**13,717**	**11,561**
Total Non Current Liabilites	**224,396**	**199,357**	**162,862**	**137,535**	**126,087**	**133,356**	**118,256**	**100,644**	**89,445**	**81,164**
Current Liabilties										
Trade and other liabilities	66,979	61,335	56,823	59,292	54,484	51,324	45,743	37,637	33,019	29,137
Short term Borrowings**	3,617	2,116	2,087	10,711	10,619	-	-	700	1,200	3,500
Total Current Liabilites	70,596	63,451	58,910	70,003	65,102	51,324	45,743	38,337	34,219	32,637
Total Liabilities	**294,992**	**262,808**	**221,773**	**207,538**	**191,189**	**184,681**	**163,999**	**138,982**	**123,665**	**113,801**
Equity										
Share Capital	**159,822**	**142,116**	**128,440**	**102,438**	**82,411**	**58,528**	**49,275**	**44,511**	**37,365**	**31,422**
Retained Earnings * **	**7,221**	**3,715**	**(12,182)**	**(25,301)**	**(28,424)**	**(34,608)**	**(25,751)**	**(20,239)**	**(13,238)**	**(9,867)**
Other reserves	**8,834**	**7,853**	**9,639**	**8,247**	**8,150**	**2,089**	**2,022**	**1,909**	**1,721**	**1,706**
Total equity	**175,877**	**153,684**	**125,897**	**85,384**	**62,137**	**26,009**	**25,546**	**26,181**	**25,848**	**23,262**
Total Equity and Liabilites	**470,869**	**416,492**	**347,670**	**292,922**	**253,326**	**210,689**	**189,544**	**165,162**	**149,513**	**137,062**

* Provisional Figures (Subject to audit)

**Presented as per NFRS adjustments since 2017.

*** Year 2020 Includes Trunk & Dedicated line bill amount Rs 6,044 million of previous years.

Nepal Electricity Authority

Statement of Profit or Loss

Figures (NRs. Million)

Particulars	2021*	2020	2019	2018	2017	2016	2015	2014	2013	2012
Sales Revenue	70,473	71,293	66,613	55,358	46,796	31,824	30,169	28,206	25,355	20,089
Less: Cost of Sales										
Power Purchase Cost- IPPs	(18,981)	(21,695)	(15,942)	(14,270)	(12,281)	(8,278)	(8,462)	(8,977)	(7,891)	(6,938)
Power Purchase Cost- India	(22,480)	(13,425)	(22,954)	(19,861)	(16,052)	(14,054)	(10,748)	(8,065)	(5,681)	(5,010)
Other Cost of Sales	(14,936)	(15,012)	(13,238)	(12,635)	(11,296)	(8,982)	(8,198)	(7,869)	(7,040)	(6,196)
Total Cost of Sales	**(56,397)**	**(50,132)**	**(52,134)**	**(46,766)**	**(39,629)**	**(31,314)**	**(27,408)**	**(24,911)**	**(20,612)**	**(18,144)**
Gross Profit	**14,076**	**21,161**	**14,479**	**8,592**	**7,167**	**510**	**2,761**	**3,294**	**4,742**	**1,944**
Other Income	6,253	4,783	4,785	3,186	2,471	1,792	1,995	1,610	1,539	1,373
Personnel Expenses Including retirement benefits	(6,353)	(6,385)	(4,944)	(4,215)	(3,374)	(3,039)	(3,189)	(4,579)	(3,198)	(4,890)
General Administration Expenses	(276)	(245)	(270)	(219)	(237)	(144)	(134)	(150)	(163)	(163)
Depreciation and Amortisation Expenses	**(5,750)**	**(5,339)**	**(4,852)**	**(4,210)**	**(3,755)**	**(3,554)**	**(3,471)**	**(3,297)**	**(3,229)**	**(3,176)**
Other Operating Expenses	-	(181)	(57)	(87)	(67)	(52)	(58)	(48)	(34)	(24)
Operating Profit	**7,950**	**13,794**	**9,141**	**3,046**	**2,205**	**(4,487)**	**(2,097)**	**(3,170)**	**(343)**	**(4,936)**
Finance Income	3,579	5,337	4,807	3,522	2,436	1,458	1,122	547	330	323
Finance cost	(5,000)	(4,537)	(3,985)	(3,283)	(3,546)	(5,080)	(4,670)	(4,235)	(4,040)	(3,885)
Other gains/(losses)/Forex	178	(228)	(9)	(278)	411	(746)	523	53	652	(897)
Impairment (Charge)/ Reversal	(750)	(1,139)	(172)	(30)	-	-	-	-	-	-
Other Non-operating expenses	-	(2)	(11)	(31)	(3)	(34)	(8)	(3)	(5)	(552)
Share of profit from investment in JV/Associates	51	45	68	29	-	-	-	-	-	-
Profit before income tax	**6,008**	**13,270**	**9,838**	**2,975**	**1,502**	**(8,890)**	**(5,130)**	**(6,808)**	**(3,405)**	**(9,948)**
Income Tax expense	(2,502)	(44)	(36)	(79)	-	-	-	-	-	-
Deferred Tax (Charge)/Reversal	-	(1,548)	9	543	-	-	-	-	-	-
Profit for the period	**3,506**	**11,678**	**9,811**	**3,439**	**1,502**	**(8,890)**	**(5,130)**	**(6,808)**	**(3,405)**	**(9,948)**

* Provisional Figures (subject to Audit)

Significant Accounting Policies and Explanatory Notes

For the year ended Ashad 31, 2078 (July15,2021)

1. CONSTITUTION ANDOWNERSHIP

Nepal Electricity Authority ('NEA') was incorporated on Bhadra 1, 2042 (16August,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, which 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, tools and instruments, furniture and fixtures.	20%
(o)	Office Equipment	15%
(p)	Miscellaneous properties	50%
(q)	Additions during the year	50% of applicable rates

Carrying amount of property, plant and equipmentiskeptatminimumvalueof1Rupee 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 instatement 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 where as 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 receivables 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 ofRs.20millioneveryyear,incase 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 profit as per the provision of Electricity Regulations, 2050.

2.15 Borrowings

Borrowings are subsequently carried at a mortised 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 liabilitiesandthoselessthan12 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 12months 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 upto 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 1st2063B.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 include cost that are directly attributable to distribution of power &expenses relating consumer services and expenses of community rural electrification expenses. Distribution expenses also include maintenance of low voltage transmission lines and system operation costs also.

2.27 Taxes

a. Currenttax

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 FinanceCost

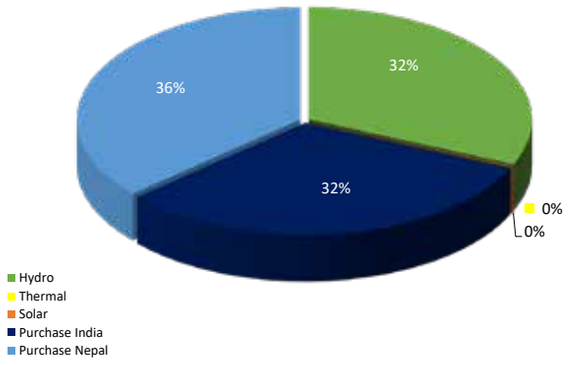
Finance costs includes borrowing cost and other interest expenses & charges on borrowings. Borrowing costs that are directly attributable to the construction of a qualifying asset are included in the cost of that asset. Other interest & charges on borrowing are treated as an expense in the period in which it occurs.

2.29 Foreign Currency Transactions

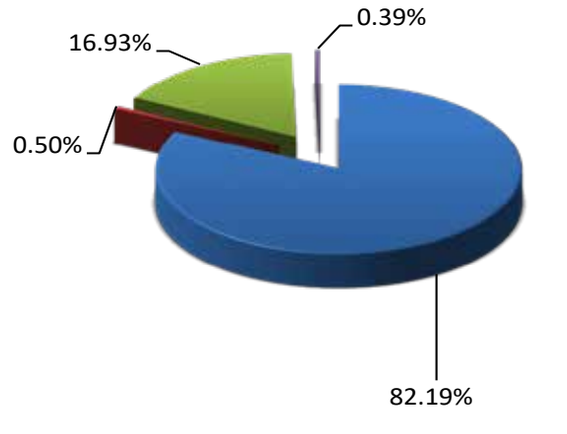
The transactions in foreign currency recognized at the prevailing rate on transaction date. The balances of monetary assets and liabilities in foreign currencies are translated at closing rate. The resulting gain or loss due to the translation is taken to Statement of Profit or Loss.

STATISTIC & SCHEMATICS

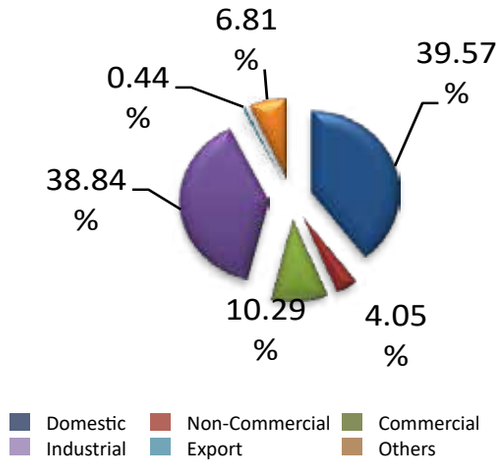
AVAILABILITY OF ENERGY (FY 2020/21)



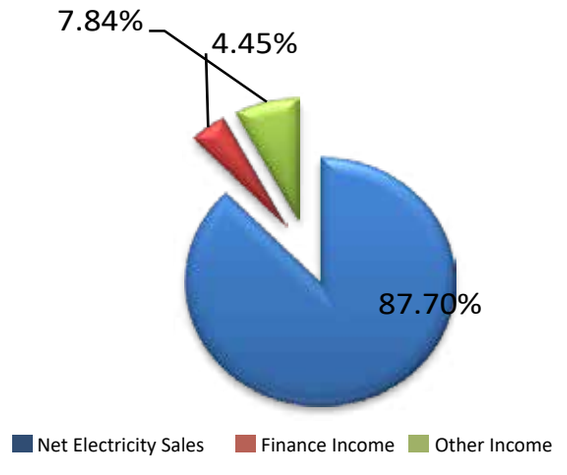
ENERGY UTILIZATION (FY 2020/21)



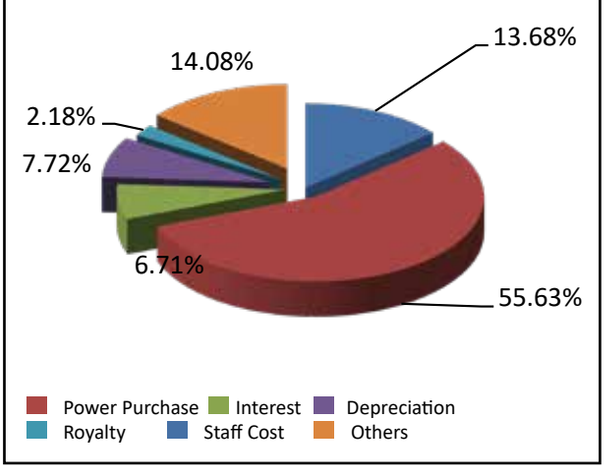
SALES (FY 2020/21)



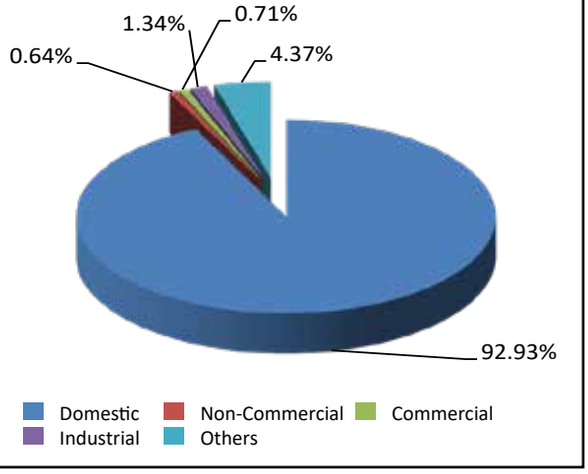
REVENUE (FY 2020/21)



EXPENDITURE (FY 2020/21)

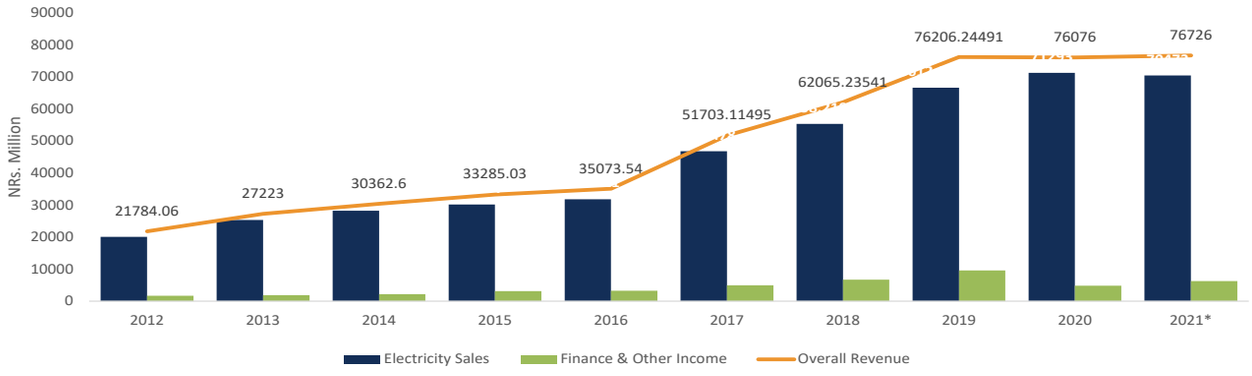


NO. OF CONSUMERS AS OF 15 JULY, 2021

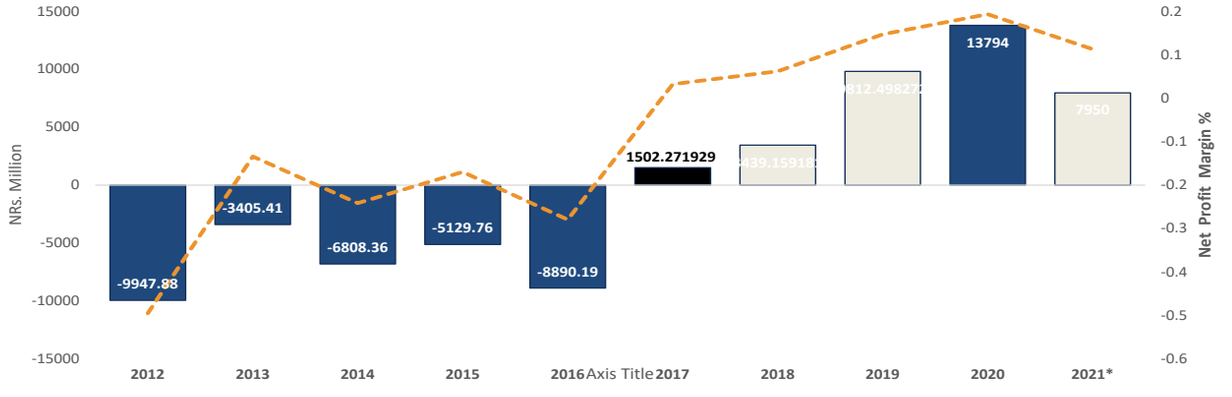


Financial Dashboard

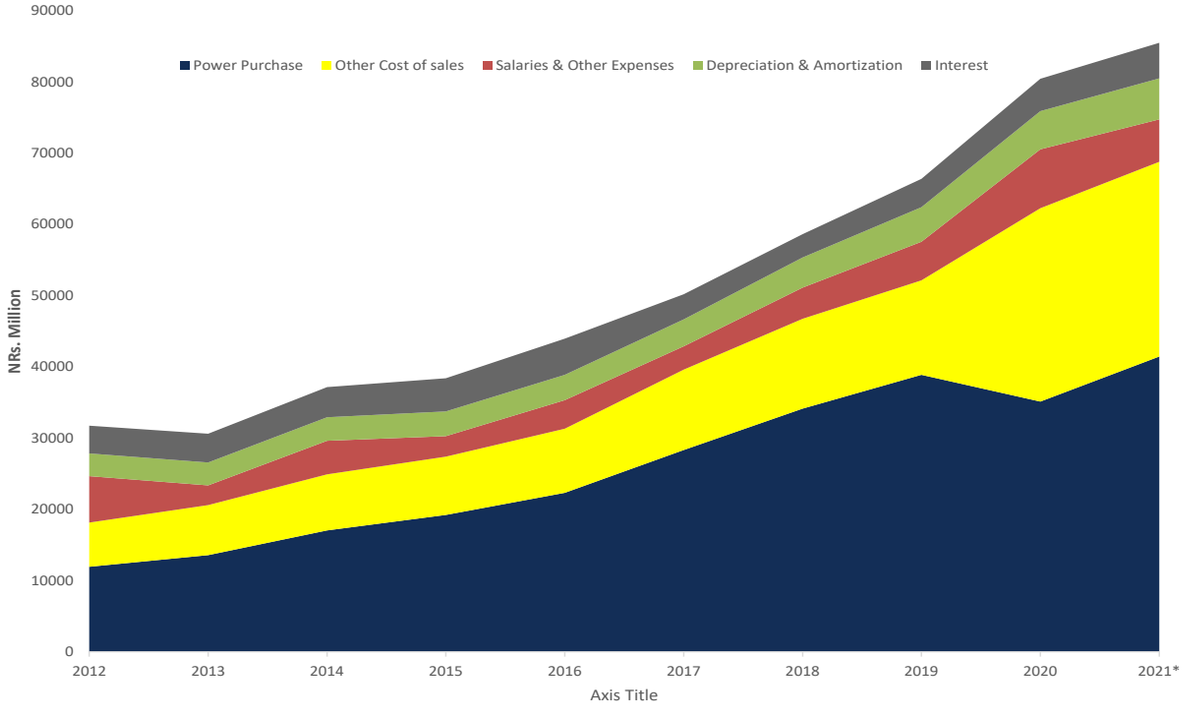
Overall Revenue Including Other Income



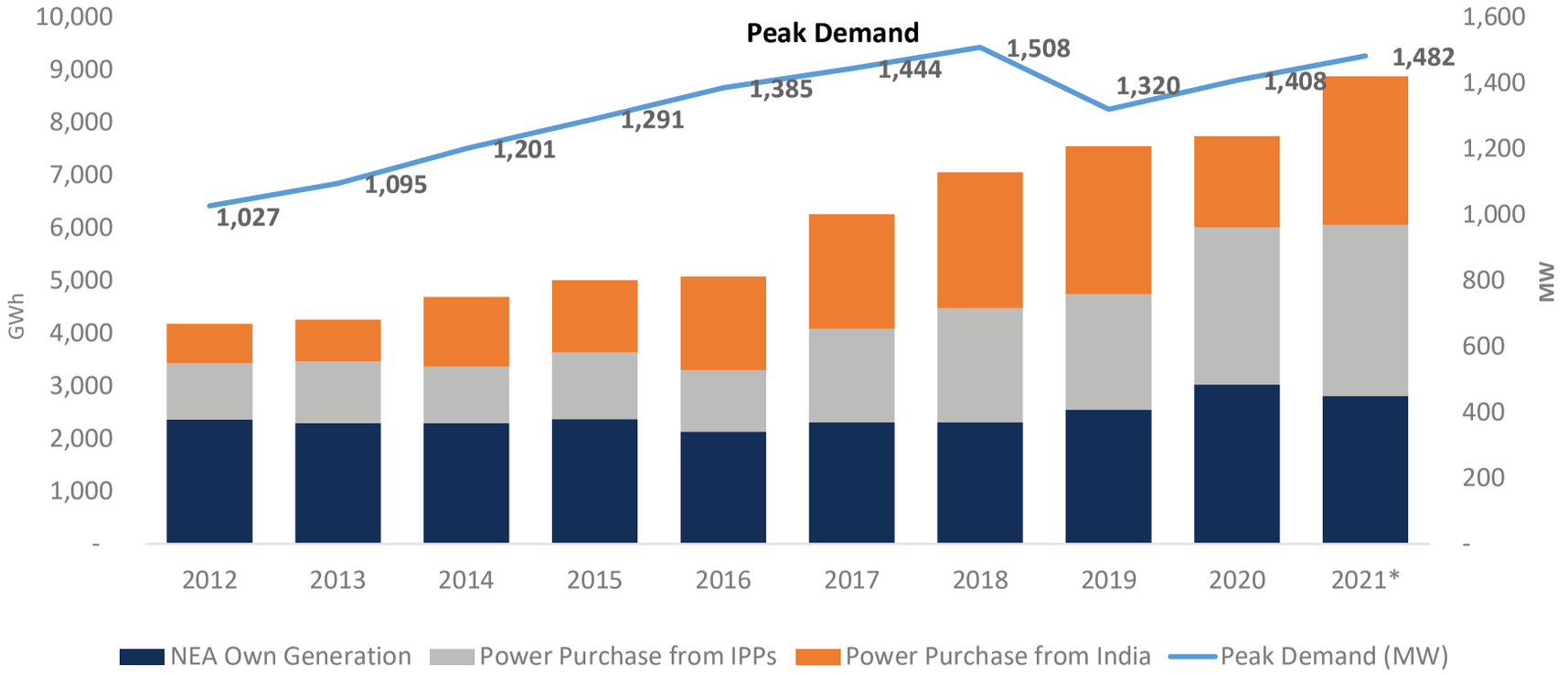
Profit & Loss & Net Profit Margin



Expenses Breakup

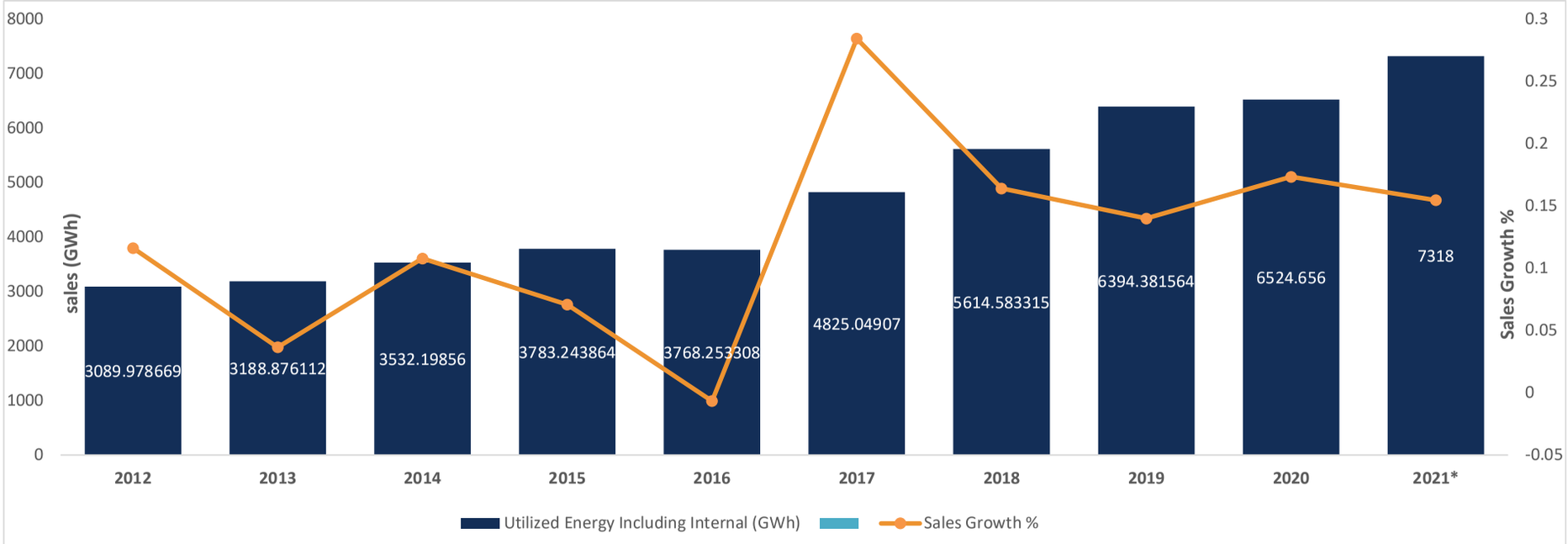


Total Energy Available & Peak Demand

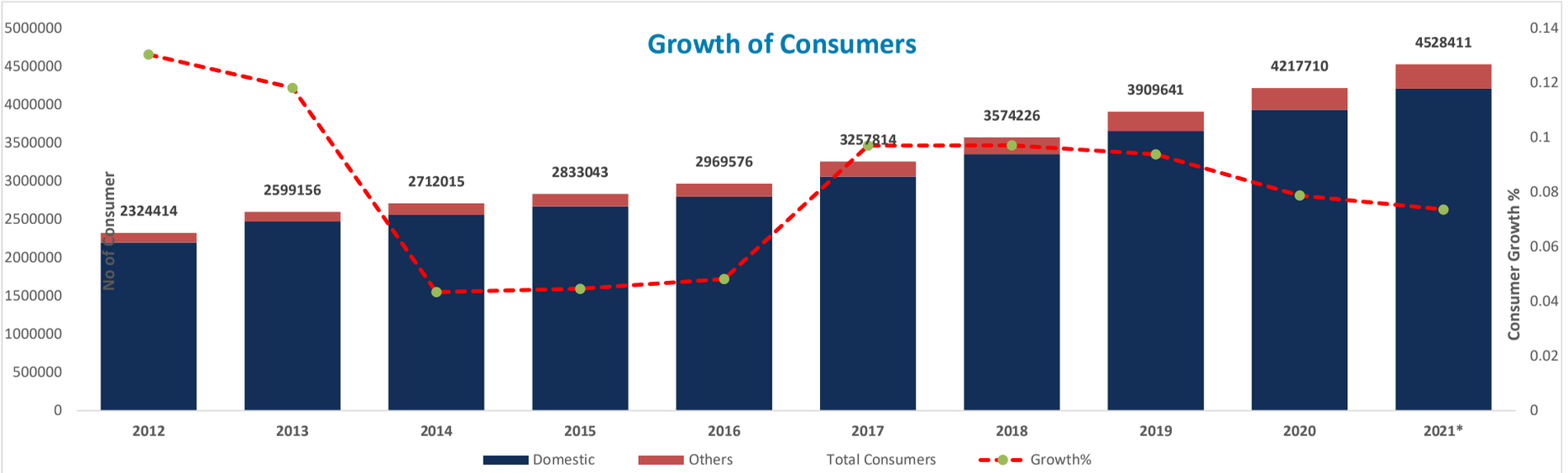


Particulars	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021*
Availability (GWh)										
NEA Own Generation	2,359	2,292	2,298	2,368	2,133	2,305	2,308	2,548	3,021	2,811
Power Purchase from IPPs	1,074	1,176	1,070	1,269	1,166	1,778	2,168	2,190	2,991	3,241
Power Purchase from India	746	790	1,319	1,370	1,778	2,175	2,582	2,813	1,729	2,826
Total Availability (GWh)	4,179	4,258	4,687	5,007	5,077	6,258	7,058	7,551	7,741	8,878
Peak Demand (MW)	1,027	1,095	1,201	1,291	1,385	1,444	1,508	1,320	1,408	1,482
* Provisional Figures (Subject to audit)										
Peak Demad MW	102,665	109,462	120,098	129,110	138,530	144,410	150,816	132,028	140,794	148,200

Electricity Sales with Growth

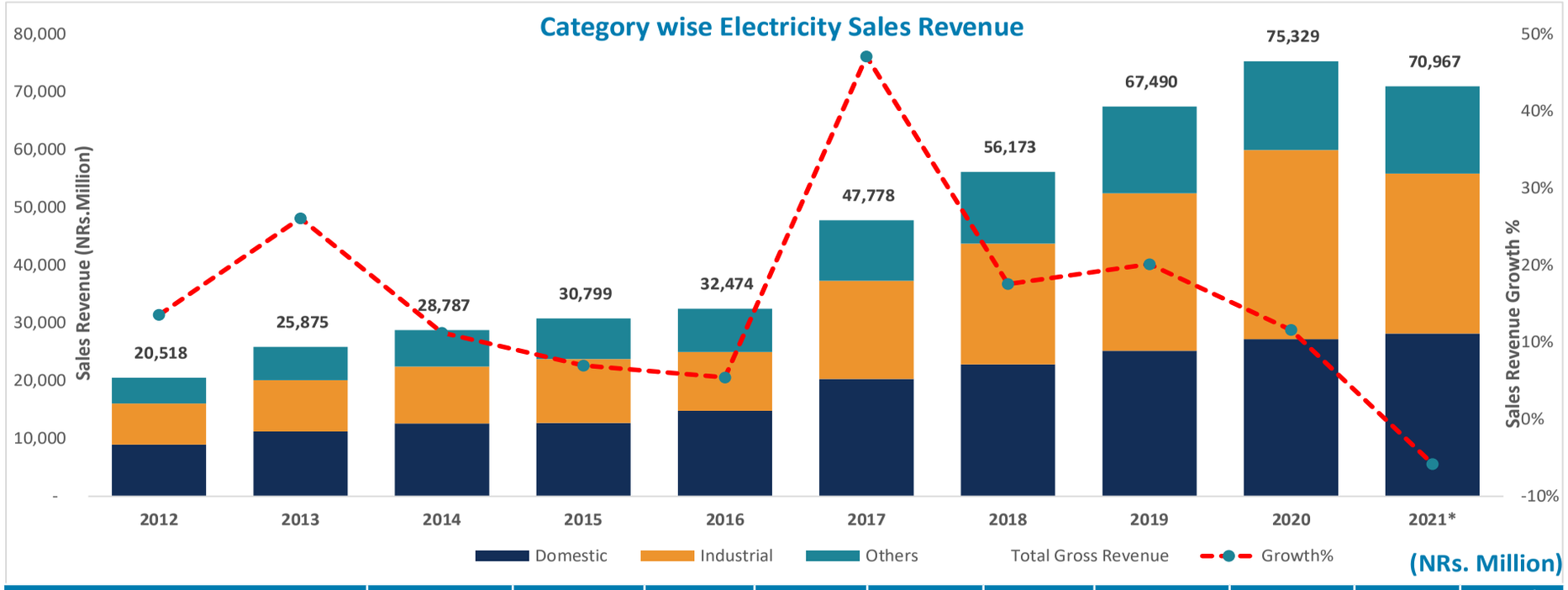


Particulars	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021*
Utilized Energy Including Internal (GWh)	3090	3189	3532	3783	3768	4825	5615	6394	6525	7318
Sales Category (GWh)										
Domestic	1343	1402	1571	1679	1797	2164	2442	2666	2852	3138
Non Commerical	116	115	127	131	134	161	172	186	190	204
Commercial	241	257	285	300	286	351	408	466	487	511
Industrial	1124	1141	1252	1352	1206	1719	2074	2422	2301	2816
Water Supply & Irrigation	65	73	83	87	100	116	138	176	182	209
Street Light	72	76	76	76	74	76	77	79	84	88
Temporary Supply	1	1	1	2	2	3	3	3	3	4
Transport	7	6	6	6	6	6	5	5	3	2
Temple	4	4	5	5	6	7	8	8	8	8
Non Domestic	0	0	0	0	0	54	103	148	151	116
Entertainment	0	0	0	0	0	1	3	6	5	4
Community Sales	69	77	86	103	104	116	125	140	151	174
Bulk Supply to India	4	4	3	3	3	3	3	35	107	44
Total Sales (GWh)	3,045	3,156	3,496	3,744	3,719	4,777	5,560	6,338	6,525	7,318
Sales Growth %	12%	4%	11%	7%	-1%	28%	16%	14%	17%	15%
* Provisional Figures (Subject to Final Audit)										

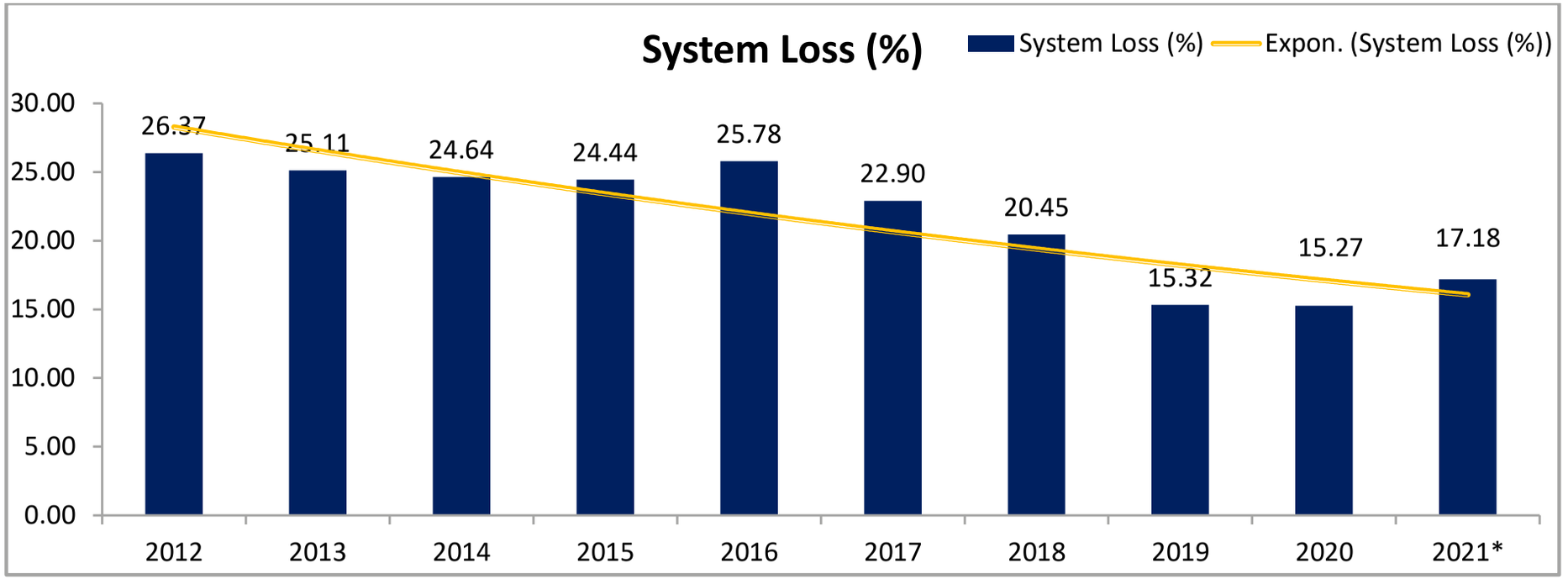


Category	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021*
Domestic	2,198,680	2,472,264	2,558,726	2,671,039	2,796,621	3,061,709	3,355,830	3,657,887	3,933,574	4,208,208
Non Commerical	14,055	15,179	16,155	16,717	17,732	19,257	21,094	23,493	26,011	29,010
Commercial	13,297	13,096	14,955	15,899	17,191	18,860	21,716	25,746	29,522	32,321
Industrial	36,409	37,498	40,265	41,825	43,639	46,345	48,800	52,697	55,888	60,782
Water Supply	860	834	1,141	1,266	1,426	1,675	2,063	2,460	2,960	3,494
Irrigation	53,165	51,520	71,845	77,066	83,283	98,626	111,493	131,935	152,485	174,917
Street Light	2,590	2,878	2,774	2,813	2,829	2,935	3,010	3,266	3,726	4,577
Temporary Supply	619	768	726	733	883	1,070	1,520	1,682	1,577	1,817
Transport	44	51	1	44	43	44	44	40	43	51
Temple	3,529	3,857	4,048	4,181	4,391	4,673	5,182	5,890	6,611	7,481
Non Domestic	-	-	-	-	-	977	1,735	2,735	3,260	3,678
Entertainment	-	-	-	-	-	45	107	150	170	192
Community Sales	1,161	1,207	1,377	1,459	1,537	1,597	1,631	1,659	1,882	1,882
Bulk Supply to India	5	4	2	1	1	1	1	1	1	1
Total Consumers	2,324,414	2,599,156	2,712,015	2,833,043	2,969,576	3,257,814	3,574,226	3,909,641	4,217,710	4,528,411
Growth%	13%	12%	4%	4%	5%	10%	10%	9%	8%	7%

* Provisional Figures (Subject to Audit)

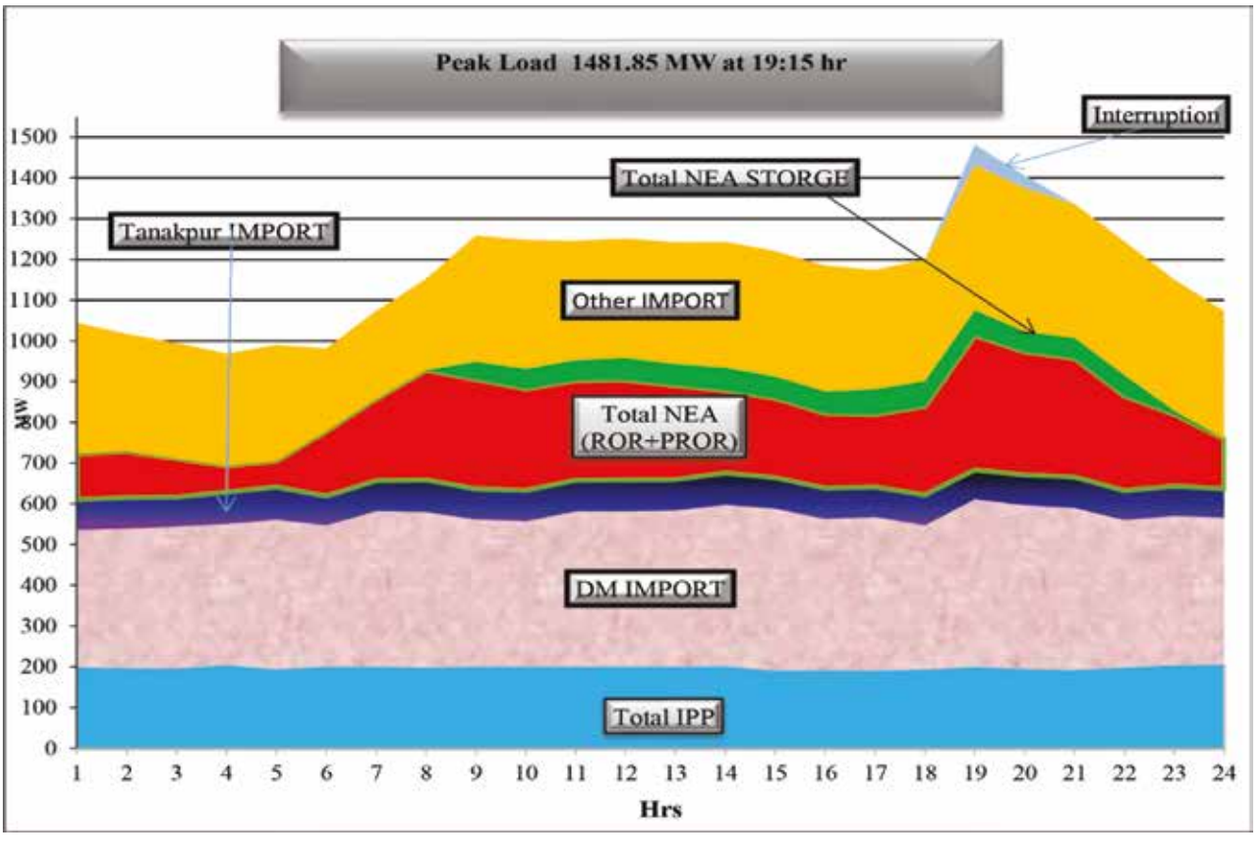


Particulars	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021*
Domestic	8,968	11,248	12,622	12,707	14,834	20,330	22,868	25,197	27,239	28,206
Non Commerical	1,092	1,355	1,487	1,644	1,995	2,479	2,594	2,831	2,923	2,888
Commercial	2,260	2,994	3,360	3,735	3,789	5,114	5,883	6,745	7,222	7,332
Industrial	7,102	8,885	9,844	11,065	10,182	16,977	20,897	27,283	32,717	27,688
Water Supply & Irrigation	295	389	418	481	525	728	865	1,092	815	707
Street Light	464	583	602	630	602	666	702	683	350	386
Temporary Supply	16	24	23	27	29	53	61	67	765	799
Transport	32	40	39	41	40	44	38	33	64	68
Temple	21	24	26	29	34	39	51	52	24	19
Non Domestic	-	-	-	-	-	655	1,419	2,278	52	57
Entertainment	-	-	-	-	-	17	50	84	2,321	1,909
Community Sales	245	301	335	400	412	631	716	734	94	79
Bulk Supply India	24	32	31	39	32	46	29	413	743	829
Total Gross Revenue	**20,518**	**25,875**	**28,787**	**30,799**	**32,474**	**47,778**	**56,173**	**67,490**	**75,329****	**70,967**
Growth%	14%	26%	11%	7%	5%	47%	18%	20%	12%	-6%
* Provisional Figures (Subject to Audit)										
** Includes Trunk & Dedicated line bill amount Rs 6,044 million of previous years.										

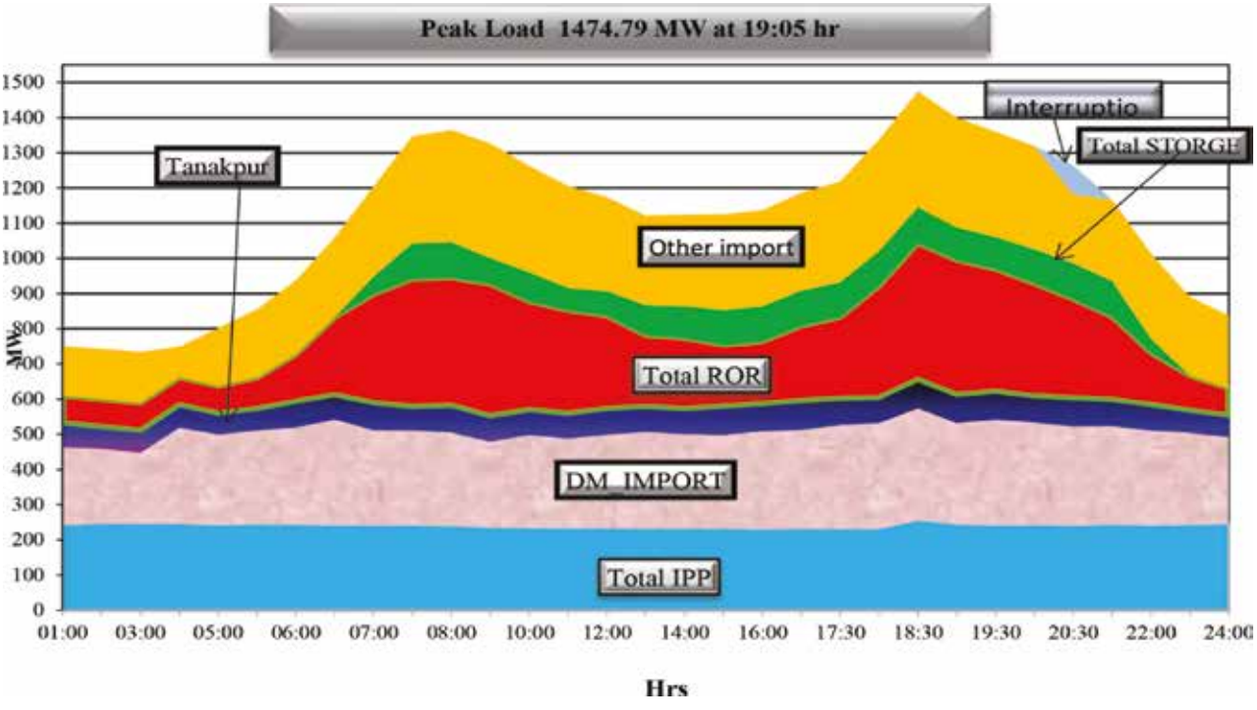


Fiscal Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021*
System Loss (%)	26.37	25.11	24.64	24.44	25.78	22.90	20.45	15.32	15.27	17.18

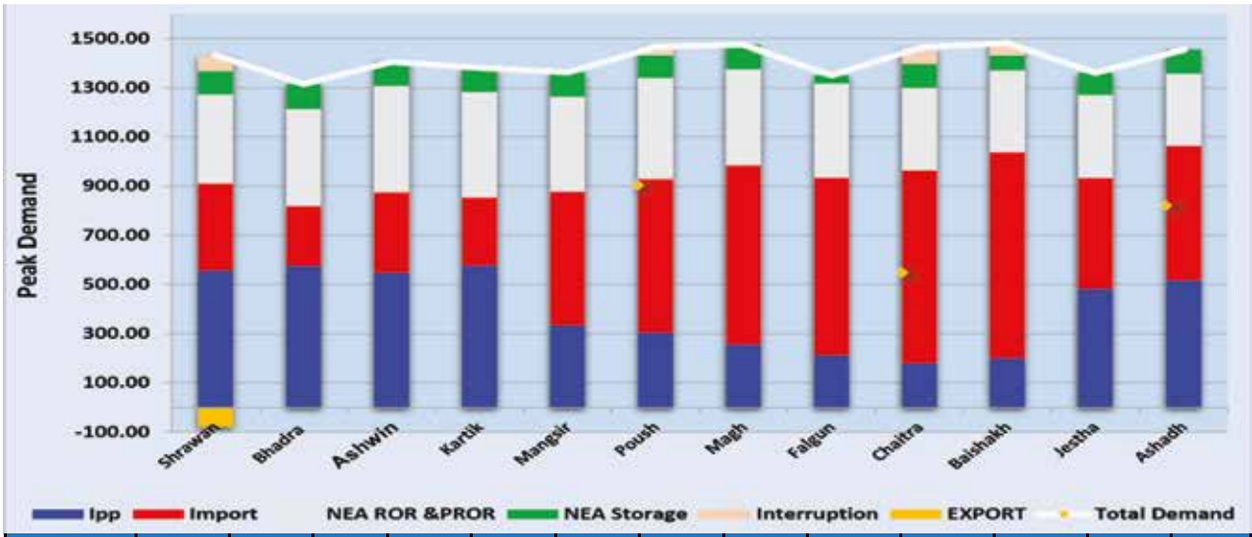
System Load Curve (Maximum Demand) Baishakh 13, 2078 (April 26, 2021) Monday



System Load Curve (Dry Peak Demand) Magh 18, 2077 (January 31, 2021), Sunday

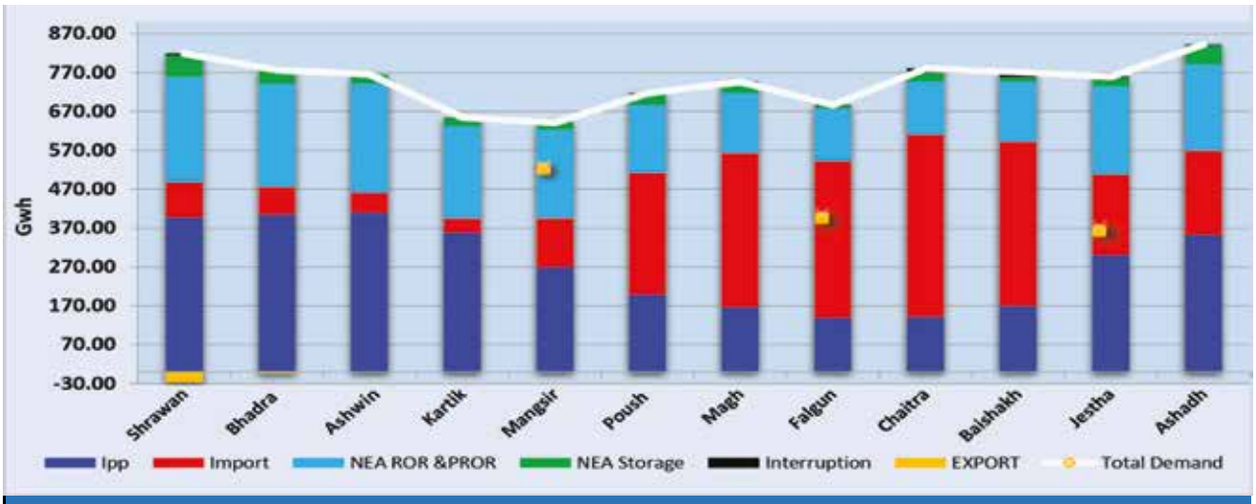


Capacity Balance (MW) in FY 20772078 (2020/21)



Energy source\Months	Shrawan	Bhadra	Ashwin	Kartik	Mangsir	Poush	Magh	Falgun	Chaitra	Baishakh	Jestha	Ashadh	Average
IPP	556.29	576.45	548.72	577.20	333.67	304.36	256.50	212.85	180.73	200.94	481.07	517.27	395.50
Import	354.00	243.71	325.86	278.20	544.00	625.26	727.80	721.70	783.82	838.23	452.10	546.33	536.75
NEA ROR &PROR	360.90	394.05	431.81	426.44	385.22	409.22	390.40	382.52	334.16	330.68	336.32	293.67	372.95
NEA Storage	96.80	101.10	99.80	100.00	101.00	94.50	100.10	33.70	99.30	62.00	92.30	98.30	89.91
Interruption	65.00	0.00	0.00	0.00	0.00	33.00	0.00	0.00	65.00	50.00	0.00	0.00	17.75
Total Demand	1432.99	1315.32	1406.19	1381.83	1363.88	1466.33	1474.79	1350.77	1463.01	1481.85	1361.80	1455.57	1412.86
EXPORT	-80.00												

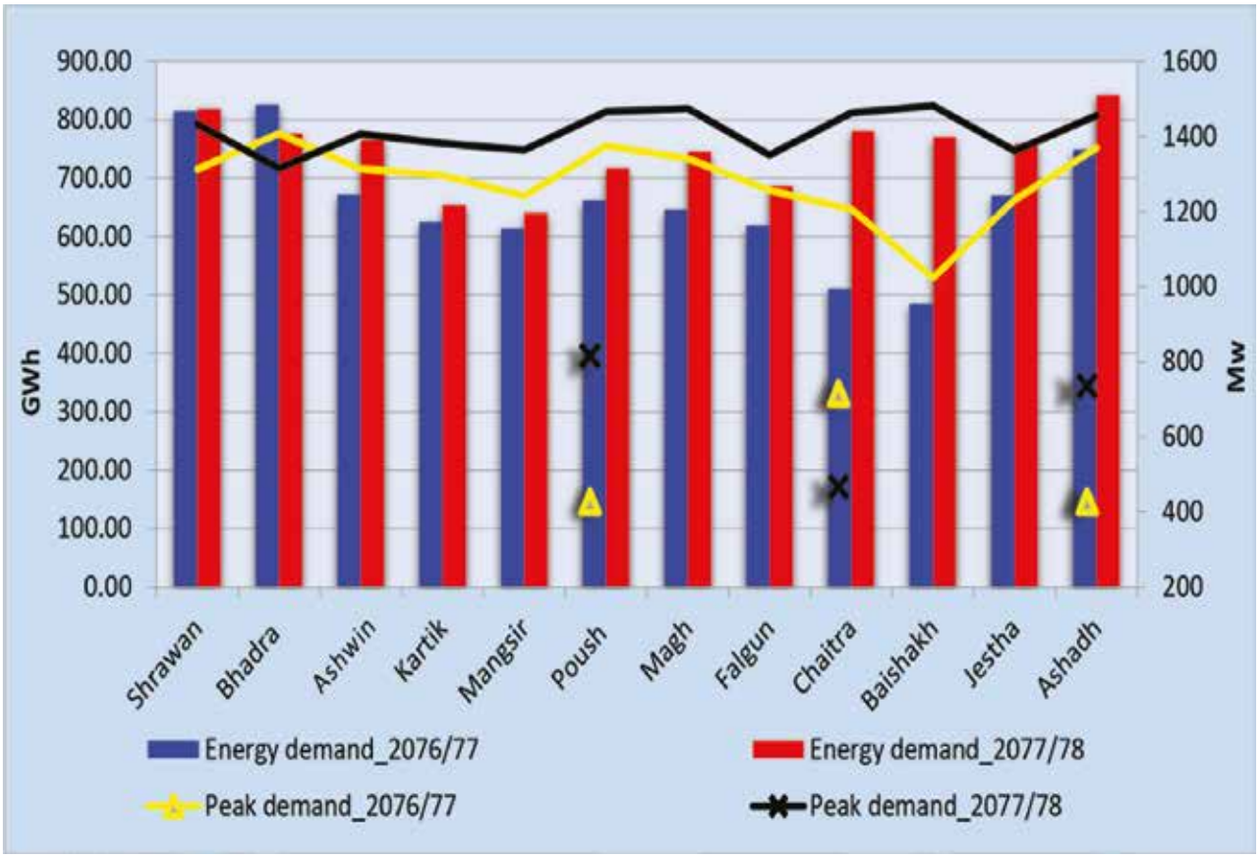
Energy Balance (GWh) in FY 2077/2078 (2020/21)



Energy Balance (Gwh) in FY 2077/2078(2020/2021)

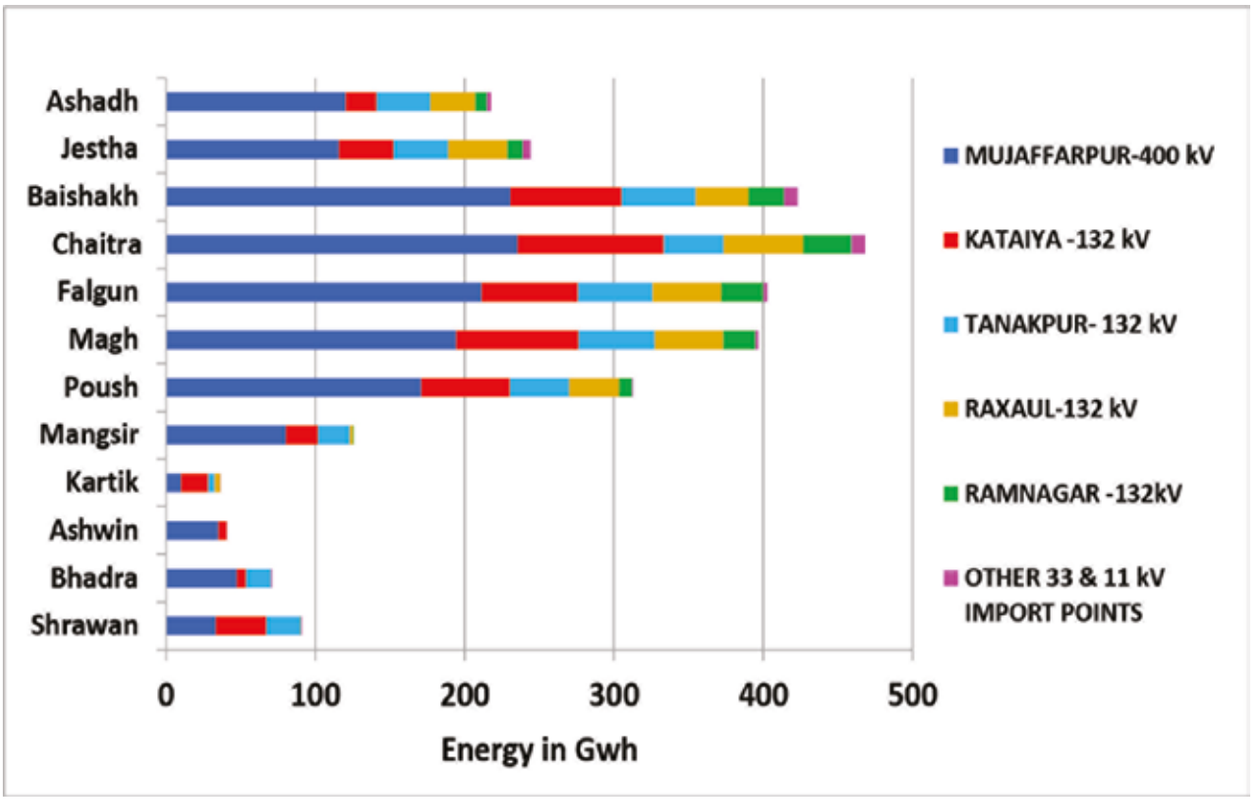
Energy source\Months	Shrawan	Bhadra	Ashwin	Kartik	Mangsir	Poush	Magh	Falgun	Chaitra	Baishakh	Jestha	Ashadh	Total
IPP	397.48	404.60	409.25	358.01	268.92	198.80	166.60	139.78	142.14	170.22	300.43	352.04	3308.27
Import	91.10	71.15	52.25	36.38	125.45	313.06	396.77	402.79	468.61	422.99	207.60	217.64	2805.79
NEA ROR &PROR	271.08	265.04	280.59	237.39	228.78	174.74	153.60	134.92	137.05	153.39	226.89	221.65	2485.10
NEA Storage	54.76	35.88	23.84	21.87	17.54	29.34	27.80	6.78	22.31	11.47	22.24	49.47	323.28
Interruption	4.59	0.00	0.00	0.76	0.12	1.41	1.12	2.07	11.00	13.04	1.96	1.82	37.87
Total Demand	819.01	776.66	765.92	654.41	640.79	717.35	745.89	686.33	781.11	771.11	759.12	842.62	8960.31
EXPORT	-27.29	-3.90	-0.81	-0.74	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	-0.10	-32.87
Net Demand	737.66	697.14	765.10	652.91	640.66	715.93	720.57	684.26	770.11	758.07	757.16	842.74	8742.30

Comparison of Energy Demand and Peak Demand between FY 2076/77 and FY 2077/78



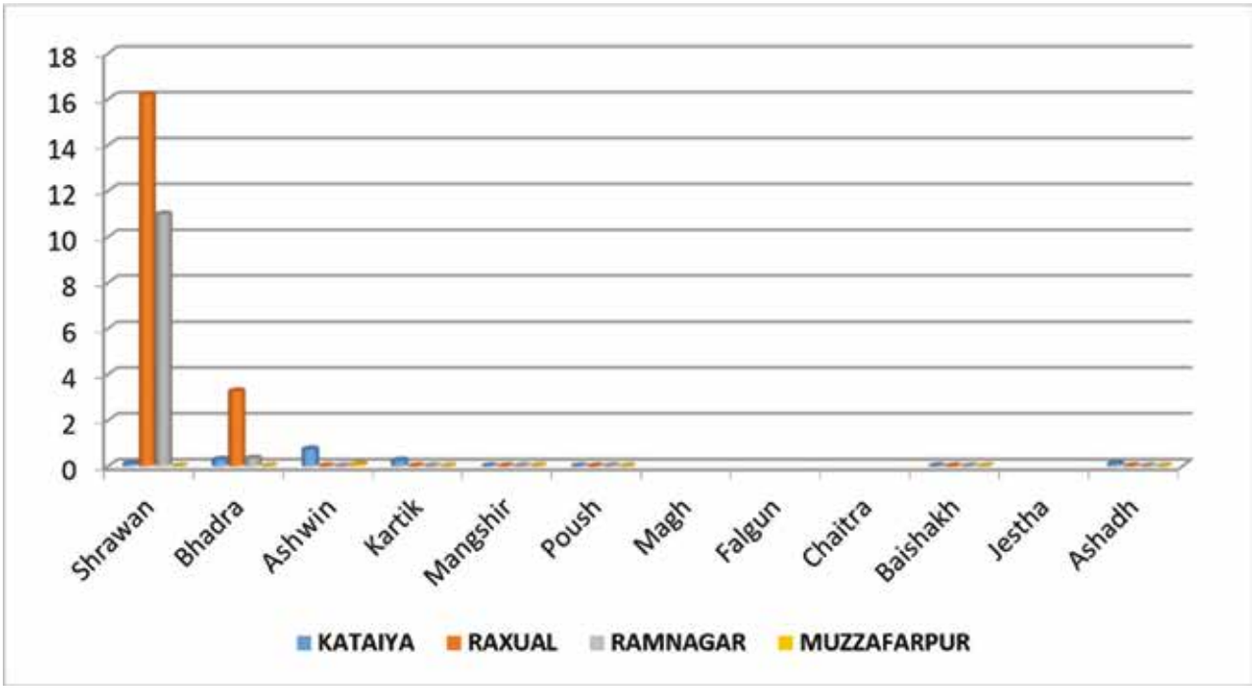
	Energy demand _2076/77	Energy demand_2077/78	Peak demand_2076/77	Peak demand_2077/78	Energy Demand increase(+)/decrease (-) in %	Peak Demand increase(+)/decrease (-) in %
Shrawan	814.30	819.01	1313.08	1432.99	0.58	8.37
Bhadra	826.14	776.66	1407.94	1315.32	-6.37	-7.04
Ashwin	671.72	765.92	1313.60	1406.19	12.30	6.58
Kartik	624.62	654.41	1295.72	1381.83	4.55	6.23
Mangsir	614.49	640.79	1242.10	1363.88	4.10	8.93
Poush	662.42	717.35	1374.90	1466.33	7.66	6.24
Magh	646.60	745.89	1340.75	1474.79	13.31	9.09
Falgun	618.53	686.33	1256.32	1350.77	9.88	6.99
Chaitra	510.87	781.11	1206.20	1463.01	34.60	17.55
Baishakh	485.53	771.11	1023.63	1481.85	37.03	30.92
Jestha	670.36	759.12	1231.63	1361.80	11.69	9.56
Ashadh	748.89	842.62	1369.52	1455.57	11.12	5.91
Total	7894.47	8960.54				
Average			1281.28	1412.86	11.70	9.11

Status of Imported Energy from different import Points in FY 2077/78



	MUJAFFARPUR-400 kV	KATAIYA -132 kV	TANAKPUR-132 kV	RAXAUL-132 kV	RAMNAGAR -132kV	OTHERS 33 & 11 kV IMPORT POINTS	TOTAL IMPORT
Shrawan	33.51	33.54	23.23	0.01	0.12	0.71	91.10
Bhadra	47.55	5.85	16.72	0.00	0.06	0.96	71.15
Ashwin	35.09	5.48		0.00	0.00	0.14	52.25
Kartik	9.92	18.12	4.39	3.92	0.00	0.02	36.38
Mangsir	80.40	21.34	21.46	1.83	0.40	0.00	125.45
Poush	170.81	59.66	39.59	33.20	9.00	0.80	313.06
Magh	194.31	81.88	51.13	45.84	21.84	1.78	396.77
Falgun	211.26	64.66	49.91	45.95	28.35	2.66	402.79
Chaitra	235.49	97.79	40.07	53.10	32.78	9.39	468.61
Baishakh	230.74	74.45	49.47	35.37	23.85	9.10	422.99
Jestha	115.69	36.50	36.50	39.66	10.81	4.95	207.60
Ashadh	120.37	20.46	36.29	30.00	7.53	2.99	217.64
Total	1485.15	519.73	368.76	288.88	134.74	33.49	2805.79

Status of Export Energy from different import Points in FY 2077/78



	KATAIYA	RAXUAL	RAMNAGAR	MUZZAFARPUR	Total
Shrawan	0.09872	16.19955	10.992778	0	31.190404
Bhadra	0.28792	3.26342	0.348016	0	4.713916
Ashwin	0.7407	0	0	0.07386	1.06456
Kartik	0.25	0	0	0	0.26448
Mangsir	0.00488	0	0	0.0096	0.01848
Poush	0.004	0	0	0	0.004
Magh					0
Falgun					0
Chaitra					0.00896
Baishakh	0.00896	0	0	0	0.00896
Jestha					0.10272
Ashadh	0.10272	0	0	0	32.487844
Total	1.4979	19.46297	11.340794	0.08346	32.385124

ANNEX-1

ELECTRICITY TARIFF

TARIFF RATES

1. Domestic Consumers

1.1 Single Phase Low Voltage (230 Volt)

kWh (Monthly)	5 Ampere		15 Ampere		30 Ampere		60 Ampere	
	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)
0-10	30.00	0.00	50.00	4.00	75.00	5.00	125.00	6.00
11-20	30.00	3.00	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
101-150	100.00	9.50	125.00	9.50	150.00	9.50	200.00	9.50
151-250	125.00	10.00	150.00	10.00	175.00	10.00	200.00	10.00
251-400	150.00	11.00	175.00	11.00	200.00	11.00	250.00	11.00
Above 400	175.00	12.00	200.00	12.00	225.00	12.00	275.00	12.00

1.2 Three phase L ow Voltage (400 Volt)

kWh (Monthly)	Up to 10 KVA		Above 10 KVA	
	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)
Up to 400	1100.00	11.50	1800.00	11.50
Above 400		12.00		12.00

1.3 Three phase Medium Voltage (33/11 kV)

kWh (Monthly)	Minimum Charge (Nrs.)	Energy Charge (Nrs/kWh)
Up to 1000	10,000.00	11.00
Above 1001		12.00

Billing Method (For 5 Ampere)

S. No.	kWh (Monthly)	Rate Nrs. Per Unit	Billing Method
1	Up to 10 units	0.00	Monthly Minimum Charge Rs. 30.00 for up to 10 units and Energy Charge Rs. 0.00 per unit
2	11 to 20 units	3.00	Monthly Minimum Charge Rs. 30.00 and Energy Charge Rs. 3.00 per unit for 1 unit to 20 units
3	21 to 30 units	6.50	Monthly Minimum Charge Rs. 50.00 and Energy Charge Rs. 3.00 per unit up to 20 units and Rs. 6.50 per unit for 21 units to 30 units
4	31 to 50 units	8.00	Monthly Minimum Charge Rs. 50.00 and Energy Charge Rs. 3.00 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
5	51 to 100 units	9.50	Monthly Minimum Charge Rs. 75.00 and Energy Charge Rs. 3.00 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
6	101 to 150 units	9.50	Monthly Minimum Charge Rs. 100.00 and Energy Charge Rs. 3.00 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
7	151 to 250 units	10.00	Monthly Minimum Charge Rs. 125.00 and Energy Charge Rs. 3.00 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 250 units
8	251 to 400 units	11.00	Monthly Minimum Charge Rs. 150.00 and Energy Charge Rs. 3.00 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 250 units and Rs. 11.00 per unit for 251 units to 400 units
9	Above 400	12.00	Monthly Minimum Charge Rs. 175.00 and Energy Charge Rs. 3.00 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 250 units and Rs. 11.00 per unit for 251 units to 400 units and Rs. 12.00 per unit for above 400 units

Similarly, billing will be made for 15, 30 and 60 Ampere. (Single Phase & 3 Phase Consumers)

2. Other Consumers

2.1 Low Voltage (230/400 V)

Consumer Category	Demand Charge (Nrs. per 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	-	4.30
5. Water Supply		
a) Community Water Supply	-	4.20
b) Other Water Supply	160.00	7.20
6. Transportation		
a) Charging Station	200.00	5.75
b) 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. per 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	-	4.80
5. Water Supply		
a) Community Water Supply	-	4.60
b) Other Water Supply	160.00	6.60
6. Transportation		
a) 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	-	4.90
5. Water Supply		
a) Community Water Supply	-	4.80
b) Other Water Supply	150.00	6.80
6. Transportation		
a) 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. per KVA/ month	Energy Charge Nrs/kWh		
		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	3.15	4.70
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) 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	3.50	4. 75
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) 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 (230/400V)				
1. Transportation				
a) 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. per KVA/ month	Energy Charge Nrs/kWh	
		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	4.70
5. Water Supply			
a) Community Water Supply	-	6.20	4.60
b) Other Water Supply	150.00	10.20	8.40
6. Transportation			
a) 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	4. 75
5. Water Supply			
a) Community Water Supply	-	6.30	4.70
b) Other Water Supply	150.00	10.50	8.50
6. Transportation			
a) 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 (230/400V)			
1. Transportation			
a) 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. 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 Baishakh to Mangsir			
33 kV	8.40	4.45	6.60
11 kV	8.60	5.05	6.70
Low Voltage (230/400V)	8.70	5.05	6.90
Tariff Rate from Paush to Chaitra			
Description	**Peak Time (17.00-23.00)**	**Normal Time (23.00-5.00)**	
33 kV	8.40	6.60	
11 kV	8.60	6.70	
Low Voltage (230/400V)	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 Baishakh to Mangsir			
33 kV	11.20	4.45	10.10
11 kV	11.60	5.05	10.20
Low Voltage (230/400V)	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)**
33 kV	11.20	10.10
11 kV	11.60	10.20
Low Voltage (230/400V)	11.70	10.30

Note: Charging station operators will be able to get maximum 20 percent additional charge in given tarrif for providing charging service to electric vehicles.

4. Community Wholesale Consumer:

Consumer Category	Energy Charge (Nrs/kWh)
1. Medium Voltage (11KV/33KV)	
Upto (N* x 20) units	3.00
Above (N* x 20) units	6.00
2. Lower Voltage Level (230/400 Volt)	
Upto (N* x 20) units	3.00
Above (N* x 20) units	6.25

N*= Total Number of Consumers of a Community Group

Electricity Generation Power Plants and Projects
Major Hydropower Stations

Major Hydropower Stations		
S.No	Power Plants	Capacity (KW)
1	Kaligandaki A	144,000
2	Middle Marsyandi	70,000
3	Marsyandi	69,000
4	Trishuli	24,000
5	Sunkoshi	10,050
6	Gandak	15,000
7	Kulekhani I	60,000
8	Devighat	14,100
9	Kulekhani II	32,000
10	Puwa Khola	6,200
11	Modi Khola	14,800
12	Chameliya	30,000
13	Upper Trishuli 3A HEP	60,000
14	Kulekhani III HEP	14,000
Sub Total		**563,150**
Small Hydropower Plants		
1	Sundarijal	640
2	Panauti	2,400
3	Fewa	1,000
4	Seti (Pokhara)	1,500
5	Tatopani	2,000
6	Chatara	3,200
7	Tinau	1,024
8	Pharping***	500
9	Jomsom**	240
10	Baglung***	200
11	Khandbari**	250
12	Phidim**	240
13	Surnaiyagad	200
14	Doti***	200
15	Ramechhap	150
16	Terhathum**	100
17	Gamgad	400
Sub Total		**14,244**
Total		**577,394**
Small Hydropower Plants (Isolated)		
1	Dhankuta***	240
2	Jhupra(Surkhet)***	345
3	Gorkhe(Illam)***	64
4	Jumla**	200
5	Dhanding***	32
6	Syangja***	80
7	Helambu	50
8	Darchula**	300
9	Chame**	45
10	Taplejung**	125
11	Manag**	80
12	Chaurjhari(Rukum)**	150
13	Syaprudaha(Rukum)**	200
14	Bhojpur**	250
15	Bajura**	200
16	Bajhang**	200
17	Arughat(Gorkha)	150
18	Okhaldhunga	125
19	Rupalgad(Dadeldhura)	100
20	Achham	400
21	Dolpa	200
22	Kalokot	500
23	Heldung(Humla)	500
Total		**4,536**
Thermal Power Plants		**Capacity(KW)**
1	Duhabi Multifuel	39,000
2	Hetauda Diesel	14,410
Total		**53,410**
Solar Power Plants		**Capacity(KW)**
1	Simikot	50
2	Gamgadhi	50
3	Battar (Nuwakot)	1250
Total		**1350**
Total Major Hydro(NEA)-Grid Connected		**577,394**
Total Small Hydro(NEA)-Isolated		4,536
Total Hydro(NEA)		581,930
Total Hydro(IPP)		814,645.40
Total Hydro(Nepal)		1,396,575
Total Thermal(NEA)		53,410
Total Solar(NEA)		1350
Total Installed Capacity(NEA & IPP)-Grid		**1,446,799.40**
Total Installed Capacity		**1,451,335.40**
Under Construction		**Capacity(KW)**
1	Upper Tamakoshi Hydropower Project	456,000
2	Tanahu Hydropower Project	140,000
3	Rahuganga HEP	40,000
4	Upper Sanjen	14,600
5	Sanjen	42,500
6	Rasuwagadi	111,000
7	Madhya Bhotekoshi	102,000
8	Upper Trishuli 3B	37,000
Total		**943,100**
Planned and Proposed		**Capacity(KW)**
1	Upper Arun HEP	1,061,000
2	Upper Modi A HEP	42,000
3	Upper Modi HEP	18,200
4	Dudhkoshi Storage HEP	635,000
5	Uttar Ganga Storage HEP	828,000
6	Tamakoshi V HEP	95,000
7	Aadhikhola Storage HEP	180,000
8	Chainpur Seti HEP	210,000
9	Begnas Rupa Pump Storage HEP	150,000
Total		**3,219,200**

** Leased to Private Sector

***Not in Normal Operation

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
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
Total (132 kV)			**3129.54**		
B	**400/220 kV Transmission Line**				
1	"Dhalkebar-Muzzaffarpur 400 kV Cross Border Line (400 kV)"	Double	78.00	MOOSE	500
2	Khimti- Dhalkebar 220 kV Transmission Line	Double	150.00	BISON	350
3	Trishuli 3B Hub-Matatirtha	Double	98.00	BISON	350
4	Matatirtha- Matatirtha Substation	Double Ckt, Underground	2.50	1C, XLPE Cu Cable	1200
		Double Ckt, Underground	2.50	1C, XLPE Cu Cable	1600
5	Dana-Kushma 220 kV Line	Double	79.6	Moose	
Total (220 kV)			**332.60**		
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	DOG	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-Birgunj	Double	144.00	WOLF	150
11	Suichatar-Teku	Double	8.20	BEAR	250
12	Suichatar-New Patan	Double	13.00	WOLF	150
13	Teku-K3 (underground)	"Double, Single Core"	5.60	XLPE Cable	400/500
14	Bhaktapur- Baneshwor-Patan	Single	16.50	LGJ 120 / WOLF	120/150
15	Bhaktapur-Banepa-Panchkhal-Sunkoshi P/S	Single	48.00	LGJ 120	120
16	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 77-78	Constructed in FY 77-78 only			
I	**Transmission Directorate**							
A	**132 kV Transmission Line**							
1	Solu Corridor	Double	180	168	122	CARDINAL	420	2021/22
2	Dordi Corridor	Double	20	17	17	CARDINAL	420	2021/22
3	Singati-Lamosangu 2nd Circuit	Single	40	25	25	BEAR	250	2021/22
4	New Modi-Lekhnath	Double	84	35	35	BEAR	250	2021/22
5	Bardaghat-Sardi	Double	40	13	13	BEAR	250	2021/22
6	"Kusaha-Kataiya Second Circuit (Cross Border-Nepal Portion)"	Single	13	11	11	BEAR	250	2020/21
7	Chameliya- Syaule- Attaria 2nd Circuit	Single	131	124.5	0	BEAR	250	2021/22
8	Ramechap-Garjyang-Khimti	Double	62	1.5	1.5	BEAR	250	2021/22
9	Thankot-Chapagaon	Double	56	16		BEAR	250	2021/22
10	"Raxual-Parwanipur Second Circuit (Cross Border-Nepal Portion)"	Single	16			BEAR	250	2021/22
11	Butwal-Lumbini	Double	40			BEAR	250	2020/21
12	Burtibang-Paudi Amarai-Tamghas-Sandhikharka-Gorunsinghe	Double	168			BEAR	250	2021/22
13	Kushaha- Biratnagar	Double	46			BEAR	250	2021/22
14	Dhalkebar-Loharpatti	Double	40.00			CARDINAL	420	2021/22
15	Kohalpur-Surkhet	Double	104.00			BEAR	250	2021/22
16	Balefi Corridor	Double	40.00			CARDINAL	420	2021/22
17	Mainahiya Sampatiya	Double	56.00			BEAR	250	2021/22
Total			**1,136.0**	**411.0**	**224.5**			
B	**220 kV Transmission Line**							
1	Koshi Corridor (Inaruwa-Basantapur-Baneshwor-Tumlingtar)	Single	106	104	33	MOOSE	500	2021/22
2	Bharatpur-Bardghat	Double	148	138	138	BISON	350	2021/22
3	Hetauda-Bharatpur	Double	148	10		BISON	350	2021/22
4	Chilime-Trishuli	Double	72			BISON	350	2021/22
5	Koshi Corridor (Basantapur-Dhungesangu)	Single	35			MOOSE	500	2021/22
Total			**509**	**252**	**171**			
C	400 kV Transmission Line							
1	Hetauda-Dhalkebar-Inaruwa	Double	576			MOOSE	500	2020/21
Total			**576**					
II	Project Managment Directorate							
A	132 kV Transmission Line							
1	Lapsifedi- Changunarayan- Duwakot	Double	28			BEAR	250	2021/22
2	Parwanipur- Pokhariya **	Double	42			ACCC Amsterdam	376	2023/24
3	Bhaktapur- Thimi- Koteswar**	Double	24			Single Core XLPE	500 sq. MM Cu	2022/23
5	Dandakhet- Rahughat **	Double	50			CARDINAL	420	2023/24
6	Ghorahi- Madichaur**	Double	80			CARDINAL	420	2023/24
7	Borang- Lapang**	Double	48			BEAR	250	2023/24

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	Koshi Corridor (Basantapur-Dhungesangu)	Single	35	MOOSE	500
3	Tumlingtal Sitalpati	Double	36.00	MOOSE	500
4	Trishuli 3B- Ratomate	Double	48.00	MOOSE	500
5	Lekhnath-Damauli	Double	90.00	MOOSE	500
6	Dhaubadi Iron Mine	Double	90.00	BISON	350
	Total		**405.00**		
C	**132 kV Transmission Line**				
1	Dhalkebar- Balganga	Double	48.00	BEAR	250
2	Nawalpur (Lalbandi) Salimpur	Double	40.00	BEAR	250
3	Pathlaiya Harniya	Double	54.00	BEAR	250
4	Bhumahi-Hakui	Double	32.00	BEAR	250
5	Bajhang-Deepayal-Attariya	Double	260.00	BEAR	250
6	Bafikot-Madichaur (Khungri)	Double	150.00	BEAR	250
7	Surkhet-Dailekh	Double	64.00	BEAR	250
8	Kaligandaki- Ridi	Double	44.00	BEAR	250
9	Godak-Anarmani	Double	70.00	BEAR	250
10	Kabeli (Amarpur) Dhungesangu	Double	40.00	BEAR	250
11	Inaruwa Dharan	Double	50.00	BEAR	250
12	Godak Soyak	Double	16.00	BEAR	250
13	Rupani-Bodebarsain	Double	36.00	BEAR	250
14	Lahan Sukhipur	Double	34.00	BEAR	250

15	"Chandrapur-Sukhdevchaur (Rajpur)"	Double	70.00	BEAR	250
16	"Barhabise Lamosaghu 2nd Circuit (Sunkoshi 132 kV SS)"	Single	12.00	BEAR	250
Total			**1020.00**		
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**		

Existing high voltage grid substations

S.No	Substation	Voltage Ratio	Capacity FY 074-75	Capacity FY 075-76	Capacity FY 076-77	Capacity FY 077-78	Total Increment
		kV	MVA	MVA	MVA	(MVA)	(MVA)
A	Kathmandu Grid Division						
1	Balaju	132/66	45	45	45	45	
		66/11	22.5	22.5	22.5	22.5	
		66/11	22.5	22.5	22.5	22.5	
		66/11		22.5	22.5	22.5	
2	Chapali	132/11	30	30	30	30	
		132/66	49.5	49.5	49.5	49.5	
		132/66	49.5	49.5	49.5	49.5	
3	Siuchatar	132/66	37.8	37.8	37.8	37.8	
		132/66	37.8	37.8	37.8	37.8	
		132/66	37.8	37.8	37.8	37.8	
		132/11			30	30	
		66/11	18	18	18	18	
		66/11	18	18	18	18	
4	New Chabel	66/11	22.5	22.5	22.5	22.5	
		66/11	22.5	22.5	22.5	22.5	
		66/11	22.5	22.5	22.5	22.5	
5	Lainchour	66/11	22.5	22.5	22.5	22.5	
		66/11	22.5	22.5	22.5	22.5	
6	New Patan	66/11	18	18	18	18	
		66/11	18	18	18	18	
		66/11	18	18	18	18	
		66/11	0	18	22.5	22.5	
7	Teku	66/11	22.5	22.5	22.5	22.5	
		66/11	22.5	22.5	22.5	22.5	
8	K3	66/11	22.5	22.5	22.5	22.5	
		66/11	22.5	22.5	22.5	22.5	
9	Baneshwor	66/11	18	18	18	30	12
		66/11	18	18	18	18	
10	Bhaktapur	132/66				49.5	49.5
		132/66	49.5	49.5	49.5	49.5	
		132/11	22.5	22.5	22.5	22.5	
		132/11			22.5	22.5	
		132/11	22.5	22.5	22.5	22.5	
11	Banepa	66/11	22.5	22.5	22.5	22.5	
		66/11	22.5				

12	Panchkhal	66/11	10	10	10	10	
13	Lamosanghu	132/33	30	30	30	30	
14	Matatirtha	132/33	30	30	30	30	
		132/11	22.5	22.5	22.5	22.5	
15	Indrawati	66/11	7.5	10	10	10	
16	Bagmati	66/11	0	0	6	6	
17	Samundratar	132/33				30	30
		132/33				30	30
		33/11				8	8
		33/11				8	8
B	Hetauda Grid Division						
18	Hetauda	132/66	45	45	45	45	
		132/66	45	45	45	45	
		66/11	10	10	10	10	
		66/11	10	10	10	10	
19	Kamane	132/33				63	63
		132/33	30	30	30	30	
		33/11	16.6	16.6	16.6	16.6	
20	Bharatpur	132/33	30	30	30	30	
		132/33	30	30	30	30	
		132/11	15	30	30	30	
		132/11	22.5	22.5	30	30	
21	Birgunj	66/33	12.5	12.5	30	30	
		66/33	12.5	12.5	12.5	12.5	
		66/11	30	30	30	30	
		66/11	30	30	30	30	
22	Parwanipur	132/11	22.5	22.5	22.5	22.5	
		132/11	22.5	22.5	22.5	22.5	
		132/11	22.5	22.5	22.5	22.5	
		132/66	63	63	63	63	
		132/66		63	63	63	
		132/66	63	0	0	63	63
23	Simra	66/11	15	15	15	15	
		66/11	15	15	15	15	
24	Amlekhgunj	66/11	7.5	7.5	7.5	7.5	
25	Pathlaiya	132/11	22.5	22.5	22.5	22.5	
26	Purbi Chitwan	132/33			30	30	
		132/33			30	30	
		33/11			16.6	16.6	

C	Dhalkebar Grid Branch						
27	Lahan	132/33					
		132/33	63	63	63	63	
		33/11	16.6	16.6	16.6	16.6	
		33/11	16.6	16.6	16.6	16.6	
28	Chapur	132/33	30	30	30	30	
		132/33	30	30	30	30	
		33/11	8	8	16.6	16.6	
29	Dhalkebar	400/220				315	315
		400/220				315	315
		400/220				315	315
		220/132				315	315
		220/132				315	315
		220/132		160	160	160	
		220/132		160	160	160	
		132/33	30	30	30	30	
		132/33	63	63	63	63	
		33/11	8	8	16.6	16.6	
		33/11	16.6	16.6	16.6	16.6	
30	Mirchaiya	132/33	30	30	30	30	
		33/11	8	16.6	16.6	16.6	
31	Rupani	132/33		63	63	63	
32	Tingla	132/33			30	30	
		33/11			8	8	
D	Duhabi Grid Branch						
33	Duhabi	132/33	63	63	63	63	
		132/33	63	63	63	63	
		132/33	63	63	63	63	
		33/11	16.6	16.6	16.6	16.6	
		33/11	16.6	16.6	16.6	16.6	
34	Anarmani	132/33	30	30	30	30	
		132/33	30	30	30	30	
		33/11	16.6	16.6	16.6	16.6	
		33/11	8	16.6	16.6	16.6	
35	Damak	132/33	30	30	63	63	
		33/11	16.6	16.6	16.6	16.6	
36	Godak	132/33	30	63	63	63	
		33/11	8	8	8	8	
37	Phidim	132/33		20	20	20	
		33/11		3	3	3	

38	Amarpur (Kabeli)	132/33		30	30	30	
		33/11		3	3	3	
E	Butwal Grid Division						
39	Butwal	132/33	63	63	63	63	
		132/33	63	63	63	63	
		132/33	63	63	63	63	
		33/11	16.6	16.6	16.6	16.6	
		33/11	16.6	16.6	16.6	16.6	
		33/11	0.0	16.6	16.6	16.6	
40	Bardghat	132/11	22.5	22.5	22.5	22.5	
		132/11	7.5	7.5	22.5	22.5	
41	Chanauta	132/33	30	30	30	30	
		132/33	12.5	12.5	30	30	
		33/11	3	8	8	8	
		33/11	3	3	8	8	
42	Lamahi	132/33	63	63	63	63	
		132/33	30	30	30	30	
		33/11	16.6	16.6	16.6	16.6	
		33/11			8	8	
43	Ghorahi	132/33		30	30	30	
		33/11		0	0	16.6	16.6
44	Kawasoti	132/33				30	30
		132/33	30	30	30	30	
		33/11	16.6	16.6	16.6	16.6	
45	Gandak	132/33			30	30	
F	Pokhara Grid Branch						
46	Damauli	132/33	30	30	30	30	
		132/33	30	30	30	30	
		33/11	16.6	16.6	16.6	16.6	
		33/11	3	3	3	3	
47	Pokhara	132/11	30	30	30	30	
		132/11	30	30	30	30	
48	Lekhnath	132/33	12.5	30	30	30	
		132/11			22.5	22.5	
		132/11	22.5	22.5	22.5	22.5	
49	Markichowk	132/33		30	30	30	
50	Syangja	132/33	30	30	30	30	
		33/11	8	8	8	8	
51	Dana	220/132				100	100
		132/33				25	25
52	Kushma	220/132				100	100

G	Attaria Grid Branch						
53	Kusum	132/11	12.5	12.5	12.5	12.5	
54	Hapure	132/33		30	30	30	
		33/11		8	8	8	
55	Attaria	132/33	30.0	30.0	30.0	30.0	
		132/33	30.0	30.0	30.0	30.0	
		33/11	16.6	16.6	16.6	16.6	
56	Kohalpur	132/33	30	63	63	63	
		132/33	30	30	30	30	
		33/11	3	3	16.6	16.6	
		33/11	16.6	16.6	16.6	16.6	
57	Lamki	132/33	15	15	15	15	
		132/33	15	15	15	15	
		33/11	16.6	16.6	16.6	16.6	
58	Mahendranagar	132/33	15	15	15	30	15
		132/33	10	15	15	15	
		33/11	7.5	7.5	7.5	16.6	9.1
59	Bhurigaon	132/33	30	30	30	30	
		33/11	8	8	8	8	
60	Pahalmanpur	132/33	30	30	30	30	
		33/11	8	8	8	8	
61	Syaule	132/33		30	30	30	
		33/11		8	8	8	

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	"220/132 132/33"	"1 Ø, 7x53.33 Bank 3 Ø, 50"	370	2021/22
2	Trishuli 3B Hub Substation	Trishuli 3 B Hub	"220/132 132/33"	"1 Ø, 7x53.33 Bank 3 Ø, 50"	370	2021/22
3	Hetauda- Bharatpur220 kV Transmission Line	New Bharatpur (Aaptari)	132/33	3 Ø, 22.5	22.5	2021/22
4	Singati Lamosanghu 132 kV Transmission Line	Singati	132/33	3 Ø, 30	30	2021/22
5	Ramechhap Garjyang Khimti 132 kV Transmission Line	Garjyang	132/33	1 Ø, 4x10 Bank	30	2021/22
6	Kushaha Kataiya 132 kV Second Circuit Transmission Line	Kushaha	132/11	3 Ø, 22.5	22.5	2021/22

7	Dordi Corridor132 kV Transmission Line	Kritipur	132/11	3 Ø, 10	10	2021/22
8	Butwal Lumbini132 kV Transmission Line	Mainahiya	"132/33 33/11"	"3 Ø, 2x45 3 Ø, 16"	106	2021/22
9	Koshi Corridor 220 kV Transmission Line	Tumlingtar	"220/132 132/33"	"1 Ø, 7x33.33 Bank 3 Ø, 2x30"	260	2021/22
		Baneshwor	220/33	3 Ø, 2x30	60	2021/22
		Basantapur	"220/132 132/33"	"1 Ø 7x33.33 Bank 3 Ø, 30"	230	2021/22
10	Ramechhap Garjyang Khimti 132 kV Transmission Line	New Khimti	220/132	1 Ø, 4x66.67 Bank	200	2021/22
11	Burtibang Paudi Amarai Tamghas Sandhikharka Gorusinghe 132 kV Transmission Line	Burtibang	132/33	3 Ø, 30	30	2021/22
		Paudi Amarai	132/33	3 Ø, 30	30	2021/22
		Tamghas	132/33	3 Ø, 30	30	2021/22
		Sandhikharka	"132/33 33/11"	"3 Ø, 30 3 Ø, 8"	38	2021/22
		Motipur	"132/33 33/11"	"3 Ø, 30 3 Ø, 8"	38	2021/22
12	Kushaha Biratnagar 132 kV Transmission Line	Biratnagar	"132/33 33/11"	"3 Ø, 2x63 3 Ø, 16"	142	2021/22
13	Nawalpur 132 kV Substation	Nawalpur	"132/33 33/11"	"3 Ø, 63 3 Ø, 16"	79	2021/22
14	Sunwal 132 kV Substation	Sunwal	"132/33 132/11"	"3 Ø, 2x63 3 Ø, 22.5"	148.5	2021/22
15	Hetauda- Dhalkebar-Inaruwa 400 kV Substation Expansion Project	Hetauda	400/220	"1 Ø, 4x167 Bank "	500	2021/22
		Inaruwa	400/220	3 Ø, 3x315	945	2021/22
16	"Nepal India Electricity Transmission and Trade Project (Hetauda-Dhalkebar-Inaruwa 400 kV Transmission Line)"	Hetauda	"220/132 132/11"	"3 Ø, 2x100 3 Ø, 10 "	210	2021/22
		Inaruwa	"220/132 220/33"	"3 Ø, 2x100 3 Ø, 2x63 "	326	2021/22
17	Koshi Corridor 220 kV Transmission Line	Dhungesanghu	132/33	"1 Ø, 7x5 Bank "	30	2021/22
18	New Modi Lekhnath132 kV Transmission Line	Lahachowk	"132/33 33/11"	"3 Ø, 30 3 Ø, 8"	38	2021/22
19	Lamahi Ghorahi 132 kV Substation Expansion	Ghorahi	132/33	"3 Ø, 63 "	63	2021/22
20	Dhalkebar Loharpati 132 kV Transmission Line	Loharpatti	"132/33 132/11 33/11"	"3 Ø, 2x30 3 Ø, 22.5 3 Ø, 16"	98.5	2022/23
Total					**4,457.00**	
II	**Under Project Management Directorate**					
1	New Butwal 220 kV Transmission Line & Substation Project	New Butwal	220/132	1 Ø, 4x33.33	100	2020/21
2	220 kV Bahrabise Substation	Barhabise	220/132	1 Ø, 4x53.33	165	2021/22
			132/11	3 Ø, 1x5		
3	Kathmandu Valley Transmission Capacity Reinforcement Project	Chobhar	132/11	3 Ø, 2x45	90	2021/22
		Futung	132/11	3 Ø, 2x45	90	2021/22
		Thimi	132/11	3 Ø, 2x45	90	2021/22

4	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
5	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		
6	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	
7	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
8	Parwanipur- Pokhariya 132 kV TL Project**	Pokhariya	132/33	3 Ø, 2x63	171	2023/24
			132/11	3 Ø, 1x45		
9	Kathmandu Valley Transmission Capacity Reinforcement Project (Phase II)**	Thimi	132/11	3 Ø, 2x45	90	2022/23
		Koteshwor	132/66	3 Ø, 2x63	216	
			132/11	3 Ø, 2x45		
10	Borang-Lapang 132 kV and Lapang-Ratmate 220 kV Transmission Line and Substation project **	Borang	132/33	3 Ø, 30	30	2023/24
		Lapang	"220/132 132/33"	"1 Ø, 7x33.33 3 Ø, 30"	230	
11	Ghorahi Madichaur 132 kV Transmission Line **	Madichaur	132/33	3 Ø, 30	30	2023/24
12	Dadakhet Rahughat132 kV Transmission Line **	Dadakhet	132/33	3 Ø, 30	30	2023/24
		Rahughat	"220/132 132/33"	"1 Ø, 7x33.33 3 Ø, 30"	230	
13	132 kV Pangtang Substation **	Pangtang	132/33	3 Ø, 30	30	2023/24
14	132 kV Keraun substation **	Keraun	132/33	3 Ø, 2x63	148.5	2023/24
			132/11	3 Ø, 22.5		
Total					**4743**	

Planned and proposed construction 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	Tumlingtar Sitalpati 220 kV Transmission Line	Sitalpati	"220/132 132/33"	"1 Ø, 7x33.33 Bank 1 Ø, 4x8 Bank "	224
4	Dharan 220/33 kV substation	Dharan	"220/33 33/11"	"3 Ø, 63 3 Ø, 10"	73
5	Dhaubadi Iron Mine 220 kV Transmission Line	Dhaubadi	220/132	3 Ø, 2x 100	200
6	Balefi Barhabise 132 kV Transmission Line	Pangtang (Balefi)	132/33	3 Ø, 63	63
7	Kaligandaki Ridi132 kV Transmission Line	Ridi	"132/33 33/11"	"3 Ø, 30 3 Ø, 8"	38
8	Lalbandi Salimpur 132 kV Transmission Line	Salimpur	132/33	3 Ø, 63	63
9	Dhalkebar Balganga 132 kV Transmission Line	Balganga	132/33	3 Ø, 2x63	126
10	Bhumahi Hakui132 kV Transmission Line	Hakui	132/33	3 Ø, 63	63
11	Godak Anarmani 132 kV Transmission Line	Anarmani	132/33	3 Ø, 63	63
12	Pathalaiya Harniya 132 kV Transmission Line	Harniya	132/33	3 Ø, 63	63
13	New Pokhara 132 kV Substation	Birauta	132/11	3 Ø, 30	30
14	Lahan- Sukhipur 132 kV Transmission Line	Sukhipur	132/33	3 Ø,2x30	60
15	Rupani- Bodebarsain 132 kV Transmission Line	Bodebarsain	132/33	3 Ø,2x30	60
16	Chandrapur- Sukhdevchaur 132 kV Transmission Line	Sukhdevchaur	132/33	"3 Ø,2x63 3 Ø,25"	151
Total					**2160**

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
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

NEPAL ELECTRICITY AUTHORITY
POWER TRADE DEPARTMENT
IPPs' Hydro Power Projects (Operation) as of FY 2077/78

S.N.	Developer	Projects	Locations	Installed Capacity (kW)	PPA Date	Commercial Operation Date
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	Chilime Hydro Power Company Ltd.	Chilime	Rasuwa	22100	2054.03.11	2060.05.08
6	Butwal Power Company Ltd.	Jhimruk Khola	Pyuthan	12000	2058.03.29	1994
7	Butwal Power Company Ltd.	Andhi Khola	Syangza	9400	2058.03.29	2071.12.22
8	Arun Valley Hydropower Development Co. (P.) Ltd.	Piluwa Khola Small	Sankhuwasabha	3000	2056.10.09	2060.06.01
9	Rairang Hydro Power Development Co. (P) Ltd.	Rairang Khola	Dhading	500	2059.08.27	2061.08.01
10	Sanima Hydropower (Pvt.) Ltd.	Sunkoshi Small	Sindhupalchowk	2500	2058.07.28	2061.12.11
11	Alliance Power Nepal Pvt.Ltd.	Chaku Khola	Sindhupalchowk	3000	2056.11.03	2062.03.01
12	Khudi Hydropower Ltd.	Khudi Khola	Lamjung	4000	2058.03.04	2063.09.15
13	Unique Hydel Co. Pvt. Ltd.	Baramchi Khola	Sindhupalchowk	4200	2058.12.14	2063.09.27
14	Thoppal Khola Hydro Power Co. Pvt. Ltd.	Thoppal Khola	Dhading	1650	2059.11.23	2064.07.13
15	Gautam Buddha Hydropower (Pvt.) Ltd.	Sisne Khola Small	Palpa	750	2061.04.29	2064.06.01
16	Kathmandu Small Hydropower Systems Pvt. Ltd.	Sali Nadi	Kathmandu	250	2062.04.24	2064.08.01
17	Khoranga Khola Hydropower Dev. Co. Pvt. Ltd.	Pheme Khola	Panchthar	995	2057.12.31	2064.08.05
18	Unified Hydropower (P.) Ltd.	Pati Khola Small	Parbat	996	2062.10.28	2065.10.27

19	Task Hydropower Company (P.) Ltd.	Seti-II	Kaski	979	2063.06.08	2065.11.14
20	Ridi Hydropower Development Co. (P.) Ltd.	Ridi Khola	Gulmi	2400	2063.05.08	2066.07.10
21	Centre for Power Dev. And Services (P.) Ltd.	Upper Hadi Khola	Sindhupalchowk	991	2064.04.07	2066.07.22
22	Gandaki Hydro Power Co. Pvt. Ltd.	Mardi Khola	Kaski	4800	2060.07.07	2066.10.08
23	Himal Dolkha Hydropower Company Ltd.	Mai Khola	Ilam	4500	2063.11.19	2067.10.14
24	Baneswor Hydropower Pvt. Ltd.	Lower Piluwa Small	Sankhuwasabha	990	2064.07.21	2068.04.01
25	Barun Hydropower Development Co. (P.) Ltd.	Hewa Khola	Sankhuwasabha	4455	2061.04.02	2068.04.17
26	Bhagawati Hydropower Development Co. (P.) Ltd.	Bijayapur-1	Kaski	4410	2066.03.30	2069.05.04
27	Kathmandu Upatyaka Khanepani bewasthapan Board	Solar	Lalitpur	680.4	2069.06.12	2069.07.15
28	Nyadi Group (P.) Ltd.	Siuri Khola	Lamjung	4950	2064.04.17	2069.07.30
29	United Modi Hydropwer Pvt. Ltd.	Lower Modi 1	Parbat	10000	2065.10.20	2069.08.10
30	Synergy Power Development (P.) Ltd.	Sipring Khola	Dolakha	9658	2065.10.20	2069.10.03
31	Laughing Buddha Power Nepal (P.) Ltd.	Middle Chaku	Sindhupalchowk	1800	2066.11.03	2069.11.15
32	Aadishakti Power Dev. Company (P.) Ltd.	Tadi Khola (Thaprek)	Nuwakot	5000	2061.12.15	2069.12.14
33	Ankhu Khola Jal Bidhyut Co. (P.) Ltd.	Ankhu Khola - 1	Dhading	8400	2066.02.22	2070.05.05
34	Nepal Hydro Developer Pvt. Ltd.	Charanawati Khola	Dolakha	3520	2067.01.13	2070.02.24
35	Laughing Buddha Power Nepal Pvt. Ltd.	Lower Chaku Khola	Sindhupalchowk	1800	2063.07.02	2070.04.24
36	Bhairabkunda Hydropower Pvt. Ltd.	Bhairab Kunda	Sindhupalchowk	3000	2065.08.02	2071.02.22
37	Radhi Bidyut Company Ltd.	Radhi Khola	Lamjung	4400	2066.10.18	2071.02.31
38	Pashupati Environmental Eng. Power Co. Pvt. Ltd.	Chhote Khola	Gorkha	993	2067.11.09	2071.03.09
39	Mailung Khola Hydro Power Company (P.) Ltd.	Mailung Khola	Rasuwa	5000	2058.04.09	2071.03.19

40	Joshi Hydropower Development Company Limited	Upper Puwa -1	Illam	3000	2066.01.23	2071.10.01
41	Sanima Mai Hydropower Limited	Mai Khola	Ilam	22000	2067.01.08	2071.10.14
42	Bojini Company Private Limited	Jiri Khola Small	Dolakha	2200	2065.10.23	2071.11.01
43	Ruru Hydropower Project (P) Ltd.	Upper Hugdi Khola	Gulmi	5000	2066.04.04	2071.12.09
44	Prime Hydropower Co. Pvt. Ltd.	Belkhu	Dhading	518	2064.04.04	2071.12.30
45	Api Power Company Pvt. Ltd.	Naugadh gad Khola	Darchula	8500	2067.01.19	2072.05.02
46	Kutheli Bukhari Small Hydropower (P).Ltd	Suspa Bukhari	Dolakha	998	2069.04.32	2072.06.03
47	Sanima Mai Hydropower Ltd.	Mai Cascade	Ilam	7000	2069.10.12	2072.10.29
48	Chhyangdi Hydropower Limited	Chhandi	Lamjung	2000	2068.12.23	2072.12.13
49	Panchakanya Mai Hydropower Ltd. (Previously Mai Valley and prior to that East Nepal)	Upper Mai Khola	Ilam	9980	2061.12.19	2073.03.09
50	Sayapatri Hydropower Private Limited	Daram Khola A	Baglung	2500	2068.12.19	2073.03.12
51	Electro-com and Research Centre Pvt. Ltd.	Jhyadi Khola	Sindhupalchowk	2000	2067.01.30	2073.05.31
52	Khani Khola Hydropower Company Pvt. Ltd.	Tungun-Thosne	Lalitpur	4360	2069.04.05	2073.07.09
53	Daraudi Kalika Hydro Pvt. Ltd.	Daraudi Khola A	Gorkha	6000	2068.05.19	2073.08.13
54	Khani Khola Hydropower Company Pvt. Ltd.	Khani Khola	Lalitpur	2000	2069.04.05	2073.08.20
55	Sapsu Kalika Hydropower Co. Pvt. Ltd.	Miya Khola	Khotang	996	2069.08.10	2073.09.03
56	Sinohydro-Sagarmatha Power Company (P) Ltd.	Upper Marsyangdi "A"	Lamjung	50000	2067.09.14	2073.09.17
57	Madi Power Pvt. Ltd.	Upper Madi	Kaski	25000	2066.05.21	2073.09.25
58	Panchthar Power Company Pvt. Ltd.	Hewa Khola A	Panchthar	14900	2068.05.30	2073.10.22
59	Sanvi Energy pvt. Ltd.	Jogmai	Ilam	7600	2069.08.07	2074.01.18
60	Bhugol Energy Dev Compay (P). Ltd	Dwari Khola	Dailekh	3750	2069.12.30	2074.01.23

61	Mai Valley Hydropower Private Limited	Upper Mai C	Ilam	5100	2068.12.23	2074.04.09
62	Dronanchal Hydropower Co.Pvt.Ltd	Dhunge-Jiri	Dolakha	600	2068.09.25	2074.06.01
63	Dibyaswari Hydropower Limited	Sabha Khola	Sankhuwasabha	4000	2068.11.17	2074.06.02
64	Puwa Khola-1 Hydropower P. Ltd.	Puwa Khola-1	Ilam	4000	2070.10.09	2074.06.23
65	Shibani Hydropower Co. Pvt. Ltd.	Phawa Khola	Taplejung	4950	2063.12.01	2074.07.14
66	Mount Kailash Energy Pvt. Ltd.	Thapa Khola	Myagdi	13600	2067.10.11	2074.08.22
67	Mandakini Hydropower Limited	Sardi Khola	Kaski	4000	2068.11.11	2074.08.23
68	Garjang Upatyaka Hydropower (P.) Ltd.	Chake Khola	Ramechhap	2830	2065.11.06	2074.08.28
69	Union Hydropower Pvt Ltd.	Midim Karapu	Lamjung	3000	2069.10.28	2074.10.15
70	Syauri Bhumey Microhydro Project	Syauri Bhumey	Nuwakot	23	2072.11.16	2074.10.18
71	Molung Hydropower Company Pvt. Ltd.	Molung Khola	Okhaldhunga	7000	2069.11.21	2074.12.12
72	Sikles Hydropower Pvt. Ltd.	Madkyu Khola	Kaski	13000	2066.08.03 2072.12.10	2074.12.19
73	Himal Dolkha Hydropower Company Ltd.	Mai sana Cascade	Ilam	8000	2069.11.14	2074.12.26
74	Barahi Hydropower Pvt.ltd	Theule Khola	Baglung	1500	2066.12.16	2075.03.24
75	Leguwa Khola Laghu Jalbidhyut Sahakari Sastha Ltd.	Leguwa Khola	Dhankuta	40	2072.11.21	2075.03.28
76	Super Mai Hydropower Pvt. Ltd.	Super Mai	Illam	7800	2073.12.06	2075.07.11
77	Chimal Gramin Bidhyut Sahakari Sanstha Ltd.	Sobuwa Khola-2 MHP	Taplejung	90	2074.11.15	2075.07.14
78	Surya Power Company Pvt. Ltd.	Bishnu Priya Solar Farm Project	Nawalparasi	960	2074.04.08	2075.08.13
79	Deurali Bahuudesiya Sahakari Sanstha Ltd.	Midim Khola	Lamjung	100	2070.02.20	2075.09.04
80	Bindhyabasini Hydropower Development Co. (P.) Ltd.	Rudi Khola A	Lamjung and Kaski	8800	2069.10.28 2073.02.13	2075.12.04
81	Mandu Hydropower Ltd.	Bagmati Khola Small	Makawanpur/ Lalitpur	22000	2069.10.07	2075.12.19
82	Salmanidevi Hydropower (P). Ltd	Kapadi Gad	Doti	3330	2069.12.11	2076.02.25

83	Eastern Hydropower Pvt. Ltd.	Pikhuwa Khola	Bhojpur	5000	2066.07.24	2076.02.27
84	Mountain Hydro Nepal Pvt. Ltd.	Tallo Hewa Khola	Panchthar	22100	2071.04.09 2075.10.16	2076.04.21
85	Pashupati Environmental Power Co. Pvt. Ltd.	Lower Chhote Khola	Gorkha	997	2072.08.04	2076.05.20
86	United Idi Mardi and R.B. Hydropower Pvt. Ltd.	Upper Mardi	Kaski	7000	2073.02.25	2076.06.20
87	Rairang Hydropower Development Company Ltd.	Iwa Khola	Taplejung	9900	2070.01.29	2076.06.20
88	Api Power Company Pvt. Ltd.	Upper Naugad Gad	Darchula	8000	2073.07.12	2076.07.13
89	Arun Kabeli Power Ltd.	Kabeli B-1	Taplejung, Panchthar	25000	2069.03.29	2076.07.23
90	Rangoon Khola Hydropower Pvt. Ltd.	Jeuligad	Bajhang	996	2071.10.20	2076.08.27
91	Dolti Power Company Pvt. Ltd.	Padam Khola	Dailekh	4800	2074.08.01	2076.09.08
92	Bindhyabasini Hydropower Development Co. (P.) Ltd.	Rudi Khola B	Lamjung and Kaski	6600	2071.4.20	2076.11.05
93	Ghalemdi Hydro Limited (Previously, Cemat Power Dev Company (P). Ltd.)	Ghalemdi Khola	Myagdi	5000	2069.12.30	2076.11.05
94	Terhathum Power Company Pvt. Ltd.	Upper Khorunga	Terhathum	7500	2073.07.29	2076.11.17
95	Upper Solu Hydroelectric Company Pvt. Ltd	Solu Khola	Solukhumbu	23500	2070.07.24	2076.12.10 (Transactional Operation Date-TOD)
96	Sagarmatha Jalabidhyut Company Pvt. Ltd.	Super Mai 'A'	Illam	9600	2074.11.14	2077.02.32
97	Mai Khola Hydropower Pvt. Ltd.	Super Mai Cascade	Illam	3800	2074.12.07	2077.03.31
98	Century Energy Pvt. Ltd.	Hadi Khola Sunkoshi A	Sindhupalchowk	997	2074.05.05	2077.05.12
99	Rawa Energy Development Pvt. Ltd.	Upper Rawa	Khotang	3000	2073.04.24	2077.06.04
100	Himalayan Hydropower Pvt. Ltd.	Namarjun Madi	Kaski	11880	2066.05.30	2077.06.12
101	Ridi Hydropower Development Co. Ltd.	Butwal Solar Project	Rupandehi	8500	2075.06.09	2077.07.15

102	Manakamana Engineering Hydropower Pvt. Ltd.	Ghatte Khola	Dolakha	5000	2070.04.28	2077.07.23
103	Everest Sugar and Chemical Industries Ltd.	Everest Sugar and Chemical Industries Ltd.	Mahottari	3000	2075.06.17	2077.10.26
104	Civil Hydropower Pvt. Ltd.	Bijayapur 2 Khola Small	Kaski	4500	2072.09.12	2077.11.18
105	Eco Power Development Company Pvt. Ltd	Mithila Solar PV Electric Project	Dhanusha	10000	2075.09.16	2077.11.22
106	Taksar-Pikhuwa Hydropower Pvt. Ltd.	Taksar Pikhuwa	Bhojpur	8000	2073.09.01	2078.01.01
107	Shiva Shree Hydropower (P.) Ltd.	Upper Chaku A	Sindhupalchowk	22200	2067.05.22	2078.02.01
108	Robust Energy Ltd.	Mistri Khola	Myagdi	42000	2067.10.20	2078.03.03
			TOTAL	814,645.4		

NEPAL ELECTRICITY AUTHORITY
POWER TRADE DEPARTMENT
IPPs' Hydropower Projects (Under Construction) as of FY 2077/78

S.N.	Developer	Projects	Locations	Installed Capacity (kW)	PPA Date	Commercial Operation Date
1	Upper Tamakoshi Hydropower Ltd.	Upper Tamakoshi	Dolkha	456000	2067.09.14	2072.9.10 - 4 Units, 2073.3.30- 2 Units
2	Nama Buddha Hydropower Pvt. Ltd.	Tinau Khola Small	Palpa	1665	2065.03.31	2066.11.1 (990kw) 2077.09.15 (675kw)
3	Jumdi Hydropower Pvt. Ltd.	Jumdi Khola	Gulmi	1750	2066.10.21	2069.10.11
4	Hira Ratna Hydropower P.ltd	Tadi Khola	Nuwakot	5000	2067.01.09	2075.10.01
5	Energy Engineering Pvt. Ltd.	Upper Mailung A	Rasuwa	6420	2067.03.25	2075.10.01
6	Greenlife Energy Pvt. Ltd.	Khani khola-1	Dolakha	40000	2067.06.24 2074.02.21 (upgraded 25MW)	2074.12.17 (25MW) 2076.09.03 (15MW)
7	Himalaya Urja Bikas Co. Pvt. Ltd.	Upper Khimti	Ramechhap	12000	2067.10.09	2075.3.32
8	Green Ventures Pvt. Ltd.	Likhu-IV	Ramechhap	52400	2067.10.19	2077.06.30
9	Manang Trade Link Pvt. Ltd.	Lower Modi	Parbat	20000	2068.05.20	2074.3.31
10	Mathillo Mailung Khola Jalbidhyut Ltd. (Prv. Molnia Power Ltd.)	Upper Mailun	Rasuwa	14300	2068.05.23	2075.10.01
11	Sanjen Hydropower Co.Limited	Upper Sanjen	Rasuwa	14800	2068.06.23	2076.09.15
12	Middle Bhotekoshi Jalbidhyut Company Ltd.	Middle Bhotekoshi	Sindhupalchowk	102000	2068.07.28	2074.03.01 2076.12.28
13	Chilime Hydro Power Company Ltd.	Rasuwagadhi	Rasuwa	111000	2068.07.28	2076.09.15
14	Water and Energy Nepal Pvt. Ltd.	Badi Gad	Baglung	6600	2068.08.13	2072.2.14
15	Sanjen Hydropower Company Limited	Sanjen	Rasuwa	42500	2068.08.19	2076.09.15
16	Gelun Hydropower Co.Pvt.Ltd	Gelun	Sindhupalchowk	3200	2068.09.25	2074.06.14
17	Dariyal Small Hydropower Pvt. Ltd	Upper Belkhu	Dhading	750	2068.11.28	2071.7.16
18	Suryakunda Hydroelectric Pvt. Ltd.	Upper Tadi	Nuwakot	11000	2068.12.03	2075.10.01
19	Himalayan Power Partner Pvt. Ltd.	Dordi Khola	Lamjung	27000	2069.03.01	2076.05.14

20	Sasha Engingeering Hydropower (P). Ltd	Khani Khola (Dolakha)	Dolakha	30000	2069.03.25	2074.12.17
21	Rising Hydropower Compnay Ltd.	Selang Khola	Sindhupalchowk	990	2069.03.31	2071.6.15
22	Liberty Hydropower Pvt. Ltd.	Upper Dordi A	Lamjung	25000	2069.06.02	2076.05.14
23	Hydro Innovation Pvt. Ltd.	Tinekhu Khola	Dolakha	990	2069.06.08	2074.12.30
24	Salankhu Khola Hydropower Pvt. Ltd.	Salankhu Khola	Nuwakot	2500	2069.06.14	2071.11.30
25	Moonlight Hydropower Pvt. Ltd.	Balephi A	Sindhupalchowk	22140	2069.07.14	2076.12.28
26	Middle Modi Hydropower Ltd.	Middle Modi	Parbat	15100	2069.08.21	2077.03.31
27	Reliable Hydropower Co. Pvt. Ltd.	Khorunga Khola	Terhathum	4800	2069.08.26	2077.08.16
28	Rara Hydropower Development Co. Pvt. Ltd.	Upper Parajuli Khola	Dailekh	2150	2069.08.28	2071.12.17
29	Lohore Khola Hydropower Co. Pvt. Ltd.	Lohore Khola	Dailekh	4200	2069.09.08	2073.06.20
30	Beni Hydropower Project Pvt. Ltd.	Upper Solu	Solukhumbu	18000	2069.09.16 2073.07.25 (PPA Revived)	2074.10.01
31	Dudhkoshi Power Company Pvt. Ltd.	Rawa Khola	Khotang	6500	2069.09.26	2073.05.31
32	Universal Power Company Ltd.	Lower Khare	Dolakha	11000	2069.10.22	2074.9.16 (8.26MW) 2076.04.03 (2.74MW)
33	Madhya Midim Jalbidhyut Company P. Ltd.	Middle Midim	Lamjung	3100	2069.10.23	2072.5.1
34	Volcano Hydropower Pvt. Ltd.	Teliya Khola	Dhankuta	996	2069.10.25	2071.7.24
35	Betrawoti Hydropower Company (P).Ltd	Phalankhu Khola	Rasuwa	13700	2069.12.06	2075.10.01
36	Himalaya Urja Bikas Co. Ltd.	Upper Khimti II	Ramechhap	7000	2069.12.09	2075.12.01
37	Dovan Hydropower Company Pvt. Ltd.	Junbesi Khola	Solukhumbu	5200	2069.12.29	2076.08.30
38	Tallo Midim Jalbidhut Company Pvt. Ltd.	Lower Midim	Lamjung	996	2070.01.19	2071.8.1
39	Tangchhar Hydro Pvt. Ltd	Tangchhahara	Mustang	2200	2070.02.20	2073.7.1
40	Abiral Hydropower Co. Pvt. Ltd.	Upper Khadam	Morang	990	2070.02.21	2071.08.01
41	Essel-Clean Solu Hydropower Pvt. Ltd.	Lower Solu	Solukhumbu	82000	2070.07.15	2076.8.30
42	Consortium Power Developers Pvt. Ltd.	Khare Khola	Dolakha	24100	2070.07.15	2075.08.15

43	Singati Hydro Energy Pvt. Ltd.	Singati Khola	Dolakha	25000	2070.07.27	2075.05.31 (16MW) 2077.04.01 (9MW)
44	Maya Khola Hydropower Co. Pvt. Ltd.	Maya Khola	Sankhuwasabha	14900	2070.08.30	2076.9.1
45	Idi Hydropower Co. P. Ltd.	Idi Khola	Kaski	975	2070.09.01	2074.09.16
46	Buddha Bhumi Nepal Hydro Power Co. Pvt. Ltd.	Lower Tadi	Nuwakot	4993	2070.12.10	2075.10.01
47	Dordi Khola Jal Bidyut Company Ltd.	Dordi-1 Khola	Lamjung	12000	2071.07.19 (10.3 MW) 2073.04.19 2075.11.21 (1.7 MW)	2076.08.16 (10.3 MW) 2077.04.02 (1.7 MW)
48	River Falls Hydropower Development Pvt. Ltd.	Down Piluwa	Sankhuwasabha	9500	2071.10.18	2076.09.01
49	Peoples' Hydropower Company Pvt. Ltd.	Super Dordi 'Kha'	Lamjung	54000	2071.11.13 2075.11.15	2077.03.29
50	Hydro Venture Private Limited	Solu Khola (Dudhkoshi)	Solukhumbu	86000	2071.11.13	2077.06.10
51	Global Hydropower Associate Pvt. Ltd.	Likhu-2	Solukhumbu/ Ramechap	33400	2071.11.19	2077.04.01
52	Paan Himalaya Energy Private Limited	Likhu-1	Solukhumbu/ Ramechap	51400	2071.11.19	2077.04.01
53	Numbur Himalaya Hydropower Pvt. Ltd.	Likhu Khola A	Solukhumbu/ Ramechap	24200	2071.11.22	2077.04.01
54	Dipsabha Hydropower Pvt. Ltd.	Sabha Khola A	Sankhuwasabha	9990	2071.12.02	2076.07.15
55	Research and Development Group Pvt. Ltd.	Rupse Khola	Myagdi	4000	2071.12.17	2076.08.02
56	Hydro Empire Pvt. Ltd.	Upper Myagdi	Myagdi	20000	2071.12.17	2077.05.30
57	Chandeshwori Mahadev Khola MH. Co. Pvt. Ltd.	Chulepu Khola	Ramechhap	8520	2071.12.23	2075.04.15
58	Nyadi Hydropower Limited	Nyadi	Lamjung	30000	2072.02.12	2077.01.06
59	Suri Khola Hydropower Pvt. Ltd.	Suri Khola	Dolakha	6400	2072.02.20	2074.12.30
60	Bungal Hydro Pvt. Ltd. (Previously Sanigad Hydro Pvt. Ltd.)	Upper Sanigad	Bajhang	10700	2072.03.15	2076.05.29
61	Kalanga Hydro Pvt. Ltd.	Kalangagad	Bajhang	15330	2072.03.15	2076.05.29
62	Sanigad Hydro Pvt. Ltd.	Upper Kalangagad	Bajhang	38460	2072.03.15	2077.04.15
63	Dhaulagiri Kalika Hydro Pvt. Ltd.	Darbang-Myagdi	Myagdi	25000	2072.04.28	2075.12.25
64	Menchhiyam Hydropower Pvt. Ltd.	Upper Piluwa Khola 2	Sankhuwasabha	4720	2072.05.11	2076.04.01

65	Kabeli Energy Limited	Kabeli-A	Panchthar and Taplejung	37600	2072.06.07	2076.11.03
66	Upper Syange Hydropower P. Ltd.	Upper Syange Khola	Lamjung	2400	2072.06.14	2075.10.01
67	Peoples Energy Ltd. (Previously Peoples Hydro Co-operative Ltd.)	Khimti-2	Dolakha and Ramechhap	48800	2072.06.14	2078.04.01
68	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)
69	Huaning Development Pvt. Ltd.	Upper Balephi A	Sindhupalchowk	36000	2072.08.29	2075.10.06
70	Upper Hewa Khola Hydropower Co. Pvt. Ltd.	Upper Hewa Khola Small	Sankhuwasabha	8500	2072.09.23	2076.03.17
71	Multi Energy Development Pvt. Ltd.	Langtang Khola	Rasuwa	20000	2072.09.29	2076.12.30 (for 10MW) 2078.04.03 (for upgraded 10MW)
72	Ankhu Hydropower (P.) Ltd.	Ankhu Khola	Dhading	34000	2073.01.30	2076.12.30
73	Myagdi Hydropower Pvt. Ltd.	Ghar Khola	Myagdi	14000	2073.02.11	2076.08.30 (8.3 MW) 2078.10.17 (5.7 MW)
74	Richet Jalbidhyut Company Pvt. Ltd.	Richet Khola	Gorkha	4980	2073.02.23	2075.07.30
75	Rapti Hydro and General Construction Pvt. Ltd.	Rukumgad	Rukum	5000	2073.03.07	2076.09.01
76	Siddhi Hydropower Company Pvt. Ltd.	Siddhi Khola	Illam	10000	2074.05.29	2077.03.31
77	Nilgiri Khola Hydropower Co. Ltd.	Nilgiri Khola	Myagdi	38000	2073.11.30	2080.08.30
78	Siuri Nyadi Power Pvt. Ltd.	Super Nyadi	Lamjung	40270	2074.02.19	2079.04.01
79	Swet-Ganga Hydropower and Construction Ltd.	Lower Likhu	Ramechhap	28100	2073.09.14	2078.08.15
80	Nilgiri Khola Hydropower Co. Ltd.	Nilgiri Khola-2	Myagdi	62000	2074.03.05	2081.08.30
81	Sano Milti Khola Hydropower Ltd.	Sano Milti	Ramechhap and Dolakha	3000	2073.01.13	2075.08.01
82	Diamond Hydropower Pvt. Ltd.	Upper Daraudi-1	Gorkha	10000	2072.08.14	2075.09.17
83	Chhyangdi Hydropower Limited	Upper Chhyangdi Khola	Lamjung	4000	2074.03.22	2078.4.05

84	Rasuwa Hydropower Pvt. Ltd	Phalanku Khola	Rasuwa	5000	2071.08.24	2076.8.01
85	Makari Gad Hydropower Pvt. Ltd.	Makarigad	Darchula	10000	2072.08.29	2076.02.32
86	Super Madi Hydropower Ltd. (Previously Himal Hydro and General Construction Ltd.)	Super Madi	Kaski	44000	2073.10.27	2078.02.28
87	Mount Nilgiri Hydropower Company Pvt. Ltd.	Rurubanchu-1	Kalikot	13500	2074.05.08	2077.11.03
88	Trishuli Jal Vidhyut Company Ltd.	Upper Trishuli 3B	Rasuwa	37000	2074.05.06	2078.11.17
89	Sindhujwala Hydropower Ltd.	Upper Nyasem	Sindhupalchowk	41400	2073.07.24	2077.03.30
90	Samling Power Company Pvt. Ltd.	Mai Beni	Illam	9510	2073.07.26	2078.08.02
91	Energy Venture Pvt. Ltd.	Upper Lapche	Dolakha	52000	2073.04.20	2078.12.30
92	Orbit Energy Pvt. Ltd. (Previously Pokhari Hydropower Company Pvt. Ltd.)	Sabha Khola B	Sankhuwasabha	15100	2074.03.26	2078.2.31
93	Daram Khola Hydro Energy Ltd.	Daram Khola	Baglung and Gulmi	9600	2073.10.09	2076.09.08
94	Sagarmatha Energy and Construction Pvt. Ltd.	Dhalkebar Solar Project	Dhanusha	3000	2075.06.24	2076.12.23
95	Gorkha Congenial Energy and Investment Pvt. Ltd.	Lamahi Solar Project	Dang	3000	2075.06.24	2076.12.23
96	Global Energy and Construction Pvt. Ltd.	Duhabi Solar Project	Sunsari	8000	2075.06.25	2076.12.24
97	Him River Power Pvt. Ltd.	Liping Khola	Sindhupalchowk	16260	2073.02.28	2077.01.22
98	Madhya Tara Khola Hydropower P. Ltd. (Prv. Pahadi Hydro Power Company (P.) Ltd.)	Madhya Tara Khola Small	Baglung	1700	2073.10.26	2075.08.29
99	Nepal Water and Energy Development Company Pvt. Ltd.	Upper Trishuli - 1	Rasuwa	216000	2074.10.14	2080.12.18
100	Mewa Developers Pvt. Ltd.	Middle Mewa	Taplejung	49000	2075.05.04	2080.06.06
101	Solar Farm Pvt. Ltd.	Belchautara Solar Project	Tanahun	5000	2075.04.23	2076.04.03
102	Him Star Urja Co. Pvt. Ltd.	Buku Kapati	Okhaldhunga and Solukhumbu	5000	2074.10.11	2077.04.15
103	Aashutosh Energy Pvt. Ltd.	Chepe Khola Small	Lamjung	8630	2075.02.15	2078.11.09
104	Indushankar Chini Udhyog Ltd.	Indushankar Chini Udhyog Ltd.	Sarlahi	3000	2075.06.10	2076.12.09
105	Sanvi Energy Pvt. Ltd.	Jogmai Cascade	Illam	6000	2075.05.07	2078.04.07

106	Jhyamolongma Hydropower Development Company Pvt. Ltd.	Karuwa Seti	Kaski	32000	2074.04.20	2079.01.12
107	Nasa Hydropower Pvt. Ltd.	Lapche Khola	Dolakha	99400	2074.07.29	2079.04.14
108	Asian Hydropower Pvt. Ltd.	Lower Jogmai	Illam	6200	2074.12.07	2078.04.01
109	Sanima Middle Tamor Hydropower Ltd. (Prv. Tamor Sanima Energy Pvt. Ltd.)	Middle Tamor	Taplejung	73000	2073.09.26	2078.05.28
110	Vision Energy and Power Pvt. Ltd.	Nupche Likhu	Ramechhap	57500	2074.11.28	2080.05.02
111	Three Star Hydropower Company Ltd.	Sapsup Khola	Khotang	6600	2075.03.25	2078.06.31
112	Dolakha Nirman Company Pvt. Ltd.	Isuwa Khola	Sankhuwasabha	97200	2075.06.26	2080.04.01
113	People's Power Limited	Puwa- 2	Illam	4960	2074.05.05	2078.06.11
114	Tundi Power Pvt.Ltd	Rahughat Mangale	Myagdi	35500	2075.03.29	2079.08.29
115	Him Consult Pvt. Ltd.	Rele Khola	Myagdi	6000	2074.01.28	2077.02.19
116	Parbat Paiyun Khola Hydropower Company Pvt. Ltd.	Seti Khola	Parbat	3500	2074.02.22	2076.12.30
117	Chirkhwa Hydropower Pvt. Ltd.	Upper Chirkhwa	Bhojpur	4700	2073.03.01	2077.04.01
118	Yambling Hydropower Pvt. Ltd.	Yambling Khola	Sindhupalchowk	7270	2072.09.29	2077.03.17
119	Gaurishankar Power Development Pvt. Ltd.	Middle Hyongu Khola B	Solukhumbu	22900	2074.12.08	2079.04.01
120	Upper Lohore Khola Hydropower Co. Pvt. Ltd.	Upper Lohore	Dailekh	4000	2074.12.08	2077.04.11
121	Unitech Hydropower Co. Pvt. Ltd.	Upper Phawa	Taplejung	5800	2074.11.11	2078.04.16
122	Omega Energy Developer Pvt. Ltd.	Sunigad	Bajhang	11050	2074.11.30	2080.02.07
123	Arun Valley Hydropower Development Company Ltd.	Kabeli B-1 Cascade	Panchthar	9940	2075.08.09	2078.06.01
124	Gorakshya Hydropower Pvt. Ltd.	Super Ankhu Khola	Dhading	23500	2074.03.15	2080.09.15
125	Api Power Company Ltd.	Upper Chameliya	Darchula	40000	2075.11.15	2079.11.13
126	Vision Lumbini Ltd.	Seti Nadi	Kaski	25000	2075.08.06	2079.04.05
127	Kasuwa Khola Hydropower Ltd.	Kasuwa Khola	Sankhuwasabha	45000	2075.08.13	2082.04.06
128	Lower Irkhuwa Hydropower Co. Pvt. Ltd.	Lower Irkhuwa	Bhojpur	13040	2075.02.16	2079.04.03

129	Apex Makalu Hydro Power Pvt. Ltd.	Middle Hongu Khola A	Solukhumbu	22000	2075.05.14	2079.04.01
130	National Solar Power Co. Pvt. Ltd.	Grid Connected Solar PV Project (VGF)	Nawalparasi	5000	2076.11.23	2077.08.22
131	Tundi Power Pvt.Ltd	Upper Rahughat	Myagdi	48500	2075.03.29	2080.08.29
132	Mabilung Energy (P.) Ltd	Upper Piluwa Khola-3	Sankhuwasabha	4950	2075.12.12	2078.11.16
133	Blue Energy Pvt. Ltd.	Super Trishuli	Gorkha and Chitwan	70000	2075.07.11	2080.11.17
134	Samyukta Urja Pvt. Ltd. (Prv. Sungava Foundation Pvt. Ltd.)	Thulo Khola	Myagdi	21300	2075.02.17	2079.04.15
135	Bhujung Hydropower Pvt. Ltd.	Upper Midim	Lamjung	7500	2074.05.29	2078.04.01
136	Shaileshwari Power Nepal Pvt. Ltd.	Upper Gaddigad	Doti	1550	2075.04.06	2077.12.19
137	Ridge Line Energy Pvt. Ltd.	Super Chepe	Gorkha Lamjung	9050	2075.12.19	2079.05.20
138	Makar Jitumaya Hydropower Pvt. Ltd.	Upper Suri	Dolakha	7000	2075.04.10	2079.12.30
			Total	3,506,785		

IPPs' Hydropower Projects in Different Stages of Development as of FY 2077/78

(Without Financial Closure)

S. N.	Developers	Projects	Location	Installed Capacity (kW)	PPA Date	Required Commercial Operation Date
1	Balephi Jalbidhyut Co. Ltd.	Balephi	Sindhupalchowk	23520	2067.09.08	2077.08.16
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	Chirkhwa Hydropower Pvt. Ltd.	Lower Chirkhwa	Bhojpur	4060	2074.01.20	2078.04.01
7	Himali Rural Electric Co-operative Ltd.	Leguwa Khola Small	Dhankuta	640	2074.02.08	2075.12.28
8	Sabha Pokhari Hydro Power (P.) Ltd.	Lankhuwa Khola	Sankhuwasabha	5000	2074.02.21	2077.09.14
9	United Mewa Khola Hydropower Pvt. Ltd.	Mewa Khola	Taplejung	50000	2074.02.21	2078.04.01
10	Sewa Hydro Ltd.	Lower Selang	Sindhupalchowk	1500	2074.02.22	2075.12.30
11	Nyam Nyam Hydropower Company Pvt. Ltd.	Nyam Nyam Khola	Rasuwa	6000	2074.03.27	2077.12.31
12	Saptang Hydro Power Pvt. Ltd.	Saptang Khola	Nuwakot	2500	2074.04.08	2076.04.12
13	Himalayan Water Resources and Energy Development Co. Pvt. Ltd.	Upper Chauri	Kavrepalanchowk	6000	2074.07.27	2078.04.04
14	IDS Energy Pvt. Ltd.	Lower Khorunga	Terhathum	5400	2074.08.24	2078.04.01
15	Langtang Bhotekoshi Hydropower Company Pvt. Ltd.	Rasuwa Bhotekoshi	Rasuwa	120000	2074.09.07	2078.09.07
16	Upper Richet Hydropower Pvt. Ltd.	Upper Richet	Gorkha	2000	2074.09.20	2077.04.01
17	Khechereswor Jal Vidhyut Pvt. Ltd.	Jadari Gad Small	Bajhang	1000	2074.10.12	2077.07.30
18	Khechereswor Jal Vidhyut Pvt. Ltd.	Salubyani Gad Small	Bajhang	233	2074.10.12	2077.09.29
19	Gaughar Ujjyalo Sana Hydropower Co. Pvt. Ltd.	Ghatte Khola Small	Sindhupalchowk	970	2074.11.11	2077.03.01
20	Seti Khola Hydropower Pvt. Ltd.	Seti Khola	Kaski	22000	2074.11.11	2079.04.15
21	Super Hewa Power Company Pvt. Ltd.	Super Hewa	Sankhuwasabha	5000	2074.12.27	2078.04.01
22	Baraha Multipower Pvt. Ltd.	Irkhuwa Khola B	Bhojpur	15524	2075.02.14	2079.04.15

23	Jhilimili Hydropower Co. Pvt. Ltd.	Gulangdi Khola	Gulmi	980	2075.02.24	2078.01.14
24	North Summit Hydro Pvt. Ltd.	Nyadi Phidi	Lamjung	21400	2075.02.24	2079.12.15
25	Himali Hydro Fund Pvt. Ltd.	Sona Khola	Taplejung	9000	2075.03.14	2080.07.30
26	Tanahun Hydropower Ltd.	Tanahun	Tanahun	140000	2075.03.15	2080.12.30
27	Sailung Power Company Pvt. Ltd.	Bhotekoshi-1	Sindhupalchowk	40000	2075.03.15	2079.07.01
28	Jalshakti Hydro Company Pvt. Ltd.	Ilep (Tatopani)	Dhading	23675	2075.03.25	2081.08.25
29	Arati Power Company Ltd.	Upper Irkhuwa	Bhojpur	14500	2075.04.01	2079.08.01
30	Mount Everest Power Development Pvt. Ltd.	Dudhkunda Khola	Solukhumbu	12000	2075.04.01	2079.06.30
31	Palun Khola Hydropower Pvt. Ltd.	Palun Khola	Taplejung	21000	2075.04.06	2080.06.21
32	Him Parbat Hydropower Pvt. Ltd.	Sagu Khola-1	Dolakha	5500	2075.04.10	2079.12.30
33	Him Parbat Hydropower Pvt. Ltd.	Sagu Khola	Dolakha	20000	2075.04.10	2079.12.30
34	Annapurna Bidhyut Bikas Co. Pvt. Ltd.	Landruk Modi	Kaski	86590	2075.04.13	2081.09.15
35	Madame Khola Hydropower Pvt. Ltd.	Madame Khola	Kaski	24000	2075.04.15	2080.12.30
36	Mid Solu Hydropower Company Pvt. Ltd.	Mid Solu Khola	Solukhumbu	9500	2075.04.21	2079.05.14
37	Apolo Hydropower Pvt. Ltd.	Buku Khola	Solukhumbu	6000	2070.02.02 2075.04.22 (Revived)	2074.04.01
38	Thulo Khola Hydropower Pvt. Ltd.	Upper thulo Khola-A	Myagdi	15000	2075.04.24	2080.06.30
39	Kalika Energy Ltd.	Bhotekoshi-5	Sindhupalchowk	62000	2075.04.25	2080.09.15
40	Api Power Company Ltd.	Chandranigahpur Solar Project	Rautahat	4000	2075.04.27	2076.02.26
41	Api Power Company Ltd.	Parwanipur Solar Project	Parsa	8000	2075.04.27	2076.02.26
42	Api Power Company Ltd.	Dhalkebar Solar Project	Dhanusha	1000	2075.05.03	2076.03.02
43	Api Power Company Ltd.	Simara Solar Project	Bara	1000	2075.05.03	2076.03.02
44	Super Ghalemdi Hydropower Pvt. Ltd.	Super Ghalemdi	Myagdi	9140	2075.05.05	2080.12.12
45	Dibyajyoti Hydropower Pvt. Ltd.	Marsyangdi Besi	Lamjung	50000	2075.05.10	2079.06.06
46	Amar Jyoti Hydro Power Pvt. Ltd.	Istul Khola	Gorkha	1506	2075.05.13	2079.10.25
47	Ichowk Hydropower Pvt. Ltd.	Gohare Khola	Sindhupalchowk	950	2075.05.25	2076.07.29
48	Pike Hydropower Pvt. Ltd.	Likhu Khola	Ramechhap and Okhaldhunga	30000	2075.05.26	2082.02.17

49	Sita Hydro Power Co. Pvt. Ltd.	Nyasim Khola	Sindhupalchowk	35000	2075.05.26	2080.03.15
50	Sushmit Energy Pvt. Ltd.	Kunaban Khola	Myagdi	20000	2075.05.29	2080.11.03
51	Masina Paryatan Sahakari Sanstha Ltd.	Masina	Kaski and Tanahu	891	2075.06.02	2076.10.29
52	Hydro Village Pvt. Ltd.	Myagdi Khola	Myagdi	57300	2075.06.04	2080.05.29
53	Shikhar Power Development Pvt. Ltd.	Bhim Khola	Baglung	4960	2075.06.10	2078.06.05
54	Dhading Ankhu Khola Hydro Pvt. Ltd.	Upper Ankhu	Dhading	38000	2075.06.14	2079.09.15
55	Phedi Khola Hydropower Company Pvt. Ltd.	Phedi Khola (Thumlung)	Bhojpur	3520	2075.06.21	2079.12.01
56	Bikash Hydropower Company Pvt. Ltd.	Upper Machha Khola Small	Gorkha	4550	2075.07.11	2080.03.30
57	Sita Hydropower Co. Pvt. Ltd.	Dudh Khola	Manang	65000	2075.07.11	2080.03.15
58	Kalinchowk Hydropower Pvt. Ltd.	Sangu Sorun)	Dolakha	5000	2075.08.09	2079.12.30
59	Ruru Hydroelectric Company Pvt. Ltd.	Rurubanchu Khola-2	Kalikot	12000	2075.08.20	2079.05.25
60	Gumu Khola Bhyakure Hydropower Pvt. Ltd.	Gumu Khola	Dolakha	950	2075.08.21	2078.05.30
61	Alliance Energy Solutions Pvt.Ltd.	Upper Sit Khola	Argakhanchi	905	2075.08.23	2077.05.04
62	Ekikrit Byapar Company Pvt. Ltd.	Brahamayani	Sindhupalchowk	35470	2075.08.24	2080.04.13
63	Integrated Hydro Fund Nepal Pvt. Ltd.	Upper Brahamayani	Sindhupalchowk	15150	2075.08.24	2080.04.13
64	Perfect Energy Development Pvt. Ltd	Middle Trishuli Ganga	Nuwakot	19410	2075.09.03	2080.02.17
65	Kabeli Hydropower Company Pvt.Ltd.	Kabeli-3	Taplejung	21930	2075.10.03	2079.09.01
66	Union Mewa Hydro Ltd.	Mewa Khola	Taplejung	23000	2075.10.04	2080.09.15
67	North Summit Hydro Pvt. Ltd.	Hidi Khola	Lamjung	6820	2075.10.04	2080.05.15
68	Sajha Power Development Pvt. Ltd.	Lower Balephi	Sindhupalchowk	20000	2075.10.06	2080.07.18
69	Sindhujwala Hydropower Ltd.	Upper Nyasem Khola A	Sindhupalchowk	21000	2075.10.06	2079.03.30
70	Mount Rasuwa Hydropower Pvt. Ltd.	Midim 1 Khola	Lamjung	13424	2075.10.07	2080.04.04
71	Habitat Power Company Pvt. Ltd	Hewa Khola "A"	Panchthar	5000	2075.10.07	2078.04.01
72	Ruby Valley Hydropower Company Ltd	Menchet Khola	Dhading	7000	2075.10.15	2080.02.13
73	Dudhpokhari Chepe Hydropower Pvt. Ltd.	Dudhpokhari Chepe	Gorkha	8800	2075.10.15	2080.01.28
74	Maa Shakti Engineering & hydropower Pvt. Ltd.	Luja Khola	Solukhumbu	23550	2075.10.16	2080.11.14
75	Sankhuwasabha Power Development Pvt. Ltd.	Super Sabha Khola	Sankhuwasabha	4100	2075.10.23	2080.06.03
76	Hilton Hydro Energy Pvt. Ltd.	Super Kabeli	Taplejung	12000	2075.11.02	2079.10.04

77	Snow Rivers Pvt. Ltd.	Super Kabeli A	Taplejung	13500	2075.11.02	2080.01.01
78	Jal Urja Pvt. Ltd.	Nuagad	Darchula	1000	2075.11.03	2078.10.22
79	Champawati Hydropower Pvt. Ltd	Chepe khola A	Lamjung	7000	2075.11.07	2079.04.04
80	Barpak Daruadi Hydropower Pvt. Ltd.	Middle Super Daraudi	Gorkha	10000	2075.11.23	2080.03.01
81	Helambu Construction Pvt. Ltd	Ksumti khola	Sindhupalchowk	683	2075.11.29	2078.03.04
82	River Side Hydro Energy Pvt. Ltd.	Tamor Khola-5	Taplejung	37520	2075.12.04	2080.04.10
83	Hydro Connection Pvt. Ltd.	Rauje Khola	Solukhumbu	17712	2075.12.04	2080.10.15
84	Milke Jaljale Hydropower Pvt.Ltd.	Upper Piluwa Hills	Sankhuwasabha	4990	2075.12.04	2081.04.04
85	Ambe Hydropower Pvt. Ltd.	Upper Bhurundi	Parbat	3750	2075.12.10	2079.04.16
86	Orbit Energy Pvt. Ltd.	Sabha Khola C	Sankhuwasabha	4196	2075.12.10	2079.04.02
87	Raghuganga Hydropower Ltd.	Rahughat	Myagdi	40000	2075.12.18	2079.10.17
88	Dhaulagiri Civil Electrical and Mechanical Engineering Pvt. Ltd.	Madhya Daram Khola A	Baglung	3000	2075.12.26	2077.12.31
89	Dhaulagiri Civil Electrical and Mechanical Engineering Pvt. Ltd.	Madhya Daram Khola B	Baglung	4500	2075.12.26	2078.02.31
90	Bhalaudi Khola Hydropower Pvt. Ltd.	Bhalaudi Khola	Kaski	2645	2076.01.06	2080.04.16
91	Kalika Construction Pvt. Ltd.	Upper Daraudi B	Gorkha	8300	2076.01.09	2080.09.15
92	Kalika Construction Pvt. Ltd.	Upper Daraudi C	Gorkha	9820	2076.01.09	2080.09.15
93	Super Khudi Hydropower Pvt. Ltd.	Upper Khudi	Lamjung	21210	2076.01.11	2080.10.09
94	Nepal Solar Farm Pvt. Ltd.	Som RadhaKrishna Solar Farm Project (VGF)	Kaski	4000	2076.11.23	2077.03.16
95	Saidi Power Co. (Pvt.) Ltd.	Saiti Khola	Kaski	999	2077.06.13	2078.02.20
96	Isuwa Energy Pvt. Ltd.	Lower Isuwa Cascade	Sankhuwasabha	37700	2077.09.27	2080.12.30
97	Manang Marsyangdi Hydropower Company Pvt. Ltd.	Manang Marsyangdi	Manang	135000	2077.12.09	2081.12.18
98	First Solar Developers Nepal Pvt. Ltd.	Bhrikuti Grid-tied Solar Project	Kapilvastu	8000	2077.12.20	2078.12.17
99	Saurya Bidhyut Power Pvt. Ltd.	Grid Connected Solar Project, Nawalparasi	Nawalparasi	2000	2077.12.20	2078.06.17
			Total	1,851,343		

POWER DEVELOPMENT MAP OF NEPAL

EXISTING / UNDER CONSTRUCTION TRANSMISSION LINES / SUBSTATIONS

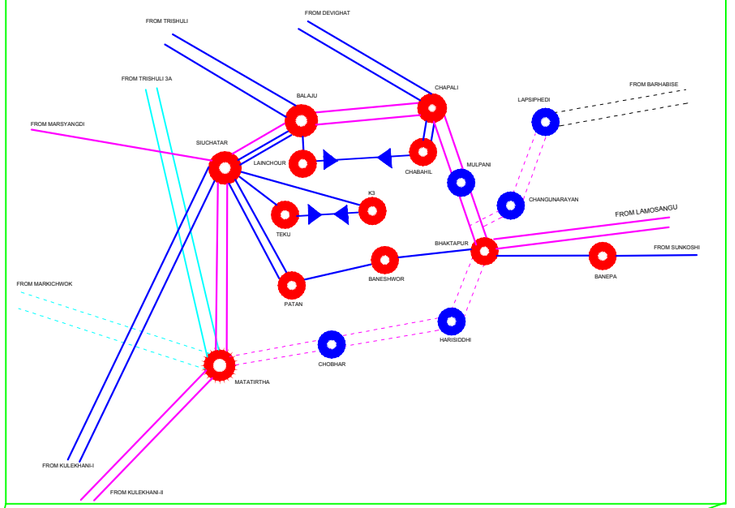
(NOT TO SCALE)

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	UP TO ASAR 2079	
▶	▶	POWER PLANTS
▶	▶	LOAD
- -		Proposed For Reinforcement

NEPAL ELECTRICITY AUTHORITY

TRANSMISSION DIRECTORATE

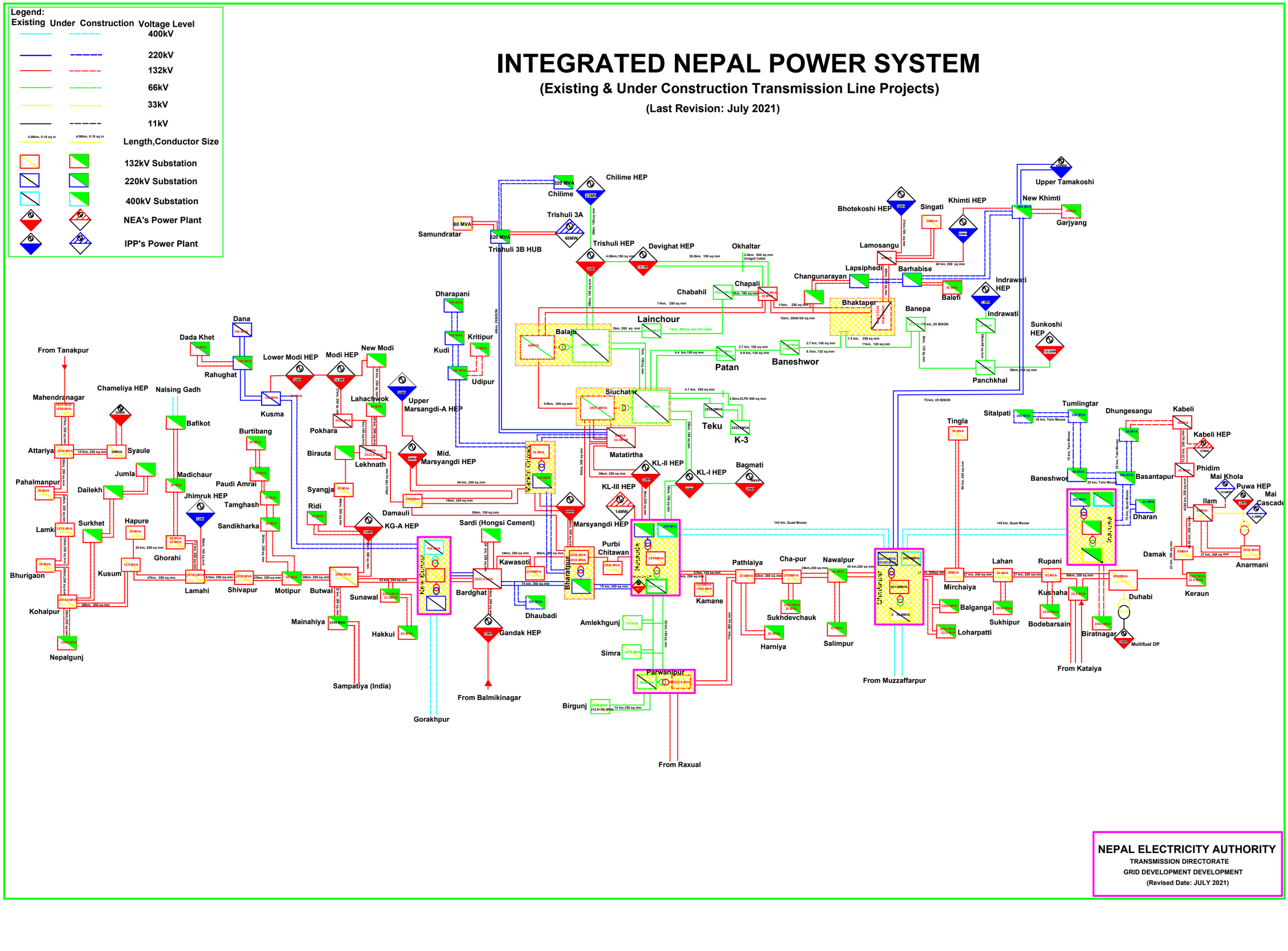
GRID DEVELOPMENT DEPARTMENT

(Revised Date: July 2021)

INTEGRATED NEPAL POWER SYSTEM

(Existing & Under Construction Transmission Line Projects)

(Last Revision: July 2021)



New Khimti 220/132 kV Substation

Khimti Dhalkebar 220kV Transmission Line

36th ANNIVERSARY 2042-2078

NEPAL ELECTRICITY AUTHORITY

NEPAL E LECTRICITY AUTHORITY

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